GOVERNMENT POLYTECHNIC, KOLHAPUR

(An Autonomous Institute of Government of Maharashtra)

Curriculum Document

CURRICULUM: MPECS-2023

(Outcome Based Curriculum)

For

DIPLOMA IN INFORMATION TECHNOLOGY

Asst. Member Secretary PBOS	Member Secretary PBOS	Chairman

Programme wise Board of Studies (PBOS)

Information Technology Programme

Government Polytechnic, Kolhapur

Learning and Assessment Scheme for Post S.S.C Diploma Courses

ProgrammeName :Diploma In Information Technology

Programme Code	**:IF(06)**	**With Effect From Academic Year**	**: 2023-24**
Duration Of Programme	**: 6 Semester**	**Duration**	**: 16 WEEKS**
Semester	**: First**	**Scheme**	**: H**

Sr No	CourseTitle	Abbrevation	Level	Course Type	CourseCode	Total IKS Hrs forSem.	Learning Scheme					Credits	Assessment Scheme											
							ActualContact Hrs./Week			Self Learning(Activity/ Assignment /MicroProject)	Notional Learning Hrs/Week		PaperDuration (hrs.)	Theory				Based on LL&TL				Based onSelf Learning		Total Marks
																		Practical						
							CL	TL	LL					FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
														Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
1	BASIC MATHEMATICS	HBMT	I	AEC	CCH105	6	4	2	-	2	8	4	3	30	70	100	40	-	-	-	-	25	10	125
2	ENGINEERING PHYSICS	HPHA	I	DSC	CCH101	4	4	-	2	2	8	4	1.5	30*#	70*#	100	40	25	10	25@	10	25	10	175
3	FUNDAMENTAL OF ELECTRONICS	HFOE	I	AEC	ITH102	0	2	-	2	2	6	3	-	-	-	-	-	50	20	50	20	25	10	125
4	WEB PAGE DESIGN	HWPD	I	DSC	ITH101	2	3	-	2	1	6	3	3	30	70	100	40	25	10	25@	10	25	10	175
5	ITWORKSHOP PRACTICE'S	HWIT	I	SEC	ITH103	0	-	-	4	2	6	3	-	-	-	-	-	25	10	50@	20	25	10	100
6	FUNDAMENTALSOF ICT	HICT	I	SEC	CCH202	0	1	-	2	1	4	2	-	-	-	-	-	25	10	25@	10	25	10	75
7	YOG AAND MEDITATION	HYAM	I	VEC	CCH203	1	-	-	1	1	2	1	-	-	-	-	-	25	10	-	-	25	10	50
	Total					**13**	**14**	**2**	**13**	**11**	**40**	**20**	-	**90**	**210**	**300**		**175**		**175**		**175**		**825**

Abbreviations:CL-ClassroomLearning,TL-TutorialLearning,LL-LaboratoryLearning,FA-FormativeAssessments-SummativeAssessment,IKS-IndianKnowledgeSystem,SLA-SelfLearningAssessment

Legends: @ InternalAssessment, # ExternalAssessment, *# On Line Examination , @$ Internal Online Examination

Note :

1. FA-THrepresentsaverageoftwoclasstestsof30markseachconductedduringthesemester.
2. IfcandidateisnotsecuringminimumpassingmarksinFA-PRofanycoursethenthecandidateshallbedeclaredas"Detained"inthatsemester.
3. If candidate is not securing minimum passing marks in SLAof any course then the candidate shall be declared as fail and will have to repeat and resubmit SLAwork.
4. NotionalLearninghoursforthesemesterare(CL+LL+TL+SL)hrs.*15Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. *SelflearninghoursshallnotbereflectedintheTimeTable.

CourseCategory: DisciplineSpecific CourseCore(DSC): 2, DisciplineSpecificElective (DSE):0,ValueEducation Course(VEC):1, Intern./Apprenti./Project./Community(INP):0,AbilityEnhancementCourse (AEC) : 2, Skill Enhancement Course (SEC) : 2, GenericElective (GE) : 0

COURSE ID :
COURSE NAME :BASIC MATHEMATICS(CE/ME/ET/IT/EE/MT)
COURSE CODE : CCH105
COURSE ABBREVIATION : HBMT

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	**04**	**4**
	Tutorial Learning	**02**	
	LaboratoryLearning	**-**	
	SLH-SelfLearning	**02**	
	NLH-Notional Learning	**08**	

B: ASSESSMENT SCHEME :-

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL				BASED ON SLA		TOTAL
					Tutorial						
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
03	30	70	100	40	--	--	--	--	25	10	125

(Total IKS Hrs for Sem.: 06 Hrs)

C: ABBREVIATIONS:-CL-ClassRoomLearning,TL-TutorialLearning,LL LaboratoryLearning,SLH-SelfLearningHours,NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA -Self LearningAssessment

Legends:@InternalAssessment,#ExternalAssessment,*#OnLine Examination,@$InternalOnlineExamination(TNR 12 font)

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL) hrs.*15Weeks
5. 1(one) credit is equivalent to 30 Notional hrs.
6. *Self learning hours shall not be reflected in the Time Table.
   *Self learning includes micro project /assignment/other activities. (The list of all assignments are given in tabular format. At least 6 to 8 assignments to be given)

D. i)RATIONALE:-

Mathematics is an important prerequisite for the development and understanding of engineering and technological concepts. For an engineer and technologist, knowledge of mathematics is an effective tool to pursue and master the applications in the engineering and technological fields. Algebra provides the language and abstract symbols of mathematics. The topic Matrices is helpful for finding optimum solution of system of simultaneous equations which are formed in the various branches of engineering using different parameters .Trigonometry is the study of triangles and angles. Contents of this subject will form foundation for further study in mathematics. Statistics can be defined as a type of mathematical analysis which involves the method of collection and analyzing the data and summing of the data in numerical form for a given set of real world observations. Calculus is a branch of mathematics that calculates how matter ,particles and heavenly bodies actually move. Derivatives are useful to find maxima & minima of a function, velocity & acceleration are also useful for many engineering problems. Hence the course provides the insight to analyze engineering problems scientifically using logarithms, matrices, trigonometry, straight line ,differential calculus and statistics.

ii) Competency:

Apply principles of Basic Mathematics to solve industry based technology problems.

1.Cognitive : To understand the mathematical concepts
2. Psychomotor : Proper handling of scientific calculator
3. Affective : Attitude of accuracy, punctuality, proper reasoning and presentation

E. COURSE LEVEL LEARNING OUTCOMES (COS):

CCH105-1 : To Apply concepts of algebra to solve engineering related problems
CCH105-2 : To Use techniques and methods of statistics to compare multiple sets of data
CCH105-3 : Solve area specific engineering problems under given conditions of straight lines
CCH105-4:- To memorize trigonometric formulae and solve problems based on them.
CCH105-5:- To solve the problems of maxima, minima, radius of curvature and geometrical applications.

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Maintain various types of electrical equipments	**PSO2** Maintain various sections of electrical power systems
Competency: Use DC machines and transformers.	3	2	1	-	1	-	2		
CCH105-1-CO-1 : To Apply concepts of algebra to solve engineering related problems	3	1	-	-	-	-	1		
CCH105-2-CO-2 : To Use techniques and methods of statistics to compare multiple sets of data	3	1	-	-	1	-	1		
CCH105-3-CO-3 : Solve area specific engineering problems under given conditions of straight lines	3	-	-	-	-	-	1		
CCH105-4-CO-4:- To memorize trigonometric formulae and solve problems based on them.	3	1	1	-	-	-	1		
CCH105-5-CO-5:- To solve the problems of maxima, minima, radius of curvature and geometrical applications.	3	2	1	-	1	-	1		

F. CONTENT:

I) Tutorial exercises

Solve any **TEN** the following Tutorial exercises shall be conducted in the Tutorial room in tutorial sessions of batches of about 20- 22 students:

Sr. no	Tutorial experiences	CO
1	Solve Simple problems of Logarithms based on given application	CCH105-1
2	Solve elementary problems on Algebra of Matrices	CCH105-1
3	Solve simultaneous equations using Matrix inversion method	CCH105-1
4	Resolve into Partial Fractions using linear non repeated, repeated and irreducible quadratic factors	CCH105-1
5	Practice problems on equation of straight lines using different forms, Solve problems on perpendicular distance, distance between two parallel lines and angle between two lines	CCH105-3
6	Solve problems on finding range, coefficient of range and mean deviation	CCH105-2
7	Solve problems on Standard deviation, coefficient of variation and comparison of two sets	CCH105-2
8	Solve problems on Allied & Compound angles	CCH105-4
9	Solve problems on Multiple & sub multiple angles	CCH105-4
10	Solve problems on factorization & De- factorization formulae	CCH105-4
11	Solve problems on Inverse Trigonometric Functions	CCH105-4
12	Solve examples on functions & rules of derivatives	CCH105-5
13	Solve examples on Derivative of composite function ,inverse & parametric functions,	CCH105-5
14	Solve examples on Derivative of exponential, implicit and logarithmic functions	CCH105-5
15	Solve examples on Application of Derivatives	CCH105-5

II)Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: CCH105-1 : To Apply concepts of algebra to solve engineering related problems			
Unit 1 Algebra	***1.1 LOGARITHMS*** 1.1.1 Concept and laws of logarithm 1.1.2 Simple examples based on laws of Logarithms ***1.2 MATRICES*** 1.2.1 Definition of a matrix, Types of matrices, Algebra of matrices, Equality of two matrices, Transpose of a matrix, 1.2.3 Adjoint and Inverse of a matrix 1.2.4 Solution of simultaneous equations having 3 unknowns using Matrix inversion method ***1.3 PARTIAL FRACTIONS*** 1.3.1 Definition of rational, proper and improper fractions 1.3.2 Various cases of Partial fractions and Examples 1.4 Algebra of Indian Knowledge System: Solution of simultaneous equations using Vedic Mathematics	12	16
CO: CCH105-2 : To Use techniques and methods of statistics to compare multiple sets of data			
Unit 2 Statistics	***MEASURES OF DISPERSION*** 2.1 Range,Coefficient of Range of Discrete and grouped data 2.2 Mean deviation and Standared Deviation aboutmean for Discrete & Grouped Data (except Assumed mean method and Step deviation method) 2.3 Variance and coefficient of Variance 2.4 Comparison of 2 sets of observations	6	10
CO: CCH105-3 : Solve area specific engineering problems under given conditions of straight lines			
Unit 3 Coordinate Geometry	***THE STRAIGHT LINE*** 3.1 Slope, intercepts & various methods of finding slope 3.2 Conditions for two straight lines to be parallel and Perpendicular to each others 3.3 Various forms of straight line 3.4 Perpendicular distance of a point from a line 3.5 Distance between two parallel lines 3.6 Angle between two straight lines 3.7 Geometry in Sulabh sutras in Indian Knowledge System	6	8

Section –II

Sr. no.	**Topics/Subtopics**	Learning Hours	Classroom learning evaluation Marks
CO: CCH105-4:- To memorize trigonometric formulae and solve problems based on them.			
Unit 4 Trigonometry	***TRIGONOMETRY*** 4.1 Fundamental Identities(Only state,No examples) 4.2 Conversion of degree into radian and vice versa of standard angles 4.3 Trigonometric ratios of Compound Angles(Without Proof) , Examples 4.4 Trigonometric ratios of Allied Angles (Without Proof) , Examples 4.5 Trigonometric ratios of Multiple and Submultiple Angles (Without Proof) , Examples 4.6 Factorization and De-Factorization Formulae (Without Proof) , Examples 4.7 Inverse Trigonometric ratios , Principle values and simple problems 4.8 Trigonometry in Indian Knowledge System : The evolution of sine function in India 4.9 Trigonometry in Indian Knowledge System : Indian Trigonometry-From ancient beginning to Nilakantha 4.10 Trigonometry in Indian Knowledge System : Ancient Indian Astronomy 4.11 Trigonometry in Indian Knowledge System: Pythagorean to triples in Sulabhsutras	14	14
CO: CCH105-5:- To solve the problems of maxima, minima, radius of curvature and geometrical applications.			
Unit 5 Differential Calculus	5.1 **Functions**:Concept of Functions and simple examples 5.2 **Limits**: Concept of Limits without examples 5.3 **Derivatives:** 5.3.1 Derivative of sum, difference, product and quotient of two or more functions 5.3.2 Derivative of composite functions 5.3.3 Derivative of Inverse functions 5.3.4 Derivative of Implicit functions 5.3.5 Derivative of Parametric functions 5.3.6 Derivative of exponential and logarithmic functions 5.3.7 Calculus in Indian Knowledge system " Discovery of Calculus by Indian Astronomers (Indian Mathematics)	16	16

CO: CCH105-5:- To solve the problems of maxima, minima, radius of curvature and geometrical applications.			
Unit 6 Application of Derivatives	***APPLICATIONS OF DERIVATIVES*** 6.1 Second Order Derivatives(without examples) 6.2 Equation of Tangent & Normal 6.3 Maxima & Minima(only for algebraic functions) 6.4 Radius of curvature	06	06

** No questions will be asked on IKS related subtopics in any question paper

G : List of Microproject /Assignments under SLA

Sr.No	List of Assignment (under SLA)	Hrs Allotted
1	Collect the Data of Marks obtained by your class in mid semester test. Compute the variance and coefficient of variance of the data	02
2	Prepare a model using the concept of tangent and normal, bending of curves in case of sliding of a vehicle.	02
3	Prepare charts of grouped and ungrouped data.	02
4	Collect statistical data on real world problems and find Mean Deviation & S.D.	02
5	Collect at least 10 examples based on real world applications which will be used to find S.D. /Variance.	02
6	Prepare models to explain different concepts.	02
7	Prepare a model using concept of radius of curvature of bending of railway tracks.	02
8	A window in the form of rectangle surmounted by a semicircular opening . The total perimeter the window to admit maximum light through the whole opening ,prepare a model using concept of Maxima & Minima for the above problem and verify the result.	02
9	Collect applications of radius of curvature on lens design and optics, mirror and reflective surface properties , road and highway design , structural behavior, roller coaster track design & make a video of 5- minutes duration.	02
10	Design a puzzle based on matrices . Create a grid of numbers and operations.	02
11	Develop a math game based on operations of matrices.	02
12	Collect examples based on real world applications of logarithm	02

	and prepare a pdf file.	
13	Measure height of trees/buildings in surrounding locations using trigonometry and prepare presentation.	02
14	Apply trigonometric principles to calculate angles ,distances, dimensions relevant to the chosen area and make a poster presentation.	02
15	Find height of room or distance between two pillars by using concept of straight line.	02

****Attempt any 10-12 Micro Projects, out of the given list.**

H : Specification table for setting question paper for semester end theory examination

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks	CO
		Remember	Understand	Apply		
I / 1	Algebra	4	6	6	16	CCH105-1
I / 2	Statistics	2	4	4	10	CCH105-2
I / 3	Coordinate Geometry	2	2	4	8	CCH105-3
II /4	Trigonometry	2	6	6	14	CCH105-4
II /5	Differential Calculus	2	6	8	16	CCH105-5
II/6	Application of Derivatives	2	2	2	6	CCH105-5
	Total Marks				70	

I) :-Assessment Criteria

Formative Assessment of Tutorial:-

Every Tutorial shall be assessed for 25 marks as per following criteria:

Domain	**Particulars**	**Marks out of 25**
Cognitive	Understanding	05
	Application	05
Psychomotor	Solving skill	05
	Remembering formulae & Accuracy	05
Affective	Discipline and punctuality	05
TOTAL		**25**

J) Instructional Methods:

1. Lectures cum Demonstrations,
2. Classroom practices.
3. Use of projector and soft material for demonstration
4. Use of internate.
5. Whatsapp groups.
6. Use of books

K) Teaching and Learning resources:

Chalk board, Books,LCD presentations, Demonstrative kits, Demonstrative charts.

L) Reference Books:

S. N.	Name of Book	Author	Publication
1	A Text Book on Engineering Mathematics (First Year Diploma)	G.V.Kumbhojkar	Phadake Prakashan, Kolhapur
2	Basic Mathematics	Patel, Rawal and others	Nirali Prakashan,Pune
3	Basic Mathematics	Sachin S. Shah & Santosh R. Mitkari	Tech-Neo Publications
4	Basic Mathematics	Vitthal B.Shinde & others	Techical Publications
5	Higher Engineering Mathematics	Grewal B.S.	Khanna publication New Delhi,2013 ISBN:8174091955
6	A text book of Engineering Mathematics	Dutta D.	New age publication New Delhi,2006 ISBN:978-81-224-1689-3
7	Studies in the History of Indian Mathematics	C.S.Seshadri	Hindustan Book Agency,New Delhi 110016.ISBN 978-93-80250-06-9
8	Indian Mathematics Engaging with the World from Ancient to Modern Times	George Gheverghese Joseph	World Scientific Publishing Europe Ltd.57 ASBN 978-17-86340-61-0
9	Calculus and Its Applications	Marvin L.Bittinger David J.Ellenbogen Scott A.Surgent	Addison-Wealey 10th Edition ISBN-13:978-0-321-69433-1
10	Mathematics- I	Deepak Singh	Khanna Book Publishing Co. (P) Ltd. ISBN:978-93-91505-42-4
11	Mathematics -II	Garima Singh	Khanna Book Publishing Co. (P) Ltd. ISBN:978-93-91505-52-3
12	Advance Engineering Mathematics	Das H.K.	S Chand publication New Delhi 2008 ISBN:9788121903455
13	Sansar ke Mahan Ganitagya	Gunakar Muley	Raj kamal Prakashan ISBN-13. 978-8126703579
14	An Introduction to	Gareth James &	Springer New York Heidelberg

	Statistical learning with applications in R	others	Dordrecht London ISBN:978-1-4614-7137-0

M) Learning Website & Software

a. www.nptel.ac.in/courses/106102064/1
b. www.scilab.org/-SCI Lab
c. www.mathworks.com/product/matlab/-MATLAB
d. Spreadsheet Applications
e. http://ocw.abu.edu.ng/courses/mathematics/
f. https://ocw.mit.edu/
g. https://libguides.cmich.edu/OER/mathematics
h. https://libguides.furman.edu/oer/subject/mathematics

COURSE ID :
COURSE NAME :ENGINEERING PHYSICS (EE/ET/IT)
COURSE CODE :CCH101
COURSE ABBREVIATION :HPHA

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	04	4
	Tutorial Learning	-	
	LaboratoryLearning	02	
	SLH-SelfLearning	02	
	NLH-Notional Learning	08	

B. ASSESSMENT SCHEME :-

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL Practical				BASED ON SLA		TOTAL
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
1.5	30*#	70*#	100	40	25	10	25@	10	25	10	175

(TotalIKSHrsforSem.:04Hrs)

C: ABBREVIATIONS:-CL-ClassroomLearning,TL-TutorialLearning,LL-LaboratoryLearning,SLH-SelfLearningHours,NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA -Self LearningAssessment
Legends:@InternalAssessment,#ExternalAssessment,*#OnlineExamination,@$InternalOnlineExamination

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidateisnotsecuringminimumpassing marksinFA-PRofanycourse thenthecandidateshallbedeclared as"Detained"in that semester.
3. IfcandidateisnotsecuringminimumpassingmarksinSLAofanycoursethenthecandidateshallbedeclaredasfailand will have to repeat andresubmit SLAwork.
4. NotionalLearninghoursforthesemesterare(CL+LL+TL+SL)hrs.*15Weeks
5. 1(one)creditisequivalentto30Notionalhrs.
6. *Selflearning hoursshall notbe reflectedin theTimeTable.

*Selflearningincludesmicroproject/assignment/otheractivities.(Provide list of all assignments here in tabular format At least 6 to 8 assignments to be given)

D. i)RATIONALE:-

Physics is the foundation of engineering and technology. The development of all engineering areas requires good understanding of fundamental principles in physics. Studying physics develops scientific methodology and technical aptitude in the students. Applications of principles of physics in engineering fields create interest and motivate the students.

ii)INDUSTRY/EMPLOYEREXPECTEDOUTCOME

Apply principles of Physics to solve engineering problems as follows:

Cognitive : i) Understanding and applying principles and laws of Physics to simple practical problems/ situations. ii) Observing iii) Classifying iv) Interpreting

Psychomotor : Handling of instruments, apparatus and tools

Affective : Skill of i) working in team ii) curiosity, interest and self-confidence

E. COURSELEVELLEARNINGOUTCOMES(COS)

CCH101-1 Estimate errors in measurement of physical quantities.

CCH101-2 Express importance of semiconductors and nanotechnology.

CCH101-3 Select proper material in engineering industry by analysis of its physical properties.

CCH101-4 Apply principles of electricity and magnetism to solve engineering problems.

CCH101-5 Apply principles of optics to solve engineering problems.

CCH101-6 Apply principles of fiber optics for related engineering applications.

Course outcomes and programme outcomes/programme specific outcomes (co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"

COs	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1**	**PSO2**
CCH101-1 Estimate errors in measurement of physical quantities.	3	1	-	1	1	1	1		
CCH101-2 Express importance of semiconductors and nanotechnology	3	-	-	-	1	1	1		
CCH101-3 Select proper material in engineering industry by analysis of its physical properties	3	1	-	1	1	1	1		
CCH101-4 Apply principles of electricity and magnetism to solve engineering problems	3	1	-	1	1	1	1		
CCH101-5Apply principles of optics to solve engineering problems.	3	1	-	-	1	1	1		
CCH101-6 Apply principles of fiber optics for related engineering applications	3	-	-	-	1	1	1		

F. CONTENT:

I) Practical exercises

The following practical exercises shall be conducted in the *Laboratory for Physics developed* by the Institute in practical sessions of batches of about 20- 22 students:

Sr. no	Laboratory experiences	CO
1	To measure internal and external dimensions of hollow cylinder by using Vernier Caliper	CCH101-1
2	To measure the diameter of bob and thickness of plate by using Vernier Caliper	CCH101-1
3	To measure the diameter of bob and thickness of plate by using Micrometer screw gauge	CCH101-1
4	To determine forbidden energy band gap in semiconductors	CCH101-2
5	To determine the viscosity of liquid by Stokes method.	CCH101-3

Sr. no	Laboratory experiences	CO
6	To determine the buoyancy force on a solid immersed in a liquid	CCH101-3
7	To measure unknown resistance of wire by Ohm's law	CCH101-4
8	To verify series law of resistances	CCH101-4
9	To verify parallel law of resistances	CCH101-4
10	To draw magnetic lines of force for given magnet by using magnetic compass	CCH101-4
11	To verify Snell's law using glass slab	CCH101-5
12	To study variation of δ with i for a prism by pin method	CCH101-5
13	To study Total Internal Reflection using glass slab	CCH101-6
14	To be added by the subject teacher as per requirement	

II) Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: CCH101-1 Estimate errors in measurement in Physical quantities.			
1	**UNITS AND MEASUREMENT** 1.1 Unit, Physical Quantities : Fundamental and Derived Quantities and their units 1.2 Systems of units : CGS, MKS, FPS and SI 1.3 Errors , Types of errors : Instrumental, Systematic and Random error, Estimation of errors : Absolute, Relative and percentage errors 1.4 Significant figures 1.5 Ancient Astronomical Instruments : Chakra, Dhanuryantra, Yasti and Phalaka yantra(IKS learning) 1.6 **SimpleNumerical problems**	**10**	**12**
CO: CCH101-2Express the importance of Semiconductors and nanotechnology.			
2	**INTRODUCTION TO SEMICONDUCTORS AND NANOTECHNOLOGY** **2.1 SEMICONDUCTORS** 2.1.1 Conductors, insulators and semiconductors 2.1.2 Energy bands 2.1.3 Intrinsic and extrinsic semiconductors 2.1.4 Minority and majority charge carriers 2.1.5 P and N type semiconductors 2.1.6 Properties of semiconductors 2.1.7 Applications of semiconductors **No numericals on above topic**	**08** (06)	**08** (06)

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
	2.2 Nanotechnology 2.2.1 Definition of nanoscale, nanometer, nanoparticle 2.2.2 Definition and examples of nanostructured materials 2.2.3 Applications of nanotechnology in electronics, automobile, textile, space, medicine, cosmetics and environment **No numericals on above topic**	(02)	(02)
CO: CCH101-3Select proper material in engineering industry by analysis of its physical properties.			
3	**PROPERTIES OF MATTER** **3.1 ELASTICITY** 3.1.1 Definitions of elasticity, plasticity, rigidity, deforming force, restoring force 3.1.2 Stress, Strain and their types 3.1.3 Elastic Limit, Statement of Hooke's law 3.1.4 Modulusof elasticity and its types, Relation between Y, K and η (No derivation) 3.1.5 Ultimate stress, breaking stress, Working stress, Factor of safety 3.1.6 Applications of elasticity 3.1.7 **SimpleNumerical problems** **3.2 VISCOSITY** 3.2.1 Definition and meaning of viscosity, velocity gradient 3.2.2 Newton's law of viscosity, Coefficient of viscosity 3.2.3 Stokes law 3.2.4 Derivation of expression for coefficient of viscosity of liquid by Stokes method 3.2.5 Effect of temperature and adulteration on viscosity ofliquids 3.2.6 Applications of viscosity **No numericals on above topic**	**12** (06) (06)	**14** (10) (04)

Section –II

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: CCH101-4 Apply principles of electricity and magnetism to solve engineering problems			
4	**ELECTRICITY AND MAGNETISM** **4.1 ELECTRICITY** 4.1.1 Concept of charge, Coulomb's inverse square law, 4.1.2 Electric field, Electric field intensity 4.1.3 Electric potential and potential difference 4.1.4 Electric current, Resistance, Ohm's law 4.1.5 Specific resistance 4.1.6 Resistances in series and parallel 4.1.7**SimpleNumerical problems** **4.2 MAGNETISM** 4.2.1 Magnetic field and magnetic field intensity and its units 4.2.2 Magnetic lines of force,magnetic flux **No numericals on above topic**	**10** (06) (04)	**12** (08) (04)
CO: CCH101-5 Apply principles of optics to solve engineering problems			
5	**OPTICS** **5.1 PROPERTIES OF LIGHT** 5.1.1 Refraction of light 5.1.2 Laws of Refraction of Light, Snell's law 5.1.3 Refraction through glass prism 5.1.4 Dispersion & Dispersive Power (in terms of angles of deviation only) 5.1.5 **SimpleNumerical problems** **5.2 LASER** 5.2.1 Introduction of LASER 5.2.2 Properties of laser 5.2.3 Spontaneous and stimulated emission 5.2.4 Population inversion and optical pumping 5.2.5 Applications of LASER **No numericals on above topic** **5.3 X-RAYS** 5.3.1 Nature and properties of x-rays. 5.3.2 Production of x-rays by Coolidge tube 5.3.3 Applications of x-rays **No numericals on above topic**	**14** (06) (04) (04)	**18** (08) (06) (04)

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: CCH101-6 Apply principles of fiber optics for related engineering applications			
6	**FIBER OPTICS** 6.1 Optical communication link 6.2 Principle of optical fiber (TIR) 6.3 Structure of optical fiber 6.4 Propagation of light in optical fiber 6.5 Advantages of optical fibers over conventional metal conductors 6.6 Applications of optical fibers **No numericals on above topic**	**06**	**06**

** No questions will be asked on IKS learning subtopics in any question papers.

G : List of Microprojects/Assignments/Other Activities under SLA

Sr.No.	List of Microprojects (any one of the following under SLA)	Hrs Allotted
1	Prepare chart showing multipliers required for converting units of physical quantities.	02
2	Prepare prototype vernier caliper of desired least count using card sheet.	02
3	Collect information about ancient astronomical instruments like Chakra, Dhanuryantra, Yasti and Phalaka yantra.	02
4	Collect different materials such as metal, plastic, glass etc and prepare models to show their electrical conductivity.	02
5	Collect different sizes of same material (eg. sugar, salt etc) and list the physical/elerical/optical/chemical/mechanical characteristics for each of them.	02
6	Prepare chart showing the three types of modulus of elasticity developed in a material.	02
7	Prepare working model to differentiate liquids on the basis of viscosity.	02
8	Prepare chart/models to demonstrate magnetic lines of force of different types of magnets.	02
9	Prepare chart/models for series and parallel combination of resistances of different values.	02
10	Prepare a model to demonstrate the variation of angle of refraction with respect to angle of incidence.	02
11	Use keychain laser to differentiate laser with ordinary light.	02

	OR	
Sr.No	List of Assignment (any one of the following under SLA)	Hrs Allotted
1	Write fundamental and derived Physical quantities with their SI units	02
2	Enlist the rules used to decide significant figures in measurements.	02
3	Write points to differentiate conductors, semiconductors and insulators on the basis of energy band diagram.	02
4	List applications of semiconductors in Civil, Mechanical, Electrical, Information Technology, Electronics and Telecommunication, Metallurgical Engineering etc.	02
5	Write down the applications of nanotechnology in the field of electronics, cosmetics, textile, environment, medical, space and defense, automobiles.	02
6	Write applications of elasticity.	02
7	Explain free fall of a sphere in a liquid column.	02
8	Write information of electric lines of force and magnetic lines of force.	02
9	Explain conversion of galvanometer into ammeter/voltmeter of desired range.	02
10	Draw ray diagrams showing different phenomena of light (reflection, refraction, dispersion etc).	02
11	Enlist the properties and applications of laser.	02
12	Explain production of X-rays using Coolidge tube.	02
13	Draw and explain of optical fiber communication link. (For EE/ET/IT students).	02
	OR	
Sr.No	List of Activity (any one of the following under SLA)	Hrs Allotted
	Any course related activity assigned by the course teacher.	02

****One microproject/ assignment/ given activity is to be completed during the semester.**

H : Specification table for setting question paper for semester end theory examination

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks	CO
		Remember	Understand	Apply		
I / 1	Units and measurements	2	4	6	12	CCH101-1
I / 2	Introduction to Semiconductors and Nanotechnology	2	2	4	08	CCH101-2
I / 3	Properties of matter (Elasticity and Viscosity)	4	2	8	14	CCH101-3
II /4	Electricity and Magnetism	2	4	6	12	CCH101-4
II /5	Optics (Properties of light, Laser & X-rays)	6	6	6	18	CCH101-5
II / 6	Fiber Optics	2	2	2	06	CCH101-6
	Total Marks				70	

I :-Assessment Criteria

i) Formative Assessment of Practical:-

Every practical assignment shall be assessed for 25 marks as per following criteria:

Domain	Particulars	Marks out of 25
Cognitive	Understanding	05
	Presentation (Observations, calculations & Result table)	05
Psychomotor	Operating Skills	05
	Drawing skills (Neat & complete circuit Diagram / schematic Diagram)	05
Affective	Discipline and punctuality	05
TOTAL		**25**

ii) Summative Assessment of Practical :

Every practical assignment shall be assessed for 25 marks as per following criteria:

Sr.no	Criteria	Marksallotted
1	Attendanceatregularpractical	05
2	Preparednessforpractical	05
3	Neat& completeDiagram / observation table	05
4	Observations / Calculations / Result / Graph	05
5	Safety / use of proper tools	05
TOTAL		**25**

iii) Assessment of SLA :-

Every Self-learning assignment shall be assessed for 25 marks as per following criteria:

Sr.no	Criteria	Marksallotted
1	Attendance	05
2	Preparednessand workmanship	05
3	Presentation (neat figures/ diagrams/ tables/ graphs etc.)	05
4	Conclusion / Inference	05
5	Oral Based on microproject/ assignment/ activity	05
TOTAL		**25**

J) Instructional Methods:

1. Lectures cum Discussions
2. Regular Home Assignments
3. Laboratory work

4.Use of projector and soft material for demonstration

K) Teaching and Learning resources:

1. Chalk board 2. Video clips 3.Slides 4. Item Bank 5. Charts

L) Reference Books:

S.N.	Name of Book	Author	Publication
1	Text book of Physics for class XI & XII (Part-I, II)	Narlikar	N.C.E.R.T Delhi
2	Engineering Physics	P.V.Naik.	Pearson Edu. Pvt. Ltd, New Delhi.
3	Concepts in Physics, Vol. I & II.	Narkhede, Pawar, Sutar	Bharti Bhawan Ltd, New Delhi.
4	Principles of Physics.	Walker, Halliday, Resnik	Wiley Publication. , New Delhi.
5	Engineering Physics	B.L. Theraja	S. Chand Publishers – New Delhi
6	Concept of modern physics	Beiser	Tata Mc-Graw Hill
7	Physics for Technicians	E. Zebro Wski	Tata Mc-Graw Hill
8	Engineering Physics	V. Rajendran	Tata McGraw-Hill Publications
9	The Archaic and The Exotic : Studies in the history of Indian astronomical instruments	Steeramula Rajeswara Sarma	Manohar Book Services
10	The Surya Siddhanta	Aryabhatta	Baptist Mission Press, Calcutta

M) Learning Website & Software

1) http://www.physicsclassroom.com
2) http://scienceworld.wolfram.com/physics/
3) http://physics.about.com/
4) http://nptel.ac.in/course.php?disciplineId=115
5) http://nptel.ac.in/course.php?disciplineId=104
6) www.fearofphysics.com
7) www.science.howstuffworks.com
8) www.iksindia.org

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COURSE ID:

Course Name : FUNDAMENTALS OF BASIC ELECTRONICS
Course Code : ITH 102
Course Abbreviation : HFOE

TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : Semiconductor physics

1. TEACHING-LEARNING & ASSESSMENT SCHEME :

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme					Credits	Assessment Scheme											
				Actual Contact Hrs./Week			SLH	NLH		Paper Duration	Theory				Based on LL & TSL				Based on SL		Total Marks
															Practical						
				CL	TL	LL					FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
											Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
ITH 102	FUNDAMENTALS of Basic Electronics	HFOE	AEC	2	-	2	2	6	3	-	-	-	-	-	50	20	50@	20	25	10	125

RATIONALE:

In today's world most of the consumer appliances are based on electronic circuits and devices. The foundation for working of computer or any of its peripherals are based on electronics. This course has been designed to develop skills to understand and test simple electronic components and circuits. After studying this course students will develop aninsight to identify, build and troubleshoot simple electronic circuits.

COMPETENCY:

Maintain electronic circuits in computer systems comprising of discrete electronicscomponents

Cognitive: Identify and illustrate the operation of basic electronics devices.

Psychomotor: Maintain and operate simple basic electronics circuit.

Affective: Attitude of i) Identify ii) Draw iii) Operate v) Test

COURSE OUTCOMES:

ITH102-1: Identify electronic component in electronic circuits

ITH102-2: Identify and handle semiconductor diodes.

ITH102-3: Examine and operate DC regulated power supply.

ITH102-4: Conversion of number systems and operate logic gates.

COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO)MATRIX:

[Note: Correlation levels: 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "-": no correlation]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1 Design and development**	**PSO2 Database and Network management**
Competency : Maintain electronic circuits in computer systems comprising of discrete electronics components									
ITH102-1									
ITH102-2									
ITH102-3									
ITH102-4									

LABORATORY WORK:

Laboratory experiments and related skills to be developed:

Sr No.	Title of Practical Exercise	Skills / Competencies to be Developed	Course Outcome
1. *	Identification and operate electronic equipment in basic electronics laboratory	1) Identify and operate different electronic equipment for voltage measurement. 2) Operate DMM, Regulated power supply, 3) Illustrate the use of breadboard	ITH102-1
2*	Identification electronic equipment in basic electronics laboratory	1) Identify and operate different electronic equipment for voltage and frequency measurement. 2) CRO, function generation.	ITH102-1
3. *	Test different types of resistors and inductors	1) Identify different types of resistor and inductors 2) Find value of different types of resistor and inductors using color code and Multimeter/LCR meter and compare them	ITH102-1
4. *	Test different types of capacitors.	1) Identify different types of capacitors 2) Find value of different types of capacitors using LCR meter and color code and compare them	ITH102-1
5. *	Test the performance of PN junction diode	1) Build the circuit as per circuit diagram 2) Record the observed readings in observation table 3) Draw the forward & reverse characteristics of PN junction diode	ITH102-2
6. *	Test Zener voltage regulator for given voltage	1) Build the circuit as per circuit diagram 2) Record the readings in observation table 3) Plot the graph for line and load regulation	ITH102-2
7.	Test the full wave center-tapped rectifier circuiton breadboard	1) Construct the circuit as per circuit diagram 2) Record the waveform displayed on the oscilloscope according to the setting of VOLT/DIV	ITH102-3

		3) Record readings measured in observation table	
8.	Test the full wave bridge rectifier circuit.	1) Construct the circuit as per circuit diagram 2) Record the waveform displayed on the oscilloscope according to the setting of VOLT/DIV	ITH102-3
9. *	Test the full wave bridge circuit rectifier with C-filter	1) Construct the circuit as per circuit diagram 2) Record the waveform displayed on the oscilloscope according to the setting of VOLT/DIV	ITH102-3
10. *	Test the performance of Regulator IC's: IC 78XX	1) Build the circuit as per circuit diagram for regulator ICs 2) Record the reading in observation table	ITH102-3
11.	Test the performance of Regulator IC's: IC 79XX.	3) Build the circuit as per circuit diagram for regulator ICs 4) Record the reading in observation table	ITH102-3
12.*	Test the working of the BJT as a switch	1) Construct the circuit as per circuit diagram 2) Test the BJT as ON switch 3) Test the BJT as OFF switch.	ITH102-4
13.*	Test the working of the BJT as a inverter	1) Construct the circuit as per circuit diagram 2) Observe the working of BJT as Inverter	ITH102-4
14*	Test Basic Logic Gates and verify Truth Table.	Realize of Basic logic gates and verify their truth table	ITH102-5
15*	Test NAND and NOR Gates and verify Truth Table.	Testing NAND and NOR gates and verify their truth table	ITH102-5

CONTENT:

C. Suggested Practical's/ Exercise

Practical Exercises and related skills to be developed:

The following practical exercises shall be conducted as practical and assess the student for attainment of the competency (any 12 experiments).The experiments numbered from 08 onwards can be demonstrated by using simulation software or virtual labs.

"*" Indicates compulsory experiments to be conducted

D. THEORY:

SECTION-I

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
ITH102-1 Identify electronic component in electronic circuits			
01	**Electronics components (R,L,C)** 1.0Components definition-discrete, non discrete, Active, passive 1.1Resistor: 1.2.1 Definition 1.2.2 General Symbol, Unit 1.2.3 Working Principle of Resistor 1.2.4Classification of resistors (No description) 1.2.5Resistors general specifications-Maximum voltage rating, power rating ,temperature coefficient ,tolerance , ohmic range, operating Temperature 1.2.6Resistor color coding with three, four, fiveBands 1.2.7 Applications 1.2 Capacitor 1.2.1 Definition 1.2.2 General Symbol, Unit 1.2.3 Working Principle of capacitor 1.2.4 Classification of capacitors (No description) 1.2.5 Color code of capacitor 1.2.6 Applications 1.3 Inductor 1.3.1 General Symbol, Unit 1.3.2 Inductor specifications –Self-inductance, Mutual inductance 1.3.3 Types of inductor (No description) 1.3.4 Color Coding of inductor 1.3.5 Applications	**05**	

ITH102-2 Identify and handle semiconductor diode and operate DC regulated power supply			
2	**DC regulated power supply** **2.1 P.N. junction diode: Ge & Si** 2.1.1Constructional features. 2.1.2Operating principle. 2.1.3 V-I Characteristics. 2.1.4 Applications. **2.2 Rectifiers:** 2.2.1 Definition: Rectification, rectifier 2.2.2 Need of rectification 2.2.3 Classification of rectifier 2.2.4 Half wave rectifier and full wave rectifier (Center-tapped and bridge): Circuit diagram, Operation and waveforms, 2.2.5 Parameters its definition and values for corresponding rectifier: (i) Average output voltage and current (ii) Ripple factor (iii) Rectifier efficiency (iv) Peak Inverse Voltage (v) Transformer Utilization Factor 2.2.6 Comparison of rectifier **2.3 Filter** 2.3.1Need of filter 2.3.2 Types of filter- (i) Shunt capacitor (ii) Series inductor (iii) LC Filter (iv) CLC filter Operation of shunt capacitor filter w.r.t full wave bridge Rectifier only **2.4 Zener diode** 2.4.1 Break down mechanism in semiconductors: Zener breakdown and Avalanche breakdown 2.4.2 Constructional features 2.4.3 Operating principle 2.4.4 V-I characteristics 2.4.5 Application: Zener as a voltage regulator **2.5 Voltage regulators** 2.5.1 Need of regulators 2.5.2 Line regulation 2.5.3 Load regulation 2.5.4 Block diagram of regulated power supply 2.5.5I C78XX and IC 79XX series voltage regulators	**10**	

	ITH102-3 Illustrate use bipolar junction transistor in electronic circuits		
3.	**Bipolar Junction Transistor(BJT)** 3.1 BJT-Types, symbols 3.2 Construction of BJT. 3.3 Operating principles of NPN transistor 3.4 Transistor configurations 3.5Modes of operation: Active, Cut-off, Saturation 3.6Transistor Biasing 3.6.1 Need of Transistor biasing 3.6.2Types of biasing (only types, no description) 3.7Single stage amplifier 3.7.1 Circuit Diagram 3.7.2 Working principle with input and output waveforms 3.7.3Applications: **i)** Operation of transistor as a switch **ii)** Operation of transistor as a inverter	**06**	
	ITH102-4 Identify and illustrate use bipolar junction transistor in electronic circuits		
4	**Number System and Logic Gates** 4.0 Terms Bit, Nibble, Byte, Word, Double Word 4.1 Introduction to Number systems- 4.1.1 Binary Number System 4.1.2Decimal Number System 4.1.3 Octal Number System 4.1.4Hexadecimal Number System 4.2 Conversion of one number system to another number system (integer and fractions) 4.3 Binary arithmetic addition, subtraction (1's and 2's complement) 4.4 Binary Multiplication, Binary Division 4.5 Logic Gates: AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR (Logic diagram, Boolean Expression and Truth Table)	**09**	
	Total	**30**	
	Semester end exam question paper should be such that total marks of questionson each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only		

Specification table for setting question paper for semester end theory examination:

Topic No.	Name of topic	Distribution of marks (Cognitive level-wise)			Course Outcome	Total Marks
		Remember	Understand	Application		
1	Electronics Components					
2	DC regulated power supply					
3	Bipolar Junction Transistor					
4	Number System					
	Total >>					

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attemptquestions of the above allotted marks only.

ASSESSMENT CRITERIA FOR PRACTICAL ASSIGNMENTS AND PRACTICALEXAMINATION

b) Assessment Criteria for Practical Assignments :

i) Continuous Assessment of Practical Assignments:

Every practical assignment shall be assessed for 25 marks as per criteria given in *Laboratory Manual*

Domain	Particulars	Marks out of 25
Cognitive	Preparation for practical	05
Psychomotor	Operating skills	05
	Observation/Result	05
Affective	Discipline and punctuality	05
	Procedure/Safety Measures/Presentation	05
TOTAL		**25**

ii) Progressive Skill Test:

One mid-term *Progressive Skill Test* of 25 marks shall be conducted as per criteriagiven Final marks of term work shall be awarded as per *Assessment Pro-forma II.*

Sr. No.	Criteria	Marks allotted

1	Neat & complete circuit Diagram / schematic Diagram.	05
2	Observations & Result Table	05
3	Sample Calculations with relevant Formulae.	05
4	Proper Graphs & Procedure / workmanship Safety measures	05
5	Oral Based on Term Work	05
	Total	**25**

b) Assessment Criteria for Term-end Practical Examination:

Every student has to perform one practical within 3 hours at semester end practicalexam which shall be assessed as per following criteria.

Sr. no	Criteria	Marks allotted
1	Preparedness for practical	10
2	Correct figures / diagrams	10
3	Observation Table	10
4	Result / calculations / graphs	10
5	Safety / use of proper tools / workmanship	10
	Total	**50**

**Assessment at semester end practical exam as per Pro-forma II.*

INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Discussions 2. Regular Home Assignments. 3. Laboratory work

Teaching and Learning Resources:

1. Chalk board 2. Video clips 3.PPT 4. Item Bank 5. Charts

REFERENCE MATERIAL :

a) Books / Journals / IS Codes

Sr. No.	Author	Title	Publisher
1.	V. K. Mehta	Principles of Electronics	S.Chand
2.	B. L. Theraja	Basic Electronics	S.Chand
3.	R.S.Sedha	A text book of Applied Electronics	S.Chand
4.	G. K. Mithal	Applied Electronics	Khanna Publication
5.	A. Motershed	Electronics Devices & Circuits	PHI Publication
6.	Malvino	Electronics Principles	McGraw Hill
7.	Bell, Devid	Fundamental of Electronics Devices and circuits	Oxford University
8.	R P Jain	Modern Digital Electronics	Tata McGraw Hill Education, New Delhi,2016ISBN(13):978-0-07-066911-6

b) Websites

i. www.nptel.iitm.ac.in
ii. www.learningaboutelectronics.com
iii. www.futurlec.com
iv. www.bis.org.in
v. www.electrical4u.com
vi. www.cadsoft.io
vii. www.electronics-tutorials.com

c) Mobile Apps:

i) Neso Academy
ii) EveryCiruit

* * *

Course Name : WEB PAGE DESIGN

Course Code : ITH 101

Course Abbreviation : HWPD

1. TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : NIL

Teaching Scheme: MPECS 2023

Scheme component	Hours / week	Credits
Theory	3	3
Practical	2	

Evaluation Scheme:

Course Code	Course Title	Abbr	Course Category /s	Learning Scheme					Credits	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH		Paper Duration	Theory				Based on LL &TSL				Based on SL		
															Practical					
				CL	TL	LL					FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA	
											Max	Max	Max	Min	Max	Min	Max	Min	Max	Min
ITH101	WEB PAGE DESIGN	HWPD	DSC	3	-	2	1	6	3	3	30	70	100	40	25	10	25@	10	25	10	175

(Total IKS Hrs for Sem. : 02 Hrs)

2. RATIONALE:

Web site design is a broad term that encompasses a wide variety of tasks, all involved in the format ion of web pages. There are essentially two types of web design approaches, which are dynamic and static design. Static web design is typically based on basic HTML code, it is essential for diploma student to learn HTML since the task of static website design is performed by using HTML coding. Even in dynamic websites, the task of presentation of content is handled through HTML coding. This course introduce web page design using HTML5 and also give emphasis on learning Cascading Style Sheets (CSS) which is a style sheet language used for describing the presentation of a document written in a markup language for formatting and styling of content, This learning enables students to design static websites and host it on Internet/Intranet.

3. COMPETENCY

- **Develop static interactive websites**

Cognitive: i) Design and write code simple web pages.

ii) Describe characteristics of CSS for effective formatting web pages.

Psychomotor: i) Surfing different types of web sites.

ii) Implementation of different types of websites.

Affective: Attitude of i) precision ii) accuracy iii) safety iv) punctuality

4. COURSE OUTCOMES:

ITH101-1: Describe web design Principles.

ITH101-2: Design web pages using different types of HTML tags.

ITH101-3: Apply HTML Programming concepts on web page.

ITH101-4: Organize content using table and frames and form.

ITH101-5: Apply presentation scheme on content using CSS.

ITH101-6: Publish website on internet or intranet

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[**Note: Correlation levels:** 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "-": no correlation]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1 Design and development**	**PSO2 Database and Network management**
Competency: Develop static interactive website	2	2	2	2	1	1	2	2	-
ITH101-1:	2	1	-	-	1	-	2	1	-
ITH101-2	-	2	1	1	1	-	-	1	-
ITH101-3:	1	2	2	1	-	-	-	1	-
ITH101-4:	-	2	2	2	1	1	1	2	-
ITH101-5:	1	2	2	2	1	2	2	2	-
ITH101-6:	1	2	2	2	1	1	1	2	-

Laboratory experiments and related skills to be developed:

(Practical's marked in * are compulsory and others are optional)

Sr. No	Title of Experiment	Skills to be developed	Course outcome
1*	Create a simple web page using structure tags	1.To write code of a simple web page using HTML	ITH101-2
2*	Design a web page and apply block level tags and HR tags.	1. To apply various block level tags in web pages. 2. Create a web page for displaying a paragraph using block level tags, HR tags.	ITH101-2
3*	Create a web page and apply text level tags.	Create a Web Page using Text level tags and Special Characters	ITH101-2
4*	To include Lists in web page	Create a web page for implementing different types of Lists. 1.Ordered List 2.Unordered List	ITH101-3
5*	Design webpage with various hyperlinks	To add hyperlinks - 1. To document in the same folder. 2. To document in the different folder. 3. To document on the web. 4. To specific section within the document. 5. To set colors for hyperlinks, active links and visited link	ITH101-3
6*	Create webpage to include images with different alignments	1. To understand concept of various attributes of <IMG> tag. 2. To use image as a hyperlink	ITH101-3
7*	Design webpage using MARQUEE tag and embed tag.	Apply multimedia effect to a webpage.	ITH101-3
8*	To create HTML table, format contents in a table cells and span the rows and columns.	1. To understand use of <TABLE> tag and its attributes. 2. Apply formatting contents in tables on web page 3 Apply colors in tables on web page 4. Merging cells in tables on web page	ITH101-4
9*	Create basic frames using different attributes And design a web page using iframe tag	1. To understand use of frames in layout of web page. 2. Apply <iFRAME> tag and its attributes	ITH101-4
10*	To create a basic login form using form controls	1. To understand use of <FORM> element and its attributes.	ITH101-4

		2. Apply form input controls like text field, password field and multiple line text field controls. 3. To use pull down menu in web pages 4. To use buttons in web pages	
11*	To use table to layout form with the different form controls and generalized buttons.	1. To understand concept of <TABLE> tag and its attributes. 2. Apply table tags to layout form with different form controls	ITH101-4
12*	To create web page and apply internal style sheet properties	1. To understand the concept of style sheet. 2. Adding style sheets to a document, linking to a Style Sheet. 3.Use font, text and box properties of style sheets	ITH101-5
13	To create web page and apply external style sheet properties	1. Adding style sheets to a document, linking to a Style Sheet. 2.Use font, text and box properties of style sheets	ITH101-5
14*	Design webpage using HTML5 semantic elements and html5 graphics and canvas elements	1.Use HTML5 semantics: Marking Text, Indicating Dates and Time, Inserting Figures, Specifying Navigation 2.Apply HTML5 Graphic and Multimedia Element <SVG> , <canvas>, <audio>,<Video>	ITH101-6
15	Install web server and publish website.	Install a web server and publish a website on Intranet.	ITH101-6
16*	Development of Mini Project(Static website) Host this website on free hosting servers.	1. Development of static informative websites as per user requirement. For example- 1) Website for Hotel 2) Website for Universities, Tourism	ITH101-6

7. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING SKILLS DEVELOPMENT (SELF LEARNING)

Self-Learning

Following are some suggestive self-learning topics: 1) Use ChatGPT/any other AI tool to explore new ideas for web development. 2) Browse and observe features of different types of websites. 3) Identify different host servers for hosting static website

Assignment

Prepare journal of practical performed in the laboratory.

The micro project has to be industry application based, internet-based, workshop-based, and laboratory-based as suggested by Teacher.

a. Website for Universities and Colleges

b. Website for book shop, grocery store and others.

c. Web site for any Vehicle Showroom.

d. Website for Hospital facilities.

e. Website for Travel and Tourism Agency.

f. Website related to any sports. (Ex. Cricket, Tennis)

8. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications
1	a) Computer System with all necessary Peripherals and Internet connectivity. b) Any Text editor and Browser c) Web server

SECTION I

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
Course Outcome ITH101-1*:* Describe web design Principles			
1	**Introduction to Web** 1.1 Basic principles involved in developing a web site, Planning Process, Five Golden rules of web designing, Web standards, Audience requirement. 1.2 **Web Terminologies:** Internet, ISP, Web Browser, URL, WWW, HTTP, Web page, Web Server, Search Engine, URL, Domain, Hyperlink and Static vs. dynamic websites. 1.3 HTML History, Components of HTML: Tags – closed tags and open tags, Attributes, Elements	07	10
Course Outcome ITH101-2: Design Web pages using different types of HTML tags.			
2	**Basics of HTML** 2.1 **Structure Tags:** !DOCTYPE, HTML, HEAD, TITLE, BODY tags 2.2 **Block Level Elements:** Headings, Paragraphs, Breaks, Divisions, Centered Text, Block Quotes, Preformatted text, Types of Address 2.3 **Text Level Elements:** Bold, Italic, Teletype, Underline, Strikethrough, Superscript, subscript, DIV tag. 2.4 Horizontal Rules, Special characters (HTML Symbols), Adding comments,	07	12
Course Outcome ITH101-3: Apply HTML Programming Concepts on web Page			
3	**HTML Programming** 3.1 **List:** Ordered, Unordered Lists, Definition Lists and Nested Lists. 3.2 **URL :** Types of URLs, Absolute URLs, Relative URLs The Anchor Tag: Linking various documents for internal & external use. 3.3 **Images:** Image Formats, Inserting Image using IMG tag, alternate text, image alignment, HSPACE, VSPACE, wrapping text, height and width of images, image as a link, image maps. 3.4 **Multimedia:** MARQUEE Tag, EMBED tag. 3.5 **Colors and Backgrounds:** Text color, Background color, Font color, link color, inserting image as page background	08	12

SECTION II

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
Course Outcome ITH101-*4:* Organize Contents Using Tables, Frames and Forms			
4	**Advanced HTML** **4.1 Table:** Table tag with attributes, TABLE, TR, TH, TD tags, Border, cell spacing, cell padding, width, align, bgcolor attributes,rowspan,colspan attributes, CAPTION tag. **4.2 Frames:** Types of Frames with their of attributes, FRAMESET tag with its attributes, Use of NOFRAMES tag, concept of iframes **4.3 Forms:** Form tag, action and method attribute, Form Fields: Single line text field, password field, multiple line text area, Radio buttons, and check boxes, SELECT and OPTION tags, Submit, Reset button.	08	12
Course Outcome ITH101-*5: Apply presentation scheme on content using CSS*			
5	**Introduction to Cascading Style Sheets** **5.1 Cascading Style Sheet:** Different Types of Style sheets, Benefits of Using CSS **,**adding style to the document: Linking to style sheets, Embedding style sheets, Using Inline style,Selectors:CLASS rules, ID rules **5.2 Style Sheet Properties:** Font,Text,box,color and background Properties**,** Creating and Using a simple external CSS file, Using the internal and inline CSS, background and color gradients in CSS setting font and text in style sheet using table layout..	07	12
Course Outcome ITG102-5: Publish website on internet or intranet			
6	**Introduction of HTML 5 and Web site Hosting** 6.1 **Introducing HTML5**: features, removed old elements list, new elements list with features, new attributes in HTML5, adding semantics: Marking Text, Indicating Dates and Time, Inserting Figures, Specifying Navigation,HTML5 Graphics and Multimedia Elements: <SVG>,<canvas>, <audio>,<Video> tags. 6.2 **Website Hosting**: Concept of Internet and Intranet, Publishing website on Intranet, Installing and configuring web server, Uploading files on intranet site, access intranet based website, Publishing website on Internet, hiring web space, Uploading files using FTP, Virtual Hosting, access Internet based website.	08	12

10. SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END THEORY EXAMINATION:

Section / Topic no.	Name of topic	Distribution of marks (Cognitive level-wise)			Course Outcome	Total marks
		Remember	**Understand**	**Application**		
I / 1	Introduction To Web	2	4	4	ITH101-1	10
I / 2	Basics of HTML	2	4	4	ITH101-2	12
I / 3	HTML Programming	2	4	6	ITH101-3	12
II/ 4	Advanced HTML	4	4	6	ITH101-4	12
II / 5	Introduction to CSS	4	4	6	ITH101-4	12
II/6	HTML5 and Website Hosting	-	4	6	ITH101-5	12
TOTAL		**14**	**24**	**32**	**----**	**70**

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

11. ASSESSMENT CRITERIA FOR TERM WORK AND PRACTICAL EXAMINATION

a) Assessment Criteria for Term work :

i) Continuous Assessment of Practical Assignments:

Every practical assignment shall be assessed for 25 marks as per following criteria:

Domain	**Particulars**	**Marks out of 50**
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	05
Affective	Discipline and punctuality	05
	Decency and presentation	05
TOTAL		**25**

Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Preparedness for practical	02
3	Neat & complete Diagram.	04
4	Observations & computer handling skill	02
5	Use of toolbar, menu bar and short cut keys.	04
6	Logical thinking and approach	04
7	Oral Based on Lab work and completion of task	04
	TOTAL	25

Assessment at semester end practical exam as per Pro-forma II.

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Technical ability	20
2.	Communication skill	10
3.	Logical approach	20
	TOTAL.	50

12. INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Discussions
2. Regular Home Assignments.
3. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board 2.Slides(PPT) 3. Self-learning Online Tutorials

13. REFERENCE MATERIAL:

a) Books / Codes

S. No.	Title of Book	Author	Publication
1.	HTML and XHTML – The complete reference	Powell, Thomas	Tata McGraw Hill, New Delhi, 2014, ISBN: 9780070701946
2.	Learning Web Design	Robbins	O'Reilly, London, 2012 ISBN 10:1-4493-1927-0
3.	Teach Yourself HTML & CSS in 24 Hours	SAMS	Pearson Education Publication, New Delhi, 2015, **ISBN:** 978-672336140
4.	HTML,XHTML and CSS	Bohem, Anne	Murach's Publication, New York, 2013, ISBN 13: 978-1890774578
5.	HTML 5 Black Book(second edition)	DT Editorial services	Dreamtech Publication, New Delhi, **ISBN:** 978-9350040959

b) Websites

i. http://www.w3schools.com/html
ii. https://www.tutorialspoint.com/html/index.htm
iii. http://www.html.net/
iv. http://www.2createawebsite.com
v. http://webdesign.about.com

***

COURSE ID: 05

Course Name : IT WORKSHOP PRACTICE'S

Course Code : ITH103

Course Abbreviation: HWIT

1. TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : Nil

Teaching Scheme: MPECS 2023

Scheme component	Hours / week	Credits
Theory	0	4
Practical	4	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment								Total		
	Theory				Based on LL& TSL PRACTICAL				Based on SL SLA		Total Marks
	FA-TH	SA-TH	TOTAL		FA-PR		SA-PR				
	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
Details of Evaluation	--	--	--	--	25	10	50@	20	25	10	100

Total IKS Hrs for Sem. : 0 Hrs

Abbreviations: CL- ClassRoom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA - Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

2. RATIONALE:

A diploma engineer's day-to-day work involves interacting with computers, peripherals, and other business-related tools and equipment in a conventional office setting. They must be able to operate and care for the equipment properly. The ability to utilize and maintain certain system peripherals authentically is required for diploma graduates. Additionally, they must be capable of doing fundamental preventative and breakdown maintenance, interacting with peripheral devices, installing new devices, and assembling desktop computers. The purpose of this course is to help them acquire these crucial abilities through a variety of workshop-based activities.

3. COMPETENCY

Apply Fundamental knowledge of computer system to work with simple applications.

Cognitive: i) State the basic parts of a computer system and relationships among component.
ii) Describe characteristics and functions of CPU's, motherboard, RAM, Storage devices

Psychomotor: i) Identify computer system and Network ii) Perform simple computer maintenance operations

Affective: Attitude of i) Precision ii) Accuracy iii) Safety iv) Punctuality

4. COURSE OUTCOMES:

ITH103-1*:* Carry-out elementary level maintenance of a PC.
ITH103-2: Create partitions and format hard disk drive.
ITH103-3: Install and configure Operating system.
ITH103-4: Configure different types of peripheral devices.
ITH103-5: Setup small Local Area Network.
ITH103-6: Use diagnostic software for fault finding in Computer system.

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "-" : no correlation **]**

Competency And COs	Programme Outcomes POs and PSOs								
	PO 1 Basic and discipline specific knowledge	PO 2 Problem analysis	PO 3 design/ development of solutions	PO 4 Engineering Tools, experimentation and testing	PO 5 Engineering practice for society, sustainability and environment	PO 6 Project management	PO 7 Life-long learning	PSO1 Design and development	PSO2 Database and Network management
Competency: Perform simple maintenance operations on computer system, peripherals and Network. Set up small LAN	1	2	1	2	1	-	1	-	1
ITH103-1	1	1	-	3	-	-	-	-	-
ITH103-2	1	-	-	2	-	-	-	1	-
ITH103-3	1	-	-	2	-	-	1	1	-
ITH103-4	-	-	-	2	-	-	1	-	-
ITH103-5	1	1	1	2	-	-	-	-	1
ITH103-6	-	2	1	2	-	-	-	-	1

6.CONTENT:

A) SUGGESTED PRACTICAL'S/ EXERCISE

A.1 Laboratory experiments and related skills to be developed:

Sr. No.	Title of Experiment	Skills to be developed	Number of hrs.	Course outcome
1.	Desktop/laptop/server type identification and its specification	1. Identify desktop/laptop by its type and verify its specifications 2. Identify type of server and verify its Specification	2	ITH103-1
2.	Identification and cleaning of Components	1.Open PC Panel and Identify Components 2. Clean inside PC - Boards and Slots	4	ITH103-1
3.	Preventive Maintenance of PC	1. Undertake Preventive Maintenance of PC using vacuum cleaner and simple tools	2	ITH103-1
4.	Perform Internal socket connections	1. Connect/disconnect power socket and controller socket to disk drives and motherboard.	2	ITH103-1
5.	Perform BIOS settings	1. Configure different BIOS settings in computer system	2	ITH103-1
6.		1. Partition and manage hard disk		

	Manage a Hard disk	2. Format hard drives with different file systems.	2	ITH103-2
7.	Installation of Windows Operating System	1. Install Operating System – Windows family (such as Windows 10, 11)	2	ITH103-3
8.	Installation of Unix family Operating System	1. Install Operating System –Unix family (such as Linux/Ubuntu/Centos)	2	ITH103-3
9.	Peripheral devices cleaning	1. Clean peripheral devices and connect it to computer	4	ITH103-4
10.	Installation of local and Network printer	1. Install local printer by applying various types of configuration settings 2. Remove and mount cartridge, troubleshoot paper jam	2	ITH103-4
11.	Share devices, files and folders	1. Share the printer, devices, folders on a network	4	ITH103-4
12.	Installation of scanner	1.Install and configure scanner	2	ITH103-4
13.	Set Input/output devices	1.Set and configure monitor/display, Speaker, Microphone and LCD Projector	2	ITH103-4
14.	Make CAT5, CAT6 Cable	1. Prepare and test crossover and straight cable, CAT5, CAT6 Cable, using connector, crimping tools, splicer	2	ITH103-5
15.	Connect devices to external port	1. Connect/disconnect LAN Cable, External Hard disk, Modem, LCD/DLP Projector	2	ITH103-5
16.	Networking devices connection	1. Connect Modem, Hub/Switches/routers and verify the connection	2	ITH103-5
17.	Fiber optic cable construction	1. Check different types of fiber optic cable's construction and connectivity	2	ITH103-5
18.	Connection of Switches/Hubs	1. Connect two Switches/Hubs using normal and uplink port	2	ITH103-5
19.	Setup Wi-Fi environment	1. Configure devices to setup Wi-Fi environment	2	ITH103-5
20.	Setup wired network environment	1. Create a small wired network environment	4	ITH103-5
21.	Setup wireless I/O devices	1. Set and configure blue tooth based wireless mouse, keyboard and other devices	2	ITH103-5
22.	Fault diagnostics	1. Use diagnostic software for PC fault finding	4	ITH103-6
23.	Anti-viruses installation	1. Install Antivirus and Configure various settings	2	ITH103-6
24.	Component replacement	1. Replace internal components of PC	4	ITH103-6

7. MAJOR EQUIPMENT / INSTRUMENTS REQUIRED

The major equipment with broad specification mentioned here will used in uniformity in conduct of experiments , as well as aid to procure equipment by authorities concerned.

Sr. No	Equipment Name with broad specification
1	Computer system with all necessary components like: motherboard, random access memory (RAM), read- only memory (ROM), Graphics cards, sound cards, internal hard disk drives, DVD drive, network interface card
2	LCD/DLP Projector (Epson EB-X49 XGA Projector Brightness: 3600lm with HDMI Port (Optional Wi-Fi).
3	Modems, hubs, switches, Router
4	Wi-Fi set-up with access point and repeater
5	Bluetooth based wireless mouse and keyboard or any other device
6	Cat5/Cat6 cable, with RJ 45 Connectors, LAN tester
7	Fiber optic cable with SC, ST, LC Connectors
8	Laser Printer
9	Scanner
10	Hub/Switches/Routers
11	Fault finding software, antivirus
12	Operating System, Hard Disk
13	Computer Maintenance kit
14	EXternal Hard Disk(500 GB/1 TB)
15	Light vacuum cleaner, approx. 200 watts with brushes and accessories

8. CONTENT:

SECTION I / II

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory evaluation Marks
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9. ASSESSMENT CRITERIA FOR PRACTICAL ASSIGNMENTS AND PRACTICAL EXAMINATION

a) Assessment Criteria for Practical Assignments :

i) Continuous Assessment of Practical Assignments:

Every practical assignment shall be assessed for 25 marks as per criteria given in *Laboratory Manual*

Domain	Particulars	Marks out of 25
Cognitive	Technical preparedness for practical	05
Psychomotor	Operating skills/Algorithm/ flowchart	05
	Observation/Logic/ Program/Result	05
Affective	Discipline and punctuality	05
	Procedure/ Decency/ Presentation	05
TOTAL		**25**

ii)Progressive Skills Test :

One mid-term *Progressive Skill Test* of 25 marks shall be conducted as per criteria given Final marks of term work shall be awarded as per *Assessment Pro-forma X.*

b) Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Logical thinking and approach ,procedure followed to achieve the result	05

3	Neat & complete Diagram and Output	05
4	Use of editors, frameworks	05
5	Oral Based on Lab work and completion of task	05
	TOTAL	25

Assessment at semester end practical exam as per Pro-forma III.

a) Assessment Criteria for Term-end Practical Examination:

Every student has to perform one practical at semester end practical exam which shall be assessed as per following criteria.

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Algorithm/ Flowchart and Program	20
2.	Results/Observations/Output	10
3.	Logical thinking and approach	10
4.	Oral	10
	TOTAL.	50

**Assessment at semester end practical exam as per Pro-formaIII*

10. INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Discussions
2. Regular Home Assignments.
3.Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board 2.Slides(PPT) 3. Self-learning Online Tutorials 4. Computer Hardware parts.

11. REFERENCE MATERIAL:

a) Books/Codes

Sr. No.	Author	Title	Publisher
1.	James, K.L.	1 The computer hardware installation, interfacing, troubleshooting and maintenance	PHI Learning, New Delhi, 2014 ISBN: 978-81-203-4798-4
2.	Minasi, Mark	The Complete PC Upgrade And maintenance Guide	BPB Publication, New Delhi ISBN:978-81-265-

			0627-9
3.	Kadam, Sachin	Computer Architecture and Maintenance Vol.1	Shroff Publication, Mumbai ISBN: 978-9350230244
4.	Craig Zacker, John Rourke	The Complete Reference PC Hardware	Mc Graw Hill Education ISBN- 13:978-0070436060

b) Websites

i) http://www.ciscopress.com/articles/article.asp?p=2086239&seqNum=4Essential Introduction to Computer
ii) http://www.instructables.com/id/Computer-Assembly/
iii) http://www.liutilities.com/how-to/operate-a-laptop-computer/
iv) https://video.search.yahoo.com/search/video?fr=mcafee&ei=UTF-8&p=hardware+maintenance+and+troublesho
v) geeksforgeeks.org/how-to-set-up-a-LAN-network
vi) https://www.youtube.com/watch?v=cc2fyg-B5WE

***

COURSE ID: 06
COURSE NAME : FUNDAMENTALS OF ICT (CE/ME/EE/MT/ET/IT)
COURSE CODE : CCH202
COURSE ABBREVIATION : HICT

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	01	2
	Tutorial Learning	-	
	LaboratoryLearning	02	
	SLH-SelfLearning	01	
	NLH-Notional Learning	04	

B. ASSESSMENT SCHEME :-

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL				BASED ON SLA		TOTAL
					Practical						
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
--	--	--	--	--	25	10	25@	10	25	10	75

(Total IKS Hrs for Sem:00 Hrs)

C: ABBREVIATIONS:- CL-ClassRoomLearning,TL-TutorialLearning,LL-LaboratoryLearning,SLH-SelfLearningHours,NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA -Self LearningAssessment

Legends:@InternalAssessment,#ExternalAssessment,*#OnLine Examination,@$InternalOnlineExamination

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidateisnotsecuringminimumpassing marksinFA-PRofanycourse thenthecandidateshallbedeclared as"Detained"in that semester.
3. IfcandidateisnotsecuringminimumpassingmarksinSLAofanycoursethenthecandidateshallbedeclaredasfailand will have to repeat andresubmit SLAwork.
4. NotionalLearninghoursforthesemesterare(CL+LL+TL+SL)hrs.*15Weeks
5. 1(one)creditisequivalentto30Notionalhrs.
6. *Selflearning hoursshall notbe reflectedin theTimeTable.

*Self learning includes micro project/ assignment/other activities.

D. i)RATIONALE:-

In any typical business setup in order to carry out routine tasks related to create business documents, perform data analysis and its graphical representations and making electronic slide show presentations, the student need to learn various software as office automation tools like word processing applications, spreadsheets and presentation tools. They also need to use these tools for making their project reports and presentations. The objective of this course is to develop the basic competency in students for using these office automation tools to accomplish the job. This course also presents an overview of emerging technologies so that students of different discipline can appraise the applications of these technologies in their respective domain.

ii)INDUSTRY/EMPLOYEREXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry identified outcome through various teaching learning experiences: 1) Use computers for Internet services, Electronics Documentation, Data Analyze and Slide Presentation. 2) Appraise Application of ICT based Emerging Technologies in different domain

E. COURSELEVELLEARNINGOUTCOMES(COS)

CCH109-1 - Use computer system and its peripherals for given purpose
CCH109-2 - Prepare Business document using Word Processing Tool
CCH109-3 - Analyze Data and represent it graphically using Spreadsheet
CCH109-4 - Prepare professional Slide Show presentations
CCH109-5–Illustrate the Use different types of Web Browsers, Apps and Emerging Technologies

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1 Design and Development	PSO2 Networking and Database Management
Competency: Use ICT based Emerging Technologies.in different domain.	3	2	2	2	2	2	2	3	2
CCH109-1Use computer system and its peripherals for given purpose	1	-	-	-	-	-	1	1	1
CCH109-2Prepare Business document	-	-	-	3	-	-	1	2	-

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1 Design and Development**	**PSO2 Networking and Database Management**
using Word Processing Tool									
CCH109-3 Analyze Data and represent it graphically using Spreadsheet	-	2	1	3	-	-	1	2	-
CCH109-4 Prepare professional Slide Show presentations	-	-	-	3	-	-	1	2	-
CCH109-5 Use different types of Web Browsers and Apps	1	-	-	3	-	-	3	-	1
CCH109-6 Explain concept and applications of Emerging Technologies	1	-	-	3	-	-	3	1	1

F. CONTENT:

I) Practical exercises

The following practical exercises shall be conducted in the *Laboratory for Fundamentals of ICT developed* by the Institute in practical sessions of batches of about 20- 22 students:

Sr. no	Laboratory experiences	CO
1	Identify various Input/outputdevices, connections and peripherals ofcomputer system. Work with Computer System,Input/output devices, and peripherals for Manages files and folders for data storage.	CCH109-1
2	Create and manage worddocument.Apply formatting features on textat line, paragraph and page level.	CCH109-2
3	Insert and edit images, shapes in adocument file	CCH109-2
4	Insert table and apply various tableformatting features on it.	CCH109-2
5	Apply page layout features in wordprocessing.Print a document by applying various print options. Use mail merge in word processing.	CCH109-2
6	Enter and format data in aworksheet.Insert and delete cells, rows and columns.Apply alignment feature on cell	CCH109-3

Sr. no	Laboratory experiences	CO
7	Create formula and "If" conditionon cell data. Apply various functions and named ranges in worksheet.	CCH109-3
8	Implement data Sorting, Filteringand Data validation features in a worksheet.	CCH109-3
9	Create charts using various chartoptions in spreadsheet.	CCH109-3
10	Print the worksheet by applyingvarious print options for worksheet.	CCH109-3
11	Apply design themes to the givenpresentation. Insert pictures text/images/shapes In slide. Use pictures text/images/shapesediting options.	CCH109-4
12	Add tables and charts in theslides.Run slide presentation in different Modes. Print slide presentation ashandouts/notes.	CCH109-4
13	Apply animation effects to thetext and slides. Add/set audio and video files in the presentation.	CCH109-4
14	Configure internet connection ona computer system. Use different web services on internet	CCH109-5
15	Configure different browsersettings. Use browsers for the givenpurpose.	CCH109-5
16	Create web forms for surveyusing different options.	CCH109-6
17	Create web forms for Quiz usingdifferent options.	CCH109-6

II) Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)
1	**Unit - I Introduction to Computer System** **1.1** Basics of Computer System: Overview Hardwareand Software Block diagram of Computer System: Input/Output unit CPU, Control Unit, Arithmetic logic Unit (ALU), Memory Unit **1.2 Internal components:** processor, motherboards, randomaccess memory (RAM), read-only memory (ROM), video cards, sound cards and internal hard disk drives) **1.3 External Devices:** Types of input/output devices, types of monitors, keyboards, mouse, printers: Dot matrix, Inkjet and LaserJet, plotter and scanner, external storagedevices CD/DVD, Hard disk and pen drive **1.4 Application Software:** word processing, spreadsheet, database management systems, control software,measuring software, photo-editing software, video-editingsoftware, graphics manipulation software SystemSoftware compilers, linkers, device drivers, operating system. **1.5 Network environments:** network interface cards, hubs, switches, routers and modems, concept of LAN, MAN,WAN, WLAN, Wi-Fi and Bluetooth **1.6 Working with Operating Systems:** Create and managefile and folders, Copy a file, renaming and deleting of filesand folders, Searching files and folders, applicationinstallation, creating shortcut of application on thedesktop.	**2**

Sr. no.	Topics/Subtopics	Learning (Hours)
2	**Unit - II Word Processing** **2.1 Word Processing:** Overview of Word processor Basics of Font type, size, colour, Effects like Bold, italic, underline, Subscript and superscript, Case changing options, Previewing a document, Saving a document,Closing a document and exiting application. **2.2 Editing a Document:** Navigate through a document, Scroll through text, Insert and delete text, Select text, Undo and redo commands, Use drag and drop to move text, Copy, cut and paste, Use the clipboard, Clear formatting, Format and align text, Formatting **2.3 Changing the Layout of a Document:** Adjust page margins, Change page orientation, Create headers and footers, Set and change indentations, Insert and clear tabs **2.4 Inserting Elements to Word Documents:** Insert and delete a page break, Insert page numbers, Insert the date and time, Insert special characters (symbols), Insert a picture from a file, Resize and reposition a picture **2.5 Working with Tables:** Insert a table, Convert a table totext, Navigate and select text in a table, Resize table cells,Align text in a table, Format a table, Insert and deletecolumns and rows, Borders and shading, Repeat tableheadings on subsequent page **2.6 Working with Columned Layouts and Section Breaks:**a Columns, Section breaks, Creating columns, Newsletterstyle columns, Changing part of a document layout orformatting, Remove section break, Add columns toremainder of a document, Column widths Adjust.	**3**
3	**Unit - III Spreadsheets** **3.1Working with Spreadsheets:** Overview of workbookand worksheet, Create Worksheet Entering sample data,Save, Copy Worksheet, Delete Worksheet, Close and openWorkbook. **3.2 Editing Worksheet**: Insert and select data, adjust rowheight and column width, delete, move data, insert rowsand columns, Copy and Paste, Find and Replace, SpellCheck, Zoom In-Out, Special Symbols, Insert Comments,Add Text Box, Undo Changes, - Freeze **3.3 Formatting Cells and sheet**: Setting Cell Type, SettingFonts, Text options, Rotate Cells, Setting Colors, TextAlignments, Merge and Wrap, apply Borders and Shades,Sheet Options, Adjust Margins, Page Orientation, Headerand Footer, Insert Page Breaks **3.4 Working with Formula:** Creating Formulas, CopyingFormulas, Common spreadsheet Functions such as sum,average, min, max, date, In, And, or, mathematicalfunctions such as sqrt, power, applying conditions usingIF. **3.5 Working with Charts:** Introduction to charts, overviewof different types of charts, Bar, Pie, Line charts, creatingand editing charts. Using chart options: chart title, axistitle, legend, data labels, Axes, grid lines, moving chart ina separate sheet. **3.6 Advanced Operations:** Conditional Formatting, DataFiltering, Data Sorting, Using Ranges, Data Validation,Adding Graphics,	**3**

Sr. no.	Topics/Subtopics	Learning (Hours)
	Printing Worksheets, print area, margins, header, footer and other page setup options.	

Section –II

Sr. no.	Topics/Subtopics	Learning (Hours)
4	**Unit - IV Presentation Tool** 4.1 **Creating a Presentation:** Outline of an effectivepresentation, Identify the elements of the User Interface, Starting a New Presentation Files, Creating a BasicPresentation, Working with textboxes, Apply Character Formats, Format Paragraphs, View a Presentation. **4.2 Inserting Media elements**: Adding and ModifyingGraphical Objects to a Presentation - Insert Images into a Presentation, insert audio clips, video/animation, AddShapes, Add Visual Styles to Text in a Presentation, Edit Graphical Objects on a Slide, Format **4.3 Working with Tables:** Insert a Table in a Slide, Format Tables and Import Tables from Other Office Applications. **4.4 Working with Charts:** Insert Charts in a Slide, Modify a Chart, Import Charts from Other Office Applications.	**4**
5	**Unit - V Basics of Internet and Emerging Technologies** **5.1 World Wide Web:** Introduction, Internet, Intranet,Cloud, Web Sites, web pages, URL, web servers, basicsettings of web browsers- history, extension, default page, default search engine, creating and retrieving bookmarks, Use of search engines. **5.2Web Services:** e-Mail, Chat, Video Conferencing, e-learning, e-shopping, e-Reservation, e-Groups, Social Networking **5.3 Emerging Technologies:** IOT, AI and ML, Drone Technologies, 3D Printing. **5.4 Tools:** Docs, Drive, forms, quiz, Translate and other Apps	**3**

** No Questions will be asked on IKS learning subtopics in any question papers.

G: List of Assignments under SLA

(Assignments Marked in * are compulsory)

<table>
<tr><th>Sr.No</th><th>List of Assignment (under SLA)</th><th>Hrs Allotted</th></tr>
<tr><td>1*</td><td>Prepare a chart showing different generations of computer along with advantages & disadvantages.</td><td>02</td></tr>
<tr><td>2*</td><td>Prepare survey report for:
There is usually a positive side and a negative side to each new technological improvement.
1. Select a technology you use every day and consider its benefits and risks.
2. What benefits does the technology provide?
3. Are there any risks involved and, if so, how can they be minimized?</td><td>02</td></tr>
<tr><td>3</td><td>The following are the marks obtained by the students in three subjects
Assume suitable data in following table:
<table><tr><td>ROLLNO</td><td>NAME</td><td>ME</td><td>QT</td><td>IOM</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>
Using Conditional Formatting list out students who secured(a) Less than 50 in QT, (b) More than 65 in IOM, (c) Between 60 and 80 in ME</td><td>02</td></tr>
<tr><td>4*</td><td>Principal Amount 2, 00,000Rate of Interest 5%Time Period 10 YearsAmount to be Paid?
From the above , Calculate the amount payable per annum and also show the effect on amount by changing a) Rate of Interest to 3% and 8%b) Time Period to 5 Years and 3 Years</td><td>02</td></tr>
<tr><td>5</td><td>Prepare a PowerPoint presentation of at least 5 slide & perform
1. Add 2.delete 3.copy& paste 4.edit slide.</td><td>02</td></tr>
<tr><td>6*</td><td>A person wants to start a business and he has four schemes to invest money according to profit and years. Find out which scheme is the most profitable.
Investment Amount Percentage for Profit No of years
20000 10% 6 years
40000 20% 5 years
14000 30% 4 years
12000 15% 5 years</td><td>02</td></tr>
<tr><td>7*</td><td>Conduct Survey of different IT Industry and prepare list of New Technology Trends in IT Industries.</td><td>02</td></tr>
<tr><td>8*</td><td>Prepare a list and compare different desktop publishing software available in market.</td><td>04</td></tr>
</table>

H : Specification table for setting question paper for semester end theory examination

Nil

I :-Assessment Criteria

i) Formative Assessment of Practical:-

Every assignment shall be assessed for 25 marks as per following criteria:

Domain	**Particulars**	**Marks out of 25**
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	05
	Drawing / drafting skills	05
Affective	Discipline and punctuality	05
TOTAL		**25**

ii) Summative Assessment of Practical:

Every practical assignment shall be assessed for 25 marks as per following criteria:

Sr.no	**Criteria**	**Marksallotted**
1	Attendanceatregularpractical	05
2	Preparednessforpractical	05
3	Neat& completeDiagram.	05
4	Observations& handling of instrument.	05
5	Oral Based on Lab work and completion of task	05
TOTAL		**25**

J) Instructional Methods:

1. Lectures cum Demonstrations,
2. Classroom practices.
3. Use of projector and soft material for demonstration

K) Teaching and Learning resources:

Chalk board, LCD presentations, Demonstrative kits, Demonstrative charts.

L) Reference Books:

S.N.	Name of Book	Author	Publication
1	Goel Anita	Computer Fundamentals	Pearson Education, New Delhi, 2014, ISBN-13: 978-8131733097
2	Miller Michael	Computer Basics Absolute Beginner's Guide, Windows 10	QUE Publishing; 8th edition August 2015, ISBN: 978-0789754516

3	Alvaro Felix	Linux: Easy Linux for Beginners	CreatevSpace Independent Publishing Platform- 2016, ISBN-13: 978-1533683731
4	Johnson Steve	Microsoft Office 2010: On Demand	Pearson Education, New Delhi India, 2010. ISBN :9788131770641
5	Schwartz Steve	Microsoft Office 2010 for Windows: Visual Quick Start	Pearson Education, New Delhi India, 2012, ISBN : 9788131766613

M) Learning Website & Software

a. https://www.microsoft.com/en-in/learning/office-training.aspx
b. http://www.tutorialsforopenoffice.org/
c. https://www.tutorialspoint.com/computer_fundamentals/index.htm
d. https://www.javatpoint.com/powerpoint-tutorial
e. https://www.techtarget.com/iotagenda/definition/Internet-of-Things-IoT
f. https://www.skillrary.com/blogs/read/introduction-to-drone-technology
g. https://support.google.com/a/users/answer/9389764?hl=en

COURSE ID:
COURSE NAME : YOGA &MEDITATION.
COURSE CODE : CCH203
COURSE ABBREVIATION : HYAM

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	00	01
	Tutorial Learning	00	
	LaboratoryLearning	01	
	SLH-SelfLearning	01	
	NLH-Notional Learning	2	

B. ASSESSMENT SCHEME :-

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL				BASED ON SLA		TOTAL
					Practical						
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
-NA-	-NA--	--NA-	--NA-	-NA-	25	10	--NA-	--NA-	25	10	50

(TotalIKSHrsforSemester:01Hr)

C: ABBREVIATIONS:- CL-Class-RoomLearning,TL-TutorialLearning,LL-LaboratoryLearning,SLH-SelfLearningHours,NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA -Self LearningAssessment

Legends:@InternalAssessment,#ExternalAssessment,*#OnLine Examination,@$InternalOnlineExamination(TNR 12 font)

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidateisnotsecuringminimumpassing marksinFA-PRofanycourse thenthecandidateshallbedeclared as"Detained"in that semester.
3. IfcandidateisnotsecuringminimumpassingmarksinSLAofanycoursethenthecandidateshallbedeclaredasfailand will have to repeat andresubmit SLAwork.
4. NotionalLearninghoursforthesemesterare(CL+LL+TL+SL)hrs.*15Weeks
5. 1(one)creditisequivalentto30Notionalhrs.
6. *Selflearning hoursshall notbe reflectedin theTimeTable.

*Selflearningincludesmicroproject/assignment/otheractivities.(Provide list of all assignments here in tabular format At least 6 to 8 assignments to be given)

D. i)RATIONALE

Diploma Graduate needs a sound body and mind to face the challenging situationsin career as employee or as an entrepreneur. Yogaand Meditation brings about the holistic development of an individual and equips with necessary balance to handle the challenges. Theage of polytechnic student is appropriate to get introduced to yoga practice as this will help them in studies as well as his professionallife. Moreover, Yoga inculcates discipline in all walks of the life of student. Pranayama practice regulates breathing practices of thestudent to improve stamina, resilience. Meditation empowers a student to focus and keep calm to get peace of mind. World Health Organization (WHO) has also emphasized the role of yoga and meditations stresspreventionmeasure.NationalEducationPolicy-2020 highlights importance of yoga and meditation amongst students of all ages. Therefore, this course for Diploma students is designed for the overall well being of the student and aims to empower students to adopt and practice Yoga in daily life.

ii)INDUSTRY/EMPLOYEREXPECTEDOUTCOME

By practicing basic yoga and pranayam in daily life, candidate should have attained the state of sound physique and balance mind to execute daily duties.

E. COURSELEVELLEARNINGOUT-COMES(COs)

Students will be able to achieve & demonstrate the following
On completion of course based learning-
CCH110_1 Practice basic Yoga and Pranayam in daily life to maintain physical and mental fitness.
CCH110_2- Practice meditation regularly for improving concentration and better handling of stress and anxiety.
CCH110_3- Follow healthy diet and hygienic practices for maintaining good health.

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"

Course Outcomes(COs)	ProgrammeOutcomes(POs)							ProgrammeSpecificOutcomes*(PSOs)		
	PO-1BasicandDisciplineSpecificKnowledge	PO-2 ProblemAnalysis	PO-3 Design/DevelopmentofSolutions	PO-4 EngineeringTools	PO-5 EngineeringPracticesforSociety,Sustainabilityand Environment	PO-6Project Management	PO-7 LifeLong Learning	PSO-1	PSO-2	
CO1	-	-	-	-	3	-	1	-	-	
CO2	-	-	-	-	3	-	1	-	-	
CO3	-	-	-	-	3	-	1	-	-	
Legends:-High:03,Medium:02,Low:01,NoMapping:- *PSOsaretobeformulatedatinstitute level										

F. CONTENT:

I) Practical exercises

Sr No	LaboratoryExperiment/PracticalTitles/TutorialTitles	Learning hrs.	Relevant COs
1	Introduction:- 1.1 Introduction to AshtangYog 1.2 Presentations on Introduction to Yogaandits History, Omkar chanting, prayer, Padmasan, Siddhasan &Vajrasan 1.3 Lab Exp: 1. Perform warming up exercises to prepare the body from head totoeforYoga - i)Nack Movement ii)Shoulder Movement iii) Trunk Movement iv)Knee Movement v)Ankle Movement	03	CCH110-1
2	Lab Exp: 2. Afterwarmup, perform all the postures of Surya Namaskar one by one in a very slow pace, Lab Exp 3. Perform multiple Surya-Namaskar (Starting with three and gradually increasing it to twelve)in one go. (Experiment 2 to 4must be followed by shavasana for self relaxation.)	4	CCH110-1, CCH110-2
3	Lab Exp: 4 Perform Sarvangasna, Halasana, Kandharasana (setubandhasana) , Uttanpadasan, Pavanmuttasan. LabExp:5 Perform Bhujangasana, Naukasana, Mandukasana. LabExp:6PerformShalbhasan, Dhanurasan, Vakrasan,Goumukhasan,Paschimottasana, Ardhamasendrasan LabExp:7 PerformVeerasan, Veer-Bhadrasana, Vrukshasana, Trikonasana. (Follow up experiment 5to7 with shavasana for self relaxation)	4	CCH110-2
4	Lab Exp: 8 Perform Deepbrathing , Anulom Vilom Pranayam Kriya LabExp:9 Practice Kapalbhati Pranayam Kriya, Bhastrika LabExp:10 Practice Bhramary Pranayam and Sheetali Pranayam	2	CCH110-3
5	Lab Exp: 11 Perform sitting in Dhyan Mudra and meditating. Start with five minute and slowly increasing to higher durations. Introduction to Vippasanna , Anappan & Chakras. (Trainerwill explainthe benefits of Meditation before practice)	2	CCH110-3

II) Theory : (Not Applicable)

Section I NA

Section –II NA

** No questions will be asked on IKS learning subtopics in any question papers.

G: List of Assignments under SLA

**Candidate has to complete at least one major assignment from the given during his or her a single semester.

Maintain a diary indicating date wise practiced one by the student with a photograph of self in yogi c posture. Prepare Diet for and nutrition chart self

Assignment:

- Prepare Diet for and nutrition chart for your self
- Self-**Learning**
  - Practiceatleast thrice aweek.
  - Read books on different methods to maintain health, wellness and to enhance mood
  - WatchvideosonYogaPractices.

H: Specification table for setting question paper for semester end theory examination: NA

I:-Assessment Criteria

Sr.No.	List of Assignment (under SLA)	Hrs Allotted
1	Maintain a diary indicating date-wise practice done by the student with a photograph of self-yogi c posture	02
2	Prepare Diet for and nutrition chart self	01
3	Practice at least thrice a week.	02
4	Read books on different methods to maintain health, wellness and to enhance mood	02
5	Watch videos on Yoga Practices.	01
6	Post your selfie with one asana on social media	02
7	Post your selfie with meditation posture on social media FB	02
8	Create your short video clip while performing one or two asanas	02
9	Create your short video performing Sun Salutation (Suyranamaskar)	01
	Total	15hrs

i) Formative Assessment of Practical:-

Every assignment shall be assessed for 25 marks as per the following criteria

Domain	**Particulars**	**Marks out of 25**
Cognitive	Understanding	05
	Application	05
Psychomotor	Performance Skills	10
Affective	Discipline and Mind Balance	05
	TOTAL	**25**

ii) Summative Assessment of Practical: NA

Every practical assignment shall be assessed for - marks as per following criteria:

Sr.no	**Criteria**	**Marksallotted**
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
TOTAL		**NA**

J) Instructional Methods:

1. Lectures cum Demonstrations
2. Laboratory practices.
3. Use of third party audio visual material for demonstration

4.Demonstration Chart

K) Teaching and Learning resources:

Presentations, Yoga kits, Demonstrative charts, Actual Practice demonstration

L) Reference Books:

S.N.	Name of Book	Author	Publication
1	Patanjalis Yoga Sutras	Swami Vivekananda	Fingerprint Publishing (2023) Prakash BooksIndiaPvtLtd,NewDelhiISBN-13?:?978-9354407017
2	Yoga for Every Body: A beginner's guide to the practice of yoga postures, breathing Exercises and me	Luisa Ray, Angus Sutherland	VitalLifeBooks (2022) ISBN-13?:?978-1739737009
3	Mudras for Modern Living: 49inspiring cards to boost your health, enhance your yoga and deepen your mind	Swami Saradananda	WatkinsPublishing(2019) ISBN-13?:?978-1786782786
4	The Relaxation and Stress Reduction Workbook	Martha Davis, Elizabeth Robbins, MatthewMcKay, Eshelman MSW	ANewHarbingerSelf-HelpWorkbook(2019)
5	Science of Yoga: Understand the Anatomy and Physiology to Perfect Your Practice	Ann Swanson	ISBN-13?:?978-1465479358

M) Learning Website & Software

1. https://onlinecourses.swayam2.ac.in/aic23ge09/preview - Yoga for Creativity
2. https://onlinecourses.swayam2.ac.in/aic19_ed28/preview- introduction to Yoga and Applications of Yoga
3. https://onlinecourses.swayam2.ac.in/aic23 e05/preview- Yoga for Creativity
4. https://onlinecourses.nptel.ac.in/noc2lhs29/preview- Psychology of Stress, Health and Well-being
5. https://onlinecourses.swayam2.ac.in/ncel9sc04/preview-Food Nutrition for Healthy LivingCourse —Swayam
6. https://onlinecourses.swayam2.ac.in/aic23e06/ preview- yoga for memory development

ProgrammeName :Diploma In Information Technology

Programme Code	**:IF(06)**	**WithEffectFromAcademicYear**	**: 2023-24**
Duration Of Programme	**: 6 Semester**	**Duration**	**: 16 WEEKS**
Semester	**: Second**	**Scheme**	**: H**

Sr No	CourseTitle	Abbrevation	Level	Course Type	Course Code	Total IKS Hrsfor Sem.	Learning Scheme					Credits	Assessment Scheme											Total Marks
							ActualContact Hrs./Week			Self Learning(Activity/ Assignment /MicroProject)	Notional Learning Hrs/Week		PaperDuration (hrs.)	Theory				Based on LL&TL				Based onSelf Learning		
																		Practical						
							CL	TL	LL					FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
																Max							Min	
1	APPLIED MATHEMATICS	HAMT	III	AEC	CCH301	2	4	2	-	-	6	3	3	30	70	100	40	-	-	-	-	-	-	100
2	ENGINEERING CHEMISTRY	HCHA	I	AEC	CCH103	4	4	-	2	2	8	4	1.5	30*#	70*#	100	40	25	10	25@	10	25	10	175
3	COMMUMNICATION SKILL	HCMS	II	AEC	CCH201	0	4	-	2	2	8	4	3	30	70	100	40	25	10	-	-	25	10	150
4	LINUX BASICS	HLIX	III	DSC	ITH301	0	2	-	2	2	6	3	-	-	-	-	-	50	20	25@	10	25	10	100
5	PROGRAMMING IN C	HPIC	I	DSC	ITH105	0	3	-	4	1	8	4	3	30	70	100	40	50	20	50@	20	25	10	225
6	ELEMENTS OF PRACTICAL ELECTRICITY	HEPE	I	AEC	ITH104	0	-	-	2	0	2	1	-	-	-	-	-	25	10	25@	10	-	-	50
7	SOCIAL AND LIFE SKILLS	HSLS	II	VEC	CCH204	-	-	-	-	2	2	1	-	-	-	-	-	-	-	-	-	50	20	50
	Total					**06**	**17**	**2**	**12**	**9**	**40**	**20**	-	**120**	**280**	**400**		**175**		**125**		**150**		**850**

Abbreviations:CL-ClassroomLearning,TL-TutorialLearning,LL-LaboratoryLearning,FA-FormativeAssessments-SummativeAssessment,IKS-IndianKnowledgeSystem,SLA-SelfLearningAssessment
Legends: @ InternalAssessment, # ExternalAssessment, *# On Line Examination , @$ Internal Online Examination
Note :
1. FA-THrepresentsaverageoftwoclasstestsof30markseachconductedduringthesemester.
2. IfcandidateisnotsecuringminimumpassingmarksinFA-PRofanycoursethenthecandidateshallbedeclaredas"Detained"inthatsemester.
3. If candidate is not securing minimum passing marks in SLAof any course then the candidate shall be declared as fail and will have to repeat and resubmit SLAwork.
4. NotionalLearninghoursforthesemesterare(CL+LL+TL+SL)hrs.*15Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. *SelflearninghoursshallnotbereflectedintheTimeTable.
CourseCategory: DisciplineSpecificCourseCore(DSC): 2,DisciplineSpecificElective (DSE):0,ValueEducation Course(VEC):1, Intern./Apprenti./Project./Community(INP):0,AbilityEnhancementCourse (AEC) : 4, Skill Enhancement Course (SEC) : 0, GenericElective (GE) : 0

COURSE ID : CE/ME/IT/EE/ET/MT
COURSE NAME : APPLIED MATHEMATICS
COURSE CODE : CCH301
COURSE ABBREVIATION : HAMT

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	04	3
	Tutorial Learning	02	
	LaboratoryLearning	-	
	SLH-SelfLearning	00	
	NLH-Notional Learning	**06**	

B: ASSESSMENT SCHEME :-

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL				BASED ON SLA		TOTAL
					Tutorial						
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
03	**30**	**70**	**100**	**40**	**--**	**--**	**--**	**--**	**--**	**--**	**100**

(TotalIKSHrsforSem.: 02Hrs)

C: ABBREVIATIONS:-CL-ClassRoomLearning,TL-TutorialLearning,LL-LaboratoryLearning,SLH-SelfLearningHours,NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA -Self LearningAssessment

Legends:@InternalAssessment,#ExternalAssessment,*#OnLine Examination,@$InternalOnlineExamination(TNR 12 font)

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidateisnotsecuringminimumpassing marksinFA-PRofanycourse thenthecandidateshallbedeclared as"Detained"in that semester.
3. IfcandidateisnotsecuringminimumpassingmarksinSLAofanycoursethenthecandidateshall bedeclaredas fail and will have to repeat and resubmit SLAwork.
4. NotionalLearninghoursforthesemesterare(CL+LL+TL+SL)hrs.*15Weeks
5. 1(one)creditisequivalentto30Notionalhrs.
6. *Selflearning hoursshall notbe reflectedin theTimeTable.

*Selflearningincludesmicroproject/assignment/otheractivities.(The list of all assignments are given in tabular format. At least 6 to 8 assignments to be given)

D. i)RATIONALE:-

Mathematics is an important pre-requisite for the development and understanding of engineering and technological concepts. For an engineer and technologist, knowledge of Mathematics is an effective tool to pursue and to master the applications in the engineering and technological fields. Applied mathematics is designed for its applications in engineering and technology. It includes integration, differential equation,. The connection between applied mathematics and its applications in real life can be understood and appreciated. Integral calculus helps in finding the area . Differential equation is used in finding curve, rectilinear motion. Statistics and probability will help a student to analyze data of large volume in their higher studies. The fundamentals of these topics are directly useful in understanding engineering applications in various fields.

ii)Competency:

The course should be taught and implemented with the aim to develop the course outcomes (CO's) for the student to acquire the competency needed to apply the mathematical techniques for engineering subjects.

1.Cognitive: Understanding and applying principles of mathematics to engineering problems
2. Psychomotor: To prepare charts displaying the area of irregular shapes using the concept of integration,prepare charts to displaying grouped and ungrouped data.
3. Affective :discipline, consistency, hard work , to concentrate ,accuracy, punctuality, aesthetics

E. COURSELEVELLEARNINGOUTCOMES(COS)(TNR 14)

CCH301-1 :To solve examples on integration using various techniques

CCH301-2 :To solve Differential equation of first order and first degree by various methods

CCH301-3 :To find approximate solution of algebraic equations and simultaneous equations by various methods.

CCH301-4:- To solve problems on Probability distributions

CCH301-5 :- Solve examples on Laplace Transform

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Maintain various types of electrical equipments	**PSO2** Maintain various sections of electrical power systems
Competency: Use DC machines and transformers.	3	2	1	-	1	-	2		
CCH301-1-CO-1 : To solve examples on integration using various techniques	3	1	-	-	1	-	1		
CCH301-2-CO-2 : To solve Differential equation of first order and first degree by various methods	3	1	1	1	1	1	1		
CCH301-3-CO-3 : To find approximate solution of algebraic equations and simultaneous equations by various methods.	2	3	1	1	1	1	1		
CCH301-4-CO-4:- To solve problems on Probability distributions	2	2	2	2	2	1	2		
CCH301-5-CO-5:- Solve examples on Laplace Transform	2	1	1	1	1	1	1		

F. CONTENT:

I) Tutorial exercises

Any **TEN** of the following Tutorial exercises shall be conducted in the Tutorial room in tutorial sessions of batches of about 20- 22 students:

Sr. no	Tutorial experiences	CO
1	Solve simple problems of Integration by substitution.	CCH301-1
2	Solve integration using by parts.	CCH301-1
3	Solve examples on Definite Integral based on given methods.	CCH301-1
4	Solve problems on properties of definite integral.	CCH301-1
5	Solve given problems for finding the area under the curve and area between two curves .(Only for civil and mechanical engg. group)	CCH301-1
6	Solve examples on mean value and root mean square value.(only for Computer, Electrical and Electronics engg. group)	CCH301-1
7	Solve first order first degree differential equation using variableseparable method.	CCH301-2
8	Solve first order first degree differential equation using exact differential equation and linear differential equation.	CCH301-2
9	Solve engineering application problems using differential equation.	CCH301-2
10	Solve problems on Bisection method, Regula falsiand Newton-Raphson method.	CCH301-3
11	Solve problems on Jacobi's method and Gauss Seidel method.	CCH301-3
12	Use Bakshali iterative methods for finding approximate value of square root.(IKS)	CCH301-3
13	Solve engineering problems using Binomial Distribution,Poisson Distribution and Normal Distribution.	CCH301-4
14	Solve problems on Laplace transform and properties of Laplace transform.	CCH301-5
15	Solve problems on Inverse Laplace transform and properties of Inverse Laplace transform.	CCH301-5

II)Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: CCH301-1 :To solve examples on integration using various techniques.			
Unit 1 Indefinite Integration	**Indefinite Integration** 1.1 Definition, Standard formulae 1.2 Rules of Integration(without proof), Examples 1.3 Integration by substitution 1.4 Integration by parts 1.5 Integration by partial fractions(only linear non repeated factors at denominator of proper fraction)	14	16
CO: CCH301-1 : To solve examples on integration using various techniques			
Unit 2 Definite Integration	**Definite Integration** 2.1 Definition, Examples 2.2 Properties of Definite Integration (without proof), Examples based on properties	8	8
CO: CCH301-2 : To solve Differential equation of first order and first degree by various methods			
Unit 3 Differential equation	**Differential equation** 4.1 Definition of differential equation 4.2 Order & degree of Differential equations 4.3 Methods of solving Differential equations of first order & first degree of following types: 4.3.1 Variable separable form 4.3.2 Exact Differential equations 4.3.3 Linear Differential Equations	8	10

Section –II

Sr. no.	**Topics/Subtopics**	Learning Hours	Classroom learning evaluation Marks
CO: CCH301-3 :- To find approximate solution of algebraic equations and simultaneous equations by various methods.			
Unit 4 Numerical Methods	**Numerical Methods** 4.1Numerical solution of Algebraic Equations 4.1.1 Bisection Method 4.1.2 Regula- Falsi Method 4.1.3 Newton –Raphson method.	10	14

	4.2 Numerical solution to simultaneous equations 4.2.1 Jacobi's Method 4.2.2 Gauss-Seidel method Bakhshali iterative method for finding approximate square root.(IKS)		
CO: CCH301-4:- To solve problems on Probability distributions			
Unit 5 **Probability Distribution**	**Probability Distribution** 5.1Binomial distribution 5.2 Poisson's distribution 5.3Normal distribution	8	8
CO:CCH301-5:- Solve examples on Laplace Transform .			
Unit 6 **Laplace Transform**	**Laplace Transform** 6.1 Definition ,Linearity property 6.2 Laplace Transforms of Standard functions(without proof) and examples 6.3 First shifting property and examples 6.4 Examples on Multiplication by t^n 6.5 Inverse Laplace Transform, Definition 6.6 Standard formulae(without proof) and examples 6.7 Inverse L.T.by using First shifting property 6.8 Inverse L.T. by using Partial fraction method	12	14

** No questions will be asked on IKS related subtopics in any question paper

G : Specification table for setting question paper for semester end theory examination

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks	CO
		Remember	Understand	Apply		
I / 1	Indefinite Integration	4	6	6	16	CCH301-1
I / 2	Definite Integration	-	4	4	8	CCH301-1
I / 3	Differential equation	2	4	4	10	CCH301-2
II /4	Numerical Methods	2	4	8	14	CCH301-3
II /5	Probability Distribution	-	4	4	8	CCH301-4
II/6	Laplace **Transform**	2	6	6	14	CCH301-5
	Total Marks				70	

H:-Assessment Criteria

i) Formative Assessment (Assessment for Learning)

- **Tests**

ii) Summative Assessment (Assessment of Learning)

- **End term exam**

I) Instructional Methods:

1. Lectures cum Demonstrations
2. Classroom practices
3. Use of projector and soft material for demonstration
4. Use of softwares such as Geogebra

J) Teaching and Learning resources:

Chalk board, LCD presentations, Demonstrative kits, Demonstrative charts.

K) Reference Books:

S.N.	Name of Book	Author	Publication
1	Higher Engineering Mathematics	Grewal B.S.	Khanna publication New Delhi,2013 ISBN:8174091955
2	A textbook of Engineering Mathematics	Dutta.D.	New age publication New Delhi,2006 ISBN:978-81-224-1689-3
3	Advance Engineering Mathematics	Kreysizg,Ervin	Wiley publication New Delhi,2016 ISBN:978-81-265-5423-2
4	Advance Engineering Mathematics	Das H.K.	S Chand publication New Delhi,2008 ISBN:978-81-219-0345-5
5	Introductory Methods of Numerical Analysis	S.S.Sastry	PHI Learning Private Limited,New Delhi.ISBN:978-81-203-4592-8
6	Studies in the History of Indian Mathematics	C.S.Seshadri	Hindustan Book Agency (India) P 19 Green Park Extension New Delhi.ISBN 978-93-80250-06-9
7	Calculus & Its Applications	Marvin L.Bittinger David J.Ellenbogen Scott A. Surgent	Addison-Wesley 10th Edition ISBN-13:978-0-321-69433-1
8	An Introduction to Statistical Learning with Application in R	Gareth James,Hastie Robert &Tibshirani	Springer New York Heidelberg Dordrecht London ISBN:978-1-4614-7138-7(eBook)

L) Learning Website & Software

a)http://nptel.ac.in/courses/106102064/1
b) https://www.woframalpha.com/
c)http://www.sosmath.com/
d)http://mathworld.wolfram.com
e)https://www.brilliant.org/
f)https://ocw.mit.edu/index.htm

COURSE ID:
COURSE NAME : ENGINEERING CHEMISTRY.
COURSE CODE : CCH 103
COURSE ABBREVIATION : HCHA

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	04	4
	Tutorial Learning	00	
	Laboratory Learning	02	
	SLH-Self Learning	02	
	NLH-Notional Learning	08	

B. ASSESSMENT SCHEME :-

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL Practical				BASED ON SLA		TOTAL
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
03	30 *#	70*#	100	40	25	10	25 @	10	25	10	175

(Total IKS Hrs for Sem. : 04 Hrs)

C: ABBREVIATIONS:- CL- Class Room Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination, @$ Internal Online Examination.(TNR 12 font)

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as"Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL) hrs.* 15 Weeks
5. 1(one) credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.

* Self learning includes micro project / assignment / other activities. (Provide list of all assignments here in tabular format At least 6 to 8 assignments to be given)

D. i) RATIONALE:-

Basic science such as Chemistry is the fundamental of Engineering & technology. It is most essential to learn the basic science to understand the fundamental concepts in Engineering & technology. Engineering chemistry deals with the study of structure, composition & properties of the materials, which form the core of the fundamental science. Many processes are based on principle of Chemistry in various industries. Topics such as Water, Electrochemistry, Corrosion, & protection of metals from corrosion are some of the direct applications of chemistry in engineering. Hence, the knowledge of chemistry is essential to the aspiring engineers of all branches in their field. Engineering materials like Steel, Rubber, Plastic, Thermocole, Glass wool, Paints, Lubricants are the backbone of various industries, machines, equipment & processes.

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME

Apply principles of advanced chemistry to solve engineering problems.

Cognitive: Understanding concepts of chemistry for applications in the area of engineering.

Psychomotor:

i) Sketching and labeling the diagrams for extraction of copper
ii) Experimentally analyzing the water samples for preparing portable water by different methods.
iii) Preparing chart of showing percentage, composition, properties and industrial applications of solders.
iv) Handling & use of glassware & chemicals.

Affective: i) Accuracy ii) Safety iii) Punctuality iv. Attitude.

E. COURSE LEVEL LEARNING OUTCOMES (COS)

CCH103-1 Apply the basic knowledge of atom, molecules and compounds in Engineering Chemistry.

CCH103-2 Apply the concepts of Electrochemistry to interpret the reasons of corrosion with its remedies.

CCH103-3 Select the relevant catalyst, insulators, adhesives, composite materials, plastic and rubber for different applications in the field of engineering.

CCH103-4 Use of water in Domestic purpose, Industrial purpose and its relevant treatment to solve industrial problems.

CCH103-5 Explain the method of Extraction of Copper and select proper types of alloys, solders for various purposes.

CCH103-6 Apply the basic knowledge of Cells and Batteries in Industrial applications.

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1**	**PSO2**
CCH103-1 CO-1 Apply the basic knowledge of atom, molecules and compounds in Engineering Chemistry.	3.0	2.0	-	1.0	3.0	1.0	3.0	1.0	1.0
CCH103 -2 CO-2 Apply the concepts of Electrochemistry to interpret the reasons of corrosion with its remedies.	3.0	2.0	-	1.0	2.0	1.0	3.0	-	-
CCH103 -3 CO-3 Select the relevant catalyst, insulators, adhesives, composite materials, plastic and rubber for different applications in the field of engineering.	3.0	1.0	-	-	2.0	1.0	3.0	-	-
CCH103 – 4 CO-4 Use of water in Domestic purpose, Industrial purpose and its relevant treatment to solve industrial problems.	3.0	2.0	-	1.0	3.0	1.0	3.0	-	-
CCH103-5 CO-5 Explain the method of Extraction of Copper and select proper types of alloys, solders for various purposes.	3.0	1.0	-	-	2.0	1.0	3.0	-	-
CCH103- 6 CO-6 Apply the basic knowledge of cells and Batteries in Industrial applications.	3.0	2.0	-	1.0	2.0	1.0	3.0	-	-

F. CONTENT:

I) Practical exercises

The following practical exercises shall be conducted in the *Laboratory for Engineering Chemistry developed* by the Institute in practical sessions of batches of about 20- 22 students:

Sr. no	Laboratory experiences	CO
1	Introduction to Chemistry laboratory	CCH103-1
2	Volumetric analysis of solution.	CCH103-1
3	Preparation of 1 N, 0.5 N & 0.1 N Solutions of different chemicals like NaOH, HCI, Oxalic acid, $FeSO_4$, etc.	CCH103-1
4	Titration of strong acid and strong bases (HCl X NaOH)	CCH103-1
5	Double titration of strong acid, strong base & weak acid (HCI X NaOH X $H_2C_2O_4.H_2O$)	CCH103-1
6	Titration of weak base , strong acid & strong base (Na_2CO_3 X H_2SO_4 X KOH)	CCH103-1
7	Estimation of chloride content in water by Mohr' s method	CCH103-4
8	Determination of amount of Ca and Mg ions present in given sample of water by E.D.T.A method	CCH103-4
9	Estimation of viscosity of oils/solutions by Ostwald's method	CCH103-1
10	Estimation of Ca in limestone.	CCH103-4
11	Titration of $KMnO_4$ & $FeSO_4$ (Redox titration)	CCH103-1
12	Estimation of % of Fe in given sample of steel.	CCH103-1
13	Determination of alkalinity of water.	CCH103-4
14	Determination of Electrochemical equivalent (ECE) by copper volt meter.	CCH103-2
15	To estimate volumetrically the percentage of copper in a given sample of Brass.	CCH103- 5
16	To demonstrate the different types of Solders.	CCH103-5

II) Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO - CCH103-1 Apply the basic knowledge of atom, molecules and compounds in Engineering Chemistry.			
1	**ATOMIC STRUCTURE AND CHEMICAL BONDING** 1.1 Philosophy of atom by Acharya Kanad. 1.2 Atom, Fundamental particles, Nature of atom. 1.3 Atomic Number, Mass Number, Isotopes and isobars. 1.4 Bohr's theory of atom. 1.5 Statement of Aufbau's principle, Hund's rule of maximum multiplicity, Pauli's exclusion principle.	**07**	**08**

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
	1.6 Lewis and Langmuir's concept of stable electronic configuration. 1.7 Electrovalency and Co-valency. 1.8 Formation Of electrovalent compounds- NaCl, $CaCl_2$. 1.9 Formation of Covalent compounds- H_2O, CO_2.		
CO - CCH103-2 Apply the concepts of Electrochemistry to interpret the reasons of corrosion with its remedies.			
2	**ELECTROCHEMISTRY AND CORROSION.** 2.1Definitions- Cathode, Anode, Conductor, Electrolyte, Electrode, Ionisation, Electrolysis. 2.2 Arrhenius Theory Of Ionisation. 2.3 Degree of Ionisation & Factors affecting degree of ionisation. 2.4 Statement of Faraday's first and second law of electrolysis. 2.5 Relation between CE and ECE. 2.6 Electrolysis of molten NaCl. 2.7 Electrolysis of CuSO4 solution by using Cu-Electrodes. 2.8 Industrial applications of electrolysis. 2.8.1 Electroplating. 2.8.2 Electro refining of Cu. 2.9 Definition & types of corrosion. 2.10 Dry or Atmospheric corrosion , Oxide Film Formation & its types, Factors affecting atmospheric corrosion. 2.11Wet or electrochemical corrosion 2.12 Factors influencing immersed corrosion 2.13 Methods of protection of metal from corrosion - Hot dipping (Galvanizing & Tinning) ,Metal spraying, Metal cladding, Cementation or sherardizing.	**10**	**10**
CO - CCH103-3 Select the relevant catalyst, insulators, adhesives, composite materials, plastic and rubber for different applications in the field of engineering.			
3	**CHEMISTRY OF ENGINEERING MATERIALS AND CATALYSIS.** **3.1 INSULATORS** 3.1.1 Definition & Characteristics of insulator. 3.1.2 Preparation, properties & uses of Glass wool, Thermocole. **3.2 COMPOSITE MATERIALS** 3.2.1 Definition. 3.2.2 Classification, Properties & Application of composite materials.	**13**	**16**

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
	3.3 PLASTICS 3.3.1Definition of Polymer, Polymerization. 3.3.2Types of polymerization – Addition & Condensation polymerization. 3.3.3Classification of plastic - Thermosoftening & Thermosetting plastic. 3.3.4 Engineering properties & applications of plastic. **3.4 RUBBER** 3.4.1 Elastomer 3.4.2 Drawbacks of Natural rubber. 3.4.3 Vulcanization of rubber. 3.4.4 Engineering properties & uses of rubber. **3.5 ADHESIVES** 3.5.1 Definition of adhesives. 3.5.2 Characteristics of good adhesive. 3.5.3 Properties of adhesive. **3.6 CATALYSIS** 3.6.1 Definition. 3.6.2 Types of Catalyst with example. - Positive catalyst - Negative catalyst 3.6.3 Types of Catalysis. - Homogeneous catalysis. - Heterogeneous catalysis 3.6.4 Catalytic Promoters. 3.6.4 Catalytic Inhibitors 3.6.5 Autocatalysis.		

Section –II

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO - CCH103-4 Use of water in Domestic purpose, Industrial purpose and its relevant treatment to solve industrial problems.			
4	**WATER** 4.1 Impurities in natural water. 4.2 Hard water & Soft water. 4.3 Hardness of water- Temporary & Permanent. 4.4 Reactions of hard water with soap. 4.5 Disadvantages of hard water for domestic & Industrial	**09**	**12**

	purpose - Textile Industry, Sugar Industry, Paper Industry Dying Industry. 4.6 Sterilization of water - Chlorination –by Cl_2, bleaching powder, Chloramines with chemical reactions. 4.7 Ion Exchange method to remove total hardness of Water.		
CO - CCH103-5 Explain the method of Extraction of Copper and select proper types of alloys, solders for various purposes.			
5	**METALLIC CONDUCTORS AND SOLDERS** **5.1 METALLIC CONDUCTORS** 5. 1.1 Occurrence of metals 5.1.2 Distinction between mineral & ore 5.1.3 Definition of flux, Gangue & Slag 5.1.4 Steps involved in metallurgy-Flow chart Concentration of ores— A) Physical Methods 1. Gravity Separation Method 2. Electromagnetic separation 3. Froth floatation method B) Chemical Methods 1. Calcination 2. Roasting . 5.1.6 Important ores of copper Metallurgy of copper-Extraction of copper from copper pyrites by concentration, roasting, smelting, Bessemerisation, Electrorefining. 5.1.7 Physical properties & uses of Copper. **5.2 SOLDERS** 5.2.1 Definition of alloy, classification of alloys & purposes of making alloy. 5.2.2 Composition, properties & applications of Soft solder. A) Tinmann's solder, B) Brazing alloy , C) Plumber's solder D) Rose metal E) Woods metal	**14**	**16**
CO - CCH103-6 Apply the basic knowledge of Cells and Batteries in Industrial applications.			
6	**CELL AND BATTERIES** 5.1Definition of Electrochemical cell, Battery, Charge, Discharge, Closed Circuit Voltage, Electrochemical couple, Internal resistance, Open Circuit Voltage, Separator, E.M.F. 5.2 Classification of Batteries such as – Primary & Secondary Batteries 5.3 Construction, Working and Applications of a	**07**	**08**

	Primary Cell such as Dry Cell , Secondary Cell such as Lead Acid Storage Cell 5.4 Charging and Discharging of Lead Acid Storage Cell 5.5 Hydrogen-Oxygen fuel cell, its chemical reactions & advantages 5.6 Introduction of solar cell		

** No questions will be asked on IKS learning subtopics in any question papers.

G : List of Assignments under SLA (25 marks)

** From the above any two assignments to be completed by the students.

Sr.No	List of Assignment (under SLA) (Any one of the following)	Hrs Allotted
1	Prepare distinguish chart for Isotopes & Isobars, Electrovalent & Covalent bond	02
2	Prepare Charts of Bohr's Theory, Lewis & Langmuir's theory.	02
3	Faraday's First & Second law statements & formula.	02
4	Electroplating & Electrorefining with diagram	02
5	Note on corrosion due to Oxygen & its types	02
6	With neat labelled diagram explain the process of 1. Galvanizing, 2. Tinning, 3. Metal spraying, 4. Metal Cladding, 5. Sherardizing	02
7	Properties of Plastics, rubber, insulator, composite materials & adhesives.	02
8	Uses/Applications of Plastics, rubber, insulator, composite materials & adhesives.	02
9	Draw diagram of Ion Exchange method	02
10	Note on Impurities present in Natural Water.	02
11	Disadvantages of hard water in Domestic purposes	02
12	Disadvantages of hard water in Industrial purposes	02
13	Flow chart of Metallurgical processes	02
14	With neat labelled diagram explain 1. Gravity separation method. 2. Electromagnetic separation method. 3. Froth floatation method.	02
15	Distinguish between Calcination & Roasting	02
16	Smelting process of Copper with diagram	02
17	Bessemerisation of Copper with diagram	02
18	Physical properties & uses of copper.	02
19	Definition & classification of alloys	02
20	Purposes of making of alloys	02
21	Composition, properties & applications of 1. Soft solder, 2. Tinmann's solder, 3. Brazing alloy, 4. Plumber's solder, 5. Rose metal, 6. Wood's metal	02

22	Definitions of Electrochemical cell, Battery, Charge, Discharge, Closed circuit voltage, Open circuit voltage, Electrochemical couple, internal resistance, Separator, EMF.	02
23	Distinguish between Primary & Secondary batteries	02
24	Construction of Dry cell	02
25	Working & applications of Dry cell	02
26	Construction of Lead acid storage cell	02
27	Working & applications of Lead acid storage cell	02
28	Construction of H_2-O_2 fuel cell with Chemical reactions & advantages	02
29	Construction & working of solar cell	02

H : Specification table for setting question paper for semester end theory Examination.

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks	CO
		Remember	Understand	Apply		
I / 1	Atomic Structure and Chemical Bonding	4	2	2	08	CCH103-1
I / 2	Electrochemistry & Corrosion	4	4	2	10	CCH103-2
I / 3	Chemistry of Engineering materials & catalysis	6	6	4	16	CCH103-3
II /4	Water	4	4	4	12	CCH103-4
II /5	Metallic conductors & solders	6	6	4	16	CCH103-5
II / 6	Cell & Batteries	4	2	2	8	CCH103-6
	Total Marks				70	

I :-Assessment Criteria

i) Formative Assessment of Practical / Self learning assessment :-

Every assignment shall be assessed for 25 marks as per following criteria:

Domain	**Particulars**	**Marks out of 25**
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	05
	Drawing / drafting skills	05
Affective	Discipline and punctuality	05
TOTAL		**25**

ii) Summative Assessment of Practical :-

Every practical assignment shall be assessed for 25 marks as per following criteria:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Preparedness for practical	05
3	Neat & complete Diagram.	05
4	Observations & handling of instrument.	05
5	Oral Based on Lab work and completion of task	05
TOTAL		**25**

J) Instructional Methods:

1. Lectures cum Demonstrations,
2. Class room practices.
3. Use of projector and soft material for demonstration
4. Charts
5. Simulation videos

K) Teaching and Learning resources:-

Chalk board, LCD presentations, Demonstrative kits, Demonstrative charts.

L) Reference Books:

Sr. No.	Author	Title	Publisher
1.	Jain & Jain	Engineering chemistry	Dhanpatrai publishing co.
2.	S. C. Rangawala	Engineering materials	Engineering publication
3.	Jain & Agarwal	Metallurgical Analysis	Agarwal publications
4.	O. P. Khanna	Material science & technology	Khanna publication on 2006
5.	Rollason	Metallurgy for Engineers	ASM publication
6.	J. C. Kuriacose	Chemistry in Engineering & Vol. 1 & 11	-
7.	P. C. Jain	Chemistry of Engineering Materials	-
8	S. S. Dara	A text of Engineering Chemistry	-
9.	R.Gopalan, D.Venkappa	Engineering Chemistry	Vikas Publishing House.

M) Learning Website & Software

a. www.substech.com
b. www.kentchemistry.com
c. www.chemcollective.org
d. www.wqa.org
e. www.chemistryteaching.com
f. www.ancient-origins.net/hisotry-famous-people/indian-sage-acharya-kanad-001399

COURSE ID :
COURSE NAME : COMMUNICATION SKILLS
COURSE CODE : CCH201
COURSE ABBREVIATION : HCMS

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	04	4
	Tutorial Learning	00	
	LaboratoryLearning	02	
	SLH-SelfLearning	02	
	NLH-Notional Learning	08	

B. ASSESSMENT SCHEME :-

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL Practical				BASED ON SLA		TOTAL
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
03	30	70	100	40	25	10	-	-	25	10	150

(TotalIKSHrsforSem.:00Hrs)

C: ABBREVIATIONS:- CL-ClassRoomLearning,TL-TutorialLearning,LL-LaboratoryLearning,SLH-SelfLearningHours,NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA -Self LearningAssessment

Legends:@InternalAssessment,#ExternalAssessment,*#OnLine Examination,@$InternalOnlineExamination.

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidateisnotsecuringminimumpassing marksinFA-PRofanycourse thenthecandidateshallbedeclared as"Detained"in that semester.
3. IfcandidateisnotsecuringminimumpassingmarksinSLAofanycoursethenthecandidateshallbedeclaredasfailand will have to repeat andresubmit SLAwork.
4. NotionalLearninghoursforthesemesterare(CL+LL+TL+SL)hrs.*15Weeks
5. 1(one)creditisequivalentto30Notionalhrs.
6. *Selflearning hoursshall notbe reflectedin theTimeTable.

*Selflearningincludesmicroproject/assignment/otheractivities.(Provide list of all assignments here in tabular format At least 6 to 8 assignments to be given)

D. i)RATIONALE:-

Communication, being an integral part of every human activity, plays a fundamental role in education, science and technology. The communication skills are essential for engineering professionals to carryout routine tasks at workplace. These skills are also required for professional activities like dialogue, persuasion and negotiation. Considering the age group and socio-economical background of the students of the Institute, this course has been designed with a skill-oriented content with some necessary theoretical foundation. Thus, this course has been designed to enhance the skills to communicate effectively and skillfully at workplace.

ii)INDUSTRY/EMPLOYEREXPECTED OUTCOME

Theaimofthiscourseistohelpthestudenttoattainthefollowingindustryidentifiedoutcomethroughvariouslearningexperiences:

1."Communicate in written and oral form of English effectively at workplace."

E. COURSELEVELLEARNINGOUTCOMES(COs)

CCH201-1 Use Contextual words in English appropriately.
CCH201-2 Comprehend the concept of communication and identify communication barriers.
CCH201-3 Prepare and participate in dialogue, conversation, elocution and debate.
CCH201-4 Make effective use of body language & graphical communication.
CCH201-5 Write letters, reports, e-mails and technical description in correct language.
CCH201-6 Prepare and present effective media aided presentation.

COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX:

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"

	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1	PSO2
Competency: Apply principles of communication to communicate in formal and informal scenario.	2	-	-	-	-	1	2		
CCH201-1 Use Contextual words in English appropriately.	1	1	-	-	-	2	1		
CCH201-2 Comprehend the concept of communication and identify communication barriers	2	1	-	-	-	2	2		
CCH201-3 Prepare and participate in dialogue, conversation, elocution	2	1	-	-	-	2	1		

and debate.									
CCH201-4 Make effective use of body language & graphical communication.	2	-	-	-	-	2	2		
CCH201-5 Write letters, reports, e-mails and technical description in correct language.	2	-	-	-	-	2	1		
CCH201-6 Prepare and present effective media aided presentation.	1	1	-	-	-	1	1		

F. CONTENT:

I) Practical Exercises

The following practical exercises shall be conducted in the Laboratory for *Communication Skills* developedby the Institute in practical sessions of batches of about 20- 22 students:

Sr No.	Title of Practical Exercise	Course Outcome
1.	Vocabulary Building: Affixation	CCH201-1
2.	Vocabulary Building: Homophones	CCH201-1
3.	Vocabulary Building: Synonyms-Antonyms and Collocations	CCH201-1
4.	Communication Cycleand Communication Barriers	CCH201-2
5.	Oral Communication: Transcription	CCH201-3
6.	Oral Communication: Prepared Speech	CCH201-3
7.	Oral Communication: Conversation	CCH201-3
8.	Oral Communication: Group Discussion	CCH201-3
9.	Oral Communication: Group Debate	CCH201-3
10.	Non-verbal Communication: Graphic Communication	CCH201-4
11.	Non-verbal Communication: Body Language	CCH201-4
12.	Written Communication: Writing formal Letters	CCH201-5
13.	Written Communication: Writing Reports	CCH201-5
14.	Written Communication: Drafting of E-mail	CCH201-5
15.	Written Communication: Technical Writing	CCH201-5
16.	Presentation Aids	CCH201-6

II) Theory

Section I

Sr. No.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: CCH201-1 Use Contextual words in English appropriately.			
1	Vocabulary Building 1.1 Affixation: Prefix and Suffix, Definition and Examples, List of common Prefixes and Suffixes 1.2 Synonyms and antonyms: Vocabulary Expansion, Context and Usage 1.3 Homophones: Identifying Homophones, Meaning and Contest, Vocabulary Expansion 1.4 Collocation: Definition and Identification, Types of Collocations	8	08
CO: CCH201-2 Comprehend the concept of communication and identify communication barriers.			
2	Introduction to Communication 2.1 Definition and Importance of Communication 2.2 Model of Communication 2.3 Principles of Effective Communication 2.4 Types of Communication: Formal, Informal, Oral, Written, Verbal, Non-Verbal, Horizontal, Upward, Downward and Diagonal Communication 2.5 Barriers to communication: Physical, Mechanical, Psychological and LanguageBarriers	14	16
CO: CCH201-3: Prepare and participate in dialogue, conversation, elocution and debate.			
3	Oral Communication 3.1 Characteristics of Oral Communication. 3.2 Phonetics: IPA, Vowels(12), Consonants(24) and Diphthongs (12) 3.3 Tone, Pronunciation and Accents. 3.4 Spoken English: Prepared and Extempore speeches 3.5 Role Play: Conversation and Dialogue 3.6 Group Discussion and Debate	8	10

Section II

Sr. No.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: CCH201-4: Make effective use of body language & graphical communication.			
4	Non-verbal Communication 4.1 Importance of Non-Verbal Communication. 4.2 Aspects of Body Language: Facial Expressions, Eye Contact, Vocalics, Gestures, Posture, Dress, Appearance and Personal Grooming and Haptics. 4.3 Non-Verbal Codes: Proxemics, chroemics, artefacts 4.4 Graphical Communication: 4.4.1 Advantages and Disadvantages of Graphical Communication. 4.4.2 Tabulation of Data and its depiction in the form of Bar Graphs and Pie Charts	08	12
CO: CCH201-5 Write letters, reports, e-mails and technical description in correct language.			
5	Written Communication 5.1 Characteristics of Written Communication. 5.2 Letter Writing: Application with Resume, Enquiry Letter, Order Letter and Complaint Letter 5.3 Writing Reports: Accident, Fall in Production Reports and Micro Project 5.4 Email Writing 5.5 Technical Writing: Object Description, Picture Description, Diary Writing 5.6 Paragraph Writing: Narrative, Descriptive and Technical	16	20
CO: CCH201-6 Prepare and present effective media aided presentation.			
6	Media-Aided Presentations 6.1 Media aids for Presentation: Strengths and Precautions 6.2 Planning, Preparing and Making a Presentation 6.3 Use of Presentation Media	06	04

** No questions will be asked on IKS learning subtopics in any question papers.

G : List of Assignments/Activities/Micro-project under SLA

**A learner should complete at least on major activity mentioned in the above list under the guidance of subject teacher.

Sr. No	List of Assignment (under SLA)	Hrs Allotted
1	Report different types of episodes and anecdotes	02
2	Seminar preparation and Presentation	04
3	Make a pod cost episode based on Indian freedom fighters.	02
4	Present summary of the editorial column of English news paper	02
5	Write review of on any one: short story, novel, film	02
6	Prepare a booklet on Indian scientist/ eminent persons	04
7	Prepare blog, vlogs and pod cast	04
8	Prepare questionnaire for interview on any one: industry personnel, social worker, entrepreneur and conduct interview.	02
9	Prepare charts/tables of vowels, diphthongs, consonant, organs of speech, vocabulary in English	02
10	Prepare charts/tables of types of communication, barrier in communication, aspects of body language	02
11	Prepare a micro project on a given topic.	04

H: Specification Table for Setting Question Paper for Semester End Theory Examination

Section/ Topic No.	Name of topic	Distribution of marks (level wise)			Total marks	CO
		Remember	Understand	Apply		
I / 1	Vocabulary Building	02	02	04	08	CCH201-1
I / 2	Introduction to Communication	04	06	06	16	CCH201-2
I / 3	Oral Communication	04	02	04	10	CCH201-3
II /4	Non-verbal Communication	04	02	06	12	CCH201-4
II /5	Written Communication	04	04	12	20	CCH201-5
II / 6	Media-aided Presentations	-	02	02	04	CCH201-6
	Total Marks				70	

I:-Assessment Criteria

i) Formative Assessment of Practical:-

Every assignment shall be assessed for 25 marks as per following criteria:

Domain	**Particulars**	**Marks out of 25**
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	05
	Drawing / drafting skills	05

Affective	Discipline and punctuality	05
TOTAL		**25**

ii) Summative Assessment of Practical:

Every practical assignment shall be assessed for 25 marks as per following criteria:

Sr.No.	Criteria	Marksallotted
1	Attendanceatregularpractical	NA
2	Preparednessforpractical	NA
3	Neat& completeDiagram.	NA
4	Observations& handlingofinstrument.	NA
5	OralBasedonLabworkandcompletionoftask	NA
TOTAL		

J) Instructional Methods:

1. Lecture cum Demonstration,
2. Classroom practices.
3. Use of projector and soft material for demonstration

K) Teaching and Learning Resources:

Chalk board, LCD presentations, Demonstrative kits, Demonstrative charts.

L) Reference Books:

S.N.	Name of Book	Author	Publication
1	Communication Skills	Sanjay Kumar ad Pushp Lata	Oxford University Press
2	Personality Development and Soft Skills	Brun K. Mitra	Oxford University Press
3	Effective Communication Skills	M Ashraf Rizvi	Tata McGraw-Hill
4	Human Communication	Burgoon Michael	SAGE Publication Inc.
5	101 Ways to Better Communication	Elizabeth Hiemey	Pustak Mahal
6	Technical Writing and Professional Communication	Thomas Huckin and Leslie	McGraw-Hill College Division

M) Learning Website & Software

a. www.nptel.com/iitm/
b. https://www.britishcouncil.in/english/learn-online
c. https://www.vocabulary.com
d. www.newagegolden.com
e. https://www.internationalphoneticassociation.org

COURSE ID: 06
COURSE NAME : LINUX BASICS
COURSE CODE : TH301
COURSE ABBREVIATION : HLIX

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	02	3
	Tutorial Learning	-	
	LaboratoryLearning	02	
	SLH-SelfLearning	02	
	NLH-Notional Learning	06	

B. ASSESSMENT SCHEME :-

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL Practical				BASED ON SLA		TOTAL
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
--	--	--	--	--	50	20	25@	10	25	10	100

(Total IKS Hrs for Sem:00 Hrs)

C: ABBREVIATIONS:- CL-ClassRoomLearning,TL-TutorialLearning,LL-LaboratoryLearning,SLH-SelfLearningHours,NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA -Self LearningAssessment

Legends:@InternalAssessment,#ExternalAssessment,*#OnLine Examination,@$InternalOnlineExamination

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidateisnotsecuringminimumpassing marksinFA-PRofanycourse thenthecandidateshallbedeclared as"Detained"in that semester.
3. IfcandidateisnotsecuringminimumpassingmarksinSLAofanycoursethenthecandidateshallbedeclaredasfailand will have to repeat andresubmit SLAwork.
4. NotionalLearninghoursforthesemesterare(CL+LL+TL+SL)hrs.*15Weeks
5. 1(one)creditisequivalentto30Notionalhrs.
6. *Selflearning hoursshall notbe reflectedin theTimeTable.

*Self learning includes micro project/ assignment/other activities.

D. i)RATIONALE:-

Linux Operating System is Open source and freely distributed Operating System (O.S). Apart from the fact that it's freely distributed, Linux's functionality, adaptability, and robustness make it highly suitable for the server platform. The course aims to provide knowledge in the basics of Linux, shell, and command line essentials.

ii)INDUSTRY/EMPLOYEREXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry-identified outcomes through various teaching-learning experiences:

1) To understand the basics of Linux operating system fundamentals and its open-source nature.
2) Basic Scripting Skills for automating tasks and creating custom shell scripts.
3) Ability to perform file operations and manipulate directories.

E. COURSELEVELLEARNINGOUTCOMES(COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

CO1 - Install Linux operating system.
CO2 - Execute general purpose commands of the Linux operating system.
CO3 - Manage files and directories in Linux operating system.
CO4 - Use vi editor in Linux operating system.
CO5 - Write programs using shell script.

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1 Design and Development**	**PSO2 Networking and Database Management**
Competency: Use Basic Scripting Skills for automating tasks and creating custom shell scripts.	3	2	2	2	1	1	2	2	1
ITH301-1 Install Linux operating system	3	2	2	3	1	-	3	-	-
ITH301-2 Execute general purpose commands of the Linux operating system	3	-	1	3	1	-	3	2	-
ITH301-3 Manage files and directories in Linux	3	-	1	3	1	-	3	2	-

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1 Design and Development**	**PSO2 Networking and Database Management**
operating system									
ITH301-4 Use vi editor in Linux operating system	3	2	2	3	1	-	3	2	-
ITH301-5 Write programs using shell script	3	2	2	3	1	-	3	-	1

F. CONTENT:

I) Practical exercises

The following practical exercises shall be conducted in the *Laboratory for Linux Basics developed* by the Institute in practical sessions of batches of about 20- 22 students:

Sr. no	Laboratory experiences	CO
1	*Install and configure the Linux operating system..	ITH301-1
2	*Execute general purpose Linux commands. 1) cal 2) date 3) echo 4) printf 5) bc 6) script 7) mailx 8) man 9) clear	ITH301-2
3	*Execute general-purpose Linux commands. 1) passwd 2) who 3) whoami 4) uname 5) tty 6) stty 7) ps 8) kill 9) sleep	ITH301-2
4	*Execute file and Directory manipulation commands. 1) pwd 2) cd 3) mkdir 4) rmdir 5) ls 6) cat 7) rm 8) mv 9) cp	ITH301-3
5	*Execute file and Directory manipulation commands. 1) touch 2) more 3) lp 4) file 5) wc 6) cmp 7) comm 8) diff 9) split	ITH301-3
6	*Execute Linux commands for compressing, decompressing, and archiving files. 1) gzip 2) gunzip 3) tar 4) tar -c 5) tar -x 6) zip 7) unzip	ITH301-3
7	*Change file and directory permissions. 1) ls -l, ls - ld 2) chmod (with all options) 3) chown 4) chgrp	ITH301-3
8	*Use the vi editor to create and edit files.	ITH301-4
9	Use wildcard characters (e.g., *, ?, []) to list and manipulate specific sets of files within the directory.	ITH301-4
10	a) Create a text file with various lines of text. b) Create a complex pipeline by chaining multiple commands together using pipes (|).	ITH301-4

Sr. no	Laboratory experiences	CO
11	*Execute input and output redirection in Linux	ITH301-4
12	*Execute the following filters commands in Linux. 1) pr 2) head 3) tail 4) cut 5) paste 6) sort 7) uniq 8) tr	ITH301-5
13	*Execute commands grep, egrep and sed in Linux	ITH301-5
14	Read user input, exit and exit status commands, expr, and logical operators in shell scripts.	ITH301-5
15	*Write the Shell script by using the "if" statement	ITH301-5
16	*Write a Shell script by using the "while" loop.	ITH301-5
17	*Write a Shell script by using the "for"- loop	ITH301-5

II) Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)
1	**Unit - I Introduction to Linux Operating System** 1.1 Introduction to Operating System and Linux. 1.2 History, Overview of Linux 1.3 Shell: Bourne, Korn, Cshell. 1.4 Linux releases, Linux File Systems (ext) and versions	**3**
2	**Unit - II General Purpose Utilities** 2.1 cal: The calendar, date: Displaying the system date, echo: Displaying message, printf: An alternative to echo, bc: The calculator, script: Recording your session 2.2 Email basics, mailx: The universal mailer 2.3 passwd: Changing your password, who: Who are the users?, uname: Knowing your machine characteristics 2.4 tty: Knowing your terminal, stty: Displayig and setting terminal charactristics	**5**
3	**Unit - III File Management in Linux** 3.1 The file: Ordinary file, Directory file, Device file, File name, The parent-child relationship, UNIX file system tree, The Unix file system, The home directory 3.1.1 pwd: Checking your current directory, cd: Changing the current directory, mkdir: Making directories, rmdir: Removing directories, ls: Listing directory contents 3.2 Absolute pathnames, Relative pathnames 3.3 Handling ordinary files, cat: Displaying and creating files, cp: Copying file, rm: Deleting files, mv: Renaming files, more: Paging output 3.4 The lp subsystem: printing a file, file: knowing the file types 3.5 wc: Counting lines, words and characters, od: Displaying data in octal, cmp: Comparing two files, comm: What is common?, diff: Converting one file to other 3.6 gzip and gunzip: Compressing and decompressing files, tar: The archival program, zip and unzip: Compressing and archiving together 3.7	**7**

Sr. no.	Topics/Subtopics	Learning (Hours)
	Basic file attributes, ls -l: Listing file attributes, the -d option: Listing directory attributes 3.8 File ownership, File permissions, chmod: Changing file permissions, directory permission, Changing file ownership, chown: Changing file owner, chgrp: Changing group owner	

Section –II

Sr. no.	Topics/Subtopics	Learning (Hours)
4	**Unit - IV The vi Editor and Shell** 4.1 The vi Editor: vi Command, Input, and Line Editing Modes. 4.2 Creating, Saving and Quitting a File in vi, Managing Editing Modes in vi. 4.3 vi Editing Commands: Common Operations. 4.4 Navigation: Movement in the four direction (h, j, k and l), Word navigation (b, e and w), Moving to Line extremes (0, | and $), Scrolling ([Ctrl-f], [Ctrl-b], [Ctrl-d] and [Ctrl-u], Absolute Movement (G) 4.5 Searching for a pattern(/ and ?), Repeating the last pattern search (n and N) 4.6 The Shell: The Shell's interpretive cycle, Shell offerings, Pattern matching: The wild-cards, Escaping and quoting, Redirection: The three standard files, /dev/null and /dev/tty: Two special files 4.7 Pipes, tee: Creating a tee, Common substitution, Shell Variables	**7**
5	**Unit - V Filters, Regular Expressions and Shell Programming** 5.1 Simple Filters: The sample database, pr: Paginating files, head: Displaying the beginning of a file, tail: Displaying the end of a file, cut: Splitting a file vertically, paste: Pasting files, sort: Ordering file, uniq: Locate repeated and nonrepeated lines,tr: Translating characters 5.2 Filters using regular expressions, grep: Searching for a pattern, Basic regular expression (BRE)- An introduction, Extended regular expressions (ERE) and egrep, sed: The stream editor 5.3 Essential Shell programming, Shell scripts, read: Making scripts interactive, Using command line arguments, exit and Exit status of command, The logical operators && and ||- Conditional executions 5.4 The if conditional, Using test and [ ] to evaluate expressions, the case conditional, expr: Computation and string handling, $0: Calling a script by different names 5.5 while: Looping, for: Looping with a list	**8**

** No Questions will be asked on IKS learning subtopics in any question papers.

G: List of Assignments under SLA

(Assignments Marked in * are compulsory)

Sr.No	List of Assignment (under SLA)	Hrs Allotted
1*	Prepare a chart showing different Open source Opearing Systems.	**06**
2*	Install Any Open source Opearing System	**06**
3*	Write a shell script that accept a file name starting and ending line numbers as arguments and display all the lines between given line no	**06**
4*	Write a Shell script that displays list of all the files in the current directory to which the user has read, write and execute permissions.?	**06**
5*	.Write a Shell script to list all of the directory files in a directory.	**06**

H : Specification table for setting question paper for semester end theory examination

Nil

I :-Assessment Criteria

i) Formative Assessment of Practical:-

Every assignment shall be assessed for 50 marks as per following criteria:

Domain	**Particulars**	**Marks out of 50**
Cognitive	Understanding	10
	Application	10
Psychomotor	Operating Skills	10
	Drawing / drafting skills	10
Affective	Discipline and punctuality	10
TOTAL		**50**

ii) Summative Assessment of Practical:

Every practical assignment shall be assessed for 25 marks as per following criteria:

Sr.no	**Criteria**	**Marksallotted**
1	Attendance at regular practical	05
2	Preparedness for practical	05
3	Neat & complete Diagram.	05
4	Observations & handling of instrument.	05
5	Oral Based on Lab work and completion of task	05
TOTAL		**25**

J) Instructional Methods:

1. Lectures cum Demonstrations,
2. Classroom practices.
3. Use of projector and soft material for demonstration

K) Teaching and Learning resources:

1. Chalk board, LCD presentations, Demonstrative kits, Demonstrative charts.
2. Computer system with all necessary components like; motherboard, random access memory(RAM), read-only memory (ROM), internal hard disk drives, Mouse, Keyboard, and open-source operating System. (RedHat, Ubuntu etc.).

L) Reference Books:

S.N.	Name of Book	Author	Publication
1	Linux The Complete Reference	Richard Petersen	McGraw Hill, 6th edition ISBN Number 978-0071492478
2	Linux command line and shell scripting	Richard Blum	Wiley India ISBN Number 978-1118983843
3	Linux Lab: Hands on Linux	Prof. Dayanand Ambawade	Dreamtech Press ISBN Number 9789350040003
4	Unix Concepts and Applications	Sumitabha Das	McGraw-Hill Education (India) Pvt Limited, 2006 ISBN Number 978-0070635463

M) Learning Website & Software

a. https://maker.pro/linux/tutorial/basic-linux-commands-for-beginners
b. https://www.guru99.com/must-know-linux-commands.html
c. https://www.shellscript.sh/
d. https://www.tutorialspoint.com/unix/shell_scripting.html
e. https://spoken-tutorial.org/tutorial/

COURSE ID:05
COURSE NAME : PROGRAMMING IN C
COURSE CODE : ITH105
COURSE ABBREVIATION : HPIC

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	03	4
	Tutorial Learning	-	
	LaboratoryLearning	04	
	SLH-SelfLearning	01	
	NLH-Notional Learning	08	

B. ASSESSMENT SCHEME :-

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL				BASED ON SLA		TOTAL
					Practical						
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
03	30	70	100	40	50	20	50@	20	25	10	225

(TotalIKSHrs.forSem.:00 Hrs.)

C: ABBREVIATIONS: -

CL-ClassroomLearning,TL-TutorialLearning,LL-LaboratoryLearning,SLH-SelfLearningHours,NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA -Self LearningAssessment
Legends:@InternalAssessment,#ExternalAssessment,*#onLine Examination,@$InternalOnlineExamination.

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidateisnotsecuringminimumpassing marksinFA-PRofanycourse thenthecandidateshallbedeclared as"Detained"in that semester.
3. IfcandidateisnotsecuringminimumpassingmarksinSLAofanycoursethenthecandidateshall bedeclaredas fail and will have to repeat andresubmit SLAwork.
4. NotionalLearninghoursforthesemesterare(CL+LL+TL+SL)hrs.*15Weeks
5. 1(one)creditisequivalentto30Notionalhrs.
6. *Selflearning hoursshall notbe reflectedin theTimeTable.

*Selflearningincludesmicroproject/assignment/otheractivities

D. i)RATIONALE:-

'C' programming language helps to build a strong foundation for computer programming. This course will help to solve beginner level problems such as mathematical operations, string processing, data structure and data structure related processing, with the help of basic concepts, control flow structures, and principles of C. This course is basically designed to create a base to develop foundation skills of procedure - oriented programming.

ii)INDUSTRY/EMPLOYEREXPECTED OUTCOME

The aim of this course is to help the students to attain the following industry identified outcome through various teaching learning experiences: Develop 'C' programs that address issues with processing strings, mathematic operations, and data structures.

E. COURSELEVEL LEARNINGOUTCOMES(COS)

ITH105-1: Develop C program using input - output functions and arithmetic expressions.
ITH105-2: Develop C program involving branching and looping statements.
ITH105-3: Implement Arrays and Strings using C programs.
ITH105-4: Develop C program using user-defined functions
ITH105-5: DevelopC program using structures.
ITH105-6: Write C program using pointer.

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
Competency: Develop 'C' programs that address issues with processing strings, mathematic operations, and data structures								2	-
ITH105-1 CO-1	3	2	2	1	-	-	1	1	-
ITH105-2 CO-2	2	3	3	2	-	-	2	1	-
ITH105-3 CO-3	2	3	3	3	-	2	2	1	-
ITH105-4 CO-4	1	3	3	3	1	2	3	3	-
ITH105-5 CO-5	2	3	3	3	-	2	3	3	-
ITH105-5 CO-6	1	3	3	3	1	1	3	3	-

F. CONTENT:

I) Practical exercises

The following practical exercises shall be conducted in the *Laboratory for Web Page Design* by the Institute in practical sessions of batches of about 20- 22 students:

(Practical's Marked in * are compulsory)

Sr. no	Laboratory experiences	CO
1	*Install and study the C programming environment	ITH105-1
2	Implement C programs using Constants and Variables	ITH105-1
3	*Implement C programs using arithmetic operators to solve given arithmetic operations	ITH105-1
4	Implement C programs using implicit and Explicit data type conversion	ITH105-1
5	*Write well commented C programs using formatted Input/output statements.	ITH105-1
6	*Implement minimum two C programs using Relational and conditional operator.	ITH105-1
7	*Implement minimum two C programs using Logical Operators	ITH105-1
8	Implement minimum two C programs using Bitwise Operators	ITH105-1
9	Implement minimum two C programs using simple If statement and if..else statement.	ITH105-2
10	* Implement minimum two C programs using nested If..else statement and if.. else if ladder e.g. - Write and Execute the C program to print the grades of students based on percentage. Grade: Distinction If per>=75 Grade: A If per>=60 and Per<75 Grade: B If per>=55 and Per Grade: Pass If per>=40 and Per<55 Grade: Fail If per<40	ITH105-2
11	* Develop C program using Switch statements	ITH105-2
12	* Write a C program to print English Calendar months as per given number(eg: If input is 4 then print "April") using Switch statement	ITH105-2
13	* Implement minimum two C programs using 'while' loop and 'do...while' loop statements.	ITH105-2
14	Implement C programs using for loop statement (e.g.- Write a C Program to print numbers from 1 to 100)	ITH105-2
15	* Print various patterns using loops. e.g. - Write C Program to print following or similar pattern * * * * * * * * * *	ITH105-2
16	* Implement C programs using One Dimensional Array. (e.g.-Write C program to input 5 numbers using array and display sum of it)	ITH105-3
17	* Implement C programs using Two Dimensional Array. (e.g.-Write C program to calculate addition of two 3X3 matrices.)	ITH105-3
18	* Write C program to perform following operations without using standard string functions. i) Calculate Length of given string ii) Print reverse of given string.	ITH105-3
19	* Develop C program using in-built mathematical and string functions.	ITH105-4

Sr. no	Laboratory experiences	CO
20	* Write C program to demonstrate User defined Functions	ITH105-4
21	Implement recursive functions in C program.	ITH105-4
22	*Implement 'Structure' in C (e.g. –Accept and Display information of one student using structure.)	ITH105-5
23	* Implement ' Array of Structure' in C (e.g.-Accept and Display 10 Employee information using structure)	ITH105-5
24	* Write C Program to print addresses and values of variables using Pointer. (e.g.- Write C program to access and display address of variables.)	ITH105-6
25	* Implement C Programs to perform arithmetic operations using Pointer.	ITH105-6

II) Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: ITH105-1: Develop C program using input - output functions and arithmetic expressions.			
1	**Basics of 'C' Programming** 1.1 Fundamentals of algorithms: Notion of algorithm, Notations used for assignment statements and basic control structures. 1.2 Introduction to 'C': General structure of 'C' program, Header file, 'main ()' function. 1.3 Fundamental constructs of 'C': Character set, tokens, keywords, Identifiers, Constants - number constants, character constants, string constants, Variables. Data types in 'C': Declaring variables, data type conversion. 1.4 Basic Input and Output functions: input and output statements using printf (), scanf () functions. 1.5 Assignments and expressions: simple assignment statements, arithmetic operators, shift operators, bitwise operators, sizeof operator.	**6**	**10**
CO: ITH105-2: Develop C program involving branching and looping statements.			
2	**Control structures** 2.1 Conditional statements: Relational operators, logical operators, if statement, if-else statements, nested if-else statements, if-else ladder, switch statement. 2.2 Looping statements: while loop, do… while loop, for loop. 2.3 Branching Statements: goto statement, use of 'break' and 'continue' statements.	**8**	**12**

ITH105-3: Implement Arrays and Strings using C programs.			
3	**Arrays and Strings** 3.1 Characteristics of an array, One dimension and two dimensional arrays, concept of multi-dimensional arrays. 3.2 Array declaration and Initialization. 3.3 Operations on Arrays. 3.4 Character and String input/output and String related operations.	**8**	**12**

Section –II

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
ITH105-4: Develop C program using user-defined functions.			
4	**Functions** 4.1 Concept and need of functions. 4.2 Library functions: Math functions, String handling functions, other miscellaneous functions such as getchar(), putchar() 4.3 Writing User defined functions - function definition, functions declaration, function call, scope of variables - local variables, global variables. 4.4 Function parameters: Parameter passing- call by value & call by reference, function return values, function return types, declaring function return types, The 'return' statement. 4.5 Recursive functions.	10	14
ITH105-5: Develop C program using structures.			
5	**Structures** 3.1 Introduction and Features of Structures 3.2 Declaration and Initialization of Structures 3.3 Array of structures.	**7**	**12**
ITH105-6: Write C program using pointer.			
6	**Pointers** 5.1 Introduction to Pointers: Definition, use of pointers, '*' and '&' operators, declaring, initializing, accessing pointers. 5.2 Pointer arithmetic. 5.3 Pointer to array. 5.4 Pointer and Text string.	**6**	**10**

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G: List of Assignments under SLA

Sr.No	List of Assignment (under SLA)	Hrs. Allotted
1	Complete any one course related to Programming in C on Infosys Springboard	04
2	Prepare a simple calculator to perform mathematical operations. Accept values and operations to be performed from user. Allow only numeric values else show appropriate messages to user.	04
3	Prepare menu driven program for Invoice management system. Accept user inputs and generate receipt and calculate amounts as per purchased items	04
4	Develop employee leave management system to display leave related information of employee.	04
5	Develop food menu card for restaurant. Display food items. Accept food menu, quantity and generate bill for the same.	04

H: Specification table for setting question paper for semester end theory examination

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks	CO
		Remember	Understand	Apply		
I / 1	Basics of 'C' Programming	4	2	4	10	ITH105-1
I / 2	Control structures	4	4	4	12	ITH105-2
I / 3	Arrays and Strings	4	4	4	12	ITH105-3
II /4	Functions	4	4	6	14	ITH105-4
II /5	Structure	2	4	6	12	ITH105-5
II / 6	Pointers	2	4	4	10	ITH105-6
	Total Marks				70	

I:-Assessment Criteria

i) Formative Assessment of Practical:-

Every assignment shall be assessed for 25 marks as per following criteria:

Domain	**Particulars**	**Marks out of 25**
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	05
	Drawing / drafting skills	05
Affective	Discipline and punctuality	05
TOTAL		**25**

ii) Summative Assessment of Practical:

Every practical assignment shall be assessed for 25 marks as per following criteria:

Sr.no	Criteria	Marksallotted
1	Attendanceatregularpractical	05
2	Preparednessforpractical	05
3	Neat& completeAlgorithm and flowcharts	05
4	Logical Approach&Programmingskill	05
5	OralBasedonLabworkandcompletionoftask	05
TOTAL		**25**

J) Instructional Methods:

1. Lectures cum Demonstrations.
2. Classroom practices.
3. Use of projector and soft material for demonstration
4. Laboratoryexperiencesandlaboratoryinteractivesessions
5. RegularHomeAssignments

K) Teaching and Learning resources:

Chalk board, LCD presentations, Self-Learning Online Tutorials, Demonstrative charts.

L) Reference Books:

S.N.	Name of Book	Author	Publication
1	Programming in ANSI 'C'	E. Balaguruswamy	Mcgraw Hill Publications ISBN 0070534772
2	Let us 'C'	YashwantKanetkar	BPB Publication ISBN 9788183331630
3	Head First C	David Griffiths, Dawn Griffiths	O'Reilly Media, Inc. ISBN: 9781449345013

M) Learning Website & Software

1. https://nptel.ac.in/courses/106104128
2. https://jsommers.github.io/cbook/control.html
3. https://www.learn-c.org/en/Functions
4. https://www.simplilearn.com/tutorials/c-tutorial/pointers-in
5. https://www.w3schools.com/c/
6. https://www.javatpoint.com/c-programming-language
7. https://www.programiz.com/c-programming
8. https://www.programiz.com/c-programming/onlinecompiler/

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COURSE ID :
COURSE NAME : ELEMENTS OF PRACTICAL ELECTRICITY
COURSE CODE : ITH104
COURSE ABBREVIATION : HEPE

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	00	1
	Tutorial Learning	00	
	LaboratoryLearning	02	
	SLH-SelfLearning	00	
	NLH-Notional Learning	00	

B. ASSESSMENT SCHEME :-

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL				BASED ON SLA		TOTAL
					Practical						
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
03	00	00	00	00	25	10	25	10	00	00	50

(Total IKS Hrs for Sem. :00Hrs)

C: Abbreviations:CL-ClassRoomLearning,TL-TutorialLearning,LL-LaboratoryLearning,SLH-SelfLearningHours,NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA -Self LearningAssessment
Legends:@InternalAssessment,#ExternalAssessment,*#OnLineExamination,@$InternalOnline Examination Note : (TNR 11 font)

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidateisnotsecuringminimumpassing marksinFA-PRofanycourse thenthecandidateshallbedeclared as"Detained"in that semester.
3. IfcandidateisnotsecuringminimumpassingmarksinSLAofanycoursethenthecandidateshallbedeclaredasfailand will have to repeat andresubmit SLAwork.
4. NotionalLearninghoursforthesemesterare(CL+LL+TL+SL)hrs.*15Weeks
5. 1(one)creditisequivalentto30Notionalhrs.
6. *Selflearning hoursshall notbe reflectedin theTimeTable.

*Selflearningincludesmicroproject/assignment/otheractivities.(Provide list of all assignments here in tabular format At least 6 to 8 assignments to be given)

D. i)RATIONALE:-

A person working in any field needs to be aware of the mode / ways of application of electricity in his field. He must be well conversant with the basic skills of maintaining the supply system to the machines used by him. This becomes much more important for an information technologist as this reduces his dependence on others for trivial works of electricity to be carried out such as replacing the fuse, calculating the load, inspecting a power supply, deciding wiring systems along with the components & load requirements etc.

This course arms the candidate with basic knowledge & skills in using electricity and related components for his machines such as computers and related device.

ii) INDUSTRY/EMPLOYEREXPECTEDOUTCOME

Theaimofthiscourseistohelpthestudenttoattainthefollowingindustryidentifiedoutcomethroughvariouslearningexperiences:

1.Identify the primary level issues related to power supply of computers and related devices

E. COURSE LEVELLEARNING OUTCOMES (COS)

ITH104-1: Use basic principles of electrical engineering related to computer supply systems.

ITH104-2: Use relevant supply system and electrical component for computer.

ITH104-3: Use the measuring instruments in computer laboratories.

ITH104-4: Use the relevant computer peripheral motors and transformer.

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note: Correlation levels :1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and development	**PSO2** Database and Network management
ITH104-1: Use basic principles of electrical engineering related to computer supply systems.	2	--	--	2	1	--	1	-	-
ITH104-2: Use relevant supply system and electrical component for computer.	2	--	--	2	2	--	1	-	-
ITH104-3: Use the measuring instruments in computer laboratories.	2	-	--	2	1	--	1	-	-
ITH104-4: Use the relevant computer peripheral motors and transformer.	2	--	--	2	2	--	1	-	-

F. CONTENT:-

I) Practical exercises

The following practical exercises shall be conducted in the *Laboratory for basic electrical engineering developed* by the Institute in practical sessions of batches of about 20- 22 students:

Sr. no	Laboratory experiences	CO
1	Verify Ohm's law.	ITH104-1
2	Measure the current, voltage of given single phase socket.	ITH104-2
3	To measure the resistance and inductance of given coil using Voltmeter, Ammeter & Multimeter	ITH104-1
4	To Measure power of single phase circuit using Wattmeter.	ITH104-2
5	Prepare specification of SMPS, Inverter, UPS (any one)	ITH104-3 &ITH104-1
6	Use of different electrical simple tools e.g. Screw driver, Tester, Pliers, Wire stripper, drill machine, Test lamp, Fish tape, Electrical Gloves, Soldering Iron, crimping Tools.	ITH104-3
7	To measure voltage & current of single transformer in laboratory.	ITH104-4
8	To study the earthing arrangement of computer laboratory.	ITH104-2
9	To measure earthing resistance of electronic devices or computer.	ITH104-2 & ITH104-3
10	To study energy bill.	ITH104-4

G:-Assessment Criteria

i) Proforma No. I & II

ii) Formative Assessment of Practical:-

Every assignment shall be assessed for 25 marks as per following criteria:

Domain	**Particulars**	**Marks out of 25**
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	05
	Drawing / drafting skills	05
Affective	Attendance/Disciplineand punctuality	05
TOTAL		**25**

ii) Summative Assessment of Practical:

At the time of Practical Examination assessed for 25 marks as per following criteria:

Sr.no	**Criteria**	**Marksallotted**
1	Knowledge about the course	05

2	Preparednessforpractical /Oral	05
3	Neat& completeDiagram/write up	05
4	Observations/Handling of instrument/ Communication/Presentation	05
5	OralBasedonLabworkandcompletionoftask	05
TOTAL		**25**

H) Instructional Methods:

1.Laboratory experiments and laboratory interactive session

I) Teaching and Learning resources:

1.Chalk board
2.Lab manual
3.Self-learning Online Tutorials
4.Virtual lab

J) Reference Books:

S.N.	Name of Book	Author	Publication
1	B. L. Theraja A. K.Theraja	A Text Book of Electrical Technology Vol-I	S. Chand and Co.
2	V. N. Mittle	Basic Electrical Engg.	Tata McGraw-Hill
3	V.K.Mehta	Electrical Technology	S. Chand and Co.

K) Learning Website & Software

i) www.electrical4u.com
ii) www.vlab.co.in
iii) www.circuitglobe.com

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COURSE ID :
COURSE NAME : SOCIAL AND LIFE SKILLS
COURSE CODE : CCH204
COURSE ABBREVIATION : HSLS

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	00	1
	Tutorial Learning	00	
	Laboratory Learning	00	
	SLH-Self Learning	02	
	NLH-Notional Learning	02	

B. ASSESSMENT SCHEME :-

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL				BASED ON SLA		TOTAL
					Practical						
	FA-TH	SA-TH	TOTAL		FA –PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
00	00	00	00	00	00	00	-	-	50	20	50

(Total IKS Hrs for Sem. : 00 Hrs)

C: ABBREVIATIONS:- CL- Class Room Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment
Legends: @ Internal Assessment, # External Assessment, *# Online Examination, @$ Internal Online Examination.

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as"Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1(one) credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.

* Self learning includes micro project / assignment / other activities. (Provide list of all assignments here in tabular format At least 6 to 8 assignments to be given)

D. i) RATIONALE:-

Life skills can be defined as abilities that enable an individual to deal effectively with the demands and challenges of life. Social skills are a subset of life skills that are needed for successful, healthy relationships toeasily adapt when moving from one social situation to the next. They help regulate our emotions effectively and develop enduring, supportive relationships, we're happier and healthier. This is why developing life skills andeventually social skills is key not only to being successful in life, it's key for our health and well-being. Thus,Teaching of Social and life skills provide students with essentials of knowing, understanding attitudes, values,morals, social skills and better equip them to handle stress and build their self-efficacy, self-esteem and self-confidence.

Note: The course offers four different alternatives (modules) for achieving above outcomes. Students must complete any one module from the following given options.

A) MODULE-I : Unnat Maharashtra Abhiyan (UMA)
B) MODULE-II : National Service Scheme (NSS)
C) MODULE-III : Universal Human Values
D) MODULE-IV: Value Education (Unati Foundation)
E) MODULE-V : Financial Literacy (NABARD)

The institute can choose to offer any one MODULE to the groups of the students by taking into consideration the resources required and resources available in the institute. Different group of students may be offered different MODULE based on their choices.

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME

Exhibit psychosocial competencies, workplace ethics, resilience, positive attitude, integrity and self-confidence

E. COURSE LEVEL LEARNING OUTCOMES (COs)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

CCH114-1 - Develop ability to adapt to new challenges.
CCH114-2 - Manage emotions effectively.
CCH114-3 - Follow workplace ethics and practices
CCH114-4 - Manage time effectively.
CCH114-5 - Increased self-confidence to handle stress.

COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX:

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"

	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1	PSO2
Competency: Apply principles of communication to communicate in formal and informal scenario.									
CCH114-1 Develop self-confidence and positive attitude towards work.							2		
CCH114-2 Set personal and professional goals.							2		
CCH114-3 Develop ability to manage emotions and to handle stress.							2		
CCH114-4 Manage time effectively.						2	2		
CCH114-5 Demonstrate effective interpersonal and leadership skills.							2		
CCH114-6 Identify and handle different types of conflicts.						2	2		

F. CONTENT:

I) Practical Exercises:
Not Applicable

II) Theory

Sr. No.	Theory Learning Outcomes (TLOs) Aligned to COs.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
	TLO 1.1 Explain developmental needs and connection of various stakeholders TLO 1.2 Enlist the localproblems	**Unit - I MODULE I : Activities UnderUnnat Maharashtra Abhiyan (UMA)** 1.1 Introduction to Societal Needs and respective stakeholders : Regional societal issues that need engineering intervention 1.2 Multidisciplinary approach-linkages of	Implementation Methodology: Considering the nature of the course designed, following points shall be considered while implementing the course.

	TLO 1.3 Design a methodology for fieldwork TLO 1.4 Select the attributes of engineering and socialsystem for measurement, quantification, and documentation TLO 1.5 Measure & quantify the quantities / systems parameters TLO 1.6 Write a report using information collected. Study the data collected from fieldwork and conclude the observations.	academia, society and technology 1.3 Stakeholders' involvement 1.4 Introduction to Important secondary data sets available such as census, district economic surveys, cropping pattern, rainfall data, road network data etc 1.5 Problem Outline and stakeholders : Importance of activity and connection with Mapping of system components and stakeholders (engineering / societal) 1.6 Key attributes of measurement 1.7 Various instruments used for data collection - survey templates, simple measuringequipments 1.8 Format for measurement of identified attributes/ survey form and piloting of the same 1.9 Fieldwork : Measurement and quantifications of local systems such as agriculture produce, rainfall, Road network, production in local industries, Produce /service which moves from A to B 1.10 Analysis and Report writing Report writing containing- 1. Introduction of the topic 2. Data collected in various formats such as table, pie chart, bar graph etc Observations of field visits and datacollected.	i) Regroup in the batches of 5-6 students for conducting the fieldwork from the bigger group. ii) Assign a few batches of the students for this course to all thefaculty members. iii) A group of course teachers will visit local governance bodies such as Municipal Corporations, Village Panchayats, Zilla Parishads, Panchayat Samitis to assess the small technological / engineering needs in their area of work. iv) The group of course teacherswill carry out initial field visits to evaluate the various possibilities of field visits / various scenarios wherein students can conduct field work to measure / quantify the parameters / attributes. v) The course will be implemented in eight sessionsand fieldwork. a) Session I - Introduction to development paradigm, fieldwork and case study as pedagogy b) Session II - VII - Society, stakeholders and value creation, measurements, rudimentary analysis and reporting c) Session VIII - Final closure session feedback and assessment d) Field work - 1. Pilot Visit - Pilot of surveyinstrument Survey Visit 1 - Data gathering / Information Collection 3. Survey Visit 2

			- Datagathering Summary Visit - Closure afteranalysis
2	TLO 2.1 Adoption of Village or Slum TLO 2.2 Survey and Problem IdentificationTLO 2.3 Conduct Project / Programs in the selected village / slum TLO 2.4 Undertake Special Camping Programme	**Unit - II MODULE II : National Service Scheme (NSS)** 2.1 Contacting Village/Area Leaders 2.2 Primary socio economic survey of few villages in the vicinity of the institute. 2.3 Selection of the village for adoption - conduct of activities 2.4 Comprehensive Socio Economic Survey of the Village/Area 2.5 Identification of Problem(s) 2.6 Dissemination of information about the latest developments in agriculture, watershed management, wastelands development, non-conventional energy, low cost housing, sanitation, nutrition and personal hygiene, schemes for skill development, income generation, government schemes, legal aid, consumer protection and allied fields. A liaison between government and other development agencies for the implementation of various development schemes in the selected village / slum.	(i) The teachers should visit the village / slum before adopting it for NSS activities. (ii) The selected area should be compact. (iii) The community people should be receptive to the ideas of improving their living standard. They should also be ready to coordinate and involve in the projects undertaken by theNSS for their up-liftment (iv) The areas where political conflicts are likely to arise should be avoided by the NSS units. The area should be easily accessible to the NSS volunteers to undertake frequent visits to slums;
3	TLO 3.1 Love and Compassion (Prem andKaruna) TLO 3.2 Truth (Satya) TLO 3.3 Non-Violence (Ahimsa) TLO 3.4 Righteousness (Dharma) TLO 3.5 Peace (Shanti)TLO 3.6 Service (Seva)TLO 3.7 Renunciation (Sacrifice) Tyaga TLO 3.8 Gender Equality and Sensitivity	**Unit - III MODULE-III : Universal Human Values** 3.1 Love and Compassion (Prem and Karuna): Introduction, Practicing Love and Compassion (Prem and Karuna) 3.2 Truth (Satya) : Introduction, Practicing Truth (Satya) 3.3 Non-Violence (Ahimsa) : Introduction, Practicing Non-Violence (Ahimsa) 3.4 Righteousness (Dharma) : Introduction, Practicing Righteousness (Dharma) 3.5 Peace (Shanti) : Introduction, Practicing Peace (Shanti) 3.6 Service (Seva) : Introduction, Practicing Service (Seva) 3.7 Renunciation (Sacrifice) Tyaga : Introduction, Practicing Renunciation (Sacrifice) Tyaga Gender Equality and Sensitivity: Introduction, Practicing Gender Equality andSensitivity	i) Lectures ii) Demonstration iii) Case Study iv) Role Play v) Observations vi) Portfolio Writing vii) Simulation viii) Motivational talks byPractitioners Site/Industry Visit
4	TLO 4.1 Punctuality TLO 4.2 Cleanliness, Hygiene and Orderliness	**Unit - IV MODULE-IV: Value Education (Unnati Foundation)** 4.1 Punctuality, Icebreaker and Simple Greeting, Understanding & Managing Emotions, Introducing Self, The power of a Positive Attitude, Talking about one's Family, Talking	i) Video Demonstrations ii) Flipped Classroom iii) Case Study iv) Role Play v) Collaborative learning vi) Chalk-Board

	TLO 4.3 Responsibility TLO 4.4 Gratitude andAppreciations TLO 4.5 Determination& Persistence TLO 4.6 Respect TLO 4.7 Team Spirit TLO 4.8 Caring & Sharing TLO 4.9 Honesty TLO 4.10 Forgive andForget	about one's Family, Making a Positive Impression, Give word list for a Word based 4.2 Cleanliness , Hygiene and Orderliness , Likes and Dislikes, Developing Confidence in Self and Others, Strengths and Weaknesses, Listening Skills , Greeting gestures, Gender Equality and Sensitivity 4.3 Responsibility, OCSEM- Visual Comprehension and Word Based Learning, Goal Setting – Make it happen, Follow, Like &Share Unnati Social Media - Facebook / Instagram/ Twitter Introducing Others, Time Management, Talking about the daily routine, Money Management 4.4 Gratitude and Appreciation , Asking Simple Questions & Asking for the price , Stress Management, Student Referral process ,Comprehending & Paraphrasing Information,A Plate of Rice and Dignity of Labour, Topicsfor Public Speaking, Placement Process , OCSEM-E-Newspaper, Critical Thinking to overcome challenges 4.5 Determination and Persistence, Guiding and Giving Directions, Language Etiquette & Mannerism, . Unnati Philosophy , b. Unnati Branding - Follow, Like & Share Unnati Social Media - Facebook / Instagram/ Twitter, Simple instructions to follow procedures, Assertiveness, Give topics for Debate, Describing a person/Objects, Refusal Skills, Word List for Word based Learning 4.6 Respect, Comparing , OCSEM - Public Speaking, Student referral process, Attending a phone call, Being a Good Team Player , Placement Process, At a Restaurant, Workplace ethics 4.7 Team Spirit, Inviting someone, OCSEM - Picture Reading & Word, a. Unnati Philosophy& b. Unnati Branding - Follow, Like & Share Unnati Social Media - Facebook / Instagram/ Twitter, Apologizing, Apologizing, Dealing effectively with Criticism, Introduce Importance of Self Learning and up skilling Caring and Sharing , Handling Customer queries, Flexibility & Adaptability, Student referral process, Writing a Resume, OCSEM-Public Speaking, Placement Process, Meditation/ Affirmation & OCSEM-Debate, Introduce Certif-ID, how to create Certif-ID Project , 4.9 Honesty, Email etiquette & Official Email communication, Alcohol & Substance use & abuse, Describing a known place , Leadership Skills, Describing an event, OSCEM-Picture Reading & Visual Comprehension	

		Forgive and Forget, Facing and Interview, OSCEM-Public Speaking , Attending a telephonic/Video interview & Mock Interview , Affirmation , Pat-a-Back & Closure (Valediction , Unnati Branding, Student Testimonials), Meditation/ Affirmation & Sponsor connect (Speak to UNXT HO)	
5	TLO 5.1 Literacy About Savings and Investments TLO 5.2 Literacy About Financial Planning TLO 5.3 Literacy About Transactions TLO 5.4 Literacy About Income, expenditure and budgeting TLO 5.5 Literacy About Inflation TLO 5.6 Literacy About Loans TLO 5.7 Literacy About the Importanceof Insurance TLO 5.8 Literacy About the Dos and Don'ts in finances	**Unit - V MODULE-V : Financial Literacy** 5.1 Introduction - Life Goals and financial goals 5.2 Savings and Investments - Three pillars of investments, Popular asset classes, Government schemes, Mutual Funds, Securities markets (Shares and bonds), Gold, Real Estate, Do's and Don'ts of investments 5.3 Retirement planning 5.4 Cashless transactions 5.5 Income, expenditure and budgeting – Concepts and Importance 5.6 Inflation- Concept, effect on financial planning of an individual 5.7 Loans – Types, Management of loans, Tax benefits 5.8 Insurance – Types, Advantages, selection Dos and Don'ts in Financial planning and Transactions	i) Online/Offline Mode ofInstructions ii) Video Demonstrations iii) Presentations iv) Case Study v) Chalk-Board Collaborative learning

** No questions will be asked on IKS learning subtopics in any question papers.

G : List of Assignments/Activities/Micro-project under SLA

Suggestive list of activities during Regular as well as Special Camping (NSS Activities)

Following list is only an illustrative list of the type of activities that can be undertaken. Under the programme it would be open to each NSS Unit to undertake one of these programmes or any other activity which may seem desirable to them according to local needs. The NSS Unit should aim at the integrated development of the area selected for its operation which could be a village or a slum. It has also to be ensured that at least a part of the programme does involve manual work.

(a) Environment Enrichment and Conservation:

The activities under this sub-theme would inter-alia, include:
(i) plantation of trees, their preservation and upkeep
(ii) Construction & maintenance of village streets, drains
(iii) Cleaning of village ponds and wells;
(iv) Popularization and construction of Gobar Gas Plants, use of non-conventional energy;
(v) Disposal of garbage & composting;
(vi) Prevention of soil erosion and work for soil conservation,
(vii) Watershed management and wasteland development
(viii) Preservation and upkeep of monuments, and creation of consciousness about the preservation of cultural heritageamong the community.

(b) Health, Family Welfare and Nutrition Programme:

(i) Programme of mass immunization;
(ii) Working with people in nutrition programmes with the help of Home Science and medical college students;
(iii) Provision of safe and clean drinking water;
(iv) Integrated child development programmes;
(v) Health education, AIDS Awareness and preliminary health care.
(vi) Population education and family welfare programme;
(vii) Lifestyle education centres and counselling centres.
© Programmes aimed at creating an awareness for improvement of the status of women: (i) programmes of educatingpeople and making them aware of women's rights both constitutional and legal;
(ii) creating consciousness among women that they too contributed to economic and social well-being of thecommunity;
(iii) creating awareness among women that there is no occupation or vocation which is not open to them provided theyacquire the requisite skills; and
(iv) imparting training to women in sewing, embroidery, knitting and other skills wherever possible.

(d) Social Service Programmes:

(i) work in hospitals, for example, serving as ward visitors to cheer the patients, help the patients, arranging occupational or hobby activities for long term patients; guidance service for out-door-patients including guiding visitors about hospital's procedures, letter writing and reading for the patients admitted in the hospital; follow up ofpatients discharged from the hospital by making home visits and places of work, assistance in running dispensaries etc.
(ii) work with the organisations of child welfare;
(iii) work in institutions meant for physically and mentally handicapped;
(iv) organising blood donation, eye pledge programmes;
(v) work in Cheshire homes, orphanages, homes for the aged etc.;
(vi) work in welfare organisations of women;
(vii) prevention of slums through social education and community action;

(e) Production Oriented Programmes:

(i) working with people and explaining and teaching improved agricultural practices;
(ii) rodent control land pest control practices;
(iii) weed control;

(iv) soil-testing, soil health care and soil conservation;
(v) assistance in repair of agriculture machinery;
(vi) work for the promotion and strengthening of cooperative societies in villages;
(vii) assistance and guidance in poultry farming, animal husbandry, care of animal health etc.;
(viii) popularisation of small savings and assistance in procuring bank loans

(f) Relief & Rehabilitation work during Natural Calamities:

(i) assisting the authorities in distribution of rations, medicine, clothes etc.;
(ii) assisting the health authorities in inoculation and immunisation, supply of medicine etc.;
(iii) working with the local people in reconstruction of their huts, cleaning of wells, building roads etc.;
(iv) assisting and working with local authorities in relief and rescue operation;
(v) collection of clothes and other materials, and sending the same to the affected areas;

(g) Education and Recreations: Activities in this field could include:

(i) adult education (short-duration programmes);
(ii) pre-school education programmes;
(iii) programmes of continuing education of school drop outs, remedial coaching of students from weaker sections;
(iv) work in crèches;
(v) participatory cultural and recreation programmes for the community including the use of mass media forinstruction and recreation, programmes of community singing, dancing etc.;
(vi) organisation of youth clubs, rural land indigenous sports in collaboration with Nehru Yuva Kendras;
(vii) programmes including discussions on eradications of social evils like communalism, castism, regionalism,untouchability, drug abuse etc.;
(viii) non- formal education for rural youth and
(ix) Legal-literacy, consumer awareness.

H: Specification Table for Setting Question Paper for Semester End Theory Examination: Not Applicable

I:-Assessment Criteria

i) Formative Assessment of Practical:-

Formative assessment (Assessment for Learning) report and presentation of fieldwork activities, self-learning (Assignment)

ii) Summative Assessment of Practical:

(Assessment of Learning)

J) Instructional Methods:

1. Group Discussion, Flipped Classroom
2. Demonstration, Case Study, Role Play, Collaborative Learning, Cooperative Learning
3. Field Visit, Survey
4. Use of projector and soft material for Demonstration (ppt, audio ,video etc)

K) Teaching and Learning Resources:

Chalk board, LCD presentations, Demonstrative kits, Demonstrative charts.

L) Reference Books:

S.N.	Name of Book	Author	Publication
1	Compendium of Training Materials for the Capacity Building of the Faculty and Students of Engineering Colleges on 'IMPROVING THE PERFORMANCE OF RURAL WATER SUPPLY AND SANITATION SECTOR IN MAHARASHTRA' Districts Economic survey reports	IRAP, Hyderabad, CTARA, IIT Bombay and UNICEF, Mumbai	UNICEF
2	Central Public Healthand Environmental Engineering Organisation	Manual on Water Supply and Treatment	Ministry of Urban Development, New Delhi
3	Specifications And Standards Committee	Indian Standards (IS) Codes and Indian Roads Congress(IRC) Codes	Bureau of Indian Standards and The Indian Road Congress
4	Prepared by each district administration	Districts Economic survey reports	Govt. of Maharashtra
5	Local college students,UMA staffs	Sample Case Studies on UMA website	IITB-UMA team

M) Learning Website & Software

a. https://gr.maharashtra.gov.in/Site/Upload/Government%20Resolutions/English/201601131501523808.pdf (Government Resolution of Government of Maharashtra regarding Unnat Maharashtra Abhiyan)
b. https://gr.maharashtra.gov.in/Site/Upload/Government%20Resolutions/English/201606151454073708.pdf (Government Resolution of Government of Maharashtra regarding Unnat Maharashtra Abhiyan Guidelines)
c. https://censusindia.gov.in/census.website/ (A Website of Census of India)
d. https://gsda.maharashtra.gov.in/english/ (A Website of Groundwater Survey and Development Agency, GoM)
e. https://mrsac.gov.in/MRSAC/map/map (A Website where district-wise mapsshowcasing

different attributes developed by Maharashtra Remote Sensing Applications Centre.)

f. https://ejalshakti.gov.in/jjmreport/JJMIndia.aspx (A Website of Jal Jivan Mission, Government of India)
g. https://cpcb.nic.in/ (A Website of Central Pollution ControlBoard, Government of India)
h. http://www.mahapwd.com/# (A Website of Public WorksDepartment, GoM)
i. http://tutorial.communitygis.net/ (A Website for GIS data sets developed by Unnat Maharashtra Abhiyan)
j. https://youtu.be/G71maumVZ1A?si=TzDTxKUpLYaRos7U (A video record of lecture by Prof. Milind Sohoni, IIT Bombay, on Engineering, Development and Society)
k. https://youtu.be/TUcPNwtdKyE?si=wnSWrhGc9dJTC-ac (A keynote talk by Prof. Milind Sohoni,IIT Bombay, on Interdisciplinary Engineering: The Road Ahead)

Learning and Assessment Scheme for Post S.S.C Diploma Courses

ProgrammeName :Diploma In Information Technology

Programme Code	**:IF(06)**	**WithEffectFromAcademicYear**	**: 2023-24**
Duration Of Programme	**: 6 Semester**	**Duration**	**: 16 WEEKS**
Semester	**: Third**	**Scheme**	**: H**

Sr No	CourseTitle	Abbrevation	Level	CourseType	Course Code	Total IKS Hrs for Sem	Learning Scheme					Credits	Assessment Scheme											
							ActualContact Hrs./Week			Self Learning (Activity/ Assignment /Micro Project)	Notional Learning Hrs/Week		Paper Duration (hrs.)	Theory				Based on LL & TL				Based on Self Learning		Total Marks
																		Practical						
							CL	TL	LL					FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
														Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
1	COMPUTER NETWORK	HCON	III	DSC	ITH302	-	3	-	2	1	6	3	3	30	70	100	40	25	10	25@	10	25	10	175
2	OBJECT ORIENTED PROGRAMMING USING C++	HOOP	III	SEC	ITH303	-	3	1	4	2	10	5	3	30	70	100	40	50	20	25#	10	25	10	200
3	DATABASE MANAGEMENT SYSTEM	HDBS	III	DSC	ITH304	-	3	1	4	2	10	5	3	30	70	100	40	25	10	25#	10	25	10	175
4	DIGITAL LOGIC &MICROPROCESSOR	HDLD	III	AEC	ITH305	-	3	-	2	1	6	3	3	30	70	100	40	25	10	25@	10	25	10	175
5	CLIENT SIDE SCRIPTING	HCLS	III	SEC	ITH306	-	1	-	4	1	6	3	-	-	-	-	-	25	10	25@	10	25	10	75
6	ESSENCE OF INDIAN CONSTITUTION	HEIC	II	VEC	CCH205	-	1	-	-	1	2	1	-	-	-	-	-	-	-	-	-	50	20	50
Total						-	**14**	**2**	**16**	**8**	**40**	**20**	-	**120**	**280**	**400**		**150**		**125**		**175**		**850**

Abbreviations:CL-ClassroomLearning,TL-TutorialLearning,LL-LaboratoryLearning,FA-FormativeAssessments-SummativeAssessment,IKS-IndianKnowledgeSystem,SLA-SelfLearningAssessment

Legends: @ InternalAssessment, # ExternalAssessment, *# On Line Examination , @$ Internal Online Examination

Note :

1. FA-THrepresentsaverageoftwoclasstestsof30markseachconductedduringthesemester.
2. IfcandidateisnotsecuringminimumpassingmarksinFA-PRofanycoursethenthecandidateshallbedeclaredas"Detained"inthatsemester.
3. If candidate is not securing minimum passing marks in SLAof any course then the candidate shall be declared as fail and will have to repeat and resubmit SLAwork.
4. NotionalLearninghoursforthesemesterare(CL+LL+TL+SL)hrs.*15Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. *SelflearninghoursshallnotbereflectedintheTimeTable.

Course Category: DisciplineSpecificCourseCore(DSC): 2,DisciplineSpecificElective (DSE):0,ValueEducation Course(VEC):1, Intern./Apprenti./Project./Community(INP):0,AbilityEnhancementCourse (AEC) : 4, Skill Enhancement

COURSE ID: 07
COURSE NAME : Computer Network
COURSE CODE : ITH302
COURSE ABBREVIATION : HCON

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	03	3
	Tutorial Learning	-	
	Laboratory Learning	02	
	SLH-Self Learning	1	
	NLH-Notional Learning	06	

B. ASSESSMENT SCHEME: -

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL				BASED ON SLA		TOTAL
					Practical						
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
	30	70	100	40	25	10	25@	10	25	10	175

(Total IKS Hrs. for Sem. 00 Hrs.)

C: ABBREVIATIONS: -

CL-ClassroomLearning,TL-TutorialLearning,LL-LaboratoryLearning,SLH-SelfLearningHours,NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA -Self Learning Assessment

Legends:@Internal Assessment, #External Assessment,
*#on Line Examination, @$Internal Online Examination.

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are(CL+LL+TL+SL)hrs.*15Weeks
5. 1(one) credit is equivalent to 30 Notional hrs.
6. *Self learning hours shall not be reflected in the Time Table.

*Self learning includes micro project / assignment /other activities

D. i) RATIONALE: -

Computer networks are essential components of modern computing infrastructure, enabling seamless exchange of information and facilitating collaboration across various devices and locations. By considering various applications, students should be able to choose, classify, install, troubleshoot, and maintain various data communication networks. This course provides the important concepts and techniques related to networking and offer students to have valuable insights into technology behind network communication.

ii) INDUSTRY/EMPLOYEREXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry identified outcome through the various learning experiences:

1. Design, classify, install, Manage, Troubleshoot Computer Network.

E. COURSELEVEL LEARNING OUTCOMES (COS)

ITH302-1: Analyze the functioning of Data Communication and Computer Network
ITH302-2: Select Types of Network, Topology, Transmission Media as per need
ITH302-3: Identify network Layers, devices and describe their functions.
ITH302-4: Analyze the Transmission Errors with respect to IEEE standards
ITH302-5: Explain working of TCP/IP protocol
ITH302-6: Describe Remote Logging, Electronic Mail and File Transfer Protocol

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"

Competency and COs	ProgrammeOutcomes POs andPSOs								
	PO 1 Basic andDisciplinespecificknowledge	PO2 Problem Analysis	PO3 Design /Development ofsolutions	PO4 EngineeringTools,Experimentation andTesting	PO5 EngineeringPracticesforsociety,sustainability andEnvironment	PO6 Project Management	PO7 Life-longLearning	PSO1 Designanddevelopment	PSO2 DatabaseandNetworkmanagement
Competency: Analyze basic principles and purpose of network Components.	2	2	2	2	1	1	2	2	1
ITH302-1: Analyze the functioning of Data Communication and Computer Network	1	--	1	1	2	--	2	--	3
ITH302-2: Select Types of Network, Topology, Transmission Media as per need.	1	1	2	1	1	-	3	--	3

ITH302-3: Identify network Layers, devices and describe their functions.	2	--	--	1	1	--	2	--	2
ITH302-4: Analyze the Transmission Errors with respect to IEEE standards	1	2	2	1	--	--	3	--	2
ITH302-5: Explain working of TCP/IP protocol	2	--	--	2	2	--	3	--	3
ITH302-6: Describe Remote Logging, Electronic Mail and File Transfer Protocol	1	1	1	--	1	--	3	--	3

F. CONTENT:

I) Practical exercises

The following practical exercises shall be conducted in the *Laboratory for Computer Network* by the Institute in practical sessions of batches of about 20- 22 students:

(Practical's Marked in * are compulsory)

Sr. No.	Laboratory Experiences	Course Outcome
*1	Visit your computer laboratory i)Identify the type of topology ii)Identify types of connecting devices with specifications iii)Identify types of cables with specifications iv)List the type of network applications commonly used iv)Draw the layout of installed network	ITH302-1
*2	Survey different networking devices available in Market & Compare Network devices.	ITH302-1
3	Prepare and test Straight and cross UTP cable using cable and RJ45 connectors	ITH302-2
*4	Create Network of 2 computer using any Guided Media for Files Sharing	ITH302-2
*5	Perform Device sharing in Network	ITH302-3
*6	Identify ways to configure IP Address Also Configure IP address using static and dynamic method.	ITH302-3

*7	Implement Classful Address in a given network node i) Identify range of IP Address in various classes ii) Justify the reason to choose various IP address	ITH302-4
*8	Execute TCP/IP network commands: ipconfig,ping,tracert	ITH302-5
*9	Execute TCP/IP network commands: netstat, pathping, route	ITH302-5
10	Install Wireshark and configure as packet sniffer- i) Capture IP,TELNET, FTP packets using Wireshark	ITH302-6
*11	1.Writing TCP Client-server program using any programming language 2.Writing UDP Client-server program using any programming language	ITH302-6
*12	Configure FTP Server to transfer file from one system to another system	ITH302-6

II) Theory

Section I

Sr. No.	Topics/Subtopics	Learning (Hours)	Marks
ITH302-1: Analyze the functioning of Data Communication and Computer Network			
1	**Fundamentals of Data Communication and Computer Network** 1.1 Process of data communication and its components: Transmitter, Receiver. Medium, Message, Protocol 1.2 Protocols, Standards, Standard organizations. Bandwidth , Data Transmission Rate, Baud Rate and Bits per second 1.3 Modes of Communication (Simplex, Half duplex, Full Duplex) 1.4 Classification of Signals-Analog Signal and Digital Signal (Introduction & Types) 1.5 Introduction to Computer Network, Network Services 1.6 Application of Computer Networks, Advantages & Disadvantages 1.7 Active and Passive Network 1.8 Network Architecture-Client Server, Peer-to Peer Network 1.9 The Internet	**7**	**10**
ITH302-2:Select Types of Network ,Topology, Transmission Media as per need			
2	**Line configuration** 2.1 Point to point, Multi point 2.2 Topology – Mesh, Star, Tree, Bus, Ring, Hybrid 2.3 Network Criteria-Categories of network, Classification of network, LAN, MAN, WAN. 2.4 Transmission media Guided and Unguided	**7**	**10**

ITH302-3: Identify network Layers, devices and describe their functions.			
3	**Network Reference Model and Network Devices** 3.1 OSI reference model 3.2 TCP/IP reference model 3.3 Comparison of OSI, TCP/IP model 3.4 Addressing- Physical Addresses, Logical Addresses Port Addresses, Specific Addresses 3.5 Network devices (Introduction & Functionalities) 3.5.1 Repeaters 3.5.2 Hubs- Types 3.5.3 Bridges-Types 3.5.4 Switches (Multiport bridges)	**8**	**14**

Section –II

Sr. No	Topics/Subtopics	Learning (Hours)	Marks
ITH302-:4Analyze the Transmission Errors with respect to IEEE standards			
4	**Error Detection and Correction** 4.1Types of Errors, Forward Error Correction Versus Retransmission 4.2 Framing: Fixed Sized and Variable Sized Framing 4.3 Error Detection: Repetition codes, Parity bits, Checksums, CRC 4.4 Error Correction: Automatic Repeat Request (ARQ), Hamming Code 4.5IEEE Standards 4.6 Wireless LAN IEEE 802.11 standard Architecture, Features of IEEE 802.11 versions: 802.11,802.11a,802.11b,802.11g,802.11n,802.11p 4.7 Bluetooth Architecture: Piconet, Scatternet	**8**	**12**
ITH302-5: Explain working of TCP/IP Protocol			
5	**TCP/IP Fundamentals** 5.1 TCP/IP Protocol suite 5.2 IPv4 Addresses 5.2.1 Address Space 5.2.2 Notations 5.2.3 Classful Addressing with Examples 5.2.4 Classless Addressing (CIDR) with Examples 5.2.5 Network Address Translation (NAT) 5.3 Transport Layer – UDP, TCP (Introduction and Functionality) 5.4 Socket Programming 5.4.1Socket and Socket based communication. 5.4.2TCP/IP Socket Programming 5.4.3UDP Socket Programming	**8**	**12**

ITH302-6: Describe Remote Logging, Electronic Mail and File Transfer Protocol			
6	**Remote Logging, Electronic Mail and File Transfer** 6.1 Remote Logging 6.1.1 TELNET 6.2 Electronic Mail 6.2.1 Architecture 6.2.2 User Agent 6.2.3 MIME 6.2.4 SMTP 6.2.5 POP and IMAP 6.2.6 Web-Based Mail 6.3 File Transfer 6.3.1 FTP 6.3.2 Anonymous FTP	**7**	**12**

No questions will be asked on IKS learning subtopics in any question papers.

G: List of Assignments under SLA

Sr No	List of Assignments Under SLA	HrsAlloted
1	Create HTTP server	02
2	Create IPv6 environment in a small network using simulator	04
3	Configure TELNET for remote login	04
4	Install server operating system	02
5	Capture TCP and UDP packet using Wireshark	02

H:SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END THEORY EXAMINATION

Section /Topic No	Name of Topic	Distribution of Marks			Total Marks	CO
		Remember	Under standing	Apply		
I	Fundamentals of Data Communication and Computer Network	2	4	4	10	ITH302-1
II	Line Configuration	2	4	4	10	ITH302-2
III	Network Reference Model and Network Device	2	4	8	14	ITH302-3
IV	Error Detection and Correction	2	4	6	12	ITH302-4
V	TCP/IP Fundamentals	2	4	6	12	ITH302-5
VI	Remote Logging, Electronic Mail and File Transfer	2	4	6	12	ITH302-6
Total Marks					70	

I: -Assessment Criteria

i) Formative Assessment of Practical: -

Every assignment shall be assessed for 25 marks as per following criteria:

Domain	**Particulars**	**Marks out of 25**
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	05
	Drawing / drafting skills	05
Affective	Discipline and punctuality	05
TOTAL		**25**

ii) Summative Assessment of Practical:

Every practical assignment shall be assessed for 25 marks as per following criteria:

Sr.no	**Criteria**	**Marks allotted**
1	Attendance at regular practical	05
2	Preparedness for practical	05
3	Neat & complete Diagram.	05
4	Observations &computer handling skill	05
5	Oral Based on Lab work and completion of task	05
TOTAL		**25**

J) Instructional Methods:

1. Lectures cum Demonstrations.
2. Classroom practices.
3. Use of projector and soft material for demonstration
4. Laboratory experiences and laboratory interactive sessions
5. Regular Home Assignments

K) Teaching and Learning resources:

Chalk board, LCD presentations, Self-Learning Online Tutorials, Demonstrative charts.

L) Reference Books:

S.N.	Name of Book	Author	Publication
1	Data Communication and Networking	Behrouz A. Forouzan	McGraw-Hill Higher Education ISBN-13 978-0-07- 296775-3
2	TCP/IP Protocol Suit	Behrouz A. Forouzan:	McGraw Hill Education ISBN-13 978-0073376042
3	Computer Networks	A.S. Tanenbaum	PRENTICE HALL ISBN-10: 0-13-212695-8 ,ISBN13:978-0-13-212695-3

M) Learning Website & Software

i. Introduction to Computer Networks | Studytonight
ii. https://nptel.ac.in/courses/106105183
iii. https://nptel.ac.in/courses/106105081
iv. http://www.w3schools.com/
v. https://www.tutorialspoint.com/data_communication_computer_network/
vi. https://searchnetworking.techtarget.com/
vii. https://onlinecourses.swayam2.ac.in/cec19_cs07/preview

***

COURSE ID: 08
COURSE NAME : OBJECT ORIENTED PROGRAMMING USING C++
COURSE CODE : ITH303
COURSE ABBREVIATION : HOOP

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	03	5
	Tutorial Learning	01	
	Laboratory Learning	04	
	SLH-Self Learning	02	
	NLH-Notional Learning	10	

B. ASSESSMENT SCHEME :-

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL				BASED ON SLA		TOTAL
					Practical						
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
03	30	70	100	40	50	20	25#	10	25	10	200

(Total IKS Hrs. for Sem.: 00 Hrs.)

C: ABBREVIATIONS: -

CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH- Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# on Line Examination, @$ Internal Online Examination .

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL) hrs.* 15 Weeks
5. 1(one) credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.

* Self learning includes micro project / assignment / other activities

D. i) RATIONALE: -

In the modern world of Information Technology, Object Oriented Programming provides the most preferred approach for software development. It offers a powerful way to cope up with real world problems. C++ helps to develop fundamental understanding of object oriented concepts. This course enables to implement object oriented approach to solve a given programming problem.

ii)INDUSTRY / EMPLOYER EXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry identified outcome through various learning experiences:

1.Develop object oriented programs using C++

E. COURSE LEVEL LEARNING OUTCOMES (COS)

ITH303-1: Describe principles of OOP.
ITH303-2: Write C++ programs using classes and objects.
ITH303-3: Develop C++ programs using constructors.
ITH303-4: Implement Inheritance in C++.
ITH303-5: Implement Polymorphism in C++.
ITH303-6: Develop C++ programs to perform file operations.

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2** Problem Analysis	**PO 3** Design / Development of solutions	**PO 4** Engineering Tools, Experimentation and Testing	**PO 5** Engineering Practices for society, sustainability and Environment	**PO 6** Project Management	**PO 7** Life-long Learning	**PSO1** Design and Development	**PSO2** Database and Network Management
Competency: Develop object oriented programs using C++	2	2	2	1	1	2	2	2	-
ITH303-1 CO-1 Describe principles of OOP	2	1	1	2	1	1	1	2	-
ITH303-2 CO-2 Write C++ programs using classes & objects	2	1	1	2	1	1	1	2	-
ITH303-3 CO-3 Develop C++ programs using constructors	2	1	1	2	1	1	1	1	-
ITH303-4 CO-4 Implement Inheritance in C++.	2	2	2	2	2	2	1	2	-

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
ITH303-5 CO-5 Implement Polymorphism in C++.	2	2	2	1	1	2	1	2	-
ITH303-6 CO-6 Develop C++ programs to perform file operations	2	2	2	1	1	2	1	2	-

F. CONTENT:

I) Practical exercises

The following practical exercises shall be conducted in the *Laboratory for Object Oriented Programming Using C++* by the Institute in practical sessions of batches of about 20-22 students:

(Practical's Marked in * are compulsory)

Sr. no	Laboratory Experiences	CO
*1	Write programs to evaluate any expression using Input / Output functions	ITH303-1
*2	Write programs using- ● Scope resolution operator ● Memory management operator ● Manipulators	ITH303-1
3	Write programs to demonstrate use of- ● Implicit type casting ● Explicit type casting	ITH303-1
4	Write programs to show use of classes and objects to define the function inside the class	ITH303-2
*5	Write programs to define the function outside the class	ITH303-2
*6	Write programs to implement inline function	ITH303-3
*7	Write programs to implement friend function using- ● Two different classes ● External function	ITH303-3
*8	Write programs to implement- ● Static data member ● Static member function	ITH303-3
*9	Write programs to create array of objects	ITH303-3

Sr. no	Laboratory Experiences	CO
*10	Write programs for- ● Default constructor ● Parameterized constructor ● Copy constructor ● Multiple constructor in one class	ITH303-3
11	Write programs using- ● Single level inheritance ● Multilevel inheritance	ITH303-4
*12	Write programs to implement multiple inheritance	ITH303-4
13	Write programs to implement hierarchical inheritance	ITH303-4
*14	Write programs to implement virtual base class.	ITH303-4
*15	Write programs to implement- ● Pointer to object ● 'this' pointer	ITH303-5
*16	Write programs for- ● Pointer to derived class in single ● inheritance ● Pointer to derived class in multilevel ● inheritance	ITH303-5
*17	Write programs to overload unary operator using- ● Member function ● Friend function	ITH303-5
18	Write programs to overload binary operator using- ● Member function ● Friend function	ITH303-5
*19	Write programs to implement virtual function	ITH303-5
*20	Write programs to read and write from/to file using- ● Constructor ● open()	ITH303-6
*21	Write programs to copy the content of one file into another file using formatted input/output functions	ITH303-6
22	Write file programs to implement sequential input and output operations on file	ITH303-6
23	Write programs to perform input / output operations on binary files	ITH303-6

II) Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
	CO: ITH303-1: Describe principles of OOP		
1	**Principles of Object Oriented Programming** 1.1 Procedure Oriented Programming (POP) verses Object Oriented Programming (OOP) 1.2 Features of Object Oriented Programming, Examples of Object Oriented languages, Applications of OOP 1.3 Data types, Type compatibility, Declaration of variable, Dynamic initialization of variable, Reference variable, Type casting 1.4 Special Operators in C++: Scope resolution operator, Memory management operators, Manipulators 1.5 Structure of C++ program, Basic Input /Output operators and functions in C++, Simple C++ Program 1.6 Control Structures.	**8**	**12**
	CO: ITH303-2: Write C++ programs using classes and objects		
2	**Classes and Objects** 2.1 Class & Object Introduction, specifying a class, Creating objects 2.1.1 Memory allocations for objects 2.1.2 Defining member Functions-Inside & Outside class 2.1.3 Access specifiers 2.2 Inline function 2.3 Static data members, Static member function 2.4 Friend function: Using two different classes, Using non-member function 2.5 Array of Objects, Object as function arguments.	**7**	**12**
	CO: ITH303-3: Develop C++ programs using constructors		
3	**Constructors and Destructors** 3.1 Concepts of Constructors 3.2 Types of constructors 3.3 Constructor overloading 3.4 Multiple constructors in a class 3.5 Copy Constructor 3.6 Destructors	**7**	**10**

Section –II

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
	CO: ITH303-4: Implement Inheritance in C++		
4	**Extending classes using Inheritance** 4.1 Introduction to Inheritance 4.1.1 Defining a derived class, Visibility modes and effects 4.2 Types of Inheritance: Single, Multilevel, Multiple, Hybrid Hierarchical 4.3 Virtual base class, Abstract class, Constructor in derived class	**7**	**12**
	CO: ITH303-5: Implement Polymorphism in C++		
5	**Pointers and Polymorphism in C++** 5.1 Concept of Pointer: Pointer declaration, Pointer operator, Address operator, Pointer arithmetic 5.2 Pointer to Object: Pointer to object, 'this' pointer, Pointer to derived class 5.3 Introduction of Polymorphism, Types of polymorphism 5.4 Compile Time Polymorphism 5.4.1 Function overloading, 5.4.2 Operator overloading: Rules for operator overloading 5.4.3 Overloading of unary and binary operators 5.5 Run Time Polymorphism: Virtual function, Rules for virtual function, Pure virtual function	**10**	**14**
	CO: ITH303-6: Develop C++ programs to perform file operations		
6	**File operations** 6.1 C++ stream classes, Classes for file stream operations 6.2 Detection of end of file, File modes 6.3 Opening & Closing files 6.3.1 Reading from and writing to files 6.3.2 Formatted Input/output functions in file 6.4 Types of file: Random access, Sequential access	**6**	**10**

** No questions will be asked on IKS learning subtopics in any question papers.

G: List of Assignments under SLA

Sr.No	List of Assignment (under SLA)	Hrs. Allotted
1	Develop Student Grading System. Accept student data and marks for 5 subjects for 5 students. Calculate the percentage and finalize grade awarded to the student. Write the records in to file.	04
2	Develop Quiz Management System. Quiz should accept student credentials and contain 10 MCQ type questions. Determine the final result. Save the result in file along with student credentials.	04
3	Develop advanced calculator for the following function: Binary to Decimal, Decimal to Binary etc.	04
4	Develop Hotel Management Application. It should accept room reservation for 10 rooms. Find number of empty rooms. Display relevant information and write maximum 5 records into file	04
5	Develop Employee Management System using Inheritance. Collect following information from user: Employee ID, Employee Name, Basic Salary, leave taken in the month Calculate Net Salary assuming applicable deductions and display. Write maximum 5 records into file.	04
6	Study Infosys Springboard Course on OOP	06
7	Any other micro project as suggested by subject faculty	04

H: Specification table for setting question paper for semester end theory examination

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks	CO
		Remember	Understand	Apply		
I / 1	Principles of Object Oriented Programming	2	4	6	12	ITH303-1
I / 2	Classes and Objects	2	4	6	12	ITH303-2
I / 3	Constructors and Destructors	2	4	4	10	ITH303-3
II /4	Extending classes using Inheritance	2	4	6	12	ITH303-4
II /5	Pointers and Polymorphism in C++	2	4	8	14	ITH303-5
II / 6	File operations	-	4	6	10	ITH303-6
	Total Marks				70	

I) Assessment Criteria

i) Formative Assessment of Practical: -

Every assignment shall be assessed for 25 marks as per following criteria:

Domain	Particulars	Marks out of 25
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	05
	Drawing / drafting skills	05
Affective	Discipline and punctuality	05
TOTAL		**25**

ii) Summative Assessment of Practical:

Every practical assignment shall be assessed for 25 marks as per following criteria:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Preparedness for practical	05
3	Neat & complete Diagram.	05
4	Observations & computer handling skill	05
5	Oral Based on Lab work and completion of task	05
TOTAL		**25**

J) Instructional Methods:

1. Lectures cum Demonstrations.
2. Class room practices.
3. Use of projector and soft material for demonstration
4. Laboratory experiences and laboratory interactive sessions
5. Regular Home Assignments

K) Teaching and Learning resources:

Chalk board, LCD presentations, Self-Learning Online Tutorials, Demonstrative charts.

L) Reference Books:

S.N.	Name of Book	Author	Publication
1	Object Oriented Programming with C++	E Balaguruswamy	McGraw-Hill Education ISBN-10:0070669074, ISBN13:9780070669079
2	Programming with C++	D Ravichandran	McGraw-Hill Education ISBN-10: 0070681899,

			ISBN13: 978-0070681897
3	The C++ Programming Language	Stroustrup B.	Pearson Education New Delhi ISBN-10: 0275967301, ISBN-13: 978-0275967307
4	Object Oriented Programming in C++	Robert Lafore	Pearson Education India ISBN-10: 8131722821, ISBN13: 978-813172282

M) Learning Website & Software

a) https://www.w3schools.com/cpp/

b) https://www.javatpoint.com/cpp-tutorial

c) https://www.javatpoint.com/cpp-files-and-streams

d) https://www.programiz.com/cpp-programming

e) https://www.programiz.com/cpp-programming/online-compiler/

f) https://www.onlinegdb.com/

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COURSE ID:09
COURSE NAME : DATABASE MANAGEMENT SYSTEM
COURSE CODE : ITH304
COURSE ABBREVIATION : HDBS

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	03	5
	Tutorial Learning	01	
	Laboratory Learning	04	
	SLH-Self Learning	2	
	NLH-Notional Learning	10	

B. ASSESSMENT SCHEME: -

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL				BASED ON SLA		TOTAL
					Practical						
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
	30	70	100	40	25	10	25#	10	25	10	175

(Total IKS Hrs.for Sem.:00 Hrs.)

C: ABBREVIATIONS: -

CL-Classroom Learning, TL-Tutorial Learning,LL-Laboratory Learning, SLH Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA -Self Learning Assessment **Legends:**@Internal Assessment, #External Assessment,*#onLine Examination,@$Internal Online Examination.

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course, then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are(CL+LL+TL+SL) hrs.*15Weeks
5. 1(one) creditisequivalentto30Notionalhrs.
6. *Self-learning hours shall not be reflected in the Time Table.

*Self-learning includes micro project/assignment/other activities

D. i) RATIONALE: -

This course focuses on fundamentals of relational database management system and enables students to design and manage database for various software applications. It also provides students with theoretical knowledge and practical skills in the use of databases and database management systems in Information Technology applications.

ii) INDUSTRY/EMPLOYEREXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry identified outcome through various learning experiences:

1. To design database and use any RDBMS package as a backend for developing database applications

E. COURSELEVEL LEARNING OUTCOMES (COS)

ITH304-1: Explain concept of database management system

ITH304-2: - Design the database for given problem

ITH304-3: Manage database using SQL.

ITH304-4: Explain the need of normalization and state various forms of normalization.

ITH304-5: Implement PL/SQL codes for given application.

ITH304-6: Apply security and backup methods on database

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1 Design and Development	PSO2 Database and Network Management
Competency: Design and implement normalized database structure and solve SQL,PL/SQL queries	1	3	2	3	2	3	3	-	3
ITH304-1: Explain concept of database management system	1	--	--	1	1	2	3	--	3
ITH304-2: Design the database for given problem	1	2	2	3	3	3	2	--	3
ITH304-3: Manage database using SQL	1	3	2	3	2	3	2	--	3
ITH304-4: Explain the need of normalization	1	1	2	2	2	2	2	--	3

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1 Design and Development**	**PSO2 Database and Network Management**
and state various forms of normalization.									
ITH304-5: Implement PL/SQL codes for given application.	1	3	2	3	2	3	2	--	3
ITH304-6: Apply security and backup methods on database	1	2	--	--	2	2	2	--	3

F. CONTENT:

I) Practical exercises

The following practical exercises shall be conducted in the *Laboratory for Database Management System* by the Institute in practical sessions of batches of about 20- 22 students:

(Practical's Marked in * are compulsory)

Sr. No.	Laboratory Experiences	Course Outcome
*1	Install the provided database software	ITH304-1
*2	Create Database schema for given application	ITH304-1
*3	Study of fundamental operations of relational algebra	ITH304-2
*4	Creating database 1)Creating database 2)Creating table 3) Inserting, updating and deleting records 4) Displaying records 5) Applying integrity constraints.	ITH304-3
*5	Modifying table structure 1) Using Alter table command 2) Using Rename command	ITH304-3
*6	Operators 1) Executing SQL queries using Arithmetic, Logical, Mathematical 2) Grouping data from tables	ITH304-3

*7	Functions 1) Executing SQL queries using String functions 2) Executing SQL queries using Date 3) Executing SQL queries using Group functions 4) Executing SQL queries using Mathematical functions	ITH304-3
*8	Subqueries, Joins 1) Executing subqueries 2) Joining tables	ITH304-3
*9	Views, Indexes, Sequences and Synonyms 1) Creating view, sequence and synonyms. Creating and Index 2) Inserting, Updating, deleting records using view 3) Deleting view 4) Creating Sequences, Altering Sequences, Dropping Sequences 5) Creating Indexes and Synonyms.	ITH304-3
10	Understanding PL/SQL block structure 2) Using conditional controls in PL/SQL 3) Using iterative controls in PL/SQL	ITH304-5
*11	Cursors 1) Understanding types of cursor and cursor attributes 2) Using explicit cursor	ITH304-5
*12	Stored Procedures and functions and Triggers 1) Creating and deleting stored procedures & functions 2) Example programs 3) Understanding the concept of trigger and its types 4) Creating a trigger 5) Applying trigger 6) Deleting trigger	ITH304-5
13	Transaction and Normalization 1) Understanding concept of transaction 2) Commit and Rollback statement 3) Understanding the concept of normalization 4) Understanding 1NF, 2NF, 3NF and BCNF	ITH304-6

II) Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Marks
	ITH304-1: Explain concept of database management system		
1	**INTRODUCTION TO DBMS** 1.1 Purpose of Database System 1.2 DBMS vs. File system 1.3 Instances and Schemas 1.4 Data Models: 1.4.1 Entity Relationship Model 1.4.2 Relational Model 1.5 Database Schema 1.6 Data Definition Language, Data Manipulation Language 1.7 Database Administrator and Database Users 1.8 Entity sets, Relationship set, Attributes, types of attributes, domain, Mapping Cardinalities	**8**	**10**
	ITH304-2: - Design the database for given problem		
2	**RELATIONAL MODEL** 2.1 Structure of Relational Database 2.2 Database Schema 2.3 Query languages 2.4 Relational Algebra 2.4.1 Fundamental Operations 2.4.2 Codd's rules of RDBMS	**6**	**12**
	ITH304-3: Manage database using SQL		
3	**SQL** 3.1 Introduction to SQL queries 3.2 Creating, Inserting, Updating, Deleting tables 3.3 Integrity constraints – primary key, foreign key, NULL constraints 3.4 Arithmetic, Logical, Relational operators 3.5 Aggregate functions, Mathematical functions, Date functions, String functions 3.6 Joins, Types of joins, Sub queries 3.7 View – need, creating, updating and deleting database view 3.8 Concept of index 3.9 Creating Sequences, Altering Sequences, Dropping Sequences 3.10 Synonyms: Creating Synonyms, Dropping Synonyms	**8**	**12**

Section –II

Sr. No	Topics/Subtopics	Learning (Hours)	Marks
ITH304-4: Explain the need of normalization and state various forms of normalization.			
4	**NORMALIZATION** 4.1 Purpose of normalization 4.2 Functional dependencies and decomposition 4.3 Normalization using 1NF, 2NF, 3NF, BCNF 4.4 Denormalization- process, benefits and drawbacks	**5**	**10**
ITH304-5:Implement PL/SQL codes for given application.			
5	**PL / SQL** 5.1 PL/ SQL block structure 5.2 Variables 5.3 PL/SQL control structures 5.4 Cursors – Types, Attributes 5.5 Triggers – Use of database trigger 5.6 Stored procedures and functions – Advantages, Syntax for Creating 5.7 Exception handling in PL/SQL	**10**	**14**
ITH304-6: Apply security and backup methods on database			
6	**DATABASE SECURITY AND TRANSACTION PROCESSING** 6.1 Database security: Introduction to database security, Data security requirements, Types of database Users, Creating, Altering and deleting users. 6.2 Protecting the data within database- Database Privileges: Systems Privileges and object privileges, Granting and revoking privileges, Grant and Revoke command 6.3 Transaction and concurrency Control-Concept, Properties and States of Transaction, Concurrency issues, need for transactions, Necessary properties of transactions (ACID properties), Transaction states, Lock-Based Concurrency Control 6.4 Database Backup –Types of Failures, Causes of failures, Database Backup	**8**	**12**

No questions will be asked on IKS learning subtopics in any question papers.

G: List of Assignments Under SLA

Sr No	List of Assignments Under SLA	Hrs Alloted
1	Create & Configure Database Server for simple web application	04
2	Execute DCL commands using SQL 1) Create Users 2) Grant Privileges to users 3)Revoke Privileges to users	04
3	Develop a database for restaurant management system. The restaurant maintain catalogue for the list of food items and generate bill for the ordered food.	08
4	Prepare Invoice management system for electricity bill generation. Accept meter reading as inputs and generate respective bill amount for the same.	08
5	Design a database for registration and admission of patient for Hospital management system, draw ER diagram and normalize the database up to 3NF	06

H: SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END THEORY EXAMINATION

Section /Topic No	Name of Topic	Distribution of Marks			Total Marks	CO
		Remember	Under standing	Apply		
I/1	Introduction To DBMS	2	4	4	10	ITH304-1
I/2	Relational Model	2	4	6	12	ITH304-2
I/3	SQL	2	4	6	12	ITH304-3
II/4	Normalization	2	2	6	10	ITH304-4
II/5	PL/SQL	2	4	8	14	ITH304-5
II/6	Database Security and Transaction Processing	2	4	6	12	ITH304-6
Total Marks					70	

I) Assessment Criteria

i) Formative Assessment of Practical: -

Every assignment shall be assessed for 25 marks as per following criteria:

Domain	**Particulars**	**Marks out of 25**
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	05
	Drawing / drafting skills	05
Affective	Discipline and punctuality	05
TOTAL		**25**

ii) Summative Assessment of Practical:

Every practical assignment shall be assessed for 25 marks as per following criteria:

Sr.no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Preparedness for practical	05
3	Neat& complete Diagram.	05
4	Observations &computer handling skill	05
5	Oral Based on Lab work and completion of task	05
TOTAL		**25**

J) Instructional Methods:

1. Lectures cum Demonstrations.
2. Classroom practices.
3. Use of projector and soft material for demonstration
4. Laboratory experiences and laboratory interactive sessions
5. Regular Home Assignments

K) Teaching and Learning resources:

Chalk board, LCD presentations, Self-Learning Online Tutorials, Demonstrative charts.

L) Reference Books:

S.N.	Name of Book	Author	Publication
1	Database System Concepts	Henry F. Korth	McGraw Hill Education ISBN : 9780078022159
2	SQL, PL/SQL – The Programming Language of Oracle	Ivan Bayross	BPB Publication ISBN 10: 8170298997 BPB Publication ISBN 13: 9788170298991
3	Introduction to Database Management Systems	ISRD Group	McGraw Hill Education ISBN 10: 0070591199 McGraw Hill Education ISBN-13 : 978-0070591196

M) Learning Website & Software

i. https://nptel.ac.in/courses/106105175
ii. https://www.w3schools.com/sql/
iii. https://www.tutorialspoint.com/sql/index.htm
iv. www.tutorialpoints.com
v. www.techopedia.com

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COURSE ID: 10
COURSE NAME : DIGITAL LOGIC & MICROPROCESSOR
COURSE CODE : ITH305
COURSE ABBREVIATION : HDLD

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	03	03
	Tutorial Learning	00	
	Laboratory Learning	02	
	SLH-Self Learning	01	
	NLH-Notional Learning	06	

B. ASSESSMENT SCHEME: -

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL				BASED ON SLA		Total
					Practical						
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
03	30	70	100	40	25	10	25@	10	25	10	175

C: ABBREVIATIONS: - CL- Class Room Learning, TL- Tutorial Learning, LL- Laboratory Learning, SLH-Self Learning Hours, NLH- Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination, @$ Internal Online Examination.

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course, then the candidate shall be declared as"Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course, then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL) hrs.* 15 Weeks
5. 1(one) credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.

* Self learning includes micro project / assignment / other activities. (Provide list of all assignments here in tabular format At least 6 to 8 assignments to be given)

D. i) RATIONALE: -

It is essential to know fundamentals of digital electronics to understand the concept of microprocessor and its applications. Microprocessors benefits to meet challenges of growing applications of advanced microprocessor based technologies hence students are expected to be conversant with components of microprocessors and microprocessor based programming. This course is designed to help the students to design digital circuits and to understand the architecture of 8086 microprocessors. The course also enables students to develop assembly language programs using instruction set of 8086 microprocessors.

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry identified outcome through various learning experiences:

1. Perform binary arithmetic and use logic gates to design combinational and sequential circuits.
2. Developing microprocessor programs to fulfill application oriented need.

E. COURSE LEVEL LEARNING OUTCOMES (COs)

ITH305-1 Test the logic gates and Perform different binary arithmetic and number system conversion operations.
ITH305-2 Construct combinational logic circuit.
ITH305-3 Construct sequential logic circuits.
ITH305-4 Use registers and instructions of 8086.
ITH305-5 Develop assembly language programs using 8086.

Course outcomes and programme outcomes/ programme specific outcomes (CO- PO/PSO) matrix

[Note: Correlation levels: 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "--" : No correlation]

COs	Programme Outcomes POs and PSOs								
	PO1 Basic and Disciplines pecific knowledge	**PO2 Problem Analysis**	**PO3 Design /Development of solutions**	**PO4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO6 Project Management**	**PO 7 Life-long Learning**	**PSO 1 Design and development**	**PSO2 Database and Network management**
ITH305-1 Test the logic gates and Perform different binary arithmetic and number system conversion operations	2	2	2	1	--	--	3	1	--
ITH305-2 Construct combinational logic circuit	2	2	2	2	--	1	--	1	--
ITH305-3 Construct sequential logic circuits	2	2	2	2	--	1	3	1	--
ITH305-4 Use registers and instructions of 8086	2	2	2	1	--	1	3	1	--
ITH305-5 Develop assembly language programs using 8086	3	2	2	2	--	2	--	1	--

F. CONTENT:

I) Practical Exercises

The following practical exercises shall be conducted in the *Laboratory for AC Machine developed* by the Institute in practical sessions of batches of about 20- 22 students:

Sr. No.	Laboratory Experiences	Course Outcome
1.	Test different Basic Gates and verify the truth table.	ITH 305-1
2.	Test different Universal gates and verify the truth table	ITH 305-1
3.	Realize all gates using universal gates NAND and NOR	ITH 305-1
4.	Construct Half adder and verify it's truth table.	ITH 305-2
5.	Construct Half subtractor and verify it's truth table.	ITH 305-2
6.	Construct Full adder and verify it's truth table.	ITH 305-2
7.	Construct SR and JK flip flop and verify the truth table.	ITH 305-3
8.	Construct D and T flip flop and verify the truth table.	ITH 305-3
9.	Construct 3 bit Asynchronous UP counter and write the sequence.	ITH 305-3
10.	Develop an assembly language program to verify the contents of general purpose and segment registers.	ITH 305-4
11.	Develop an assembly language program to verify the contents of flags and memory locations of different segments.	ITH 305-4
12.	Develop an ALP to add i) two 8bit and ii) two 16 bit numbers bit numbers	ITH 305-5
13.	Develop an ALP to subtract i) two 8bit and ii) two 16 bit numbers	ITH 305-5

	bit numbers	
14.	Develop an ALP to multiply two 16 bit numbers. (Signed and unsigned.)	ITH 305-5
15.	Develop an ALP to divide two 16 bit numbers. (Signed and unsigned.)	ITH 305-5

II) Theory

Section I

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
Course Outcome ITG302-1: Test the logic gates and Perform different binary arithmetic and number system conversion operations			
1	**NUMBER SYSTEMS AND LOGIC GATES.** 1.1 Terms Bit, Nibble, Byte, Word, Double Word 1.2 Introduction to Number systems- Binary Number System, Decimal Number System, Octal, hexadecimal number system. 1.3 Different codes: ASCII, Gray, BCD, Excess -3 code 1.4 Conversion of one number system to another number system (integer and fractions) 1.5 Binary arithmetic addition, subtraction (1's and 2's complement) 1.6 BCD addition, BCD subtraction (9's and 10's complement) 1.7 Basic gates (AND, OR, NOT), Derived gates (NAND, NOR, EX-OR, EX-NOR), Concept of universal gate, Realization of all gates using universal gates.	7	12
Course Outcome ITG302-2: Construct combinational logic circuit.			
2	**COMBINATIONAL LOGIC CIRCUITS** 2.1 Laws of Boolean algebra, De Morgan's Theorem, Simplification of Boolean equations using Boolean algebra and its realization using gates. 2.2 Standard/canonical forms for Boolean functions (SOP and POS), Min terms and Max terms. 2.3 Expression's simplification using Boolean algebra techniques (K map for 2,3,4 variables) 2.4 Construction of Half and Full Adder, Half and Full Subtractor using K-map. 2.5 Necessity, principle and types of multiplexers 2.6 Necessity, principle and types of demultiplexers	8	12

Course Outcome ITG302-3: Construct sequential logic circuits.			
3	**SEQUENTIAL LOGIC CIRCUITS** 3.1 Comparison of combinational and sequential circuit. Block diagram of sequential logic circuit. 3.2 Flip-flops: Triggering methods used, Edge and Level triggering. 3.3 Working of different types of flip-flops with diagram and truth table (SR, JK, D and T type flip flop) 3.4 Asynchronous UP and DOWN counter design (3 bit) using T Flip flop 3.5 Four bit shift register using D Flip Flop. 3.6 SISO, SIPO, PISO, PIPO shift register.	7	10
	Sub-total	22	34

SECTION II

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
	Course Outcome ITG302-4: Use registers and instructions of 8086.		
4	**INTRODUCTION TO 8086 MICROPROCESSOR.** 4.1 Salient features of 8086, pin diagram 4.2 Architecture of 8086, flag register 4.3 Segment register of 8086. 4.4 Concept of memory segmentation and pipelining 4.5 Physical address generation 4.6 Concept of minimum and maximum mode of operation. 4.7 Timing diagram in minimum and maximum mode.	10	18
	Course Outcome ITG302-5: Develop assembly language programs using 8086.		
5	**ASSEMBLY LANGUAGE PROGRAMMING OF 8086** 5.1 Concept of assembly language program. 5.2 Instruction Set-Data transfer, Arithmetic and logical, Branch and loop, Shift, rotate and string instructions (Only formats and example) 5.3 Addressing modes of 8086 and relevant examples 5.4 Assembly Language programs for (8 bit & 16 bit) Addition, subtraction, Multiplication and Division.	13	18
	Sub-total	23	36

G: List of Assignments under SLA

Sr. No.	List of Assignment (under SLA)	Hours allotted
1.	Convert given numbers into different number systems	02
2.	Study different codes (min.5) other than mentioned in curriculum	02
3.	Find addition and subtraction for given numbers (min 5) using 1's, 2's, 9's and 10's complement method	02
4.	List out different ICs used for implementation of Logic gates with	02

	their pin number and internal diagram.	
5.	List and Prove different Boolean laws.	02
6.	Implement full adder and full subtractor using NAND gate only	02
7.	Find the different ICs required to implement SR, JK, D and T flip flop. Draw their pin diagram.	02
8.	Design 3 bit asynchronous UP and DOWN counter using T flip flop	02
9.	Implement SISO, SIPO, PISO, PIPO shift register using shift register ICs	02
10.	Write an assembly language program to verify the contents of general purpose, segment registers, flags and memory locations of different segments.	02
11.	Study the development of Pentium family.	02
12.	Write and assembly language program to design16 bit Calculator	02
13.	Write and assembly language program to design checker's Board using 8x8 matrix	02
14.	Write an assembly language program using 8086 to generate the Fibonacci series.	02
15.	Find the factorial of a given number using 8086 assembly language programming.	02
16.	Write an ALP to multiply two BCD numbers	02

**Eight out of 16 assignments covering all five COs are compulsory. As per the requirement course teacher can modify the assignments.

H: Specification table for setting question paper for semester end theory assessment

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks	CO
		Remember	Understand	Apply		
I / 1	Number systems and logic gates.	2	4	6	12	ITH305-1
I / 2	Combinational logic circuits	2	4	6	12	ITH305-2
I / 3	Sequential logic circuits	2	4	4	10	ITH305-3
II /4	Introduction to 8086 microprocessor.	2	8	8	18	ITH305-4
II /5	Assembly language programming of 8086	2	8	8	18	ITH305-5
Total Marks		**10**	**28**	**32**	**70**	

I: -Assessment Criteria

i) Formative Assessment of Practical: -

Every Practical assignment shall be assessed for 25 marks as per following criteria:

Domain	Particulars	Marks out of 25
Cognitive	Technical preparedness for practical	05
Psychomotor	Operating skills/Algorithm/ flowchart	05
Psychomotor	Observation/Logic/ Program/Result	05
Affective	Discipline and punctuality	05
Affective	Procedure/ Decency/ Presentation	05
TOTAL		**25**

ii) Summative Assessment of Practical:

Every Student shall be assessed for 25 marks as per following criteria:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Logical thinking and approach, procedure	05
3	followed to achieve the result	05
4	Neat & complete Diagram and Output	05
5	Use of editors, frameworks	05
TOTAL		**25**

J) Instructional Methods:

1. Lectures cum Demonstrations
2. Class room practices
3. Use of projector and soft material for demonstration
4. Virtual Laboratory

K) Teaching and Learning resources:

Chalk board, LCD presentations, Demonstrative kits, Demonstrative charts

L) Reference Books:

Sr. No	Name of Book	Author	Publication
1	R P Jain	Modern Digital Electronics	Tata McGraw Hill Education, New Delhi,2016ISBN(13):978-0-07-066911-6
2	Leach Donald P,Malvino Albert Paul,Saha	Digital Principles and Applications	Tata McGraw Hill Education, New Delhi,2016ISBN:978-93-392-0341-2

	Gautam		
3	Bhurchandi K M,Roy A K	Advanced microprocessors and peripherals 3/E	Tata McGraw Hill Education, New Delhi,2016ISBN:9781259006135
4	Savaliya M T	8086 Programming and advanced processor architecture	Wiley India. New Delhi,2013,ISBN:978-81-265-3091-5
5	Triebel, Walter, Singh A.,Avtar	The 8088 and 8086Microprocessors	SCITECH Publications, Chennai 2015, ISBN:978-8183717021

M) Learning Website & Software

i. https://dld-iitb.vlabs.ac.in/
ii. https://www.falstad.com/circuit/
iii. https://logic.ly/
iv. http://www.learnabouth-electronics.org/digital/dig42.php
v. https://cse15-iiith.vlabs.ac.in/
vi. http://www.logiccircuit.org/download.html

COURSE ID:11
COURSE NAME :CLIENT SIDE SCRIPTING
COURSE CODE :ITH306
COURSE ABBREVIATION :HCLS

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	01	3
	Tutorial Learning	-	
	Laboratory Learning	04	
	SLH-Self Learning	01	
	NLH-Notional Learning	06	

B. ASSESSMENT SCHEME:-

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL				BASED ON SLA		TOTAL
					Practical						
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
-	-	-	-	-	25	10	25@	10	25	10	75

(TotalIKSHrs.forSem.:00 Hrs.)

C: ABBREVIATIONS: -

CL-Classroom Learning, TL-Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA -Self Learning Assessment
Legends: @Internal Assessment, #External Assessment, *# on Line Examination, @$Internal Online Examination.

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course, then the candidate shall be declared as "Detained" in that semester.
3. IfcandidateisnotsecuringminimumpassingmarksinSLAofanycoursethenthecandidateshall bedeclaredas fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are(CL+LL+TL+SL) hrs.*15Weeks
5. 1(one)creditisequivalentto30Notionalhrs.
6. *Self-learning hours shall not be reflected in the Time Table.

*Self-learning includes micro project/assignment/other activities

D. i) RATIONALE: -

JavaScript is the globally used client-side languages for the web. The JavaScript language is so popular that hundreds of developers have made customized libraries that make development easier for other programmers and web designers. This course enables student to understand JavaScript concept and perform interactive dynamic scripting for real time web based projects.

ii)INDUSTRY/EMPLOYEREXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry identified outcome through various learning experiences:

1. Develop interactive dynamic webpages using JavaScript.

E. COURSELEVEL LEARNINGOUTCOMES(COS)

ITH306-1: Create interactive webpages using JavaScript control flow structure**,** arrays, functions and strings

ITH306-2: Develop webpage to handle form events using JavaScript.

ITH306-3: Create webpage using cookies and validating form with regular expression.

ITH306-4: Develop webpage with Object and DOM.

ITH306-5: Use of node.js, JSON and angular.js framework.

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"

Competency and Cos	ProgrammeOutcomes POs andPSOs								
	PO1 Basic and Disciplin especific knowledg e	**PO2 Proble m Analysis**	**PO3 Design /Develop ment of solutions**	**PO4 Engineeri ng Tools, Experime ntation and Testing**	**PO5 Engineering Practices for society, sustainability and Environm ent**	**PO6 Project Manage ment**	**PO7 Life-long Learning**	**PSO1 Design and develop ment**	**PSO2 Database and Network management**
Competency: Develop interactive dynamic webpages using JavaScript	1	2	2	3	1	--	1	3	--
ITH306-1: Create interactive webpages using JavaScript control flow structure**,** arrays, functions and strings	-	1	2	3	1	--	1	2	--
ITH306-2: Develop webpage to handle form events using JavaScript.	1	2	3	3	1	1	1	2	--
ITH306-3: Create webpage using cookies and validating form with regular expression.	1	2	2	2	1	--	--	2	--

ITH306-4: Develop webpage with Object and DOM.	1	2	2	2	1	1	--	2	--
ITH306-5: Use of node.js, JSON and angular.js framework.	1	1	2	1	2	--	1	1	--

F. CONTENT:

I) Practical exercises

The following practical exercises shall be conducted in the *Laboratory for Client Side Scripting* by the Institute in practical sessions of batches of about 20- 22 students:

(Practical's Marked in * are compulsory)

Sr. No.	Laboratory Experiences	Course Outcome
*1	Write a javascript with HTML program using variables and datatypes.	ITH306-1
*2	Create Webpage with javascript to insert into HTML and using external javascript file.	ITH306-1
*3	Write javascript to demonstrate use of operators.	ITH306-1
*4	Implement JavaScript program using if condition statement and looping .	ITH306-1
*5	Implement JavaScript to use array and associative array.	ITH306-1
*6	Write JavaScript program to implement string methods and functions	ITH306-1
*7	Design a webpage in JavaScript to implement form fields.(Assume any website)	ITH306-2
*8	Create a webpage to implement registration form for ecommerce website. Apply all form events.	ITH306-2
*9	Create a webpage to implement all cookies function.	ITH306-3
10	Create a webpage to implement session.	ITH306-3
11	Develop a webpage for validation of form field using regular expressions.	ITH306-3
*12	Implement JavaScript program using concept of object and DOM object.	ITH306-4
*13	Write program using node.js, JSON and angular.js framework	ITH306-5

II) Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)
ITH306-1: Create interactive webpages using JavaScript control flow structure, arrays, functions and strings.		
1	**INTRODUCTION to JAVA SCRIPT** 1.1 Web Scripting Fundamentals, Server- Versus Client-Side Programming 1.2 History, Features, JavaScript statements, A Simple Example, Code Editing Tools, The HTML Document, Keywords, Literals, JavaScript Values, Comments 1.3 Variables and data types 1.4 Expressions and Operators, Arithmetic Operators Comparison Operators, Logical (or Relational) Operators, Assignment Operators, Conditional (or ternary) Operators 1.5 If else, if else if, nested if statement, switch case 1.6 Loop statement – for loop, for ---in loop, while loop, do – while loop, continue statement 1.7 Inserting the JavaScript into an HTML document, using external java script files with examples	**2**
2	**ARRAY, FUNCTIONS AND STRING** 2.1 Declare array, initializing an Array, defining a array element, access the array element, Using array with Loop, Properties and methods of the Array Object, Using Associative array 2.2 Function – declaring & defining function, Adding parameters to function, scope of variable and arguments 2.3 Calling a function with and without an argument, calling function from HTML, function calling another function, returning a value from function 2.4 String – String and string methods	**3**
ITH306-2: Develop webpage to handle form events using JavaScript.		
3	**FORM & EVENT HANDLING** 3.1 Building blocks of the form: - forms basics, accessing forms, Form Fields- textbox, password field, radio buttons, checkboxes, pull-down menus, scrolled lists, buttons, hidden fields, common Input Element Properties, Form Validation 3.2 Introduction to Event Handler, 3.3 Form Events – Abort Event, Blur Event, Change Event, Click Event, Focus Event, Keydown, Keypress, Keyup Event, Load Event, Mousedown, Mousemove, Mouseup, Mouseover, Mouseout, Reset, Submit, Unload Event 3.4 Creating Script using Event Handler	**3**

Section –II

Sr. no.	Topics/Subtopics	Learning (Hours)
ITH306-3: Create webpage using cookies and validating form with regular expression.		
4	**COOKIES, SESSION & REGULAR EXPRESSION** 4.1 Cookies – Definition, the document. Cookie property, Cookie ingredients, writing a cookie, reading a cookie, deleting a cookie, writing multiple values in a single cookie 4.2 Session: Introduction to Session &it's working. 4.3 Regular Expression – Need of regular expression, Concept of regular expression, finding non matching characters, entering a range of characters, matching digits and non-digits, matching punctuation and symbols, matching words, Using String replace () with a Regular Expression	**2**
ITH306-4: Develop webpage with Object and DOM.		
5	**OBJECT & DOCUMENT OBJECT MODEL** 5.1 Defining Objects, creating Object, Accessing Object Properties, Accessing Object Methods 5.2 Browser Properties -opening a window, giving a new window focus, JavaScript location and history 5.3 Defining the Document object, Using the properties of Document Object, Using the methods of document object	**3**
ITH306-5: Use of node.js, JSON and angular.js framework.		
6	**JAVASCRIPT FRAMEWORK & CROSS-PLATFORM RUNTIME ENVIRONMENT** 6.1 Introduction to Node .js, a simple example application 6.2 Introduction to Angular.js, a simple example application 6.3 Difference between Node.js and Angular.js 6.4 Introduction to JSON, example	**2**

No questions will be asked on IKS learning subtopics in any question papers.

G) SLA

Sr.No	List of Assignment (under SLA)	Hrs Allotted
1	Create a web page that displays buyer's information entry form containing name, address, city, pin code, mail id, Phone Number, Product details, payment mode. Frame different validation rules for user inputs. Use JavaScript a regular expression to perform error checking on user input as per validation rules.	**04**
2	Build a simple slide show in JavaScript with six unique images. Design appropriate web page with at least two sections: with slide show in one section. When any image on this slide is clicked display information about it in other section. Use features for controlling window location.	**04**
3	Design and create web pages of an institute with different sections. Use pulldown menus in one section and implement validation of menu selections. Use other sections for displaying information about respective selected menu item.	**04**
4	Create a simple animation in JavaScript: create basic page showing a circle of white marble. Using the setTimeout() method create an animation on the page that makes an orange marble rotate around this circle by moving the orange marble to the next location in the circle every circle second. Allow the user to stop the animation by placing the cursor on any marble (use clearTimeout()).	**04**

I) Assessment Criteria

i) Formative Assessment of Practical: -

Every assignment shall be assessed for 25 marks as per following criteria:

Domain	Particulars	Marks out of 25
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	05
	Drawing / drafting skills	05
Affective	Discipline and punctuality	05
TOTAL		**25**

ii) Summative Assessment of Practical:

Every practical assignment shall be assessed for 25 marks as per following criteria:

Sr.no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Preparedness for practical	05
3	Neat& complete Diagram.	05
4	Observations & computer handling skill	05
5	Oral Based on Lab work and completion of task	05
TOTAL		**25**

J) Instructional Methods:

1. Lectures cum Demonstrations.
2. Classroom practices.
3. Use of projector and soft material for demonstration
4. Laboratory experiences and laboratory interactive sessions
5. Regular Home Assignments

K) Teaching and Learning resources:

Chalk board, LCD presentations, Self-Learning Online Tutorials, Demonstrative charts.

L) Reference Books:

S.N.	Name of Book	Author	Publication
1	A JavaScript Beginner Guide	John Pollock	McGraw Hill Companies
2	JavaScript The complete Reference	Thomas Powell, Fritz Schneider	Publisher(s):McGraw-Hill ISBN: 9780071741217
3	JavaScript Absolute Beginner Guide	Kriupa Chinnathambi	Pearson Education
4	JavaScript in 24 hours(SAMS teach yourself)	Phil Ballard, Michael Moncour	Pearson Education , Inc

M) Learning Website & Software

i. https://www.w3schools.com/js/
ii. https://www.javascripttutorial.net/
iii. https://www.tutorialspoint.com/javascript/index.htm
iv. https://javascript.info/

***

Programme : ALL
Semester : THIRD
Course Title : ESSENCE OF INDIAN CONSTITUTION
Course Code : CCH205

I. RATIONALE

This course will focus on the basic structure and operative dimensions of Indian Constitution. It will explore various aspects of the Indian political and legal system from a historical perspective highlighting the various events that led to the making of the Indian Constitution. The Constitution of India is the supreme law of India. The document lays down the framework demarcating the fundamental political code, structure, procedures, powers, and sets out fundamental rights, directive principles, and the duties of citizens. The course on constitution of India highlights key features of Indian Constitution that makes the students a responsible citizen. In this online course, we shall make an effort to understand the history of our constitution, the Constituent Assembly, the drafting of the constitution, the preamble of the constitution that defines the destination that we want to reach through our constitution, the fundamental right constitution guarantees through the great rights revolution, the relationship between fundamental rights and fundamental duties, the futurist goals of the constitution as incorporated in directive principles and the relationship between fundamental rights and directive principles.

II. INDUSTRY/EMPLOYEREXPECTEDOUTCOME

The aim of this course is to help the student to attain the following industry /employer expected outcome
–Abide by the Constitution in their personal and professional life.

III. COURSELEVELLEARNINGOUTCOMES(COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

CCH205 CO1- List salient features and characteristics of the constitution of India.
CCH205 CO2 - Follow fundamental rights and duties as responsible citizen and engineer of the country.
CCH205 CO3 - Analyze major constitutional amendments in the constitution.
CCH205 CO4- Follow procedure to cast vote using voter-id.
CCH205 CO5- List the roles & responsibilities of State Election Commission towards peoples in the state.
CCH205 CO-6 List Judiciary provisions for the peoples in general

IV. TEACHING-LEARNING&ASSESSMENTSCHEME

Course Code	CourseTitle	Abbr	Course Category /s	LearningScheme					Credits	AssessmentScheme											
				Actual Contact Hrs./Week			SLH	NLH		Paper Duration	Theory				BasedonLL&TL Practical				Basedon SL		Total Marks
				CL	TL	LL					FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
											Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
CCH205	ESSENCEOF INDIAN CONSTITUTION	EIC	VEC	1	-	-	1	2	1	-	-	-	-	-	-	-	-	-	50	20	50

Total IKS Hrs for Sem. : Hrs Abbreviations: CL- ClassRoom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORYLEARNINGOUTCOMESANDALIGNEDCOURSECONTENT

Sr. No.	Topics/Sub-topics	Lectures (Hours)
	SECTION-I	
1	**CCH205 CO1- List salient features and characteristics of the constitution of India.** **The Constitution:-** 1.1 Introduction. 1.2 The History of making of the Indian Constitution. 1.3 Basic structure and its interpretation. 1.4 Fundamental Rights and Duties and their interpretation	**2**
2	**CCH205 CO2 - Follow fundamental rights and duties as responsible citizen and engineer of the country.** **Union Government** 2.1 Structure of the Indian Union. 2.2 President–Role and power. 2.3 Prime minister and council of ministers. 2.4 LokSabha and Rajya Sabha. 2.5 Union Territories and their limitations.	**3**
3	**CCH205 CO3 - Analyze major constitutional amendments in the constitution.** **State Government.** 3.1 Governor–Role andpower. 3.2 Chief Minster and council of ministers. 3.3 State secretariat. 3.4 Administrative Regions of Maharashtra.	**3**
	SECTION-II	
4	**CCH205 CO4- Follow procedure to cast vote using voter-id.** **Local Administration:-Their roles and responsibilities** 4.1 District Administration. 4.2 Municipal Corporation. 4.3 Zilla Panchayat 4.4 Taluka (Tahasil) Administration.	**2**
5	**CCH205 CO5- List the roles & responsibilities of State Election Commission towards peoples in the state.** **Election Commission** 5.1 Role and functioning. 5.2 Chief Election Commissioner–Appointment. 5.3 State Election Commission. 5.4 Elections and duties of government/Non government servants–introduction	**2**
6	**CCH205 CO-6 List Judiciary provisions for the peoples in general** **Introduction to Judiciary Provisions :-** 1.1 Introduction 1.2 Different courts. 1.3 Government legal advisor-provisions. **1.4** Limitations of courts and co-ordination with Home department.	**3**

VI. LABORATORYLEARNINGOUTCOMEANDALIGNEDPRACTICAL/TUTORIALEXPERIENCES :N.A.

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)

- Outline the procedure to submit application for Voter-id
- Assignments are to be provided by the course teacher in line with the targeted COs.
  A1. Prepare an essay on Constitution of India .
  A2 Prepare a comparative chart of Unique features of Indian Constitution of India and Constitution of USA
- Assignments are to be provided by the course teacher in line with the targeted COs. A1. Prepare an essay on Constitution of India . A2 Prepare a comparative chart of Unique features of Indian Constitution of India and Constitution of USA A3. Self-learning topics: Parts of the constitution and a brief discussion of each part Right
. to education and girl enrollment in schools. GER of Girls and Boys. Rig

Micro project:-

1. Organize a workshop-cum discussions for spreading awareness regarding Fundamental Rights of the citizen of the country
2. Prepare elaborations where directive principle of State policy has prevailed over Fundamental rights with relevant Supreme Court Judgments.
3. Organize a debate on 42nd, 97th and 103rd Constitutional Amendment Acts of Constitution of India.

Seminar

1. Differences in the ideals of Social democracy and Political democracy.
2. Democracy and Women's Political Participation in India.
3. Khap Panchayat - an unconstitutional institution infringing upon Constitutional ethos.
4. Situations where directive principles prevail over fundamental rights.

Group discussions on current print articles

1. Art 356 and its working in Post-Independent India.
2. Women's Resrvation in Panchayat leading to Pati Panchayats - Problems and Solutions.
3. Adoption of Article 365 in India.
4. Need of Amendments in the constitution.
5. Is India moving towards a Unitary State Model ?

Activity

Arrange Mock Parliament debates.
Prepare collage/posters on current constitutional issues.

1. National (Art 352) & State Emergencies (Art 356) declared in India.
2. Seven fundamental rights.
3. Land Reforms and its effectiveness - Case study of West-Bengal and Kerala.

Cases: Suggestive cases for usage in teaching:

- A.K. Gopalan Case (1950) :SC contented that there was no violation of Fundamental Rights enshrined in Articles 13, 19, 21 and 22 under the provisions of the Preventive Detention Act, if the detention was as per the procedure established by law. Here, the SC took a narrow view of Article 21.
- Shankari Prasad Case (1951) : This case dealt with the amendability of Fundamental Rights (the First Amendment's validity was challenged). The SC contended that the Parliament's power to amend under Article 368 also includes the power to amend the Fundamental Rights guaranteed in Part III of the Constitution.
- Minerva Mills case (1980) :This case again strengthens the Basic Structure doctrine. The judgement struck down 2 changes made to the Constitution by the 42nd Amendment Act 1976, declaring them to violate the basic structure. Thejudgement makes it clear that the Constitution, and not the Parliament is supreme.
- Maneka Gandhi case (1978) :A main issue in this case was whether the right to go abroad is a part of the Right to Personal Liberty under Article 21. The SC held that it is included in the Right to Personal Liberty. The SC also ruled that the mere existence of an enabling law was not enough to restrain personal liberty. Such a law must also be "just, fair and reasonable."

Other cases:

1. Kesavananda Bharati Case (1973) : In this case the Hon. SC laid down a new doctrine of the 'basic structure' (or 'basic features') of the Constitution. It ruled that the constituent power of Parliament under Article 368 does not enable it to alter the 'basic structure' of the Constitution. This means that the Parliament cannot abridge or take away aFundamental Right that forms a part of the 'basic structure' of the Constitution.
2. Mathura Rape Case(1979) : A tribal woman Mathura (aged 14 to 16 years) was raped in Police Custody. The case raised the questions on the idea of 'Modesty of Woman' and here it was was a tribal woman who succumbs to multiple pattiarchies. Custodial rape was made an offence and was culpable with the detainment of 7 years or more under Section 376 of Indian Penal Code. The weight of proofing the allegations moved from the victim to the offender, oncesexual intercourse is established. The publication of the victim's identity was banned and it was also held that rape trials should be conducted under the cameras.
3. Puttswamy vs Union of India (2017) : In this landmark case which was finally pronounced by a 9-judge bench of the Supreme Court on 24th August 2017, upholding the fundamental right to privacy emanating from Article 21. The court stated that Right to Privacy is an inherent and integral part of Part III of the Constitution that guarantees fundamental rights. The conflict in this area mainly arises between an individual's right to privacy and the legitimate aim of the government to implement its policies and a balance needs to be maintained while doing the same.
4. Navtej Singh Johar & Ors. v. Union of India (2018) : Hon. SC Decriminalised all consensual sex among adults, including homosexual sex by scrapping down section 377 of the Indian penal code (IPC). The court ruled that LGBTQcommunity are equal citizens and underlined that there cannot be discrimination in law based on sexual orientation and gender.
5. Anuradha Bhasin Judgement (2020) : The Supreme Court of India ruled that an indefinite suspension of internet services would be illegal under Indian law and that orders for internet shutdown must satisfy the tests of necessity andproportionality. The Court reiterated that freedom of expression online enjoyed Constitutional protection, but could berestricted in the name of national security. The Court held that though the Government was empowered to impose a complete internet shutdown, any order(s) imposing such restrictions had to be made public and was subject to judicial review.

Note :
Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way. The faculty must allocate judicial mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills. If a microproject is assigned, it is expected to be completed as a group activity. SLA marks shall be awarded as per the continuous assessment record. If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

2 LABORATORYEQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED : NOT APPLICABLE

3 SUGGESTEDWEIGHTAGETOLEARNINGEFFORTS&ASSESSMENTPURPOSE(Specification Table)

Sr.No	Unit	UnitTitle	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Constitution and Preamble	CO1	4	0	0	0	0
2	II	Fundamental Rights and Directive Principles	CO2	4	0	0	0	0
3	III	Governance and Amendments	CO3	4	0	0	0	0
4	IV	Electoral Literacy and Voter's Education	CO4	3	0	0	0	0
GrandTotal				**15**	**0**	**0**	**0**	**0**

4 ASSESSMENTMETHODOLOGIES/TOOLS

Formative assessment (Assessment for Learning): Suggested Proformas are to be used for ASSESSMENT.
Assignment,Self-learningand TermsworkSeminar/Presentation

Summative Assessment (Assessment of Learning):-Suggested Proformas are to be used for ASSESSMENT

1 SUGGESTED COS-POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes(POs)							Programme Specific Outcomes* (PSOs)		
	PO-1Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6Project Management	PO-7 LifeLong Learning	PSO-1	PSO-2	PSO-3
CO1	1	-	-	-	2	-	-			
CO2	1	-	-	-	2	-	-			
CO3	1	2	-	-	2	-	1			
CO4	-	-	-	1	-	-	-			
Legends:-High:03,Medium:02,Low:01,NoMapping:- *PSOsaretobeformulatedatinstitutelevel										

6. SUGGESTED LEARNING MATERIALS/BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	P.M.Bakshi	TheConstitutionofIndia	Universal Law Publishing, New Delhi 15th edition, 2018, ISBN: 9386515105 (Check the new edition)
2	D.D.Basu	IntroductiontoIndianConstitution	Lexis Nexis Publisher, New Delhi, 2015, ISBN:935143446X
3	B.K. Sharma	IntroductiontoConstitutionofIndia	PHI, New Delhi, 6thedition, 2011, ISBN:8120344197
4	MORE READS:	Oxford Short Introductions - The Indian Constitution by Madhav Khosla. The Indian Constitution: Cornerstone of a Nation by Granville Austin. Working a Democratic Constitution:A History by Garnville Austin Founding Mothers of the Indian Republic: Gender Politics of the Framing of the Constitution by Achyut Chetan. Our Parliament by Subhash C. Kashyap. Our Political System by Subhash C. Kashyap. OurConstitutionbySubhashC.Kashyap. IndianConstitutionalLawbyRumiPal.	ExtraRead
5	B.L.Fadia	TheConstitutionofIndia	Sahitya Bhawan,Agra, 2017, ISBN:8193413768

2 LEARNING WEBSITES & PORTALS

Sr.No	Link/Portal	Description
1	http://www.legislative.gov.in/constitution-of-india	Constitutionoverview
2	https://en.wikipedia.org/wiki/Constitution_of_India	Partsofconstitution
3	https://www.india.gov.in/my-government/constitution-india	Constitutionoverview
4	https://www.toppr.com/guides/civics/the-indian-constitution/ the-constitution-of-india/	Fundamental rights and duties
5	https://main.sci.gov.in/constitution	Directiveprinciples
6	https://legalaffairs.gov.in/sites/default/files/chapter%203. pdf	Partsofconstitution
7	https://www.concourt.am/armenian/legal_resources/world_consti tutions/constit/india/india-e.htm	Partsofconstitution
8	https://constitutionnet.org/vl/item/basic-structure-indian-c onstitution	Partsofconstitution

Government Polytechnic Kolhapur

Learning and Assessment Scheme for Post S.S.C Diploma Courses

ProgrammeName :Diploma In Information Technology

Programme Code	**:IF(06)**	**WithEffectFromAcademicYear**	**: 2023-24**
Duration Of Programme	**: 6 Semester**	**Duration**	**: 16 WEEKS**
Semester	**: Fourth**	**Scheme**	**: H**

Sr No	CourseTitle	Abbrevation	Level	CourseType	Course Code	Total IKS Hrs for Sem	Learning Scheme					Credits	Assessment Scheme												
							ActualContact Hrs./Week			Self Learning (Activity/ Assignment /Micro Project)	Notional Learning Hrs/Week		Paper Duration (hrs.)	Theory				Based on LL & TL				Based on Self Learning		Total Marks
																		Practical						
							CL	TL	LL					FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
														Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
1	DATA STRUCTURE USING C	HDSC	III	DSC	ITH307	-	3	1	4	-	8	4	3	30	70	100	40	50	20	25@	10	-	-	175
2	JAVA PROGRAMMING	HJPR	III	SEC	ITH308	-	3	-	4	1	8	4	3	30	70	100	40	25	10	25#	10	25	10	175
3	OPERATING SYSTEM	HOSY	III	DSC	ITH309	-	3	-	2	1	6	3	3	30	70	100	40	25	10	-	-	25	10	150
4	ASP.NET WITH C#	HASP	III	SEC	ITH310	-	2	-	4	-	6	3	-	-	-	-	-	75	30	50#	20	-	-	125
5	PYTHON PROGRAMMING	HPYT	IV	SEC	ITH401	-	2	-	4	2	8	4	-	-	-	-	-	50	20	50#	20	25	10	125
6	ENVIRONMENTAL EDUCATION & SUSTAINABILITY	HEES	II	VEC	CCH206	-	2	-	-	2	4	2	1.5	30	70*#	100	40	-	-	-	-	25	10	125
Total						-	**15**	**1**	**18**	**6**	**40**	**20**	-	**120**	**280**	**400**		**225**		**150**		**100**		**875**

Abbreviations:CL-ClassroomLearning,TL-TutorialLearning,LL-LaboratoryLearning,FA-FormativeAssessments-SummativeAssessment,IKS-IndianKnowledgeSystem,SLA-SelfLearningAssessment

Legends: @ InternalAssessment, # ExternalAssessment, *# On Line Examination , @$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30marks each conducted during the semester.
2. If candidate is not securin gminimum passing marks in FA-Pr of any course then the candidate shall be declaredas"Detained"in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester (CL+LL+TL+SL)hrs.*15Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. *Self learning hour sshal lnot be reflected in theTime Table.

Course Category: DisciplineSpecificCourseCore(DSC): 2,DisciplineSpecificElective (DSE):0,ValueEducation Course(VEC):1, Intern./Apprenti./Project./Community(INP):0,AbilityEnhancementCourse (AEC) : 0, Skill Enhancement Course (SEC) : 3, GenericElective (GE) : 0

COURSE ID:12
COURSE NAME : Data Structure using in C
COURSE CODE : ITH307
COURSE ABBREVIATION : HDSC

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	03	4
	Tutorial Learning	01	
	LaboratoryLearning	04	
	SLH-SelfLearning	-	
	NLH-Notional Learning	08	

B. ASSESSMENT SCHEME: -

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL				BASED ON SLA		TOTAL
					Practical						
03	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				175
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
	30	70	100	40	50	20	25@	10	-	-	

(TotalIKSHrs.forSem.:00 Hrs.)

C: ABBREVIATIONS: -

CL-ClassroomLearning,TL-TutorialLearning,LL-LaboratoryLearning,SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA -Self LearningAssessment

Legends: @Internal Assessment,# External Assessment,
*# on Line Examination, @ $Internal Online Examination.

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained "in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course ,then the candidate shall be declared as fail and will have to repeat andresubmit SLAwork.
4. NotionalLearninghoursforthesemesterare(CL+LL+TL+SL) hrs.*15Weeks
5. 1(one) credit is equivalent to 30 Notional hrs.
6. *Self learning hours shall not be reflected in the Time Table.

*Self learning includes micro project /assignment/other activities

D. i)RATIONALE: -

This course focuses on advanced computer programming with an emphasis on designing and implementing abstract data structures. It teaches students how to efficiently organize and structure data to implement algorithms effectively. Key topics include fundamental and advanced data structures, algorithm analysis, design principles, and real-world applications. By mastering these concepts, students develop strong problem-solving skills essential for software engineering roles.

ii)INDUSTRY/EMPLOYEREXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry identified outcome through various learning experiences:

1.Implement algorithm using relevant Data Structures.

E. COURSELEVEL LEARNINGOUTCOMES(COS)

ITH307-1:Perform basic operation on array.

ITH307-2: Apply different searching and Sorting techniques to data.

ITH307-3:Implement basic operations on Linked List.

ITH307-4:Perform operations on Stack using Array and Linked List Implementations.

ITH307-5:Perform operations on Queue using Array and Linked List Implementations.

ITH307-6:Implement program to create and traverse tree to solve problems.

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1 Design and Development**	**PSO2 Database and Network Management**
CompetencyImplement algorithm using relevant Data Structures.	2	2	2	1	1	1	1	1	-
ITH307-1 CO-1 Perform basic operation on array.	2	-	-	1	-	-	1	1	-
ITH307-2 CO-2 Apply different searching and Sorting techniques to data.	2	2	2	1	-	-	1	1	-
ITH307-3 CO-3 Implement basic operations on Linked List.	2	2	2	1	1	1	1	1	-
ITH307-4 CO-4 Perform operations on Stack using Array and Linked List	2	2	2	1	-	1	1	1	-

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1 Design and Development**	**PSO2 Database and Network Management**
Implementations.									
ITH307-5 CO-5 Perform operations on Queue using Array and Linked List Implementations.	2	2	2	1	-	1	1	1	-
ITH307-6 CO-6 Implement program to create and traverse tree to solve problems	2	2	2	1	-	1	1	1	-

F. CONTENT:

I) Practical Exercises

The following practical exercises shall be conducted in the *Laboratory for Data Structure using C* by the Institute in practical sessions of batches of about 20- 22 students:

Sr. no	Laboratory Experiences	Course Outcome
1	* Implement a 'C' Program forArray operation.	ITH307-1
2	*Implement a 'C' Program to sort array (for String and Numeric Array) using Bubble Sort method.	ITH307-1
3	*Implement a 'C' Program to sortarray (for String and Numeric Array) using Selection Sortmethod.	ITH307-1
4	*Implement a 'C' Program to sortarray (for String and Numeric Array) usingInsertion Sortmethod.	ITH307-1
5	*Implement a 'C' Program tosearch particular data elementfrom the given array(for String and Numeric Array) usingLinear Search.	ITH307-1
6	*Implement a 'C' Program tosearch particular data elementfrom the given array (for String and Numeric Array) usingBinary Search.	ITH307-1
7	*Implement a 'C' Program toperform Insert, Delete, Traverseand Search operations on SinglyLinked List.	ITH307-1
8	Write a C Program to Create Two Polynomials using a Linked List. & add Two Polynomials using a Linked List.	ITH307-2
9	*Implement a 'C' Program toperform PUSH and POPoperation(with all Operationcondition) on stack using array.	ITH307-2
10	*Implement a 'C' Program toperform Recursion using stack	ITH307-2
11	*Write a 'C' program to print given string in reverse using Stack.	ITH307-3
12	*Write a 'C' Program to perform PUSH and POPOperations on a Stack using a Linked List.	ITH307-3

Sr. no	Laboratory Experiences	Course Outcome
13	*Write a 'C' program to perform multiplication oftwo numbers using recursion.	ITH307-3
14	Write a 'C' program to create a Singly Linked Listand traverse in reverse order using recursion.	ITH307-4
15	*Implement a 'C' Program toperform INSERT and DELETEoperations on Linear Queueusing array.	ITH307-4
16	* Write a 'C' Program to perform INSERT andDELETE operations on Linear Queue using aLinked List.	ITH307-4
17	*Implement a 'C' Program to perform INSERT and DELETE operations on Circular Queue using array.	ITH307-4
18	*Implement a 'C' Program to perform INSERT and DELETE operations on Circular Queue using Linked List.	ITH307-5
19	*Write a 'C' Program to Create a Priority Queue using a Linked List.	ITH307-5
20	* Write a 'C' Program to Implement BST (Binary Search Tree) and Traverse in In-Order.	ITH307-6
21	Write a 'C' Program to Traverse BST in Preorder, and Post-Order.	ITH307-6

II) Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: ITH307-1: Perform basic operation on array.			
1	**INTRODUCTION TO DATA STRUCTURE** 1.1 Concept and need of DS, Abstract data type 1.2 Types of Data Structure: 1.2.1 Linear Data Structure 1.2.2 Non-Linear Data Structure 1.3 Operations on data structures 1.3.1 insertion 1.3.2 Deletion 1.3.3 searching 1.3.4 traversing 1.3.5 sorting 1.4 Algorithm Complexity: 1.4.1 Time Complexity 1.4.2 Space Complexity	**7**	**10**
CO: ITH307-2: Apply different searching and Sorting techniques to data.			
2	**SORTING & SEARCHING** 2.1 Sorting - Introduction 2.2 Sorting Techniques – Sorting of Data set using following sorting techniques: 2.2.1 Bubble Sort 2.2.2 Selection Sort	**8**	**12**

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
	2.2.3 Insertion Sort 2.2.4 Quick Sort 2.2.5 Merge Sort 2.2.6 Radix Sort 2.3 Searching – Introduction 2.3.1 Linear Search 2.3.2 Binary Search		
CO: ITH307-3:Implement basic operations on Linked List.			
3	**LINKED LIST** 3.1 Introduction to Linked list: Definition, Example of Linked List, Terminologies: Node, Address, Pointer, Information/Data,Next, Null Pointer, Empty list. 3.2 Types of lists – Linear list, Circular list,doubly linked list 3.3 Operations on Singly linked list - Searching, Insertion of new node and Deletion of node in list 3.4 Applications of Linked List.	**8**	**12**

Section –II

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: ITH307-4: Perform operations on Stack using Array and Linked List Implementations.			
4	**STACK** 4.1 Introduction to Stack: Definition, Example of Stack, Stack as an Abstract Data Type 4.2 Representation of Stack in memory using Arrays 4.2.1 Primitive operations of stack: PUSH, POP 4.2.2 Stack Operations Conditions — Stack Full / Stack Overflow, Stack Empty / Stack Underflow. 4.2.3 Applications of Stack • Reversing a list • Polish notations 4.3 Conversion of infix to postfix expression, Evaluation of postfix expression, Converting an infix into prefix expression, Evaluation of prefix expression. 4.4 Recursion: Factorial & Fibonacci sequence using recursion. 4.5 Implementation of stack using linked list	**8**	**12**
CO: ITH307-5:Perform operations on Queue using Array and Linked List Implementations.			
5	**QUEUES** 5.1 Introduction to Queue: Definition, Example of Queue, Queue as an Abstract Data Type 5.2 Representation of Queue in memory using Arrays 5.3 Types of Queues: Linear Queue, Circular Queue, Concept of Priority Queue, Concept of Double Ended Queue 5.4 Queue Operations — INSERT, DELETE 5.4.1 Queue Operations Conditions — Queue Full, Queue Empty	**7**	**12**

	5.5 Applications of Queue 5.6 Implementation of queue using linked list		
CO: ITH307-6: Implement program to create and traverse tree to solve problems.			
6	**TREES AND GRAPH** 6.1 Introduction to Tree Terminology- tree, leaf node, degree of node, degree of tree, level of node, Depth / Height of tree, Path, In-degree & Out-degree, Ancestor & descendant nodes 6.2 Types of Trees: General tree, Binary tree, Binary search tree (BST). - Binary tree Traversal methods: In order traversal, Preorder traversal, Post order traversal 6.3 Expression Tree 6.4 Introduction to Graph Terminology - graph, node (vertices), arcs (edge), directed graph, undirected graph, in-degree, out-degree, adjacent, successor, Predecessor, weight, weighted graph, path, length, cycle, connected graph, multigraph, complete graph, strongly Connectedgraph 6.5 Sequential Representation of Graph 6.6 Adjacency List, Adjacency Matrix of directed / undirected graph.	**7**	**12**

** No questions will be asked on IKS learning subtopics in any question papers.

G: List of Assignments under SLA

Nil

H: Specification table for setting question paper for semester end theory examination

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks	CO
		Remember	Understand	Apply		
I / 1	INTRODUCTION TO DATA STRUCTURE	2	4	4	10	ITH307-1
I / 2	SORTING & SEARCHING	2	4	6	12	ITH307-2
I / 3	LINKED LIST	2	4	6	12	ITH307-3
II /4	STACK	2	4	6	12	ITH307-4
II /5	QUEUE	2	4	6	12	ITH307-5
II / 6	TREE & GRAPH	2	4	6	12	ITH307-6
	Total Marks				70	

I)Assessment Criteria

i) Formative Assessment of Practical: -

Every assignment shall be assessed for 25 marks as per following criteria:

Domain	**Particulars**	**Marks out of 25**
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	05
	Drawing / drafting skills	05
Affective	Discipline and punctuality	05
TOTAL		**25**

ii) Summative Assessment of Practical:

Every practical assignment shall be assessed for 25 marks as per following criteria:

Sr.no	Criteria	Marksallotted
1	Attendance at regular practical	05
2	Preparedness for practical	05
3	Neat & complete Diagram.	05
4	Observations &computer handling skill	05
5	Oral Based on Lab work and completion of task	05
TOTAL		**25**

J) Instructional Methods:

1. Lectures cum Demonstrations.
2. Classroom practices.
3. Use of projector and soft material for demonstration
4. Laboratory experiences and laboratory interactive sessions
5. Regular Home Assignments
6.

K) Teaching and Learning resources:

Chalk board, LCD presentations, Self-Learning Online Tutorials, Demonstrative charts.

L) Reference Books:

S.N.	Name of Book	Author	Publication
1	Data Structures with 'C' (SIE)(Schaum's Outline Series)	Lipschutz	McGraw Hill Education, New Delhi ISBN: 978-0070701984
2	Data Structures using 'C'	Balgurusamy, E.	McGraw Hill Education, New Delhi 2013, ISBN: 978-1259029547
3	Data Structures using 'C'	ISRD Group	McGraw Hill Education, New Delhi 2013, ISBN: 978-12590006401
4	Understanding Pointers in C	Yashwant Kanetkar	BPB ISBN 8170298911

M) Learning Website & Software

a) https://www.javatpoint.com/data-structure-introduction
b) https://www.geeksforgeeks.org/introduction-to-data-structure/
c) https://studytonight.com/data-structures/
d) https://www.tutorialspoint.com/data_structures_algorithms/
e) https://www.w3schools.in/data-structures/
f) https://www.mygreatlearning.com/blog/data-structure-tutorial-for-beginners/
g) https://byjus.com/gate/introduction-to-data-structure-notes/

***

COURSE ID: 13
COURSE NAME : Java Programming
COURSE CODE : ITH308
COURSE ABBREVIATION : HJPR

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	03	4
	Tutorial Learning	-	
	Laboratory Learning	04	
	SLH-Self Learning	01	
	NLH-Notional Learning	08	

B. ASSESSMENT SCHEME :-

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL				BASED ON SLA		TOTAL
					Practical						
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
03	30	70	100	40	25	10	25#	10	25	10	175

(Total IKS Hrs. for Sem.: 00 Hrs.)

C: ABBREVIATIONS: -

CL- Classroom Learning, TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# on Line Examination, @$ Internal Online Examination.

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course, then the candidate shall be declared as"Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course, then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL) hrs.* 15 Weeks
5. 1(one) credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.

* Self learning includes micro project / assignment / other activities

D. i) RATIONALE: -

Java is Open-Source Platform. Java enhances and refines the object-oriented paradigm, supporting the development of dynamic, secure, and portable web-based applications. This knowledge is crucial for creating customized and web-based applications. Java's platform independence makes it widely utilized in various business applications.

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry identified outcome through various learning experiences:

1. Develop standalone and network-based applications using Java.

E. COURSE LEVEL LEARNING OUTCOMES (COS)

ITH308-1: Develop java program using classes and objects.

ITH308-2: Develop java program for implementing code reusability concept.

ITH308-3: Develop program to implement multithreading and exception handling.

ITH308-4: Develop java program for implementing event handling using window-based application components.

ITH308-5: Implements network programming in java.

ITH308-6: Develop java program for managing database.

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2** Problem Analysis	**PO 3** Design / Development of solutions	**PO 4** Engineering Tools, Experimentation and Testing	**PO 5** Engineering Practices for society, sustainability and Environment	**PO 6** Project Management	**PO 7** Life-long Learning	**PSO1** Design and Development	**PSO2** Database and Network Management
Competency: Develop standalone and network-based applications using Java.	2	2	2	2	1	2	1	3	3
ITH308-1 CO-1 Develop java program using classes and objects.	2	2	1	2	-	1	1	2	1
ITH308-2 CO-2 Develop java program for implementing code reusability concept.	2	2	2	2	-	1	1	3	2
ITH308-3 CO-3 Develop program to implement multithreading and exception handling.	2	2	2	2	-	1	1	3	2

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
ITH308-4 CO-4 Develop java program for implementing event handling using window-based application components.	2	2	2	2	1	2	2	3	2
ITH308-5 CO-5 Implements network programming in java.	2	2	2	2	1	2	2	3	3
ITH308-6 CO-6 Develop java program for managing database.	2	2	2	2	1	2	2	3	3

F. CONTENT:

I) Practical exercises

The following practical exercises shall be conducted in the *Laboratory for Web Page Design* by the Institute in practical sessions of batches of about 20- 22 students:

Sr. no	Laboratory Experiences	Course Outcome
1	*Install any IDE software application.	ITH308-1
2	Implement programs to evaluate different types of Expressions.	ITH308-1
3	Develop program to implement different control structures.	ITH308-1
4	*Develop program to implement String and String Buffer Class.	ITH308-1
5	*Implement array and vectors in Java.	ITH308-1
6	Convert primitive data types into object and vice-versa.	ITH308-1
7	Initialize objects using constructors.	ITH308-1
8	Implement concepts of inheritance for code reusability.	ITH308-2
9	*Implement multiple inheritance. (Interface)	ITH308-2
10	*Implement packages in Java.	ITH308-2
11	*Execute different processes simultaneously using multithreading.	ITH308-3
12	Identify the different types of errors using exception handling.	ITH308-3
13	*Manage different types of user defined exceptions.	ITH308-3
14	*Design GUI using different AWT components.	ITH308-4

Sr. no	Laboratory Experiences	Course Outcome
15	Design GUI using different menu class.	ITH308-4
16	Design GUI using border layout manager.	ITH308-4
17	*Design GUI using grid layout manager.	ITH308-4
18	Implement swing components in a frame.	ITH308-4
19	Design Jtree and Jtable using advanced swing components in a frame	ITH308-4
20	*Implement action event in java.	ITH308-4
21	*Implement various keys and mouse events.	ITH308-4
22	*Implement text event in java.	ITH308-4
23	Extract the hostname and IP address using Inet Address class.	ITH308-5
24	*Retrieve various components of URL using different methods of URL and connection class	ITH308-5
25	*Implement client-server TCP based communication.	ITH308-5
26	Implement client server UDP based communication.	ITH308-5
27	*Make database connectivity using appropriate JDBC driver	ITH308-6
28	*Manage database using JDBC.	ITH308-6
29	*Manage database using JDBC using Prepared Statement.	ITH308-6
30	*Implement dynamic query.	ITH308-6

II) Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: ITH308-1: Develop java program using classes and objects.			
1	**Introduction to Java** 1.1 Java features and the Java programming environment 1.2 Defining a class, creating object, accessing class members 1.3 Java tokens and data types, symbolic constant, scope of variable, typecasting, and different types of operators and expressions, decision making and looping statements 1.4 Arrays, strings, string buffer classes, vectors, wrapper classes 1.5 Constructors and methods, types of constructors, method and constructor overloading, nesting of methods, command line arguments, garbage collection, visibility control: public, private, protected, default, private protected	**8**	**12**

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: ITH308-2: Develop java program for implementing code reusability concept.			
2	**Inheritance, Interface and Packages** 2.1 Inheritance: concept of inheritance, types of Inheritance: single inheritance, multilevel inheritance, hierarchical inheritance, method overriding, final variables, final methods, use of super, abstract methods and classes 2.2 Interfaces: Define interface, implementing interface, accessing interface variables and methods, extending interfaces 2.3 Package: Define package, types of package, naming and creating package, accessing package, import statement, static import, adding class and interfaces to a package	**7**	**12**
CO: ITH308-3: Develop program to implement multithreading and exception handling.			
3	**Exception Handling and Multithreading** 3.1 Errors and Exception: Types of errors and exceptions, try and catch statement, throws and finally statement, built-in exceptions, throwing our own exception 3.2 Multithreaded programming: creating a thread: By extending to thread class and by implementing runnable Interface, Life cycle of thread: Thread methods, thread exceptions, thread priority and methods, synchronization	**7**	**10**

Section –II

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: ITH308-4: Develop java program for implementing event handling using window-based application components.			
4	**Event handling using Abstract Window Toolkit (AWT) & Swings Components** 4.1 Component, container, window, frame, panel, use of AWT controls: labels, buttons, checkbox, checkbox group, text field, text area 4.2 Use of layout managers: flow Layout, border Layout, grid Layout, grid Bag Layout, menu bars, menus, file dialog 4.3 Introduction to swing: Swing features, difference between AWT and Swing. 4.4 Swing components: Icons and Labels, Text Field, Combo Box, Button, Checkbox, Radio Button 4.5 Advanced Swing Components: Tabbed Panes, Scroll Panes, Trees, Tables, Progress bar, tool tips 4.6 Introduction to Event Handling: The delegation Event Model: Event sources, Event listeners	**8**	**12**

CO: ITH308-5: Implements network programming in java.			
5	**Basics of Network Programming** 5.1 Socket Overview: Client/Server, reserved Sockets, proxy servers, Internet Addressing 5.2 Java and the Net: The networking classes and interfaces, Inet Address: Factory Methods, Instance Methods 5.3 TCP/IP Client and Server Sockets, datagram sockets, datagram packets 5.4 The URL Class, URL Connection class	**7**	**12**
CO: ITH308-6: Develop java program for managing database			
6	**Interacting with Database** 6.1 Introduction to JDBC, ODBC 6.2 JDBC architecture: Two tier and Three tier models 6.3 Types of JDBC drivers, DriverManager class, Connection interface, Statement interface, PreparedStatement interface, ResultSet Interface	**8**	**12**

** No questions will be asked on IKS learning subtopics in any question papers.

G: List of Assignments under SLA

(Assignments Marked in * are compulsory)

Micro project

- Develop mini-ATM machine system. It should accept account_no, account_holder_name, account_balance and perform operations such as withdrawal, Deposit and balance check.
- Develop Quiz Management System. Quiz should accept student credentials and contain 10 MCQ type questions. Determine the final result. Save the result in table along with student credentials.
- Energy Billing System: Expected to develop bill amount module based on usage of energy consumption.
- Develop Employee Management System. Insert employee details such as employee_name, emp_id,emp_salary etc.. into database and retrieve data from table.
- Any other micro project as suggested by course teacher.

H: Specification table for setting question paper for semester end theory examination

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks	CO
		Remember	Understand	Apply		
I / 1	Introduction to Java	2	4	6	12	ITH308-1
I / 2	Inheritance, Interface and Packages	2	4	6	12	ITH308-2
I / 3	Exception Handling and Multithreading	2	4	4	10	ITH308-3
II /4	Event handling using Abstract Window Toolkit (AWT) & Swings Components	2	4	6	12	ITH308-4
II /5	Basics of Network Programming	2	4	6	12	ITH308-5
II / 6	Interacting with Database	2	4	6	12	ITH308-6
	Total Marks				70	

I)Assessment Criteria

i) Formative Assessment of Practical: -

Every assignment shall be assessed for 25 marks as per following criteria:

Domain	**Particulars**	**Marks out of 25**
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	05
	Drawing / drafting skills	05
Affective	Discipline and punctuality	05
TOTAL		**25**

ii) Summative Assessment of Practical:

Every practical assignment shall be assessed for 25 marks as per following criteria:

Sr. no	**Criteria**	**Marks allotted**
1	Attendance at regular practical	05
2	Preparedness for practical	05
3	Neat & complete Diagram.	05
4	Observations & computer handling skill	05
5	Oral Based on Lab work and completion of task	05
TOTAL		**25**

J) Instructional Methods:

1. Lectures cum Demonstrations.
2. Class room practices.
3. Use of projector and soft material for demonstration
4. Laboratory experiences and laboratory interactive sessions
5. Regular Home Assignments

K) Teaching and Learning resources:

Chalk board, LCD presentations, Self-Learning Online Tutorials, Demonstrative charts.

L) Reference Books:

S.N.	Name of Book	Author	Publication
1	E Balaguruswamy	Programming with JAVA	Mcgraw Hill Education (India) Private Limited, New Delhi .ISBN-13: 978-93-5134-320-2
2	Schildt Herbert	Java Complete Reference	Mcgraw Hill Education, New Delhi . ISBN:9789339212094
3	Holzner, Steven et al	Java 8 Programming Black Book	Dreamtech Press, New Delhi. ISBN: 978-93-5119-758-4

M) Learning Website & Software

a) https://www.javatpoint.com/java-tutorial
b) https://www.w3schools.com/java/
c) https://www.tutorialspoint.com/java/index.htm
d) https://www.programiz.com/java-programming/online-compiler/
e) https://onecompiler.com/java
f) https://infyspringboard.onwingspan.com/web/en/login?ref=%2Fapp%2Ftoc%2Flex_29%2Foverview
g) https://onlinecourses.nptel.ac.in/noc22_cs47/preview
h) https://www.odbms.org/wp-content/uploads/2013/11/009.01-Arlo

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COURSE ID: 14
COURSE NAME : OPERATING SYSTEM
COURSE CODE : ITH309
COURSE ABBREVIATION : HOSY

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	03	3
	Tutorial Learning	-	
	Laboratory Learning	02	
	SLH-Self Learning	01	
	NLH-Notional Learning	06	

B. ASSESSMENT SCHEME :-

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL Practical				BASED ON SLA		TOTAL
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
03	30	70	100	40	25	10	--	--	25	10	150

(Total IKS Hrs. for Sem.: 00 Hrs.)

C: ABBREVIATIONS: -

CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# on Line Examination, @$ Internal Online Examination.

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as"Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1(one) credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.

* Self learning includes micro project / assignment / other activities

D. i) RATIONALE:-

The study of operating system is not only the basic understanding of system software but also it provides an insight for developing application software. This course primarily focuses on design and data structures used for managing the resources. It also covers case study on Windows operating system structure.

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry identified outcome through various learning experiences:

1. Manage Operations of Operating System

E. COURSE LEVEL LEARNING OUTCOMES (COS)

ITH309-1: Describe the basic functions of operating systems.
ITH309-2: Use Operating systems tools to perform various functions.
ITH309-3: Execute Process commands for performing process management operations.
ITH309-4: Apply various CPU Scheduling Algorithms on given processes.
ITH309-5: Analyze the various memory management techniques.
ITH309-6: Apply File management techniques.

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
Competency: Manage Operations of Operating System.	2	2	2	1	1	1	2	-	1
ITH309-1 CO-1 Describe the basic functions of operating systems	2	-	-	1	1	-	2	-	1
ITH309-2 CO-2 Use Operating systems tools to perform various functions	2	2	-	1	1	-	1	-	1
ITH309-3 CO-3 Execute Process commands for performing process management operations	2	1	1	2	-	-	2	-	1

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
ITH309-4 CO-4 Apply various CPU Scheduling Algorithms on given processes	2	2	2	1	-	1	1	-	1
ITH309-5 CO-5 Analyze the various memory management techniques	3	2	2	1	-	1	2	-	1
ITH309-6 CO-6 Apply File management techniques.	1	2	2	2	-	1	1	-	1

F. CONTENT:

I) Practical Exercises

The following practical exercises shall be conducted in the *Laboratory for Web Page Design* by the Institute in practical sessions of batches of about 20- 22 students:

Sr. no	Laboratory Experiences	Course Outcome
1	Install and configure Linux or alike Operating System	ITH309-1
2	Execute general purpose commands like date, time, cal, clear, banner, tty, script, man.	ITH309-1
3	Work with multiple Linux terminals and basic commands: who, who am I, login, passwd, su, pwd.	ITH309-2
4	a) Use operating system services(Editor, GUI, File Handling) b) Run Commands to start, stop, and restart the specified service in Linux.	ITH309-2
5	Execute Process commands: ps, wait, sleep, exit, kill.	ITH309-3
6	Write a Program for implementing scheduling algorithm FCFS	ITH309-4
7	Write a Program for round robin scheduling	ITH309-4
8	Write a C Program to implement FIFO Page replacement algorithm.	ITH309-5
9	Execute file and directory manipulation commands	ITH309-6
10	Execute text processing commands: tr, wc, cut, paste, spell, sort, grep, more.	ITH309-6
11	Use VI editor and perform all editor commands	ITH309-6
12	Write and Execute shell script by using different control statements: if ,for statement	ITH309-6

II) Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: ITH309-1: Describe the basic functions of operating systems			
1	**Introduction to Operating System** 1.1 Operating System: Concepts, Components of OS, And Operations of OS: Process Management, Memory Management, Storage Management, Protection and Security. 1.2 Views of OS: User View, System View 1.3 Operating System Operations: Dual Mode, Timer 1.4 Special-Purpose Systems: Real-Time Embedded Systems, Multimedia Systems, Batch OS,Time Shared OS,Distributed System, Mobile OS(Android,iOS) 1.5 Open-Source Operating System: Linux, BSD Unix	**7**	**10**
CO: ITH309-2: Use Operating systems tools to perform various functions			
2	**Services and Components of Operating System** 2.1 Different Services of Operating System. 2.2 System Calls-Concept, types of operating system calls 2.3 OS component-Process Management, Main memory Management, file Management, I/O system management, secondary storage management 2.4 Use of operating system tools, user management, security policy, device management, performance monitor, task scheduler.	**7**	**12**
CO: ITH309-3: Execute Process commands for performing process management operations			
3	**Process Management** 3.1 Process-Process states, Process Control Block (PCB). 3.2 Process Scheduling- Scheduling Queues Schedulers, Context switch. 3.3 Operations on Process: Creation, Termination 3.4 Inter-Process Communication (IPC): Introduction, shared memory system and message passing system. 3.5 Threads-Benefits, users and kernel threads, Multithreading Models –Many to One, One to One, Many to Many. 3.6 Thread Libraries, Threading Issues	**8**	**12**

Section –II

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: ITH309-4: Apply various CPU Scheduling Algorithms on given processes			
4	**CPU Scheduling** 4.1 Scheduling types-Scheduling objective, CPU and I/O burst cycles, Pre-emptive, Non-Preemptive scheduling, and scheduling criteria. 4.2 Types of scheduling algorithms-First come first served (FCFS), shortest job first (SJF), Shortest Remaining Time (SRTN), Round Robin(RR) Priority scheduling, multilevel queue scheduling. 4.3 Critical section problem. 4.4 Deadlock- system, Models, Necessary condition leading to Deadlocks, Deadlock Handling: Preventions, avoidance and Recovery**.**	**8**	**12**
CO:ITH309-5: Analyze the various memory management techniques			
5	**Memory Management** 5.1 Basic Memory Management-Partitioning, Fixed and variable. 5.2 Free space management techniques-Bitmap, Linked List. 5.3 Introduction to Paging, Segmentation, Fragmentation, and Page Fault 5.4 Demand Paging 5.5 Page replacement Algorithm-FIFO, LRU, Optimal.	**7**	**12**
CO: ITH309-6: Apply File management techniques			
6	**File Management** 6.1 File-concepts, Attributes, Operations, types and File System Structure. 6.2 Access Methods-Sequential, Direct, Swapping, File Allocation Methods-Contiguous, Linked, Indexed. 6.3 Directory Structure-Single level, two level, and tree structured directory, Disk organization and Disk Structure-Physical structure, Logical structure, Raid structure of Disk, RAID level 0 to 6. 6.4 File System Implementation: Partitions and Mounting, Virtual File Systems	**8**	**12**

** No questions will be asked on IKS learning subtopics in any question papers.

G: List of Assignments under SLA

Sr.No	List of Assignment (under SLA)	Hrs. Allotted
1	Study and present three Microsoft Device Drivers	02
2	Study Infosys Spring board course on Operating System	04
3	Study and present HDFS configuration	02
4	Write a shell script that schedules a process and run the shell script at specific time.	03
5	Write a shell script that tests the connectivity of group of computers	02
6	Write a shell script that counts number of files and number of directories in a directory.	02

H: Specification table for setting question paper for semester end theory examination

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks	CO
		Remember	Understand	Apply		
I / 1	Introduction to Operating System	2	4	4	10	ITH309-1
I / 2	Services & Components of Operating System	2	4	6	12	ITH309-2
I / 3	Process Management	2	4	6	12	ITH309-3
II /4	CPU Scheduling	2	4	6	12	ITH309-4
II /5	Memory Management	2	4	6	12	ITH309-5
II / 6	File Management	2	4	6	12	ITH309-6
	Total Marks				70	

I:-Assessment Criteria

i) Formative Assessment of Practical:-

Every assignment shall be assessed for 25 marks as per following criteria:

Domain	**Particulars**	**Marks out of 25**
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	05
	Drawing / drafting skills	05
Affective	Discipline and punctuality	05
TOTAL		**25**

ii) Summative Assessment of Practical:

Every practical assignment shall be assessed for 25 marks as per following criteria:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Preparedness for practical	05
3	Neat & complete Diagram.	05
4	Observations & computer handling skill	05
5	Oral Based on Lab work and completion of task	05
TOTAL		**25**

J) Instructional Methods:

1. Lectures cum Demonstrations.
2. Class room practices.
3. Use of projector and soft material for demonstration
4. Laboratory experiences and laboratory interactive sessions
5. Regular Home Assignments

K) Teaching and Learning resources:

Chalk board, LCD presentations, Self-Learning Online Tutorials, Demonstrative charts.

L) Reference Books:

S.N.	Name of Book	Author	Publication
1	Operating System Concepts	Silberschatz Galvin, Gagne, John Wisley & Sons	Wiley and Sons, Ninth Edition, Galvin. 2015, ISBN: 978-5 1-265-5427-0 2 ISBN-13: 978-0470128725
2	Operating Systems	Achyut S. Godbole, Tata McGraw-Hill	Tata McGraw Hill Education, 2015, ISBN: 97800705911343
3	Operating System Concept & Design	Milan Milenkovic, TMH	McGraw Hill Education ISBN-10: 0074632728 ISBN-13: 978-0074632727
4	Operating Systems: Internal and Design Principles	Stallings, William	Pearson, 8 edition, 2015 ISBN:978-0133805918
5	Unix Concepts and Programming	Das, Sumitabha	McGraw Hill Education, 2015 ISBN:978-0070635463

M) Learning Website & Software

a. www.cs.wisc.edu/
b. www.cs.kent.edu/osf 03/notes/index.html
c. http://www.howstuffworks.com/operating-system
d. www.en.wikipedia.org/wiki/Operatingsystem

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COURSE ID: 15
COURSE NAME : ASP.NET WITH C#
COURSE CODE : ITH310
COURSE ABBREVIATION : HASP

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	02	3
	Tutorial Learning	-	
	Laboratory Learning	04	
	SLH-Self Learning	-	
	NLH-Notional Learning	06	

B. ASSESSMENT SCHEME :-

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL				BASED ON SLA		TOTAL
					Practical						
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
-	-	-	-	-	75	30	50#	20	-	-	125

(Total IKS Hrs. for Sem.: 00 Hrs.)

C: ABBREVIATIONS: -

CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment
Legends: @ Internal Assessment, # External Assessment, *# on Line Examination, @$ Internal Online Examination.

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as"Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1(one) credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.

* Self learning includes micro project / assignment / other activities

D. i) RATIONALE:-

.NET Framework (pronounced dot net) is a software framework developed by Microsoft that runs primarily on Microsoft Windows. It includes a large library and provides language interoperability (each language can use code written in other languages) across several programming languages. This course requires knowledge of web page designing. It involves the technologies used today to develop interactive and sophisticated web sites using ASP.NET. Web Technology is based on dot net technology, a frame work, which supports many languages so that application designed in one language (like C++, COBOL, JAVA, etc) can be connected/interfaced with this frame work hence it is more flexible and advanced.

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry identified outcome through various learning experiences:

1. Design Windows Applications and Web Applications using C# and ASP.NET technology.

E. COURSE LEVEL LEARNING OUTCOMES (COS)

ITH310-1: Develop C# programs using control structures and functions.
ITH310-2: Develop C# programs for implementing Object Oriented programming concept.
ITH310-3: Design simple ASP.NET web forms using controls.
ITH310-4: Develop programs in ASP.NET using Cookies, Session, Application and Server Objects.
ITH310-5: Connect and manipulate database using ADO.NET for ASP.NET Web Applications

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experim entation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1 Design and development**	**PSO2 Database and Network management**
Competency: Design Windows Applications and Web Applications using C# and ASP.NET technology	1	1	3	2	1	1	1	2	2
ITH310-1: Develop C# programs using control structures and functions.	1	--	2	2		--	-	1	--
ITH310-2: Develop C# programs for implementing Object Oriented programming concept.	1	1	3	3	1	-	1	2	--

ITH310-3: Design simple ASP.NET web forms using controls.	1	1	2	3	1	-	1	2	1
ITH310-4: Develop programs in ASP.NET using Cookies, Session, Application and Server Objects.	1	1	2	2	1	-	1	3	2
ITH310-5: Connect and manipulate database using ADO.NET for ASP.NET Web Applications	1	1	3	2	1	-	1	3	3

F. CONTENT:

I) Practical exercises

The following practical exercises shall be conducted in the *Laboratory for Object Oriented Programming Using C++* by the Institute in practical sessions of batches of about 20- 22 students:

(Practical's Marked in * are compulsory)

Sr. No.	Laboratory experiences	Course outcome
*1.	Development of C# program using Decision Making Statements	ITH310-1
*2.	Development of C# program using Iterative(Loop) statements	ITH310-1
*3.	1. Development of C# program using numeric functions in .net –Log, Sin, Cos etc. 2. Development of C# program using String functions in .net –Mid, InStr, Replace etc 3. Develop C# programs using user defined functions, functionOverloading	ITH310-1
*4	1. Working with Form controlproperties 2. Working With Label , text boxand Command button control Properties	ITH310-2
*5	1. Working with Option button andcheck box properties 2. Working with Combo box and Linux	ITH310-2
*6	1. Implementation Constructors and Destructors 2. Implementation of Inheritance 3. Implementation of Polymorphism	ITH310-2

*7	1. Textbox – use of properties, methods and events 2. Label - use of properties, methods 3. Command button - use of properties, methods and events	ITH310-3
*8	1. Difference in use of Option button, Checkbox 2. Option button - use of properties, methods and events 3. Checkbox - use of properties, methods and events 4. Listbox - use of properties, methods and events 5. Combobox - use of properties, methods and events	ITH310-3
*9	1. Design registration form of college using text box, text area, radio list, check list,button etc. using Autopostback property. 2. Simple application for following function: (1) Login (2) Surfing (3) Logout	ITH310-3
*10	Implementation of Reading cookies And write cookies	ITH310-4
*11	1. Develop session programs with Session object, SessionID, Session.Timeout and Session.Abandon 2. To make use of Session Variables	ITH310-4
12	1. Implement OnStart and OnEnd events of Session and Application obj. 2. Create Global.asa file 3. Creating Master Page in ASP.NET	ITH310-4
*13	1. To establish connection to database 2. To close a connection to database	ITH310-5
*14	1. To manipulate the data in database	ITH310-5
*15	1. To manipulate the data in database	ITH310-5
*16	Online application (student, employee, product, shopping mall) (a) Using dataset, data reader. (b) Same application using data table and data row. (use data grid to display data) (c) Bind the data to data grid using properties / templates. (d) Display details (student, employee, product, etc.) using data list. (4 cols per line)	ITH310-5

II) Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)
	ITH310-1: Develop C# programs using control structures and functions.	
1	**C# script basic fundamentals** 1.1 The .NET Framework - an Overview • Framework Components • Framework Versions • Types of Applications which can be developed using MS.NET 1.2 Introduction to C# :- features of C#, C# Preprocessor Directives, Creating a simple C# console application 1.3 Data Types & Variables, Expression and Operators, Enums Conditional Switch…Case statements 1.4 Functions: Defining a Function, parameters and return types, Update and Event Functions 1.5 Loops: for each, while & do while 1.6 Arrays	5
	ITH310-2: Develop C# programs for implementing Object Oriented programming concept.	
2	**FUNCTIONS, DEBUGGING AND ERROR HANDLING** 2.1 Creating Windows Form application in .NET with Toolbox (Use of Textbox, label, command button, Option button Checkbox, List box, combo box, password) 2.2 Events:-Event Sources, Event Handlers, Events and Delegates, Multiple Event Handlers	4
3	**IMPLEMENTATION OBJECT ORIENTED PROGRAMMING** 3.1 Classes and Objects: - Creating Class, creating an array of objects, Using this keyword, Nesting classes, Methods as Class Members, passing an Object as an Argument to a Method, Returning a Value from a Method, Access Modifiers 3.2 Constructors and Destructors 3.3 Static Classes and Static Class Members 3.4 Encapsulation, Using Delegates 3.5 Inheritance and Polymorphism	6

Section –II

Sr. no.	Topics/Subtopics	Learning (Hours)
	ITH310-3: Design simple ASP.NET web forms using controls.	
4	**INTRODUCTION TO ASP.NET** 4.1 Difference between ASP and ASP.NET 4.2 Introduction to web application, its uses, Introduction to IIS 4.3 ASP.NET IDE, Life cycle of an ASP.NET web Page 4.4 ASP.NET Web forms, Introduction to MVC framework, Using Web forms controls – Textbox, listbox, command button, combo box, Option Button, Checklist Box	**5**
	ITH310-4: Develop programs in ASP.NET using Cookies, Session, Application and Server Objects.	
5	**USING COOKIES, SESSION AND SERVER OBJECT** 5.1 Cookies Definition, Advantages and Disadvantages of Cookies 5.2 Creating a Cookies, Removing Cookies 5.3 Session Objects - Using session variables 5.4 Application Objects - Using application variables 5.5 Initializing Application and Session variables 5.6 Creating a global.asa file 5.7 Server object- Methods- CreateObject, Execute, HTMLEncode, MapPath, Transfer Adding web.config file. Creating Simple Master Pages	**5**
	ITH310-5: Connect and manipulate database using ADO.NET for ASP.NET Web applications.	
6	**INTEGRATING WITH DATABASE, ADO.NET** 6.1 Microsoft's universal data access strategy – OLEDB, ODBC, RDO, ADO,ADO.net 6.2 The Connection object, Making a Sql connection object. Using Sql Connection, Closing a connection 6.3 ADO.Net in ASP.Net 6.3.1 Connection and Command Object. 6.3.2 Dataset and data reader. 6.3.3 Data table and Data row. 6.3.4 Web.config introduction. 6.3.5 Binding data with data grid. 6.4 Accessing and manipulating data using command Object. 6.4.1 The Recordset and Field object 6.4.2 Executing a query 6.4.3 Opening a recordset 6.4.4 Navigating in a recordset 6.5 Creating Database application with Window from and Web application	**5**

	6.6 Web Services :- The Life Cycle of Web Service , The Structure of Web Service , Creating a Web Service	

No questions will be asked on IKS learning subtopics in any question papers.

I) Assessment Criteria

i) Formative Assessment of Practical:-

Every assignment shall be assessed for 25 marks as per following criteria:

Domain	**Particulars**	**Marks out of 25**
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	05
	Drawing / drafting skills	05
Affective	Discipline and punctuality	05
TOTAL		**25**

ii) Summative Assessment of Practical:

Every practical assignment shall be assessed for 25 marks as per following criteria:

Sr. no	**Criteria**	**Marks allotted**
1	Attendance at regular practical	05
2	Preparedness for practical	05
3	Neat & complete Diagram.	05
4	Observations & computer handling skill	05
5	Oral Based on Lab work and completion of task	05
TOTAL		**25**

J) Instructional Methods:

1. Lectures cum Demonstrations.
2. Class room practices.
3. Use of projector and soft material for demonstration
4. Laboratory experiences and laboratory interactive sessions
5. Regular Home Assignments

K) Teaching and Learning resources:

Chalk board, LCD presentations, Self-Learning Online Tutorials, Demonstrative charts.

L) Reference Books:

S.N.	Name of Book	Author	Publication
1	NET Programming 6-in-1, Black Book	Kogent Learning Solutions Inc.	DreamTech Press
2	C# 8.0 and .NET Core 3.0 Modern Cross-Platform Development	Mark J. Price	Kindle Edition
3	The Complete Reference ASP.NET	Anthony Jones	Paperback
4	ASP.net	Dave Mercer	TATA Mc Grow Hill

M) Learning Website & Software

i) https://docs.microsoft.com/en-us/dotnet/csharp
ii) http://www.tutorialspoint.com/csharp/
iii) http://www.completecsharptutorial.com/
iv) http://csharp.net-tutorials.com/

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COURSE ID: 16
COURSE NAME : PYTHON PROGRAMMING
COURSE CODE : ITH401
COURSE ABBREVIATION : HPYT

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	02	4
	Tutorial Learning	-	
	Laboratory Learning	04	
	SLH-Self Learning	02	
	NLH-Notional Learning	08	

B. ASSESSMENT SCHEME :-

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL				BASED ON SLA		TOTAL
					Practical						
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
-	-	-	-	-	50	20	50#	20	25	10	125

(Total IKS Hrs. for Sem.: 00 Hrs.)

C: ABBREVIATIONS: -

CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment
Legends: @ Internal Assessment, # External Assessment, *# on Line Examination, @$ Internal Online Examination.

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as"Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1(one) credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.

* Self learning includes micro project / assignment / other activities

D. i) RATIONALE:-

Python is known for its clear and concise syntax, making it a great language for beginners to learn programming concepts. This allows learners to focus on the core ideas without getting bogged down in complex syntax rules. Python can be used for a wide range of tasks, including web development, data science, machine learning, automation, and scripting. This makes it a valuable skill for many different professions. Python has a large and active community of developers, which means there are many resources available online to help you learn and solve problems. Python boasts a vast collection of libraries that provide pre-written code for common tasks. This saves programmers time and effort as they don't have to write everything from scratch. Popular libraries include NumPy for numerical computing, Pandas for data analysis, and Matplotlib for data visualization. Python excels at automating repetitive tasks, which can save you a lot of time and effort. This can be anything from automating data entry to scraping data from websites. With its readability, versatility, and strong community support, Python is a great language to get started with programming.

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry identified outcome through various learning experiences:

1. Implementing Procedural and object-oriented programming with python.
2. Learn basics of Machine Learning and Data analysis.

E. COURSE LEVEL LEARNING OUTCOMES (COS)

ITH401-1: Recognize different building blocks, data types in Python.
ITH401-2: Implement python programs using operators, control flow statement and function.
ITH401-3: Apply object-oriented programming concept in python.
ITH401-4: Implement python programs using different file handling functions.
ITH401-5: Validate patterns using regular expression & perform machine learning functions.
ITH401-6: Develop python programs using GUI toolkit and interfacing with database.

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solutions	PO 4 Engineering Tools, Experim entation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1 Design and development	PSO2 Database and Network management
Competency: Develop programming Knowledge with python to solve real engineering problem.	2	2	3	3	1	2	2	3	2
ITH401-1: Recognize different building blocks, data types in Python.	1	1	--	2	--	--	--	1	--
ITH401-2: Implement python programs using operators,	1	1	2	3	1	1	1	2	--

control flow statement and function.									
ITH401-3: Apply object-oriented programming concept in python.	1	1	2	2	1	1	1	2	--
ITH401-4: Implement python programs using different file handling functions.	2	1	2	2	1	--	1	2	2
ITH401-5: Validate patterns using regular expression and perform machine learning functions.	2	2	2	2	1	--	1	2	--
ITH401-6: Develop python programs using GUI toolkit and interfacing with database.	2	2	3	3	1	1	1	3	3

F. CONTENT:

I) Practical Exercises

The following practical exercises shall be conducted in the *Laboratory for Python Programming* by the Institute in practical sessions of batches of about 20- 22 students:

(Practical's Marked in * are compulsory)

Sr. No.	Laboratory Experiences	Course Outcome
*1	Install and Configure Python IDE	ITH401 – 1
*2	Implement programs on data types on numbers, string and arrays	ITH401 – 1
*3	Implement programs on different types of structures (Set and list,) in python.	ITH401 – 1
*4	Implement programs on different types of structures (tuples, data dictionaries)	ITH401 – 1
*5	Implement programs on conditional and looping statement with operators.	ITH401 – 1
*6	Implement programs using looping statement.	ITH401 – 1
*7	Implement programs using functions	ITH401 – 2
*8	Implement programs on Constructors and Destructors	ITH401 – 2
*9	Implementation of inheritance	ITH401 – 2
*10	Implementation of Method overloading	ITH401 – 2
*11	Implementation of Method overriding	ITH401 – 2

*12	Implement programs on Exception Handling	ITH401 – 2
*13	Implementation of file handling operations.	ITH401 – 3
*14	Write program for file handling operations	ITH401 – 3
*15	Implement Pattern searching in regular Expression.	ITH401 – 5
16	Write program for Validation in Regular Expression	ITH401 – 5
*17	Implement Machine learning functions	ITH401 – 5
18	Implement Machine learning operations	ITH401 – 5
*19	Write python GUI program that adds labels and buttons to the Tkinter window.	ITH401 – 6
*20	Write program to create a connection between database and python.	ITH401 – 6
21	Implement python program to select records from the database table and display the result.	ITH401 – 6

II) Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)
	ITH401-1: Recognize different building blocks, data types in Python.	
1	**INTRODUCTION TO PYTHON PROGRAMMING** 1.1 Introduction to Python, Features of Python 1.2 Python Environment Setup – Installation and working of IDE 1.3 Python building blocks – Identifiers, Keywords, Indention, Variable, Comments 1.4 Components of Python program data types (At least 4 methods of each) 1.4.1 Numbers 1.4.2 Strings 1.4.3 Arrays 1.4.4 Sets 1.4.5 Lists — Changeable Sequences of Data, 1.4.6 Tuples — Unchanging Sequences of Data, 1.4.7 Dictionaries — Groupings of Data Indexed by Name, 1.5 Object storage 1.6 Type conversion 1.6.1 Assignment statements	**5**

	1.6.2 Print statements 1.7 Introduction to in built libraries. 1.8 Running simple python script to display a message	
ITH401-2: Implement Python programs using operators, control flow statement and function.		
2	**OPERATORS, CONTROL FLOW STATEMENTS AND FUNCTIONS** 2.1 Basic Operators – Arithmetic, Comparison/Relational, Assignment, Logical, Bitwise, Membership, Identity operators, Python operator Precedence, 2.2 Control flow statement 2.2.1 Conditional Statement 2.2.2 Looping Statement 2.2.3 Loop using Continue, Pass, break, else statement 2.3 functions: - Function definition, function calling, function argument and parameter passing, return statement, Scope of the variable, local variable and global variable.	**4**
ITG404 -3 Apply object oriented programming concept in Python		
3	**OBJECT ORIENTED PROGRAMMING IN PYTHON** 3.1 Creating a Class 3.1.1 Self Variables 3.1.2 Types of Methods 3.2 Constructors 3.3 Inheritance 3.4 Polymorphism 3.4.1 Operator Overloading 3.4.2 Method Overloading & Overriding 3.5 Exception Handling 3.5.1 Errors in a Python Program 3.5.2 Exceptions 3.5.3 Types of Exceptions 3.5.4 The Except Block	**6**

Section –II

Sr. no.	Topics/Subtopics	Learning (Hours)
ITH401-4: Implement Python programs using different file handling functions.		
4	**FILE HANDLING** 4.1 Types of Files in Python 4.2 Opening a File 4.3 Closing a File 4.4 Knowing Whether a File Exists or Not 4.5 Working with Binary Files 4.6 Appending Text to a File 4.7 Understanding read functions, read(), readline() and readlines() 4.8 Understanding write functions, write() and writelines()	**5**
ITH401-5: Validate patterns using regular expression and perform machine learning functions.		
5	**Regular Expression & Machine Learning Functions** 5.1 Pattern searching using regex in python (findall, search, split, sub) 5.2 Password, email, url validation using regular expression 5.3 Machine learning – Data set, Data Types 5.4 Mean, Median, Mode 5.5 Standard Deviation, Percentile, Data Distribution & Histogram, Normal Data Distribution	**5**
ITH401-6: Develop Python programs using GUI toolkit and interfacing with database.		
6	**GUI Programming and Databases** 6.1 GUI Programming: 6.1.1Writing a GUI with Python 6.1.2 GUI Programming Toolkits 6.1.3 Creating GUI Widgets with Tkinter 6.1.5 Creating Layouts, Radio Buttons and Checkboxes, Dialog Boxes. 6.5 Database Access: 6.5.1 Python's Database Connectivity 6.5.2 Types of Databases Used with Python 6.5.3 Mysql database Connectivity with Python 6.5.4 Performing Insert , Deleting & Update operations on database	**5**

G)

Sr. No	List of Assignment (under SLA)	Hrs Allotted
1	Web Scraping with Beautiful Soup (Write a program that utilizes the Beautiful Soup library to scrape data from a website.)	**08**
2	Data Analysis with Pandas (Analyze a real-world dataset (provided or found online) using Pandas.)	**08**
3	Building a Text-Based Adventure Game (Develop a text-based adventure game where the user interacts with the environment through text prompts and choices.)	**08**
4	Building a Simple Machine Learning Model (Train a basic machine learning model using scikit-learn library.)	**08**

I) Assessment Criteria

i) Formative Assessment of Practical: -

Every assignment shall be assessed for 25 marks as per following criteria:

Domain	**Particulars**	**Marks out of 25**
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	05
	Drawing / drafting skills	05
Affective	Discipline and punctuality	05
TOTAL		**25**

ii) Summative Assessment of Practical:

Every practical assignment shall be assessed for 25 marks as per following criteria:

Sr. no	**Criteria**	**Marks allotted**
1	Attendance at regular practical	05
2	Preparedness for practical	05
3	Neat & complete Diagram.	05
4	Observations & computer handling skill	05
5	Oral Based on Lab work and completion of task	05
TOTAL		**25**

J) Instructional Methods:

1. Lectures cum Demonstrations.
2. Class room practices.
3. Use of projector and soft material for demonstration
4. Laboratory experiences and laboratory interactive sessions
5. Regular Home Assignments

K) Teaching and Learning resources:

Chalk board, LCD presentations, Self-Learning Online Tutorials, Demonstrative charts.

L) Reference Books:

S.N.	Name of Book	Author	Publication
1	Python Programming	Rao, K. Nageshwara, Shaikh Akbar	SciTech Publication
2	Python: The Complete Reference	Martin C Brown	McGraw Hill Publication
3	Learning Python	Mark Lutz, David Ascher	O'Reilly Publication
4	Python Essential Reference	Beazley, David	Addison-Wesley Professional

M) Learning Website & Software

i) https://docs.python.org/3/tutorial/
ii) https://www.w3schools.com/python/
iii) https://www.spokentutorial.org
iv) https://www.tutorialspoint.com/python/index.htm

***

Programme Name/s ALL
Programme :- CE/EE/ME/ET/MT/IF

Semester : Fourth
Course Title : ENVIRONMENTAL EDUCATION AND SUSTAINABILITY
Course Code CCG206

I. RATIONALE

The survival of human beings is solely depending upon the nature. Thus, threats to the environment directly impact on existence and health of humans as well as other species. Depletion of natural resources and degradation of ecosystems is accelerated due to the growth in industrial development, population growth, and overall growth in production demand. To address these environmental issues, awareness and participation of individuals as well as society is necessary. Environmental education and sustainability provide an integrated, and interdisciplinary approach to study the environmental systems and sustainability approach to the diploma engineers.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

Resolve the relevant environmental issue through sustainable solutions

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

CO1 - Identify the relevant Environmental issues in specified locality. CO2 - Provide the green solution to the relevant environmental problems. CO3 - Conduct SWOT analysis of biodiversity hotspot
CO4 - Apply the relevant measures to mitigate the environmental pollution.
CO5 - Implement the environmental policies under the relevant legal framework.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme					Credits	Assessment Scheme												
				Actual Contact Hrs./Week			SLH	NLH		Paper Duration	Theory				Based on LL & TL				Based on SL		Total Marks
															Practical						
				CL	TL	LL					FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
											Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
CCH206	ENVIRONMENTAL EDUCATION AND SUSTAINABILITY	EES	VEC	2	-	-	2	4	2	1.5	30	70*#	100	40	-	-	-	-	25	10	125

[Use Proforma 1 for Assessment of SLA]

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's)aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	**CCH206.1** 1.1 Explain the need of studying environment and its components. 1.2 Investigate the impact of population growth and industrialization on the relevant environmental issues and suggest remedial solutions 1.3 Explain the Concept of 5 R w.r.t. the given situation 1.4 elaborate the relevance of Sustainable Development Goals in managing the climate change 1.5 Explain the concept of zero carbon-footprint with carbon credit	**Unit - I Environment and climate change** 1.1 Environment and its components, Types of Environments, Need of environmental studies 1.2 Environmental Issues- Climate change, Global warming, Acid rain, Ozone layer depletion, nuclear accidents. Effect of population growth and industrialization 1.3 Concept of 5R, Individuals' participation in i) 5R policy, ii) segregation of waste, and iii) creating manure from domestic waste 1.4 Impact of Climate change, Factor contributing to climate change, Concept of Sustainable development, Sustainable development Goals (SDGs), Action Plan on Climate Change in Indian perspectives 1.5 Zero Carbon footprint for sustainable development, (IKS-Enviornment conservation in vedic and pre-vedic India)	Lecture Using Chalk-Board Presentations

2	**CCH206.2** 2.1 Justify the importance of natural resources in sustainable development 2.2 Explain the need of optimum use of natural resources to maintain the sustainability 2.3 Differentiate between renewable and non-renewable sources of energy 2.4 Suggest the relevant type of energy source as a green solution to environmental issues	**Unit - II Sustainability and Renewable Resources** 2.1 Natural Resources: Types, importance, Causes and effects of depletion. (Forest Resources, Water Resources, Energy Resources, Land resources, Mineral resources), (IKS- Concepts of Panchmahabhuta) 2.2 Impact of overexploitation of natural resources on the environment, optimum use of natural resources 2.3 Energy forms (Renewable and non-renewable) such as Thermal energy, nuclear energy, Solar energy, Wind energy, Geothermal energy, Biomass energy, Hydropower energy, biofuel 2.4 Green Solutions in the form of New Energy Sources such as Hydrogen energy, Ocean energy & Tidal energy	Lecture Using Chalk-Board Presentations
3	**CCH206.3** 3.1 Explain the characteristics and functions of ecosystem 3.2 Relate the importance of biodiversity and its loss in the environmental sustainability 3.3 Describe biodiversity assessment initiatives in India 3.4 Conduct the SWOT analysis of the biodiversity hot spot in India 3.5 Explain the need of conservation of biodiversity in the given situation	**Unit - III Ecosystem and Biodiversity** 3.1 Ecosystem - Definition, Aspects of ecosystem, Division of ecosystem, General characteristics of ecosystem, Functions of ecosystem 3.2 Biodiversity - Definitions, Levels, Value, and loss of biodiversity 3.3 Biodiversity Assessment Initiatives in India 3.4 SWOT analysis of biodiversity hot spot in India 3.5 Conservations of biodiversity - objects, and laws for conservation of biodiversity	Lecture Using Chalk-Board Presentations Video Demonstration
4	**CCH206.4** 4.1 Classify the pollution based on the given criteria 4.2 Justify the need of preserving soil as a resource along with the preservation techniques 4.3 Maintain the quality of water in the given location using relevant preventive measures 4.4 State the significance of controlling the air pollution to maintain its ambient quality norms 4.5 Compare the noise level from different zones of city with justification 4.6 Describe the roles and responsibilities of central and state pollution control board	**Unit - IV Environmental Pollution** 4.1 Definition of pollution, types- Natural & Artificial (Man- made) 4.2 Soil / Land Pollution – Need of preservation of soil resource, Causes and effects on environment and lives, preventive measures, Soil conservation 4.3 Water Pollution - sources of water pollution, effects on environment and lives, preventive measures, BIS water quality standards for domestic potable water, water conservation 4.4 Air pollution - Causes, effects, prevention, CPCB norms of ambient air quality in residential area 4.5 Noise pollution - Sources, effects, prevention, noise levels at various zones of the city 4.6 Pollution Control Boards at Central and State Government level: Norms, Roles and Responsibilities	Lecture Using Chalk-Board Presentations

5	CCH206.5 5.1 Explain Constitutional provisions related to environmental protection 5.2 Explain importance of public participation (PPP) in enacting the relevant laws 5.3 Use the relevant green technologies to provide sustainable solutions of an environmental problem 5.4 Explain the role of information technology in environment protection	Unit – V- Environmental legislation and sustainable practices 5.1 Article (48-A) and (51-A (g)) of Indian Constitution regarding environment, Environmental protection and prevention acts 5.2 Public awareness about environment. Need of public awareness and individuals' participation. Role of NGOs 5.3 Green technologies like solar desalination, green architecture, vertical farming and hydroponics, electric vehicles, plant-based packaging 5.4 Role of information technology in environment protection and human health	Lecture Using Chalk-Board Presentations Video Demonstrations

VI . LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES: N.A.

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)

Assignment

Suggest the steps to implement (or improve the implementation) of the 5R policy in your home/institute stating your contribution

Draft an article on India's Strategies to progress across the Sustainable Development Goals

Make a chart of Renewable and non-renewable energy sources mentioning the advantages and disadvantages of each source

Conduct the SWOT analysis of biodiversity hotspot in India

Prepare a mind-mapping for the zero carbon footprint process of your field

Prepare a chart showing sources of pollution (air/water/ soil), its effect on human beings, and remedial actions

Any other assignment on relevant topic related to the course suggested by the facilitator

UNICEF Certification(s)

Students may complete the self-paced course launched by Youth Leadership for climate Exchange under UNICEF program on portal www.mahayouthnet.in . The course encompasses five Modules in the form of Units as given below: -

Unit 1: Living with climate change

Unit 2 : Water Management and Climate Action

Unit 3: Energy Management and Climate Action

Unit 4 : Waste Management and Climate Action

Unit 5 : Bio-cultural Diversity and Climate Action

If students complete all the five Units they are not required to undertake any other assignment /Microproject/activities specified in the course. These units will suffice to their evaluations under SLA component

Micro project

Technical analysis of nearby commercial RO plant.

Comparative study of different filters used in Household water filtration unit

Evaluate any nearby biogas plant / vermicomposting plant or any such composting unit on the basis of sustainability and cost-benefit

IKS-Study and prepare a note on Vedic and Pre-Vedic techniques of environmental conversion

Visit a local polluted water source and make a report mentioning causes of pollution
Any other activity / relevant topic related to the course suggested by the facilitator

Activities

Prepare a report on the working and functions of the PUC Center machines and its relavance in pollution control.
Prepare and analyse a case study on any polluted city of India
Prepare a note based on the field visit to the solid waste management department of the municipal corporation / local authority
Record the biodiversity of your institute/garden in your city mentioning types of vegetation and their numbers
Visit any functional hall/cultural hall /community hall to study the disposal techniques of kitchen waste and prepare a report suggesting sustainable waste management tool
Watch a video related to air pollution in India and present the summary
Any other assignment on relevant topic related to the course suggested by the facilitator

Note :

Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
The faculty must allocate judicial mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
If a microproject is assigned, it is expected to be completed as a group activity.
SLA marks shall be awarded as per the continuous assessment record.
If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. ABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Nil	All

IX . SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Environment and climate change	CO1	6	4	4	4	12
2	II	Sustainability and Renewable Resources	CO2	08	4	4	8	16
3	III	Ecosystem and Biodiversity	CO3	6	4	4	4	12
4	IV	Environmental Pollution	CO4	10	4	8	6	20
5	V	Environmental legislation and sustainable practices	CO5	5	4	4	4	10
Grand Total				**30**	**20**	**24**	**26**	**70**

X . ASSESSMENT METHODOLOGIES/TOOLS

Formative assessment (Assessment for Learning)

Two-unit tests (MCQs) of 30 marks will be conducted and average of two-unit tests considered. Formative assessment of self learning of 25 marks should be assessed based on self learning activity such as UNICEF Certification(s)/Microproject/assignemnt/activities. (60 % weightage to process and 40 % to product)

Two-unit tests (MCQs) of 30 marks will be conducted and average of two-unit tests considered.

Formative assessment of self learning of 25 marks should be assessed based on self learning activity such as UNICEF Certification(s)/Microproject/assignemnt/activities. (60 % weightage to process and 40 % to product)

Assessment of Self Learning :- Based on work done by students as a self learning Activities such as microprojects ,assignments and similar activities using proforma 1 marks of SLA can be calculated.

XI. SUGGESTED COS-POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	-	1	-	-	3	2	3			
CO2	-	2	2	-	3	2	3			
CO3	-	-	-	-	3	1	2			
CO4	1	-	-	-	3	2	2			
CO5	1	-	2	-	3	2	3			
Legends :- High:03, Medium:02,Low:01, No Mapping: - *PSOs are to be formulated at institute level										

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	Y. K. Singh	Environmental Science	New Age International Publishers, 2006, ISBN: 81-224-2330-2
2	Erach Bharucha	Environmental Studies	University Grants Commission, New Delhi
3	Rajagopalan R.	Environmental Studies: From Crisis to Cure.	Oxford University Press, USA, ISBN: 9780199459759, 0199459754
4	Shashi Chawla	A text book of Environmental Science	Tata Mc Graw-Hill New Delhi
5	Arvind Kumar	A Text Book of Enviornmental science	APH Publishing New Delhi (ISBN 978-8176485906)

XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://sdgs.un.org/goals	United Nation’s website mentioning Sustainability goals
2	http://www.greenbeltmovement.org/news-and-events/blog	Green Belt Movement Blogs on various climatic changes and other issues
3	http://www.greenbeltmovement.org/what-we-do/tree-planting-fo r-watersheds	Green Belt Movement's work on tree plantation, soil conservation and watershed management techniques

4	https://www.youtube.com/@ierekcompany/videos	International Experts For Research Enrichment and Knowledge Exchange – IEREK's platform to exchange the knowledge in fields such as architecture, urban planning, sustainability
5	www.mahayouthnet.in	UNICEF Intiative for youth leadership for climate action
6	https://eepmoefcc.nic.in/index1.aspx?lsid=297&lev=2&lid=1180&langid=1	GOI Website for public awareness on enviornmetal issues
7	https://egyankosh.ac.in/handle/123456789/61136	IGNOU's Intiative for online study material on Enviornmental studies
8	https://egyankosh.ac.in/handle/123456789/50898	IGNOU's Intiative for online study material on sustainability
9	https://sustainabledevelopment.un.org/content/documents/11803Official-List-of-Proposed-SDG-Indicators.pdf	Final list of proposed Sustainable Development Goal indicators
10	https://sustainabledevelopment.un.org/memberstates/india	India's Strategies to progress across the SDGs.
11	https://www.un.org/en/development/desa/financial-crisis/sustainable-development.html	Challenges to Sustainable Development
12	https://nptel.ac.in/courses/109105190	NPTEL course on sustainable development
13	https://onlinecourses.swayam2.ac.in/cec19_bt03/preview	Swayam Course on Enviornmetal studies (Natural Resources, Biodiversity and other topics)
14	https://onlinecourses.nptel.ac.in/noc23_hs155/preview	NPTEL course on enviornmental studies which encomopasses SDGs, Pollution, Cliamate issues, Energy, Policies and legal framework
15	https://www.cbd.int/development/meetings/egmbped/SWOT-analysis-en.pdf	SWOT analysis of Biodiversity
16	https://www.sanskrit.nic.in/SVimarsha/V2/c17.pdf	Central sanskrkit university publication on Vedic and pre vedic enviornmetal conservation

Note : Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students

Government Polytechnic Kolhapur

Learning and Assessment Scheme for Post S.S.C Diploma Courses

ProgrammeName :Diploma In Information Technology

Programme Code	**:IF(06)**	**With Effect From AcademicYear**	**: 2023-24**
Duration Of Programme	**: 6 Semester**	**Duration**	**: 16 WEEKS**
Semester	**: Fifth**	**Scheme**	**: H**

Sr No	CourseTitle	Abbrevation	Level	CourseType	Course Code	Total IKS HrsforSem	Learning Scheme					Credits	Assessment Scheme											
							ActualContact Hrs./Week			Self Learning(Activity/ Assignment /MicroProject)	Notional LearningHrs/Week		Paper Duration (hrs.)	Theory				Based on LL & TL				Based on Self Learning		Total Marks
																		Practical						
							CL	TL	LL					FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
														Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
1	MANAGEMENT INFORMATION SYSTEM	HMIS	V	AEC	ITH501	-	5	-	-	1	5	2	1	15*#	35*#	50	20	-	-	-	-	50	20	100
2	SOFTWARE ENGINEERING AND TESTING	HSET	IV	DSC	ITH402	-	8	-	2	-	10	2	3	30	70	100	40	25	10	25@	10	-	-	150
3	INTERNET OF THINGS	HIOT	IV	SEC	ITH407	-	-	-	2	2	4	1	-	-	-	-	-	25	10	-	-	25	10	50
4	ROBOTICS & AUTOMATION	HRBT	IV	SEC	ITH408	-	-	-	2	2	4	1	-	-	-	-	-	25	10	-	-	25	10	50
5	PROJECT	HPRJ	V	INP	ITH502	-	-	-	4	2	6	2	-	-	-	-	-	-	-	50#	20	50	20	100
6	WEB DEVELOPMENT	HWDT	IV	SEC	ITH406	-	2	-	2	-	4	1	-	-	-	-	-	50	20	50#	20	-	-	100
7	ENTREPRENEURSHIP DEVELOPMENT AND STARTUPS	HESU	V	SEC	CCH501	-	2	-		1	3	1	-	-	-	-	-	-	-	-	-	50	20	50
8	INTERNSHIP(16 WEEKS)	HINP	V	INP	CCH505	-	-	-	-	-	-	10	-	-	-	-	-	100	40	100#	40	-	-	200
Total						**0**	**17**	**0**	**12**	**8**	**36**	**20**	**-**	**45**	**105**	**150**		**225**		**225**		**200**		**800**

Abbreviations:CL-ClassroomLearning,TL-TutorialLearning,LL-LaboratoryLearning,FA-FormativeAssessments-SummativeAssessment,IKS-IndianKnowledgeSystem,SLA-SelfLearningAssessment

Legends: @ InternalAssessment, # ExternalAssessment, *# On Line Examination , @$ Internal Online Examination

Note :

1. FA-THrepresentsaverageoftwoclasstestsof30markseachconductedduringthesemester.
2. IfcandidateisnotsecuringminimumpassingmarksinFA-PRofanycoursethenthecandidateshallbedeclaredas"Detained"inthatsemester.
3. If candidate is not securing minimum passing marks in SLAof any course then the candidate shall be declared as fail and will have to repeat and resubmit SLAwork.
4. NotionalLearninghoursforthesemesterare(CL+LL+TL+SL)hrs.*15Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. *SelflearninghoursshallnotbereflectedintheTimeTable.

Course Category: DisciplineSpecificCourseCore(DSC): 2,DisciplineSpecificElective (DSE):0,ValueEducation Course(VEC):1, Intern./Apprenti./Project./Community(INP):0,AbilityEnhancementCourse (AEC) : 4, Skill Enhancement Course (SEC) : 0, GenericElective (GE) : 0

COURSE ID : 17
COURSE NAME : MANAGEMENT INFORMATION SYSTEM
COURSE CODE : ITH501
COURSE ABBREVIATION : HMIS

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	5	2
	Tutorial Learning	-	
	Laboratory Learning		
	SLH-Self Learning	1	
	NLH-Notional Learning	6	

B. ASSESSMENT SCHEME:-

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL				BASED ON SLA		TOTAL
					Practical						
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	100
3	15*#	35*#	50	20					50	20	

(Total IKS Hrs. for Sem.: 00 Hrs.)

C: ABBREVIATIONS: -

CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# on Line Examination, @$ Internal Online Examination.

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as"Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1(one) credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.

* Self learning includes micro project / assignment / other activities

D. i) RATIONALE: -

Information Systems plays major role in IT, and management of Information System for become major issue. We introduced this subject to our curriculum so that our students will able to deal with management of information system.

Management Information System facilitates the decision makers to extend their planning horizons & introduce even greater levels of uncertainty in business plans & budgeted allocations. Management Information System facilitates higher degree of accountability in business process.

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME

Apply software engineering principles to develop software product.

E. COURSE LEVEL LEARNING OUTCOMES (COS)

ITH501-1: Illustrate the concepts of Management of Information System with Strategic Design.
ITH501-2: Capture Decision making concepts with its information.
ITH501-3: Apply Various Decision Support Systems
ITH501-4: Relate Various Technologies and E-Business Models of Information System.
ITH501-5: List various applications of MIS

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
Competency - Understand importance of Management Information System in modern organization.	-	-	-	-	-	2	1	2	-
ITH501-1 Illustrate the concepts of Management of Information System with Strategic Design	1	2	2	2	1	-	1	2	-

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
ITH501-2 Capture Decision making concepts with its information.	2	2	2	2	-	-	-	1	-
ITH501-3 Apply Various Decision Support Systems	1	2	2	3	-	2	1	1	-
ITH501-4 Relate Various Technologies and E-Business Models of Information System.	2	2	3	3	1	2	1	2	-
ITH501-5 List various applications of MIS	2	2	3	3	1	1	1	1	-

Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
ITH501-1: Identify relevant software process model for software development.			
1	**INTRODUCTION TO MANAGEMENT** 1.1 MIS : Concept, Definition , Role of MIS 1.2 Impact of management information system 1.3 MIS the User 1.4 MIS for a Digital Firm	03	06
2	**STRATEGIC DESIGN OF MIS** 2.1 Essentiality of Strategic Planning 2.2 Strategic Management of Business 2.3 Strategy Design of MIS 2.4 IT Strategy and Balanced Scorecard – IT strategies	06	08
ITH501-2: Capture Decision making concepts with its information.			
3	**DECISION MAKING & INFORMATION** 3.1 Decision making concepts and process 3.2 Behavioral Concepts in Decision Making 3.3 MIS & Decision making 3.4 Information concept 3.5 Classification of the Information	06	10

Section II

Sr. No.	Topics / Subtopics	Lectures (Hours)	Theory Evaluation (Marks)
ITH501-3*:Apply Various Decision Support Systems*			
4	**DECISION SUPPORT SYSTEM** 1.1 Decision Support System (DSS): Concept and Philosophy 1.2 DSS Models: Behavioral, Management Science and Operations Research Models 1.3 Group Decision Support System (GDSS) 1.4 Artificial Intelligence (AI) System 1.5 Knowledge Based Expert System (KBES) 1.6 DSS Application in E-enterprise 1.7 MIS and Benefits of DSS	04	08

ITH501-4: *Relate Various Technologies and E-Business Models of Information System.*			
5	**TECNOLOGY OF INFORMATION SYSTEM AND E-BUSINESS** 5.1 Introduction 5.2 Data Processing and Transaction Processing 5.3 Application Processing 5.4 Information System Processing 5.5 Introduction to E-business 5.6 Models of E-business 5.7 Internet and World Wide Web (WWW)	04	08
ITH501-5*:List various applications of MIS*			
6	**APPLICATIONS OF MIS** 6.1 Applications in manufacturing sector: Personal Management, Financial Management, Production Management, Materials Management, and Marketing Management 6.2 Applications in Service sector : Airlines, Hotels, Hospitals, Banking, Insurance, Utilities, and Finance.	07	10

** No questions will be asked on IKS learning subtopics in any question papers.

F: Specification table for setting question paper for semester end theory examination

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks	CO
		Remember	Understand	Apply		
I / 1	Introduction to management	2	2	2	6	CO1
I / 2	Strategic design of MIS	2	2	4	8	CO2
I / 3	Decision making & information	2	4	4	10	CO3
II /4	Decision support system	2	4	2	8	CO4
II /5	Technology of information system and e-business	2	2	4	8	CO5
II /6	Applications of MIS	2	2	6	10	CO6
	Total Marks				50	

G: List of Assignments under SLA

1. Case Study:- Customer Relationship Management (CRM) systems
2. Case Study :-MIS of E-Commerce Business
3. Case Study:- MIS of Manufacturing Business
4. Case Study:-AI based Expert system.

H) Instructional Methods:

1. Lectures cum Demonstrations.
2. Class room practices.
3. Use of projector and soft material for demonstration
4. Laboratory experiences and laboratory interactive sessions
5. Regular Home Assignments
6.

H) Teaching and Learning resources:

Chalk board, LCD presentations, Self-Learning Online Tutorials, Demonstrative charts.

I) Reference Books:

S.N.	Name of Book	Author	Publication
1	"Management Information Systems".	Kenneth C. Laudon & Jane P. Laudon.	Pearson Publishing.
2	Management Information System	Waman S. Jawadekar	Tata McGraw Hill,
3	Management Information System	O'Brien	

J) Learning Website & Software

1. www.tutorialspoint.com//software_engineering/
2. https://www.geeksforgeeks.org/business-studies/decision-support-system/
3. https://insights.sei.cmu.edu/library/
4. https://nptel.ac.in/courses/106105087

***

COURSE ID : 18
COURSE NAME : SOFTWARE ENGINEERING AND TESTING
COURSE CODE : ITH402
COURSE ABBREVIATION : HSET

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	8	2
	Tutorial Learning	-	
	Laboratory Learning	2	
	SLH-Self Learning	-	
	NLH-Notional Learning	10	

B. ASSESSMENT SCHEME: -

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL				BASED ON SLA		TOTAL
					Practical						
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				150
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
3	30	70	100	40	25	10	25@	10	-	-	

(Total IKS Hrs. for Sem.: 00 Hrs.)

C: ABBREVIATIONS: -

CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# on Line Examination, @$ Internal Online Examination.

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as"Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1(one) credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.

* Self learning includes micro project / assignment / other activities

D. i) RATIONALE: -

Software engineering plays a pivotal role in addressing complex problems and improving efficiency to build software product. This course focuses on providing a structured framework by understanding and applying the working knowledge of the principles, techniques, and practices for estimation, designing, testing and quality management of software development projects. It enables students to blend the domain specific knowledge with the programming skills to get quality software products.

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME

Apply software engineering principles to develop software product.

E. COURSE LEVEL LEARNING OUTCOMES (COS)

ITH402-1: Identify relevant software process model for software development.
ITH402-2: Use appropriate principles of software modeling to create data design.
ITH402-3: Apply project management techniques in software development.
ITH402-4: Apply different software testing types to ensure the quality of software product.
ITH402-5: Identify defect to improve the overall quality of the software using automated testing tools.
ITH402-6: Develop and execute automated test scripts based on testing requirements.

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
Ability to systematically design, develop, test, and maintain reliable, scalable, and efficient software solutions	1	2	2	2	1	2	2	2	-
ITH402-1 Identify relevant software process model for software development.	1	2	2	2	1	-	1	2	-
ITH402-2 Use appropriate	2	2	2	2	-	-	-	1	-

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
principles of software modeling to create data design.									
ITH402-3 Apply project management techniques in software development.	1	2	2	3	-	2	1	1	-
ITH402-4 Apply different software testing types to ensure the quality of software product.	2	2	3	3	1	2	1	2	-
ITH402-5 Identify defect to improve the overall quality of the software using automated testing tools.	2	2	3	3	1	1	1	1	-
ITH402-6 Develop and execute automated test scripts based on testing requirements.	-	1	2	3	-	-	3	2	-

F. CONTENT:

I) Practical exercises

The following practical exercises shall be conducted in the Laboratory for Software Engineering & Testing by the Institute in practical sessions of batches of about 20- 22 students:

Sr. no	Laboratory experiences	CO
1*	Use any software tool to Write problem statement and identify scope of the project.	ITH402-1
2*	Select relevant process model to define activities and related tasks set for assigned software project like Library Management System (Teacher can assign different projects in a group).	ITH402-1
3*	Gather application specific requirements for assimilate into RE (Requirements engineering) model. Prepare SRS (Software Requirement Software) document.	ITH402-2
4*	Write use cases for different user scenarios. Draw use case diagram for different user scenarios using any tool.	ITH402-2
5	Draw the Activity diagram to represent the flow from one activity to another activity using any tool. Design Decision table using any tool.	ITH402-2
6*	Draw data flow diagram: DFD 0 Level, DFD 1 Level, DFD 2 Level for the software project using any tool.	ITH402-2
7	Draw class diagram for the software project using any tool. Draw Sequence diagram for the software project using any tool. Draw Collaboration diagram for the software project using any tool.	ITH402-2
8*	Estimate size of the project using function point metric for the software project using any tool.	ITH402-3
9*	Estimate cost of the project using COCOMO (Constructive Cost Model)/COCOMO II approach for the software project using any tool.	ITH402-3
10*	Identify risk involved in the project. Prepare RMMM(Risk Management, Mitigation and Monitoring) Plan.	ITH402-3
11	Use CPM (Critical Path Method) / PERT (Programme Evaluation and Review Technique) for software project scheduling.	ITH402-3
12	Prepare Timeline charts / Gantt charts to track the progress of the software project using any tool.	ITH402-3
13*	Design test cases w.r.t. functional testing for the software project.	ITH402-4
14*	Design test cases w.r.t. Control and decision making statement for the software project 1) For... Loop 2) Switch...case 3) Do... While 4) If...else	ITH402-4
15*	Design test cases for Web Page Testing for any Web Site.	ITH402-4
16	Design test cases for e-commerce (Flipkart, Amazon) login form with respect to GUI testing.	ITH402-4
17*	Prepare test plan for a standalone application.	ITH402-5
18*	Prepare test plan for web application like any Chatting Application.	ITH402-5
19	Prepare defect report after executing test cases for login functionality.	ITH402-5
20	Execute test cases for e-commerce application (Flipkart, Amazon) login form using an Automation Tool.	ITH402-5

Sr. no	Laboratory experiences	CO
21*	Automated Web Application Testing with Selenium WebDriver.	ITH402-6
22*	Data-Driven Testing with Selenium	ITH402-6

II) Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO 1: Identify relevant software process model for software development.			
1	**Basics of Software Engineering** 1.1 Software, software engineering as layered approach, characteristics of software, types of software 1.2 Software development framework: Software generic process framework activities and umbrella activities 1.3 Software engineering core principles, communication practices, planning practices, modelling practices, construction practices, software deployment practices 1.4 Prescriptive process models: Waterfall model, Incremental model, RAD model, prototyping model, Spiral model 1.5 Agile software development: Agile process, and its importance, extreme programming, scrum 1.6 Selection criteria for software process model	**8**	**10**
CO 2: Use appropriate principles of software modeling to create data design.			
2	**Software Requirement, Modeling and Design** 2.1 Requirement engineering: Requirement engineering task, types of requirement, developing use-case 2.2 SRS (Software Requirements Specifications): Need of SRS, format and it's characteristics 2.3 Translating requirement model into design model 2.4 Design modelling: Fundamental design concepts-abstraction, information hiding, patterns, modularity, concurrency, verification, aesthetics 2.5 Design notations: Data flow diagram (DFD), structured flowcharts	**8**	**12**

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO 3: Apply project management techniques in software development.			
3	**Software Project Management** 3.1 The management spectrum- 4P's 3.2 Metrics for size estimation: Line of code (LoC), function points (FP) 3.3 Project cost estimation using COCOMO (Constructive Cost Model), COCOMO II 3.4 Define risk, types of risk, RMMM strategy 3.5 Project scheduling: Basic principle, scheduling techniques - CPM, PERT 3.6 Project tracking: Timeline charts, Gantt charts	**8**	**12**

Section –II

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO 4: Apply different software testing types to ensure the quality of software product.			
4	**Basics of Software Testing** 4.1 Software testing, objective of testing, software testing life cycle (STLC) 4.2 Failure, fault, error, defect, bug terminology 4.3 Test case, when to start and stop testing 4.4 Quality assurance, quality control and verification - validation, Quality evaluation standards: Six sigma, CMMI levels 4.5 Static and dynamic testing 4.6 The box approaches: Compare white box testing, black box testing 4.7 Levels of testing: Unit testing, integration testing, system testing, acceptance testing	**8**	**12**
CO 5: Identify defect to improve the overall quality of the software using automated testing tools.			
5	**Test and Defect Management** 5.1 Test planning: Preparing a test plan 5.2 Test management: Test infrastructure management 5.3 Test reporting: Executing test cases, preparing test summary report 5.4 Definition and types of defect, defect life cycle, defect template 5.5 Comparison of manual testing and automation testing 5.6 Metrics and measurement: Types of metrics -product metrics and process metrics	**8**	**12**

CO 6: Develop and execute automated test scripts based on testing requirements.			
6	**Automation in Software Testing** 6.1 Benefits and Challenges of Test Automation 6.2 Automate vs. Manual Testing 6.3 Popular Automation Tools: Selenium 6.4 Types of Automation Frameworks: Data-Driven, Keyword-Driven, Hybrid Framework 6.4 Continuous Integration and Test Automation 6.5 Writing Maintainable Test Scripts 6.6 Handling Flaky Tests	**8**	**12**

** No questions will be asked on IKS learning subtopics in any question papers.

G: List of Assignments under SLA

(Assignments Marked in * are compulsory)

NA

H: Specification table for setting question paper for semester end theory examination

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks	CO
		Remember	Understand	Apply		
I / 1	Basics of Software Engineering	2	4	4	10	CO1
I / 2	Software Requirement, Modeling and Design	2	4	6	12	CO2
I / 3	Software Project Management	2	4	6	12	CO3
II /4	Basics of Software Testing	2	4	6	12	CO4
II /5	Test and Defect Management	2	4	6	12	CO5
II /6	Automation in Software Testing	2	4	6	12	CO6
	Total Marks				70	

I:-Assessment Criteria

i) Formative Assessment of Practical:-

Every assignment shall be assessed for 25 marks as per following criteria:

Domain	**Particulars**	**Marks out of 25**
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	05
	Drawing / drafting skills	05
Affective	Discipline and punctuality	05
TOTAL		**25**

ii) Summative Assessment of Practical:

Every practical assignment shall be assessed for 25 marks as per following criteria:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Preparedness for practical	05
3	Neat & complete Diagram.	05
4	Observations & computer handling skill	05
5	Oral Based on Lab work and completion of task	05
TOTAL		**25**

J) Instructional Methods:

1. Lectures cum Demonstrations.
2. Class room practices.
3. Use of projector and soft material for demonstration
4. Laboratory experiences and laboratory interactive sessions
5. Regular Home Assignments
6.

K) Teaching and Learning resources:

Chalk board, LCD presentations, Self-Learning Online Tutorials, Demonstrative charts.

L) Reference Books:

S.N.	Name of Book	Author	Publication
1	Software Testing: Principles and Practices	Naresh Chauhan	Oxford University Press Noida. ISBN: 9780198061847
2	Software Testing	Ron Patton	Sams Publishing; 2nd edition, 2005 ISBN: 0672327988
3	Software Testing: Principles, Techniques and Tools	M. G. Limaye	Tata McGraw Hill Education, New Delhi., 2009 ISBN 13: 9780070139909
4	Software Engineering: Principles and practices	Deepak Jain	Oxford University Press, New Delhi ISBN 9780195694840

M) Learning Website & Software

1. www.tutorialspoint.com//software_engineering/
2. https://insights.sei.cmu.edu/library/
3. https://nptel.ac.in/courses/106105087

***

COURSE ID : 21
COURSE NAME : INTERNET OF THINGS
COURSE CODE : ITH407
COURSE ABBREVIATION : HIOT

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	-	1
	Tutorial Learning	-	
	Laboratory Learning	2	
	SLH-Self Learning	2	
	NLH-Notional Learning	4	

B. ASSESSMENT SCHEME:-

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL				BASED ON SLA		TOTAL
					Practical						
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	50
-	-	-	-	-	25	10	-	-	25	10	

(Total IKS Hrs. for Sem.: 00 Hrs.)

C: ABBREVIATIONS: -

CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# on Line Examination, @$ Internal Online Examination.

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3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1(one) credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.

* Self learning includes micro project / assignment / other activities

D. i) RATIONALE: -

IoT is responsible for the super-fast evolution of industry 4.0, where the operations are mostly automated thus eliminating the need for much human intervention. The Internet of Things (IoT) describes the network of physical objects- "things" that are embedded with sensors , software's and other technologies. IoT edge devices gather data from sensors and send it to a cloud-based infrastructure where the IoT applications can be monitored and managed. IoT enables the creation of innovative solutions to real world challenges.

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME

Develop and implement creative solutions for real time problems that can enhance efficiency, safety and convenience across various domains.

E. COURSE LEVEL LEARNING OUTCOMES (COS)

ITH407-1: Understand the fundamental concepts of IoT.
ITH407-2: Analyze IoT gateways and microcontrollers.
ITH407-3: Apply sensòrs and communication protocols to design efficient IoT systems.
ITH407-4: Understand the software stack required for developing and managing IoT applications
ITH407-5: Integrate IoT services with cloud computing for scalable data storage, processing, and real-time analytics.
ITH407-6: Understand the fundamentals of 3D printing technology and its applications.

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
Design and build working IoT prototypes.	-	1	2	2	1	2	3	2	-
ITH407-1 Understand the fundamental concepts of IoT.	2	1	2	2	1	2	1	2	-
ITH407-2 Analyze IoT gateways and microcontrollers.	1	2	2	3	2	2	2	1	-

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
ITH407-3 Apply sensòrs and communication protocols to design efficient IoT systems.	1	2	2	3	2	2	2	1	-
ITH407-4 Understand the software stack required for developing and managing IoT applications	1	2	2	3	2	2	2	2	-
ITH407-5 Integrate IoT services with cloud computing for scalable data storage, processing, and real-time analytics.	2	2	3	3	2	2	2	1	-
ITH407-6 Understand the fundamentals of 3D printing technology and its applications.	2	1	2	2	1	2	1	2	-

F. CONTENT:

I) Practical exercises

The following practical exercises shall be conducted in the *Laboratory for Internet of Things* by the Institute in practical sessions of batches of about 20- 22 students:

Sr. no	Laboratory experiences	No. of Hours	CO
1	Circuit Design for IoT System — Door Automation Solution	2	ITH407-1

Sr. no	Laboratory experiences	No. of Hours	CO
2	Build the IOT Home Security Solution using IR, Camera and Buzzer	2	ITH407-1,2,3
3	Build the Energy Saving Solution with Smart Lighting	2	ITH407-1,2,3,4,5
4	Demonstrate a timer based Smart Irrigation Solution	2	ITH407-1,2,3
5	Demonstrate IOT in Healthcare - Smart, Pulse Rate and Oxygen Monitoring Solution	2	ITH407-1,2,3,4,5
6	Construct IOT application in Weather Forecasting - Wind Speed, Temperature and Humidity Monitoring	2	ITH407-1,2,3,4,5
7	Build IOT in Agriculture - S wart Scalable Irrigation Solution	2	ITH407-1,2,3,4,5
8	Build a Home Security Solution - Digital Lock with Camera	2	ITH407-1,2,3,4,5
9	Calibration of 3D printer-bed level, temperature calibration, filament flow rate calibration	2	ITH407-6

II) Theory

Section I

Sr. no.	Topics/Subtopics
CO: Understand the fundamental concepts of IoT.	
1	**Fundamental Building Blocks of IOT** 1.1 Why Learn IoT 1.2 Impact of loT on Work d and Job Opportunities 1.3 Fundamental Building Blocks of IoT Application. 1.4 Demonstrate example use case highlighting the following: - 5 steps of application building - Fundamental building blocks of the use case - Circuit Designer - Block Programmer
CO: Analyze IoT gateways and microcontrollers.	
2	**IoT Gateway and Microcontroller & Microprocessor** 2.1Know your IoT Gateway 2.2Microcontrollers — Arduino / ESP32 2.3 Microprocessor — Raspberry Pi 4B
CO: Apply sensors and communication protocols to design efficient IoT systems.	

Sr. no.	Topics/Subtopics
3	**Sensors and Communication Protocols in IoT** 3.1 Working Principles of Sensors 3.2 Sensor Calibration 3.3 IoT Communication Protocols - Bluetooth, WiFi, SPI, USB, UART, I2C

Section –II

Sr. no.	Topics/Subtopics
CO: Understand the software stack required for developing and managing IoT applications	
4	**Software Stack for IoT Application** 4.1 Circuit Designer Overview 4.2 Block Programming 4.3 Python Direct IDE 4.4 Introduction to Python 4.5 Learn Python using Blocks
CO: Integrate IoT services with cloud computing for scalable data storage, processing, and real-time analytics.	
5	**IoT Services and Cloud Computing** 5.1 Unlocking power of IoT 5.2 Mobile browser to IoT Gateway Communication 5.3 Cloud Connectivity for ÎoT Application 5.4 How to open AWS account 5.5 AWS Cost Management
CO: Understand the fundamentals of 3D printing technology and its applications.	
6	**Introduction to 3D printing** 6.1 Basic principle of 3D printing, steps in 3D printing process 6.2 3D printer components and its calibration 6.3 Common basic slicer settings (layer height, fill density, supports, platform adhesion — skirt, brim, raft, shell thickness) 6.4 Post-processing techniques, need of post-processing, steps in post processing

** No questions will be asked on IKS learning subtopics in any question papers.

G: List of Assignments under SLA

(Assignments Marked in * are compulsory)

Complete any one course related to “Internet of Things” freely available on Infosys Springboard/NPTEL/Spoken Tutorial.

Micro project

- Construct a Timer Based Automatic Bell/Buzzer
- Design an Alcohol Sensing & Alert System for vehicle drivers.
- Automate a fan based on room temperature monitoring.

- Electronic Smart Blind Stick- If someone is in front of blind person, LED and Buzzer should on otherwise LED and Buzzer will remains off
- Electronic Notice Board- Any Message send from mobile application should get displayed on LCD. When new message sends, previous message gets automatically erased and replaced with new message.

Assignment

- Solve Assignment covering all COs given by Course Teacher.

Note:

Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.

H: Specification table for setting question paper for semester end theory examination

NA

I:-Assessment Criteria

i) Formative Assessment of Practical:-

Every assignment shall be assessed for 25 marks as per following criteria:

Domain	Particulars	Marks out of 25
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	05
	Drawing / drafting skills	05
Affective	Discipline and punctuality	05
TOTAL		**25**

J) Instructional Methods:

1. Lectures cum Demonstrations.
2. Class room practices.
3. Use of projector and soft material for demonstration
4. Laboratory experiences and laboratory interactive sessions
5. Regular Home Assignments

K) Teaching and Learning resources:

Chalk board, LCD presentations, Self-Learning Online Tutorials, Demonstrative charts.

L) Reference Books:

S.N.	Name of Book	Author	Publication
1	David Hanes, Gonzalo Salgueiro, Patrick Grossetti	IoT Fundamentals: Nell orking Technologies, Protocols, and Use Cases for the Internet of'Things	Cisco Press ISBN. 978-1-58714-456- 1 599

2	Sinlen Monk	Raspberry Pi Cookbook	Publisher(s). O'Reilly Media, Inc. ISBN.' 9781098130923
3	N. Ida	Sensors, Actuators and Their Interfaces	SciTech Publishers 2014
4	Daniel Minoli	Building the Internet of Things with IPv6 and MIPv6. The Evolving World of M2M Communications	Willy Publications 2016, ISBN: 978-1-118-47347-4
5	Dernd Scholz-Reiter, Florian Michahelles	Architecting the Internet of Things	Springer 2016, ISBN.' 978- 3-642-19157- 2

M) Learning Website & Software

1. *https://github.com/microsoft/IoT-For-Beginners*
2. *https://javatpoint.com/difference-between-sensors-and-actuators*

***

COURSE ID : 22
COURSE NAME : ROBOTICS & AUTOMATION
COURSE CODE : ITH408
COURSE ABBREVIATION : HRBT

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	-	1
	Tutorial Learning	-	
	Laboratory Learning	2	
	SLH-Self Learning	2	
	NLH-Notional Learning	4	

B. ASSESSMENT SCHEME:-

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL				BASED ON SLA		TOTAL
					Practical						
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	50
-	-	-	-	-	25	10	-	-	25	10	

(Total IKS Hrs. for Sem.: 00 Hrs.)

C: ABBREVIATIONS: -

CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# on Line Examination, @$ Internal Online Examination.

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as"Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1(one) credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.

* Self learning includes micro project / assignment / other activities

D. i) RATIONALE: -

The progress in Robotics & its applications is massive and widespread from Industrial Automation to defence applications. The goals of human-robot interaction are to make daily lives easier, more efficient, and more enjoyable. These fields contribute significantly on future Intelligence system in Industry & Society. This course enable students to comprehend principles of Robotics and apply them in the industry applications.

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME

Develop and implement creative solutions for real time problems that can enhance efficiency, safety and convenience across various domains.

E. COURSE LEVEL LEARNING OUTCOMES (COS)

ITH408-1: Understanding industrial robot and safety.
ITH408-2: Identify basic components of industrial robot.
ITH408-3: Select Industrial robot for given applications.
ITH408-4: Select actuator and sensor for given robotic application.
ITH408-5: Maintain industrial robot.
ITH408-6: Program robot for given application.

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
Competencies: Understanding robotic systems, including their mechanical components, sensors, and actuators.	2	2	2	1	-	1	1	1	-
ITH408-1: Understanding industrial robot and safety.	2	2	2	1	-	1	1	1	-

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
ITH408-2: Identify basic components of industrial robot.	2	2	2	1	-	1	1	1	-
ITH408-3: Select Industrial robot for given applications.	2	2	2	1	-	1	1	-	-
ITH408-4: Select actuator and sensor for given robotic application.	2	2	2	1	-	1	1	-	-
ITH408-5: Maintain industrial robot.	2	1	-	-	2	1	1	-	-
ITH408-6: Program robot for given application.	2	1	-	1	-	1	1	1	-

F. CONTENT:

I) Practical exercises

The following practical exercises shall be conducted in the *Laboratory for Robotics & Automation* by the Institute in practical sessions of batches of about 20- 22 students: **(Any 5)**

Sr. no	Laboratory experiences	No. of Hours	CO
1	Identify different basic robotic components and its working for given system	2	ITH408-1
2	Robot installation and control panel wiring & Homing	2	ITH408-1
3	Demonstration of teach pendant	2	ITH408-2
4	Operate robot for basic motions using teach pendant	2	ITH408-3
5	Identify types of motor and drive used in Robotics.	2	ITH408-3
6	Identify types of sensor for given application & Interfacing of sensors.	2	ITH408-4

Sr. no	Laboratory experiences	No. of Hours	CO
7	Make use of Basic Robot Program Instructions: MOVE, POINT, WAIT, SET, IF, ELSE, LOOP, HALT, JUMP	2	ITH408-5
8	Robot programming for Conditional Statements.	2	ITH408-5
9	Setup and Programming for Magnetic Pick and Place	2	ITH408-6

Note: "Students are required to perform any five experiments from the prescribed list as part of the curriculum."

II) Theory

Nil

G: List of Assignments under SLA

(Assignments Marked in * are compulsory)

Complete any one course related to “Robotics & Automation” freely available on Infosys Springboard/NPTEL/Spoken Tutorial.

Micro project

- Program robot to follow 2D path.
- Program robot to identify material.
- Program robot for gluing application.
- Program Robot for logistic sorting system.
- Program robot for casketing/ sealing application.
- Prepare a report on latest technology of industrial robot.
- Case study on future robot technologies.
- Case study on various future applications of robotic systems.

Note:

Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.

H: Specification table for setting question paper for semester end theory examination

NA

I:-Assessment Criteria

i) Formative Assessment of Practical:-

Every assignment shall be assessed for 25 marks as per following criteria:

Domain	**Particulars**	**Marks out of 25**
Cognitive	Understanding	05
	Application	05

Psychomotor	Operating Skills	05
	Drawing / drafting skills	05
Affective	Discipline and punctuality	05
TOTAL		**25**

J) Instructional Methods:

1. Lectures cum Demonstrations.
2. Class room practices.
3. Use of projector and soft material for demonstration
4. Laboratory experiences and laboratory interactive sessions
5. Regular Home Assignments

K) Teaching and Learning resources:

Chalk board, LCD presentations, Self-Learning Online Tutorials, Demonstrative charts.

L) Reference Books:

S.N.	Name of Book	Author	Publication
1	Industrial Robotics	Mikell P. Groover. Michell Weiss, Roger N. Nagel, Nicholas G. Odrey & As fish Dutta	McGraw Hill Education (India) Pvt. Ltd., Chennai 2012, ISBN (I3): 978-1-25-900621-0
2	Introduction to Industrial Robotics	Ramchandran Nagarajan	Pearson Education India, New Delhi, 2006, ISBN: 978-93-325-4480-2
3	Robotics and Industrial Automation	R. K. Rajput	S. Chand limited, 2008 ISBN-9788121929974
4	Fundamentals of Robot Technology	D. J. Todd	British library Cataloguing in Publication Data ISBN (I3): 978-94-011-6770-3
5	A Textbook on Industrial Robotics	Ganesh S. Hegde	University Science Press, New Delhi, 2009, ISBN: C-16689/08/12

M) Learning Website & Software

1. *https://github.com/microsoft/IoT-For-Beginners*
2. *https://javatpoint.com/difference-between-sensors-and-actuators*

***

COURSE ID : 23
COURSE NAME : PROJECT
COURSE CODE : ITH502
COURSE ABBREVIATION : HPRJ

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	-	2
	Tutorial Learning	-	
	Laboratory Learning	04	
	SLH-Self Learning	02	
	NLH-Notional Learning	06	

B. ASSESSMENT SCHEME :-

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL				BASED ON SLA		TOTAL
					Practical						
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	100
--	-	-	-	-			50#	20	50	20	

C: Abbreviations: CL- ClassRoom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment
Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @$ Internal Online ExaminationNote :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as"Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1(one) credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.

* Self learning includes micro project / assignment / other activities. (Provide list of all assignments here in tabular format At least 6 to 8 assignments to be given)

D. i) RATIONALE:-

In the field of Information Technology various technologies (hardware and Software) needs to be integrated and proper paradigms needs to be implemented to develop any kind of computer applications. Hence it becomes essential to get hands on experience for developing industrial applications. This course is essential to understand the implementation of the system development process i.e. analysis, design, coding, debugging and testing. The project work should be undertaken by group of 4-5 students who will jointly work and implement the project with the approval of guide. The student should decide the area of proposal work as per

requirement of Industry / community or environment and work together for hardware / software solution for that work. The project work is divided into two phases. In the first phase the group is expected to submit a synopsis upon choosing a project work. The synopsis report should include following points:

1. Title of project
2. Introduction
3. Study of existing system
4. Need of proposed work / Choice of topic with reasoning
5. Literature review / Related work
6. Hardware and software requirements
7. Outline of proposed work
8. Block diagram
9. Expected schedule

Student should work on detailed system design, data flow design, data structure layout, file designs and complete 30 to 40 percent of work out of complete project work as a part of term work submission in the form of joint report.

The term work assignment should be carried out under the guidance of appointed project guide by Head of Dept. A seminar should be delivered by student on latest trends in IT as part of term work. The oral examination will be conducted by internal examiner as appointed by the Institute.

3.COMPETENCY:

Implementation of the software system development process i.e. analysis, design and coding.

Cognitive: i) Decide the area of proposal work as per requirement of Industry / community or environment

ii) Understand phases of Software Development Life Cycle for the project work

iii) Apply concepts of database, programming and networking for hardware or software solution of project work

Psychomotor: i) Prepare a block diagram for the proposed work

ii) Draw a Data Flow Diagram for the proposed system

Affective: Attitude of i) precision ii) accuracy iii) safety iv) punctuality v) aesthetic presentation

4.COURSE OUTCOMES:

The students will be able to:

ITH502-1: Identify need of Industry / community or environment and the area of proposed Work.

ITH502-2: Prepare a synopsis report including requirements, design, proposed schedule and modules of the project work.

ITH502-3: Develop leadership, interpersonal skill and team work sense of environmental responsibility.

ITH502-4: Acquire knowledge and latest changes in technology.

Competency, course outcomes and programme outcomes/programme specific outcomes

(cp-co-po/pso) matrix

[Note: Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
Competency: Implementation of the software system development process i.e. analysis, design and coding.	2	3	2	3	2	3	2	3	1
ITH502-1 Identify need of Industry / community or environment and the area of proposed work	2	3	-	-	2	2	2	-	-
ITH502-2 Prepare a synopsis report including requirements, design, proposed schedule and modules of the project work	2	2	3	2	1	3	2	3	1
ITH502-3 Develop leadership, interpersonal skill and team work sense of environmental responsibility.	2	2	3	-	1	-	-	-	-
ITH502-4 Acquire knowledge and latest changes in technology.	3	2	3	3	2	2	1	3	2

E. CONTENT:-

Sr. No.	Topics/ Subtopics
CO: ITH503-1 1 Identify need of Industry / community or environment and the area of proposed work	
1	1.1 Literature survey 1.2 Project identification
CO: ITH503-2 Prepare a synopsis report including requirements, design, proposed schedule and modules of the project work	
2	2.1 Initial Design
CO: ITH503-3 Develop leadership, interpersonal skill and team work sense of environmental responsibility	
3	3.1 Project Design
4	4.1 Identify impact of project on society and environment, if implemented in large scale.
5	5.1 Project implementation 5.2 Project testing 5.3 Project installation or commissioning
CO: ITH503-4 Acquire knowledge and latest changes in technology.	
6	6.1 Report writing and presentation

F. Self-Learning Activities for Diploma Project Course

During the course of the project, several self-learning activities were undertaken to develop technical knowledge, practical skills, and project management abilities. These activities help enhance student understanding of the project domain and supported independent problem-solving. The key self-learning areas are summarized below:

1. **Understanding Project Background:**
   - Study similar projects, case studies, and past reports to understand the problem and solution approach.
2. **Tool and Software Learning:**
   - Learn essential tools through online tutorials and practice.
3. **Component Study and Selection:**
   - Gain knowledge of hardware and software components
4. **Design of proposed work:**
   - Practice using simulation tools to validate project ideas before physical implementation.
5. **Practical Skill Development:**
   - Implement the project work
6. **Data Analysis and Testing:**
   - Learn to collect and analyze project-related data, conduct basic testing, and interpret results for system improvement.
7. **Report Writing and Documentation:**
   - Understood the structure and format of technical project reports, including proper formatting, flowcharts, and referencing.
8. **Presentation and Communication Skills:**
   - Practice delivering project presentations and responding to viva questions by studying sample videos and mock sessions.
9. **Time and Team Management:**
   - Develop task schedules, allocated responsibilities, and monitored project milestones using planning tools like Gantt charts.

H. Assessment Criteria

i) Formative Assessment of Project Work :-

Sr. No.	Evaluation Criteria	Marks
1.	Literature survey/review	5
2.	Project identification	5
3.	Initial design/ synopsis	5
4.	Detailed design	10
5.	Project implementation	5
6.	Project testing and installation	10
7.	Report writing	5
8.	Presentation	5
Total		**50**

ii) Summative Assessment of Practical :

Sr.no	Criteria	Marks
1	Project demonstration & execution	10
2	Project presentation	10
3	Contribution in project	10
4	Subject knowledge	10
5	Question & answer	10
Total		**50**

I. Instructional Methods:

a. Discussions.
b. Industrial visits.
c. Time bound assignments and work.
d. Project Exhibition
e. Mock presentation of project

K. Reference Books:

1. Various Computer and Information technology journals.

M. Guidelines for report writting

Arrangement of Contents:

1. Cover Page or Title Page
2. Declaration
3. Certificate by Guide
4. Acknowledgment
5. Preface
6. Title of project
7. Introduction
8. Study of existing system
9. Need of proposed work / Choice of topic with reasoning
10. Literature review / Related work
11. Requirement Analysis / SRS
12. Hardware and software requirements
13. System design that includes details of modules of system along with Data
14. Flow Diagrams, ER diagram and Block diagram etc.

15. Implementation details with snapshots
16. Applications
17. Conclusion and Future work
18. Bibliography

Paper & Typing dimension :

Page : A4 (ON ONE SIDE)
Margin : TOP 15mm
: BOTTOM 15mm
: RIGHT 15mm
: LEFT 30mm
Font : Times New Roman
Size : 12 points (expect the cover page, title page, headings and titles)
Spacing between lines: 1.15 (expect the change in paragraph, cover page, title page, headings and titles)
Header : Title of the project & Academic Year
Footer : Short name of institute, page number (on left side)

COURSE ID : 20
COURSE NAME : Web Development
COURSE CODE : ITH406
COURSE ABBREVIATION : HWDT

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	02	02
	Tutorial Learning	00	
	Laboratory Learning	04	
	SLH-Self Learning	01	
	NLH-Notional Learning	07	

B. ASSESSMENT SCHEME: -

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL				BASED ON SLA		TOTAL
					Practical						
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	100
	-	-	-	-	50	20	50#	10	-	-	

(Total IKS Hrs. for Sem.: 00 Hrs.)

C: ABBREVIATIONS: -

CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# on Line Examination, @$ Internal Online Examination.

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as"Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1(one) credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.

* Self learning includes micro project / assignment / other activitie

D. i) RATIONALE: -

The PHP Hypertext Preprocessor (PHP) is a server-side scripting language that allows web developers to create dynamic websites that interact with databases. This course is designed to build skills of developing websites with PHP. Students will be able to develop interactive web applications using PHP and MySQL databases. This course also introduces Laravel, a modern PHP framework that simplifies common tasks such as routing, database operations, authentication, and MVC-based web

application development. Learning Laravel enables students to adopt industrial best practices for structured and maintainable web development.

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME

This course prepares students with essential skills in full-stack web development using PHP and Laravel, aligning with current industry demands. By the end of the course, students will:

1. Develop full-stack web applications using PHP for server-side scripting and Laravel as the modern MVC framework for structured and scalable development.
2. Manage databases effectively, integrating MySQL and other relational databases for secure and efficient data storage and retrieval.
3. Build dynamic and interactive web applications, ensuring user-friendly interfaces and responsive design using HTML, CSS, Bootstrap, and JavaScript.
4. Optimize scalability and performance, applying Laravel best practices to build high-performance, secure, and maintainable web solutions.
5. Develop and integrate RESTful APIs using Laravel, enabling seamless communication between frontend interfaces and backend logic.
6. Enhance problem-solving and debugging skills, leveraging Laravel's debugging tools and PHP error handling for smooth application functionality.
7. Gain hands-on project experience, preparing for roles such as Full-Stack Developer, Laravel Developer, or PHP Web Developer.Employers seek professionals proficient in these technologies to develop scalable, secure, and modern web solutions that meet industry needs.

E. COURSE LEVEL LEARNING OUTCOMES (COS)

ITH 406-1: Install PHP and Laravel, and apply basics to build simple MVC-based web applications.
ITH 406-2: Apply PHP functions and array/string operations to process structured data.
ITH 406-3: Develop secure and validated web forms using PHP and Laravel.
ITH 406-4: Implement session management, cookie handling, and email functionality using PHP and Laravel.
ITH 406-5: Connecting to MySQL Database and Hosting Web Applications

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
Build full-stack web apps with PHP, MySQL	3	3	2	2	2	2	2	3	3
ITH406-1 Install PHP and Laravel, and apply basics to build simple MVC-based web applications.	3	3	2	2	2	2	2	3	3
ITH406-2 Apply PHP functions and array/string operations to process structured data.	3	3	2	3	1	1	2	2	3
ITH406-3 Develop secure and validated web forms using PHP and Laravel.	3	2	3	3	2	2	2	3	3
ITH406-4 Implement session management, cookie handling, and email functionality using PHP and Laravel.	3	2	3	3	2	2	2	3	3
ITH406-5 Connecting to MySQL Database and Hosting Web Applications	3	3	3	3	2	3	2	3	3

F. CONTENT:

I) Practical exercises

The following practical exercises shall be conducted in the *Laboratory for Web Page Design* by the Institute in practical sessions of batches of about 20- 22 students:

Sr. no	Laboratory experiences	CO
1	*Install PHP, Apache & MySQL using XAMPP, WAMP, or any latest tool.	ITH406-1
2	*Setup Laravel using Composer and configure development environment.	ITH406-1
3	*Understand Laravel folder structure, run basic Artisan commands, and setup a route/controller/view.	ITH406-1
4	*Create and manipulate arrays (Indexed, Associative, Multidimensional), and use implode(), explode(), array_flip().	ITH406-2

Sr. no	Laboratory experiences	CO
5	Perform string operations using strlen(), strrev(), strpos(), str_replace(), ucwords(), strtoupper(), strtolower(), strcmp().	ITH406-2
6	*Design a form with text inputs, process data using $_GET and $_POST, and redirect users.	ITH406-3
7	*Implement form validation using preg_match(), validate email, URL, input length, and redirect after successful validation.	ITH406-3
8	*Create a form in Laravel using Blade, submit data using POST, and use @csrf token.	ITH406-3
9	*Perform form validation in Laravel using validate () method and show validation messages.	ITH406-4
10	Implement cookies and sessions in Laravel using cookie() and session() helpers.	ITH406-4
11	*Create PHP script to handle cookies and sessions (set, retrieve, delete cookies, manage session data across pages).	ITH406-4
12	Write a PHP script to send emails using the mail() function.	ITH406-4
13	*Send emails in Laravel using Mailable classes and Mail::to()->send(), with .env SMTP config.	ITH406-4
14	*Use PHP (mysqli/PDO) to connect to MySQL and perform CRUD: insert, delete, update, fetch records.	ITH406-5
15	*Perform CRUD operations in Laravel using Eloquent ORM, routes, controllers, and Blade views.	ITH406-5

II) Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: ITH406-1 Install PHP and Laravel, and apply basics to build simple MVC-based web applications.			
1	**Fundamentals of PHP: Syntax, Control Structures, Arrays, Functions, and Strings** **1.1 Overview of PHP** 1.1.1 History, Features, and Syntax of PHP 1.1.2 Introduction to Apache Web Server and MySQL 1.1.3 Relationship Between Apache, MySQL, and PHP 1.1.4 Installation of PHP (WAMP, XAMPP, or Any Latest Server) **1.2 PHP Basics** 1.2.1 Variables, Global Variables, Data Types, Operators, Expressions, and Constants 1.2.2 Decision-Making Control Statements: if, if-else, nested if, switch, break, continue 1.2.3 Loop Control Structures: while, do-while, for, foreach **1.3 Introduction to Laravel Framework** 1.3.1 Overview of Laravel: Features, MVC architecture, and advantages over core PHP	**03**	

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
	1.3.2 Installing Laravel using Composer and setting up a development environment 1.3.3 Understanding Laravel folder structure and basic Artisan commands 1.3.4 Creating a basic Laravel route, controller, and view 1.3.5 Introduction to Blade templating engine		
CO: ITH406-2 Apply PHP functions and array/string operations to process structured data.			
2	**Arrays, Functions, and String Operations in PHP** **2.1 Creating and Manipulating Arrays** Types of Arrays: Indexed, Associative, and Multidimensional Declaring, initializing, modifying, and deleting elements **2.2 Extracting and Formatting Array Data** Using implode(), explode(), and array_flip() to format and manipulate data **2.3 Traversing Arrays** Looping through arrays using for, foreach, and while Handling nested arrays **2.4 Functions in PHP** 2.4.1Defining and calling functions 2.4.2 **Types of functions:** 2.4.2.1 User-defined 2.4.2.2 Variable functions 2.4.2.3 Anonymous (lambda) functions 2.4.2.4 Function parameters, return types, and scope **2.5 String Operations and Functions** **Built-in functions:** str_word_count(), strlen(), strrev(), strpos(), str_replace() ucwords(), strtoupper(), strtolower(), strcmp()	**02**	
CO: ITH406-3 Develop secure and validated web forms using PHP and Laravel.			
3	**PHP Forms and Validation** **3.1 Working with Forms in PHP** 3.1.1 Form controls: Text box, Text area, Radio button, Checkbox list, Submit/Reset buttons 3.1.2 GET and POST methods: Submitting and accessing form values using $_GET and $_POST 3.1.3 Embedding PHP within HTML: Displaying output, redirecting users using header () **3.2 Form Validation in PHP** 3.2.1 Using built-in functions for form validation: empty(),	**03**	

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
	isset(), preg_match() 3.2.2 Validating strings, numbers, email addresses, URLs, and input length 3.2.3 Handling invalid input and displaying error messages **3.3 Laravel Form Handling and Validation** 3.3.1 Creating forms in Laravel using Blade templates and @csrf token 3.3.2 Handling form data in Laravel controllers using the Request object 3.3.3 Server-side validation using Laravel's validate() method: Required fields, email, min/max length, regex, and custom rules 3.3.4 Displaying validation errors in Blade views 3.3.5 Preserving old input and redirecting after validation failure		

Section –II

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: ITH406-4 Implement session management, cookie handling, and email functionality using PHP and Laravel.			
4	**Cookies, Session Management, and Email Handling** **4.1 Managing Cookies and Sessions in PHP** 4.1.1 Cookies in PHP: Purpose, attributes (name, value, expiry, path), creation and deletion using setcookie() 4.1.2 Sessions in PHP: Starting a session (session_start()), storing/retrieving session data, and destroying a session **4.2 Laravel Cookies and Session Handling** 4.2.1 Setting, retrieving, and deleting cookies using Laravel's cookie() helper 4.2.2 Working with session data using session() helper 4.2.3 Using flash messages, storing user data, session configuration, and security considerations **4.3 Sending Emails** **PHP:**4.3.1 Sending emails using PHP's mail() function: syntax, headers, formatting 4.3.2 Validating and handling email form inputs Laravel:4.3.3 Introduction to Laravel Mail system 4.3.4 Sending emails using Mail::to()->send() 4.3.5 Creating and using Mailable classes 4.3.6 Email configuration using .env (SMTP, Mailtrap, etc.)	**02**	

CO: ITH406-5 Connecting to MySQL Database and Hosting Web Applications			
5	**5.1 Introduction to MySQL** 5.1.1Understanding MySQL: Concepts, database structure, and SQL syntax 5.1.2Introduction to relational databases and data types Basics of querying using SELECT, INSERT, UPDATE, DELETE **5.2 Connecting to MySQL Database** 5.2.1Using PHP: 5.2.1Connecting with mysqli_connect() and PDO Error handling and closing connections 5.2.2 Using Laravel: Database configuration via .env file Understanding Laravel's database settings (config/database.php) Using Eloquent ORM and Query Builder **5.3 Creating and Deleting Databases Using PHP:** 5.3.1 Executing SQL statements through PHP scripts 5.3.2 Using Laravel:Using Artisan commands and migrations to create and manage database schema **5.4 Performing CRUD Operations** 5.4.1 Using PHP: Inserting, updating, deleting, and fetching records using mysqli or PDO 5.4.2 Using Laravel: Performing CRUD using Eloquent models and Query Builder Route-controller-model interaction for data manipulation **5.5 Hosting the Website** Preparing PHP and Laravel projects for deployment Setting up a hosting environment (Localhost to live server) Uploading files, managing. env configuration, and connecting to a hosted MySQL database Basic security and file permission considerations	**02**	

** No questions will be asked on IKS learning subtopics in any question papers.

G: List of Assignments under SLA

(Assignments Marked in * are compulsory)

1. **Online Task Management System**

Objective: Develop a simple task management system where users can create, update, delete, and track tasks using PHP, MySQL.

Technology Stack:

- **Frontend:** HTML, CSS, JavaScript, Bootstrap
- **Backend:** Laravel or Core PHP
- **Database:** MySQL (CRUD Operations)
- **Authentication:** Laravel for user login & session management

2. **Online Event Booking System**

Objective: Develop a web-based event booking system where users can browse, book, and manage event tickets using PHP, MySQL.

Technology Stack:

- **Frontend:** HTML, CSS, JavaScript, Bootstrap
- **Backend:** Laravel or Core PHP

- **Database:** MySQL (CRUD Operations)
- **Authentication:** PHP/Laravel for user login & session management

3. **Online Appointment Booking System (PHP & MySQL)**
   Objective: Develop a web-based appointment booking system where users can schedule, manage, and cancel appointments using PHP and MySQL.

Technology Stack:

- **Frontend:** HTML, CSS, JavaScript (Bootstrap for UI)
- **Backend:** PHP (Core PHP or Laravel)
- **Database:** MySQL (CRUD Operations)
- **Authentication:** PHP Session & Cookies

4. **Student Record Management System (Laravel/PHP)**
   Objective: Create a platform to manage student details like name, roll number, course, section, etc.

Technology Stack:

- **Frontend:** HTML, CSS, JavaScript (Bootstrap for UI)
- **Backend:** PHP (Core PHP or Laravel)
- **Database:** MySQL (CRUD Operations)
- **Authentication:** PHP Session & Cookies

H: Specification table for setting question paper for semester end theory examination

NIL

I: -Assessment Criteria

i) Formative Assessment of Practical: -

Every assignment shall be assessed for 25 marks as per following criteria:

Domain	**Particulars**	**Marks out of 25**
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	05
	Drawing / drafting skills	05
Affective	Discipline and punctuality	05
TOTAL		**25**

ii) Summative Assessment of Practical:

Every practical assignment shall be assessed for 25 marks as per following criteria:

Sr. no	**Criteria**	**Marks allotted**
1	Attendance at regular practical	05
2	Preparedness for practical	05
3	Neat & complete Diagram.	05
4	Observations & computer handling skill	05
5	Oral Based on Lab work and completion of task	05
TOTAL		**25**

J) Instructional Methods:

1. Lectures cum Demonstrations.
2. Class room practices.
3. Use of projector and soft material for demonstration
4. Laboratory experiences and laboratory interactive sessions
5. Regular Home Assignments

K) Teaching and Learning resources:

Chalk board, LCD presentations, Self-Learning Online Tutorials, Demonstrative charts.

L) Reference Books:

S.N.	Name of Book	Author	Publication
1	W. Jason Gilmore	Beginning PHP and MySQL, 4th Edition	Apress
2	Steven Holzner	PHP: The Complete Reference	McGraw-Hill
3	Robin Nixon	Learning PHP, MySQL, JavaScript, CSS & HTML5, Third Edition	O'reilly Media
4	Julie C. Meloni	Teach yourself PHP, MySQL and Apache All in One , 5th Edition	Pearson Education

M) Learning Website & Software

PHP Learning Resources

1. **Official PHP Manual** – https://www.php.net/manual/en/**W3Schools PHP Tutorial** – https://www.w3schools.com/php/
2. **PHP The Right Way** – https://phptherightway.com/
3. **TutorialsPoint PHP Guide** – https://www.tutorialspoint.com/php/index.htm
4. **Laravel (PHP Framework)** – https://laravel.com/

***

Course Name : 11

Course Name : ENTREPRENEURSHIP AND START-UP
Course Code : CCH501
Course Abbreviation : HESU

A. LEARNING SCHEME:

Scheme component	Actual Contact Hours / week	Credits
Classroom Learning (CL)	02	1
Tutorial Learning (TL)	-	
Laboratory Learning (LL)	--	
Self-Learning Hours (SLH)	01	
Notional Learning (NLH)	3	

B. ASSESSMENT SCHEME:

PAPER DURATION IN HRS	Theory				Based on LL & TL Practical				Based on Self Learning		Total Marks
	FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
	Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
-	-	-	-	-	-	-	-	-	50	20	50

(Total IKS Hrs for Sem:1 Hrs)

C. ABBREVIATIONS:

CL- Classroom Learning, TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination, @$ Internal Online Examination

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course, then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL) hrs.* 15 Weeks
5. 1(one) credit is equivalent to 30 Notional hrs.
6. * Self learning includes micro project / assignment / other activities.

D. i) RATIONALE:

Globalization, liberalization and Privatization along with revolution in information technology have opened up new opportunities transforming lives of masses. In this context, there is an immense opportunity of establishing manufacturing, service, trading, marketing and consultancy enterprises by diploma engineer. Our fast-growing economy provides ample scope for diploma engineers to succeed as an entrepreneur. Entrepreneurship requires distinct skill sets which are attempted to be developed through this course. To begin with, this course aims to develop the competency and the related outcomes in order to start small enterprises.

i) INDUSTRY / EMPLOYER EXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry identified outcome through various learning experiences:

1) Understanding and applying business principles and labor laws.
2) Improved business skills, imagination and planning of enterprise.

E. COURSE LEVEL LEARNING OUTCOMES (CO'S)

CCH501-1: Identify entrepreneurial attributes

CCH501-2: Identify the business opportunities that suits you

CCH501-3: Use the support systems to zero down to your business idea.

CCH501-4: Develop comprehensive business plans.

CCH501-5: Prepare plans to manage the enterprise effectively.

Competency, course outcomes and programme outcomes/programme specific outcomes (CP-CO-PO/PSO) matrix

[Note: Correlation levels: 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"]

Competency and Cos	Programme outcome POs and PSO's								
	PO 1 Basic and discipline specific knowledge	PO 2 Problem analysis	PO 3 Design/ development of solutions	PO 4 Engineering tools, experimentation & testing	PO 5 Engineering practices for society, sustainability and environment	PO 6 project manage-ment	PO 7 Life-long learning	PSO1	PSO2
Competency									
CCH501-1 Identify entrepreneurial attributes	2	2	2	-	-	3	2	-	3
CCH501-2 Identify the business	2	2	2	2	-	3	2	-	3

opportunitie s that suits you									
CCH501-3 Use the support systems to zero down to your business idea.	2	2	2	2	-	3	2	-	3
CCH501-4 Develop comprehens ive business plans.	2	2	2	2	-	3	2	-	3
CCH501-5 Prepareplan s to manage the enterprise effectively.	2	2	2	2	-	3	2	-	3

F. CONTENT:

i. Practical Exercise:

Not Applicable

ii. THEORY

Sr. No.	Topics / Sub-topics	Lectures (Hours)
1	**Entrepreneurship Development- Concept and Scope** **Indian Knowledge System for entrepreneurship development(IKS)** 1.1 Concepts and Overview of Entrepreneurship. Evolution and Growth of Entrepreneurship in India. Role of Entrepreneurship in Economic Development. Entrepreneurship as a career. 1.2 Traits of successful intrapreneur / entrepreneur: Consistency, creativity, initiative, independent decision making, assertiveness, persuasion, persistence, information seeking, 1.3 Entrepreneurship: Scope in local and global market. 1.4 Intrapreneur and entrepreneur. 1.5 Types of enterprises and their features: Manufacturing, Service and trading. 1.6 Steps in Setting up of a business	**03**

2	**Entrepreneurial Opportunities and Selection Process:** 2.1 Product / Service selection: Process, core competence, product / service life cycle, new product / service development process, mortality curve, Creativity and innovation in product / Service modification / development. 2.2 Process selection: Technology life cycle, forms and cost of transformation, Factors affecting process selection, Location for an industry, Material handling. 2.3 Market study procedures: Questionnaire design, sampling, Market survey, Data analysis 2.4 Getting information from concerned stake holders such as Maharashtra Centre for Entrepreneurship Development (MCED), National Institute for Micro, Small and Medium Enterprises (NI-MSME, Prime Minister Employment Generation Program (PMEGP), Directorate of Industries (DI), Khadi Village Industries Commission (KVIC).	04
3	**Support Systems:** 3.1 Categorization of MSME, Ancillary Industries. 3.2 Support System-Government Agencies: MCED, NI- MSME, PMEGP, DI, KVIC. 3.3 Support agencies for entrepreneurship guidance, training, registration, technical consolation, technology transfer and quality control, marketing and finance 3.4 Breakeven point, return of investment and return on sales.	**03**
4	**BUSINESS PLAN PREPARATION:** 4.1 Sources of Product for Business: Feasibility study. 4.2 Ownership, Capital, Budgeting, Matching Entrepreneur with the project, Feasibility report preparation and evaluation criteria. 4.3 Business plan preparation.	**03**
5	**Managing Enterprise:** 5.1 Unique Selling proposition (U.S.P.): Identification, Developing a marketing plan. 5.2 Preparing Strategies of handling Business: Policy making, negotiation and bargaining techniques. 5.3 Risk management: [planning for calculated risk taking, initiation with low-cost projects, integrated futuristic planning, angel investors, venture capitalist. 5.4 Incubation centres: Role and procedure.	**03**

G. Suggested micro projects / assignments/ activities for specific learning / skills development (self-learning) under SLA

Sr. No.	Assignments	Relevant CO	Approx. Hrs. Required
1	Submit a profile summary (about 500 words) of a successful entrepreneur indicating milestone achievement.	1	02*
2	Undertaking SWOC analysis to arrive at your business idea of a product / service.	1	02
3	Survey industries of your stream; grade them according to the level of scale of production, investment, turnover, pollution to prepare a report on it.	2	02
4	Visit a bank/Financial institution to enquire about various funding schemes for small scale enterprise.	2	02*
5	Collect loan application forms of national banks/other financial institutions.	2	02*
6	Compile the information from financial agencies that will help you set up your business enterprise.	3	02*
7	Compile the information from government agencies that will help you set up your business enterprise.	3	02*
8	Prepare Technological feasibility report of a chosen product/service.	3	02*
9	Prepare a set of short term, medium- and long-term goals for starting a chosen small-scale enterprise.	3	02*
10	Prepare marketing strategy for your chosen product/service.	4	02*
11	Compile the information about insurance schemes covering different risk factors.	4	02
12	Find the breakeven point for the business idea chosen by you.	4	02
13	Prepare a business plan for your chosen small-scale enterprise.	5	02
14	Organize funfair for your class and write report of profit/loss.	5	02
15	Visit report of any industry: Brief history, types and details of services/support assistance being given, any other information which is useful to self-employer/entrepreneur.	5	02

*-Suggested assignment for the students.

ASSESSMENT CRITERIA:

i) Formative Assessment of Practical: -

Every assignment shall be assessed for 25 marks as per following criteria:

Domain	Particulars	Marks out of 25
Cognitive	Understanding	05
	Application	05

Psychomotor	Observation and recording	10
Affective	Discipline and punctuality	05
TOTAL		**25**

ii) Assessment of SLA: -

Every Self-learning assignment shall be assessed for 25 marks as per following criteria:

Sr.no	Criteria	Marks allotted
1	Punctuality	05
2	Presentation (neat figures/ drawing etc.)	05
3	Market Survey / Data collection	10
4	Team work	05
	TOTAL	**25**

H. INSTRUCTIONAL METHODS:

1 Lectures cum Demonstrations,

2 Class room practices.

3 Use of projector and soft material for demonstration

I. TEACHING AND LEARNING RESOURCES:

Chalk board, Power Point presentations and Demonstrative kits.

J. REFERENCE BOOKS:

Sr. No.	Title of Books	Author	Publication
1	The entrepreneurial Instinct: How Everyone Has the Innate Ability to Start a Successful Small Business.	Mehta, Monica	McGraw-Hill Education, New Delhi, 2012, ISBN 978-0-07-179742-9
2	Entrepreneurship	Hisrich R. D.	McGraw-Hill Education, New Delhi, 2013, ISBN-13: 978-1259001635
3	Part I Readings in Entrepreneurship Education	Sareen S.B.	Entrepreneurship Development Institute of India (EDI), GOI, Ahmedabad, 2016; ISBN: 978-0078029169
4	Reading Materials of Entrepreneurship Awareness Camp	Gujral, Raman	Entrepreneurship Development Institute of India (EDI), GOI, Ahmedabad

5	Product Design and manufacturing	Chitale A.K.	PHI Learning, New Delhi 2014; ISBN: 9788120348738
6	Entrepreneurship Development Small Business Entrepreneurship	Charantimath, Poornima	Pearson Education India, New Delhi; ISBN: 9788131762264
7	Entrepreneurship Development: Special Edition for MSBTE	CPSC, Manila	Tata McGraw Hill, New Delhi
8	Entrepreneurship Development Small Business Management	Khanka S. S.	S. Chand and sons, New Delhi, ISBN: 978-93-5161-094-6
9	Entrepreneurship Development	S. Anil Kumar	New Age International, New Delhi, ISBN: 9788122414349

COURSE ID : 12
COURSE NAME : INTERNSHIP (16 WEEKS)
COURSE CODE : CCH505
COURSE ABBREVIATION: HINP

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	--	10
	Tutorial Learning		
	Laboratory Learning		
	SLH-Self Learning		
	NLH-Notional Learning		

B. ASSESSMENT SCHEME: -

PAPER DURATION	THEORY				BASED ON LL&TL Practical				BASED ON SLA		TOTAL
NIL	FA- TH	SA- TH	TOTAL		FA -PR		SA-PR		MAX	MIN	
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN			200
	NIL	NIL	NIL	NIL	100	40	100#	40	-	-	

Note: Students have to register for Internship with the help of Govt. agency such as BOAT (Board of Apprenticeship Training.
Students have to register Credits for Industrial Training are in-line of guidelines of NCrF : The industrial training is of 16 weeks considering 36-40 hours per week engagement of students (as per Guidlines of GR of Maharashtra Govt.) under Self Learning with guidance of industry supervisor / Mentor.

C. ABBREVIATIONS: -

CL- Classroom Learning, TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH- Notional Learning Hours, FA - Formative Assessment, SA -Summative Assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# Online Examination, @$ Internal Online Examination.

1. FA-TH represents the average of two class tests of 30 marks each conducted during the semester.
2. If the candidate is not securing the minimum passing marks in FA-PR of any course, then the candidate shall be declared as "Detained" in that semester.
3. If the candidate is not securing the minimum passing marks in the SLA of any course, then the candidate shall be declared as a fail and will have to repeat and resubmit the SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL) hrs.* 15 Weeks
5. 1(one) credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.

* Self learning includes micro project / assignment / other activities

D. I. RATIONALE: -

Globalization has prompted organizations to encourage skilled and innovative workforce. Internships are educational and career development opportunities, providing practical/ hands-on experience in a field or discipline. A summer internship is an opportunity for students to get accustomed to modern industry practices, apply the knowledge and skills they've acquired in the classroom to real-world situations, and become familiar with industry environments before they enter the professional world. Keeping this in mind, industrial training is incorporated to all diploma programmes as it enables the student to get equipped with practical skills, soft skills and life skills

ii. INDUSTRY / EMPLOYER EXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

Apply skills and practices to industrial processes.

E. COURSE LEVEL LEARNING OUTCOMES (COS)

CCH505.1: Observe time/resource management and industrial safety aspects.

CCH505.2: Acquire professional experience of industry environment.

CCH505.3: Prepare report of assigned activities and accomplishments.

COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note: Correlation levels: 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "-":no correlation**]**

Competency and COs	Programme Outcomes POs and PSOs								
	PO 1 Basic and discipline specific knowledge	**PO 2 Problem analysis**	**PO 3 design/ development of solutions**	**PO 4 Engineering Tools, experimentation and testing**	**PO 5 Engineering practice for society, sustainability and environment**	**PO 6 Project management**	**PO 7 Life-long learning**	**PSO1**	**PSO2**
Competency:	2	-	-	-	-	3	-	**1**	**2**
CCH505.1	2	-	-	1	-	1	1	**1**	**2**
CCH505.2	2	-	1	1	-	2	1	**1**	**2**
CCH505.3	1	-	-	2	-	2	-	**1**	**2**

F. GENERAL GUIDELINES FOR ORGANIZING INDUSTRIAL TRAINING

The industry /organization selected for Industrial training/ internships shall be Government /Public Limited / Private limited / Startup /Centre of Excellence/ Skill Centers/ Skill Parks etc.

Duration of Training - 16 weeks students engagement time

Period of Time slot – After completion of 4th semester examination and up to total sixteen weeks.

Industry area - Engineering Programme Allied industries of large, medium or small-scale, Organization/Govt./ Semi Govt Sectors.

G. ROLE(S) OF DEPARTMENT AT THE INSTITUTE:

The following activities are expected to be performed by the concerned department at the Institute.
Table of activities to be completed for Internship

S. N	Activity	Suggested Schedule WEEKS
1	Collection of information about the industry available and ready for extending training with its offered capacity of students (Sample Format 1)	During 4th semester
2	Allocations of Student and Mentor as per availability (Mentor: Student Ratio (1:15)	During 4th semester
3	Communication with Industry and obtaining its confirmation: Sample letter Format	14th week of 4th semester
4	Securing consent letter from parents/guardians of students (Sample Format 2)	15th week of 4th semester
5	Enrollment of Students for industrial training (Format 3)	During 4th semester
6	Issue of letter to industry for training along with details of students and mentor (Format 4)	15 days before end of 4th semester examination
7	Organize Internship Orientation session for students	During 4th semester examination
8	Progressive Assessment of internship by Industry supervisor.	Each week (16 weeks) -5marks for each week
9	Progressive Assessment of internship by Institute Mentor at the Industry	Each quarter of 1 month(4 weeks) during training period- 5 marks for each quarter
10	Assessment of training by institutional mentor and Industry mentor	5th Semester ESE

Suggestions-

a. The department can take help of alumni or parents of students having contacts in different industries for securing placement.
b. Students would normally be placed as per their choices; in case of more demand for a particular industry, students would be allocated considering their potential. However, preference for placement would be given to students who have arranged placement in a company with the help of their parents or relatives.
c. Principal/HOD/Faculty should address students about industrial safety norms, rules, and discipline to be maintained in the industry during training before releasing students for training.
d. The faculty members, during the industry visit or sometimes through online mode, will check the progress of the student in the training, student attendance, discipline, and project report preparation each week.

H. ROLES AND RESPONSIBILITIES OF STUDENTS:

1. Students may interact with the mentor to suggest choices for suitable industry, if any. If students have any contact in industry through their parents or relatives, then the same may be utilized for securing placement for themselves and their peers.
2. Students must fill the forms/formats duly signed by institutional authorities along with a training letter and submit it to a training officer/mentor in the industry on the first day of training.
3. Students must carry with him/her Identity card issued by the institute during the training period.
4. Students should follow industrial dressing protocols, if any. In absence of specific protocol students must wear college uniform compulsorily.
5. Students will have to get all necessary information from the training officer/mentor at industry regarding schedule of training, rules and regulation of the industry and safety norms to be followed. Students are expected to observe these rules, regulations and procedures.
6. Students must be fully aware that if they disobey any rule of industry or do not follow the discipline then non- disciplinary action will be taken.
7. Students must maintain a weekly diary (Format 6) by noting daily activities undertaken and get it duly signed from industry mentor or Industrial training in charge.
8. In case students face any major problems in industry such as an accident or any disciplinary issue then they should immediately report the same to their mentor at the institute.
9. Prepare a final report about the training for submitting to the department at the time of presentation and viva- voce and get it signed from a mentor as well as industry training in charge.
10. Students must submit the undertaking as provided in Format 5.

I. TYPOGRAPHICAL GUIDELINES FOR INDUSTRY TRAINING REPORT

1. Following is the suggestive format for preparing the training report. Actual report may differ slightly depending upon the nature of industry. The training report may contain the following
2. The training report shall be computer typed (English- British) and printed on A4 size paper.
3. Text Font -Times New Roman (TNR), Size-12 point
4. Subsection heading TNR- 12 point bold normal
5. Section heading TNR- 12 capital bold
6. Chapter Name/ Topic Name – TNR- 14 Capital
7. All text should be justified. (Settings in the Paragraph)
8. The report must be typed on one side only with double space with a margin 3.5 cm on the left, 2.5 cm on the top, and 1.25 cm on the right and at bottom.
9. The training report must be hardbound/ Spiralbound with a cover page in black color. The name of the candidate, diploma (department), year of submission, name of the institute shall be printed on the cover.

10. The training report, the title page should be given first then the Certificate followed by the acknowledgment and then contents with page numbers.

J. FORMAT OF INDUSTRIAL TRAINING REPORT

Following format may be used for training report. Actual format may differ slightly depending upon the nature of Industry/ Organization.

- Title Page
- Certificate
- Abstract
- Acknowledgement
- Content Page

Chapter 1	Organization structure of Industry and general layout.
Chapter 2	Introduction to Industry / Organization (history, type of products and services, turnover and number of employees etc.)
Chapter 3	Types of Major Equipment/raw materials/instruments/machines/ hardware/software used in industry with their specifications, approximate cost, specific use and routine maintenance done
Chapter 4	Processes/ Manufacturing techniques and methodologies and material handling procedures
Chapter 5	Testing of Hardware/Software/ Raw materials/ Major material handling product (lifts, cranes, slings, pulleys, jacks, conveyor belts etc.) and material handling procedures.
Chapter 6	Safety procedures are followed, and safety gear is used by the industry.
Chapter 7	Details of Practical Experiences in Industry/Organization, if any, in Production/Assembly/Testing/Maintenance
Chapter 8	Detailed report of the tasks undertaken (during the training).
Chapter 9	Special/challenging experiences encountered during training if any (may include students' liking & disliking of workplaces).
Chapter 10	Conclusion
Chapter 11	References/sources of information

K. LEARNING STRATEGIES DURING TRAINING IN THE INDUSTRY.

Students should visit the website of the industry where they are undergoing training to collect information about products, processes, capacity, number of employees, turnover etc. They should also refer to the handbook of the major machines and operations, testing, and quality control manuals.

L. Table - Distribution of End-Semester-Examination (ESE) marks of Industrial Training

Internal Examiner			**External Examiner**	**Total ESE marks**
Marks for Industrial Training Report	**Marks for Seminar/ Presentation**	**Marks for Oral/Viva-voce**		
25	25	25	25	100

Format-1

(To *be obtained on Company's Letter Head*)

Collecting Information about Industry/Organization available for training along with capacity

1) Name of the industry/organization:
2) Address/communication details with email:
3) Contact person details:
   a) Name:
   b) Designation:
   c) Email
   d) Contact number/s:
4) Type:
   a) Govt / PSU / Pvt /
   b) Large scale / Medium scale / Small scale

5) Products/Services offered by industry:

6) a. Whether willing to offer Industrial training facility during June to August for Diploma in Engineering students: Yes / No.
   a) If yes, whether you offer 16 weeks training: Yes/No
   b) Possible Industrial Capacity:

Students	Programme name						Total
	Civil	Mechanical	Electrical	Information Technology	Metallurgy	Electronics & Telecommunica Tion	
Male							
Female							
Total							

7) Whether accommodation available for interns Yes / No. If yes capacity:____
8) Whether internship is charged or free:
   If charged please specify amount per candidate: _

Seal and signature of responsible person at Industry:

Format-2
(Obtaining Consent Letter from parents/guardians)

To,
The principal,
Government Polytechnic, Kolhapur .

Subject: Consent for Industrial Training.

Respected Sir,
I am fully aware that -

i. My ward studying in fourth semester at Government Polytechnic, Kolhapur , has to undergo 16 weeks of Industrial training for partial fulfillment towards completion of Diploma in _____
ii. For this fulfillment he/she has been deputed at industry, located at---------- for Industrial training /internship for the period from _____to _____.

~~With respect to abov~~e I give my full consent for my ward to travel to and fro from the mentioned industry.
Further I undertake that –

a. My ward will undergo the training at his/her own cost and risk during training and/or stay.
b. My ward will be entirely under the discipline of the organization where he/she will be placed and will abide by the rules and regulations in face of the said organization.
c. My ward is NOT entitled to any leave during the training period.
d. My ward will regularly submit a prescribed weekly diary, duly filled and countersigned by the training supervisor of the organization to the mentor faculty of the polytechnic.

I have explained the contents of the letter to my ward, who has also promised to adhere strictly to the requirements. I assure that my ward will be properly instructed to take his own care to avoid any accidents/injuries in the industry. In case of any accident neither industry nor the institute will be held responsible.

Signature :

Name : _____
Address : _____

Phone Number : _____

Format-3 (Students Enrollment for Industrial Training (To *be maintained by Department*)

(Academic Year –)

Sr. No.	Roll No.	Name of Student	Name of Industry	Name of Mentor at Institute

Format-4

(Issue Letter to the Industry/Organization for the training along with details of students and mentors on Institute Letter Head)

To,
The HR Manager,

_____

_____

Subject: Placement for Industrial training of 16 weeks in your organization

Reference: Your consent letter no _____.

Sir,

With reference to the above we are honored to place the following students from this institute for Industrial training in your esteemed organization as per the arrangement arrived .

The purpose of this training is to equip the student with some essential skills relevant to the demands of the industry and world of work, as well as to provide exposure to the professional environment and work culture. It is hoped that this training may enhance his/her employability and livelihood opportunities. In view of the above, we kindly request your support in facilitating this Industrial Training for the student. He/she has been adequately oriented and guided on the expectations of this training, including the maintenance of a daily diary during the training period.

Additionally, the institute has secured the necessary consent and undertaking from the parent/guardian regarding the guidelines for exit training. In view of all the above industry shall refrain from involving students into the mundane and housekeeping activities. Your cooperation in this regard will be highly appreciated.

Diploma programme in _____

Sr. No.	Roll No.	Name of Student	Name and designation of Mentor
1.			
2.			

Kindly extend all possible cooperation to the students for above. Thanking you.

Yours Sincerely,

Principal
Government Polytechnic, Kolhapur

CC- Mentor.

Format-5

(Undertaking by the students)

To
The Principal,
Government Polytechnic, Kolhapur

Subject: Undertaking regarding Placement for Industrial training of 16 weeks duration.

I Mr./Ms. _____Roll No: _____

Son/Daughter of _____ _____studying in_department at your Institute, am fully aware of the Industrial Training requirement and related responsibilities and participation in the_____Industrial training from:_____To_____. I assure you that I will be of good behavior and be obedient to the staff and mentor during the Industrial training. I will also abide and will not participate in all activity. I will also discipline myself within the rules and regulations of the Institution. I am also aware that I am participating in the Industrial Training at my own risk and I will not hold the Institute responsible in any way in any eventuality namely Accident /Injury/death or whatever mishap and I myself will be solely responsible for my safety.

Place:Kolhapur

Date:

Signature of the student

GOVERNMENT POLYTECHNIC, KOLHAPUR

Evaluation Sheet for Formative Assessment of Internship

Academic Year: Department: Electrical Engineering

Semester: V Course – Internship Course Code - CCH505 Name of Coordinator:

Enrollment No	**Name of Student**												**Marks (5 marks each week) by Mentor & Industry Supervisor jointly**						**PA Marks by Mentor faculty (20 Marks) [B]**	**Total [Marks 100] [A]+[B]**
		WK 1	**WK 2**	**WK 3**	**WK 4**	**WK 5**	**WK 6**	**WKN 7**	**WK 8**	**WK 9**	**WK 10**	**WK 11**	**WK 12**	**WK 13**	**WK 14**	**WK 15**	**WK 16**	**Total [80 Marks] [A]**		

Name and Designation of Mentor *Name and Designation of Industry Supervisor*

The faculty should visit the Industry at least for four times Online /Off line mode and He will give Marks for 4 Times Quarterwise. [Mentor will give marks 4 times (5 marks each time) and total of 20 marks]

EVALUATION BY MENTOR

Sr No.	Roll No	Quarter 1 Marks Out Of 5 By mentor	Quarter 2 Marks Out Of 5 By mentor	Quarter 3 Marks Out Of 5 By mentor	Quarter 4 Marks Out Of 5 By mentor	Average of column

DAILY DIARY FORMAT TO BE MAINTAINED BY STUDENT

Week 1: From _____To _____

Day	Activities carried out	Remark
1		
2		
3		
4		
5		
6		

Signature of Mentor : _____

Signature of Industrial Supervisor : _____

The same format need to follow for every week of the inductrial training.

Government Polytechnic Kolhapur

Learning and Assessment Scheme for Post S.S.C Diploma Courses

ProgrammeName :Diploma In Information Technology

Programme Code	**:IF(06)**	**WithEffectFromAcademicYear**	**: 2023-24**
Duration Of Programme	**: 6 Semester**	**Duration**	**: 16 WEEKS**
Semester	**: Sixth**	**Scheme**	**: H**

Sr No	CourseTitle	Abbrevation	Level	CourseType	Course Code	Total IKS HrsforSem	Learning Scheme					Credits	Assessment Scheme											
							ActualContact Hrs./Week			Self Learning(Activity/ Assignment /MicroProject)	NotionalLearningHrs/Week		Paper Duration (hrs.)	Theory				Based on LL & TL				Based on Self Learning		Total Marks
																		Practical						
							CL	TL	LL					FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
														Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
1	EMERGING TRENDS IN COMPUTER & INFORMATION TECHNOLOGY	HETC	V	DSC	ITH503	-	4	-	-	2	6	3	1.5	30*#	70*#	100	40	-	-	-	-	50	20	150
2	INFORMATION SECURITY	HIFS	IV	DSC	ITH504	-	4	-	4	-	8	4	3	30	70	100	40	50	20	50#	20	-	-	200
3	MOBILE APPLICATION DEVELOPMENT	HMAD	V	SEC	ITH505	-	2	-	4	2	8	4	-	-	-	-	-	25	10	50#	20	25	10	100
4	ELECTIVE I	-	IV	DSE	-	-	4	-	2	-	6	3	3	30	70	100	40	25	10	50@	20	-	-	175
5	ELECTIVE II	-	V	DSE	-	-	4	-	2	-	6	3	3	30	70	100	40	25	10	50@	20	-	-	175
6	OPEN SOURCE LAB	HOSL	V	SEC	ITH509	-	-	-	4	2	6	3	-	-	-	-	-	25	10	50#	20	25	10	100
Total						-	**18**	-	**16**	**6**	**40**	**20**	-	**120**	**280**	**400**	-	**150**	-	**250**	-	**100**	-	**900**
ELECTIVE I																								
E1	AI & ML	HAIM	IV	DSE	ITH403	-	4	-	2	-	6	3	3	30	70	100	40	25	10	50@	20	-	-	175
E1	NETWORK ADMINISTRATION	HNAD	IV	DSE	ITH404	-	4	-	2	-	6	3	3	30	70	100	40	25	10	50@	20	-	-	175
E1	CLOUD COMPUTING	HCLC	IV	DSE	ITH405		4	-	2	-	6	3	3	30	70	100	40	25	10	50@	20	-	-	175
ELECTIVE II																								
E2	DATA ANALYTICS	HDAS	V	DSE	ITH506	-	4	-	2	-	6	3	3	30	70	100	40	25	10	50@	20	-	-	175
E2	ADVANCED DATABASE SYSTEM	HADB	V	DSE	ITH507	-	4	-	2	-	6	3	3	30	70	100	40	25	10	50@	20	-	-	175
E2	DATA WAREHOUSING & MINING	HDWM	V	DSE	ITH508	-	4	-	2	-	6	3	3	30	70	100	40	25	10	50@	20	-	-	175

Abbreviations:CL-ClassroomLearning,TL-TutorialLearning,LL-LaboratoryLearning,FA-FormativeAssessments-SummativeAssessment,IKS-IndianKnowledgeSystem,SLA-SelfLearningAssessment

Legends: @ InternalAssessment, # ExternalAssessment, *# On Line Examination , @$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks Each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as"Detained"in that semester.
3. If candidate is not securing minimum passing marks in SLAof any course then the candidate shall be declared as fail and will have to repeat and resubmit SLAwork.
4. NotionalLearninghoursforthesemesterare(CL+LL+TL+SL)hrs.*15Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. *Self learning hours shall not be reflected in the Time Table.

Course Category: Discipline Specific Course Core(DSC): 2 ,Discipline Specific Elective (DSE):2,Value Education Course(VEC):0, Intern./Apprenti./Project./Community(INP):0, Ability Enhancement Course (AEC) : 4, Skill Enhancement Course (SEC) : 2, Generic Elective (GE) : 0

PBOS MEMBER SECRETARY

HEAD OF DEPARTMENT

COURSE ID : 24
COURSE NAME : Emerging Trends in Computer and Information Technology
COURSE CODE : ITH503
COURSE ABBREVIATION : HETI

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	04	3
	Tutorial Learning	-	
	Laboratory Learning	-	
	SLH-Self Learning	02	
	NLH- Notional Learning	06	

B. ASSESSMENT SCHEME:-

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL Practical				BASED ON SLA		TOTAL
3	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				150
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
	30*#	70*#	100	40	-	-	-	-	50	20	

(Total IKS Hrs. for Sem.: 00 Hrs.)

C: ABBREVIATIONS: -

CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH- Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# Online Examination, @$ Internal Online Examination .

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1(one) credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.

* Self learning includes micro project / assignment / other activities

C. i) RATIONALE: –

Advancements and applications of Computer Engineering and Information Technology are ever changing. Emerging trends aims at creating awareness about major trends that will define

technological advancements in the upcoming years in the field of Computer Engineering and Information Technology.

E. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

ITH503-1: Describe deep learning and neural networks
ITH503-2: Understand basics of data science and big data analytics
ITH503-3: Describe Block chain technology
ITH503-4: Describe ethical hacking process and its types
ITH503-5: Describe digital forensics and evidence handling procedure
ITH503-6: Describe Robotic Process Automation

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
Competency: - Understand latest trends in IT field	3	2	1	2	-	-	2	1	2
ITH503-1: Describe ethical hacking process and its types	3	2	1	1	-	-	2	1	2
ITH503-2: Describe digital forensics and evidence handling procedure	3	2	1	1	-	-	2	1	2
ITH503-3: Describe Block chain technology	3	2	1	2	-	-	2	1	2
ITH503-4: Describe deep learning and neural networks	3	2	1	1	-	-	2	1	2
ITH503-5: Understand basics of data science and big data analytics	3	2	1	1	-	-	2	1	2
ITH503-6: Describe Robotic Process Automation	3	2	1	-	-	-	2	1	2

F. CONTENT:

I) Practical exercises - Not Applicable

II) Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: ITH503-1 Describe ethical hacking process and its types			
1	**Ethical Hacking** 4.1 Types of hackers 4.2 Need to hack your own system 4.3 Types of attacks – 4.3.1 Non technical attacks 4.3.2 Network – Infrastructure attacks 4.3.3 Operating system attacks 4.3.4 Application and other socialized attacks 4.4 Ethical hacking process 4.5 Types of hacking 4.5.1 Network hacking 4.5.2 Wireless network attacks 4.5.3 Operating system attacks 4.5.4 Database vulnerabilities 4.5.5 Web vulnerabilities 4.5.6 Applications hacking	**10**	**12**
CO: ITH503-2 Describe digital forensics and evidence handling procedure			
2	**Digital Forensics** 5.1 Introduction 5.2 Digital forensics investigation process 5.3 Ethical issues in digital forensics – ethical and unethical norms for digital investigation 5.4 Digital evidence – best evidence rule, original evidence 5.5 Characteristics of digital evidence – Locard's exchange principle	**10**	**10**

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
	5.6 Types of evidence – illustrative, electronics, documented, substantial 5.7 Challenges in evidence handling 5.8 Chain of custody 5.9 Volatile evidence 5.10 Digital forensics models		
CO: ITH503-3 Describe Blockchain technology			
3	**Blockchain Technology** 3.1 Evolution of digital money 3.2 What is blockchain? Distributed ledger technology, consensus mechanisms (Proof of Work, Proof of Stake) 3.3 Centralized vs decentralized systems 3.4 Key concepts: nodes, miners, consensus, immutability 3.5 Public vs private blockchains 3.6 Blockchain layers 3.7 Transactions & blocks structure 3.8 Merkle trees 3.9 Smart contracts overview 3.10 Common attacks and security issues	**10**	**12**

** No questions will be asked on IKS learning subtopics in any question papers.

Section –II

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: ITH503-4 Describe deep learning and neural networks			
4	**Deep Learning & Neural Networks** 1.1 Artificial Intelligence, Machine Learning and Deep learning – Interconnection and difference 1.2 Real-world case studies: Google Assistant, recommendation systems, self-driving cars 1.3 Introduction to neural networks and deep learning 1.4 Natural Language Processing (NLP) - 1.4.1 Text analysis, sentiment analysis, and chatbot creation 1.4.2 Real-world applications: Virtual assistants, customer service bots	**14**	**16**
CO: ITH503-5 Understand basics of data science and big data analytics			
5	**Data Science & Big Data Analytics** 2.1 Data Collection & Preprocessing 2.1.1 Types of data: structured, unstructured, semi-structured 2.1.2 Cleaning and preprocessing: Handling missing data, normalization, outliers 2.2 Data Analysis & Visualization 2.2.1 Exploratory Data Analysis (EDA): Understanding data patterns and trends 2.2.2 Data visualization: Using tools like Tableau, Power BI, and Matplotlib for insights 2.2.3 Real-world case studies: Predicting customer churn, market basket analysis 2.3 Big Data Technologies 2.3.1 Introduction to Big Data concepts (volume, variety, velocity) 2.3.2 Introduction to Distributed computing frameworks: Hadoop, Apache Spark	**10**	**12**

CO: ITH503-6 Describe Robotic Process Automation			
6	**Robotic Process Automation** 6.1 What is Process Automation? 6.2 Evolution from traditional automation to RPA 6.3 Types of automation 6.4 RPA vs AI vs BPM 6.5 Benefits, limitations, and use cases (banking, HR, insurance, logistics) 6.6 RPA lifecycle	**06**	**08**

G: List of Assignments under SLA

(Assignments Marked in * are compulsory)

1. Students should complete one or two online courses on any MOOCs platform on latest trends in IT.
2. Prepare a technical report on case studies related to the topics like – security issues in block chain, applications of deep learning in healthcare
3. Analyze risks involved in AI generated images, deep fakes etc.
4. Perform a Basic Security Audit on any web application
5. Analyze a Real Dataset to understand data handling, preprocessing, and visualization skills.
6. Automate a Simple Workflow to understand automation & version control
7. Analyze Password Strength
8. Find Vulnerabilities on Safe Practice Sites
9. Network Scanning (Simulation Only)
10. Identify and explain 5 real-life applications of AI/ ML

H: Specification table for setting question paper for semester end theory examination

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks	CO
		Remember	Understand	Apply		
I / 1	Ethical Hacking	4	4	4	12	ITH503-1
I / 2	Digital Forensics	4	4	2	10	ITH503-2
I / 3	Blockchain Technology	2	4	6	12	ITH503-3
II /4	Deep Learning & Neural Networks	4	6	6	16	ITH503-4
II /5	Data Science & Big Data Analytics	4	4	4	12	ITH503-5
II / 6	Robotic Process Automation	2	4	2	08	ITH503-6
	Total Marks				70	

I:-Assessment Criteria

i) Formative Assessment of Practical: - Not Applicable

ii) Summative Assessment of Practical: Not Applicable

J) Instructional Methods:

1. Lectures cum Demonstrations.
2. Class room practices.
3. Use of projector and soft material for demonstration
4. Laboratory experiences and laboratory interactive sessions
5. Regular Home Assignments
6.

K) Teaching and Learning resources:

Chalk board, LCD presentations, Self-Learning Online Tutorials, Demonstrative charts.

L) Reference Books:

S. N.	Name of Book	Author	Publication
1	Introduction to AI & Machine Learning	Munesh Chandra Trivedi , Ankit Srivastava	Khanna Book Publishing ISBN-10 9355386885
2	BIG DATA ANALYTICS	M I Thariq Hussan	Notion Press ISBN-13 979-8890023001
3	BLOCKCHAIN TECHNOLOGY	Chandramouli Subramanian ,Asha A George ,Abhilash K A Meena Karthikeyan	Universities Press (India) Pvt. Ltd., ISBN-10 9389211638
4	Ethical Hacking & Digital Forensics	Aamer Khan	Code Academy
5	Robotic Process Automation	Gerardus Blokdyk	star cooks ISBN-13 -978 : 0655429760

M) Learning Website & Software

1. https://www.tutorialspoint.com/artificial_intelligence/artificial_intelligence_overview. htm
2. https://www.javatpoint.com/introduction-to-artificial-intelligence

***

COURSE ID : 25
COURSE NAME : INFORMATION SECURITY
COURSE CODE : ITH504
COURSE ABBREVIATION : HIFS

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	4	4
	Tutorial Learning	-	
	Laboratory Learning	4	
	SLH-Self Learning	-	
	NLH-Notional Learning	08	

B. ASSESSMENT SCHEME:-

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL				BASED ON SLA		TOTAL
					Practical						
3	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				200
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
	30	70	100	40	50@	20	50#	20	-	-	

(Total IKS Hrs. for Sem.: 00 Hrs.)

C: ABBREVIATIONS: -

CL- Classroom Learning, TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# on Line Examination, @$ Internal Online Examination.

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course, then the candidate shall be declared as"Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course, then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL) hrs.* 15 Weeks
5. 1(one) credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Timetable.

* Self learning includes micro project / assignment / other activities

C. i) RATIONALE: -

Information security protects information from unauthorized access and activities. It is important for students to be aware of security issues and technologies involved to ensure information safety and privacy. This course focuses on various techniques used to encrypt

data while transferring it on network. Also includes prevention measures to protect data from security threats and attacks.

E. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

ITH504-1: Identify types of attacks which cause threat to Information Security.
ITH504-2: Apply multi-factor user authentication and access control mechanisms
ITH504-3: Apply basic encryption / decryption techniques for a given text.
ITH504-4: Apply various encryption algorithms used for information security.
ITH504-5: Implement security techniques to prevent internet threats.
ITH504-6: Identify Cybercrimes and explain Cyber law concepts

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
Competency: - Understand and apply information security measures	2	2	2	1	-	-	2	2	2
ITH504-1 Identify types of attacks which cause threat to Information Security.	3	2	-	1	-	-	2	1	2
ITH504-2 Apply multi-factor user authentication and access control mechanisms	3	2	2	1	-	-	2	1	2
ITH504-3 Apply basic encryption / decryption techniques for a given text	3	2	2	2	-	-	2	2	2
ITH504-4 Apply various encryption algorithms used for information security	3	2	2	2	-	-	2	2	2
ITH504-5 Implement security techniques to prevent	3	1	1	1	-	-	2	-	2

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
internet threats.									
ITH504-6 Identify Cybercrimes and explain Cyber law concepts	2	-	-	-	-	-	2	-	-

F. CONTENT:

I) Practical exercises

The following practical exercises shall be conducted in the *Laboratory for Information Security* by the Institute in practical sessions of batches of about 20- 22 students:

Sr. no	Laboratory experiences	CO
1	Install and configure Antivirus software on system (Licensed copy) Use privacy and security settings on operating system. Set up single level authentication for computer system Grant security to file, folder or application using access permissions and verify it	CO1
2	Write code using any programming language to create strong password authentication (Password should be more than 8 characters, and combination of digits, letters and special characters #, %, &, @)	CO2
3	Write application using any programming language to implement authentication and authorization (Read / Write / Execute) for specific file.	CO2
4	Write a program to implement Caesar cipher technique to perform encryption and decryption of text	CO3
5	Implement Vernam cipher encryption technique to perform encryption of text	CO3
6	Implement rail fence encryption technique to perform encryption of text	CO3
7	Implement simple Columnar Transposition encryption technique	CO3
8	Use Steganography to encode and decode the message using any open-source tool	CO3
9	Implement any 2 simple Hash functions using any programming language	CO4

Sr. no	Laboratory experiences	CO
10	Create and verify digital signature using any Open-source tool	CO4
11	Send a test mail securely using any open-source tool	CO5
12	Set up security policies for any web browser and Email account (Example: setting filter, spam for email security. Low security apps settings, cookies, synchronization for web browser)	CO5
13	Case Study: Prepare a technical report on recent Information Security attack like ransomware and its Measures	CO6
14	Case Study: Prepare a technical report on digital forgery regarding digital payments like digital arrest	CO6

II) Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: ITH504-1 Identify types of attacks which cause threat to Information Security.			
1	**Introduction to Information Security** 1.1 Information Security Overview: Introduction to information, need of information security 1.2 Information classification, Criteria for information classification 1.3 Basic principles of information security: Confidentiality, Authentication, Integrity, Availability, Access Controls, Repudiation 1.4 Type of Attacks: Active and Passive attacks, Denial of Service, DDOS, Backdoors and Trapdoors, Sniffing, phishing, Spoofing, Man in the Middle, Replay, TCP/IP Hacking, Encryption attacks, Social Engineering, Man-in-middle attack 1.5 Types of Malwares and their impact on security and prevention: - Virus, Worms, Trojan horse, Spyware, Adware, Ransomware, Logic Bombs, Rootkits, Backdoors, Keyloggers 1.6 Threat and Risk Analysis: Introduction to assets, vulnerability, threats, risks, relation between: threat, vulnerability, risks	**8**	**12**
CO: ITH504-2 Apply user identification and authentication methods			

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
2	**User Authentication and Access Control** 2.1 Identification and Authentication methods : Electronic user authentication, username and password, multi-factor authentication, token-based authentication, biometrics 2.2 Guessing password, Password attacks : Piggybacking, Shoulder surfing, Dumpster diving 2.3 Biometrics : Finger prints, Hand prints, Retina scan patterns, Voice patterns, Signature and Writing patterns, Keystrokes. 2.4 Authorization : Introduction to authorization, goals of authorization 2.5Access controls : Access control principles, Access rights and permission	**8**	**10**
CO: ITH504-3 Apply cryptographic techniques			
3	**Fundamentals of Cryptography** 3.1 Introduction : Plain text, Cipher text, Cryptography, Cryptanalysis, Cryptology, Encryption, Decryption 3.2 Symmetric and Asymmetric cryptography : Introduction, working, key management, asymmetric cryptography -public key distribution 3.3 Substitution techniques : Caesar cipher, Playfair cipher, Vigenere cipher, Vernam cipher (One-time pad), Hill Cipher 3.4 Transposition techniques : Rail fence technique , Simple columnar technique 3.5 Steganography : Introduction and working of steganography	**14**	**12**

Section –II

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: ITH504-4 Apply cryptographic algorithms to maintain Information Security			
4	**Encryption Algorithms** 4.1 Symmetric Key Cryptography - 4.1.1 DES (Data Encryption Standard) algorithm 4.1.2 AES (Advanced Encryption Standard) algorithm 4.2 Asymmetric Key Cryptography - 4.2.1 RSA algorithm 4.2.2 Diffie-Hellman key exchange algorithm, Man-in-middle attack 4.3 Cryptographic Hash Functions 4.3.1 Hash Function : Introduction, Features of Hash Functions, security requirements, applications 4.3.2 Digital Signature : Introduction and working of digital signature 4.3.3 Working of MD5 and SHA algorithm	**16**	**18**
CO: ITH504-5 Apply measures to prevent attacks on network and Internet			
5	**Internet Security** 5.1 Firewall : Need of firewall, Types of firewalls : Packet filters, Stateful packet filters, Application gateways, Circuit gateways 5.2 Secure HTTP 5.3 Intrusion Detection System(IDS) : Network-based IDS, Host-based IDS, Honeypots 5.4 E-mail security : Simple mail transfer protocol (SMTP), Pretty good privacy (PGP), S/MIME	**08**	**10**
CO: ITH504-1 Classify cyber crimes			
6	**Cyber Crime and Cyber Laws** 6.1 Cyber-crime: Introduction, Hacking, Digital forgery, Cyber stalking/Harassment, Cyber pornography, Identity theft & fraud, Cyber terrorism, Cyber defamation, OS fingerprinting 6.2 Cyber Laws: Introduction, Need, Categories: Crime against individual, Government, Property, Information Technology Act	**06**	**08**

** No questions will be asked on IKS learning subtopics in any question papers.

G: List of Assignments under SLA

(Assignments Marked in * are compulsory)

H: Specification table for setting question paper for semester end theory examination

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks	CO
		Remember	Understand	Apply		
I / 1	Introduction to Information Security	4	4	4	12	ITH504-1
I / 2	User Authentication and Access Control	4	4	2	10	ITH504-2
I / 3	Fundamentals of Cryptography	2	4	6	12	ITH504-3
II /4	Encryption Algorithms	4	6	8	18	ITH504-4
II /5	Internet Security	4	4	2	10	ITH504-5
II / 6	Cyber Crime and Cyber Laws	4	2	2	08	ITH504-6
	Total Marks				70	

I: -Assessment Criteria

i) Formative Assessment of Practical: -

Every assignment shall be assessed for 25 marks as per following criteria:

Domain	**Particulars**	**Marks out of 25**
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	05
	Drawing / drafting skills	05
Affective	Discipline and punctuality	05
TOTAL		**25**

ii) Summative Assessment of Practical:

Every practical assignment shall be assessed for 25 marks as per following criteria:

Sr. no	**Criteria**	**Marks allotted**
1	Attendance at regular practical	05
2	Preparedness for practical	05
3	Neat & complete Diagram.	05
4	Observations & computer handling skill	05
5	Oral Based on Lab work and completion of task	05
TOTAL		**25**

J) Instructional Methods:

1. Lectures cum Demonstrations.
2. Classroom practices.
3. Use of projector and soft material for demonstration
4. Laboratory experiences and laboratory interactive sessions
5. Regular Home Assignments
6.

K) Teaching and Learning resources:

Chalk board, LCD presentations, Self-Learning Online Tutorials, Demonstrative charts.

L) Reference Books:

S.N.	Name of Book	Author	Publication
1	Cryptography and Network security Third Edition	Atul Kahate	McGraw-Hill; Fourth edition ISBN-13: 978-9353163303
2	Computer Security Principles and Practice, Third Edition	William Stallings, Lawrie Brown	Pearson. ISBN-13: 978-0-13-377392-7
3	Information Technology Security Fundamentals	by Glen Sagers, Bryan Hosack	ISBN-10 1606499165 ISBN-13 978-1606499160

M) Learning Website & Software

1. http://williamstallings.com/
2. https://www.cisco.com/site/us/en/learn/topics/security/what-is-information-security-infosec.html

***

COURSE ID : 26
COURSE NAME : MOBILE APPLICATION DEVELOPMENT
COURSE CODE : ITH505
COURSE ABBREVIATION : HMAD

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	2	4
	Tutorial Learning	-	
	Laboratory Learning	4	
	SLH-Self Learning	2	
	NLH-Notional Learning	8	

B. ASSESSMENT SCHEME: -

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL				BASED ON SLA		TOTAL
					Practical						100
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
-	-	-	-	-	25	10	50#	20	25	10	

(Total IKS Hrs. for Sem.: 00 Hrs.)

C: ABBREVIATIONS: -

CL- Classroom Learning, TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# on Line Examination, @$ Internal Online Examination.

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as"Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL) hrs.* 15 Weeks
5. 1(one) credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.

* Self learning includes micro project / assignment / other activities

D. i) RATIONALE: -

The aim of this course is to familiarize students with Flutter, an open-source UI software development kit, used to develop applications for Android, iOS, Linux, Mac, Windows. This course covers the key concepts of app development using flutter and dart.

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME

Understand the fundamentals of Flutter and Dart, including the syntax, structure, and features of both languages.

E. COURSE LEVEL LEARNING OUTCOMES (COS)

3

ITH505-1: Install and use Flutter and Dart from the ground up, step-by-step.

ITH505-2: Use Dart Programming Language - Fundamentals and intermediate topics.

ITH505-3: Build a robust apps with Flutter using Flutter widgets.

ITH505-4: Create WebView widget in Flutter.

ITH505-5: Design, build, debug Flutter Android and iOS Apps with Material Design Guidelines and Widgets.

ITH505-6: Get Flutter apps to communicate with a real time database - Firebase.

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
Build visually appealing and responsive user interfaces using Flutter's built-in widgets and layout elements.	2	1	2	2	2	1	2	2	1
ITH505-1 Install and use Flutter and Dart from the ground up, step-by-step.	2	2	1	2	2	-	2	1	-
ITH505-2 Use Dart Programming Language - Fundamentals and intermediate topics.	2	1	2	2	2	1	2	1	-
ITH505-3 Build a robust apps with Flutter using Flutter widgets.	2	1	2	1	2	1	2	2	-
ITH505-4 Create WebView widget in Flutter.	2	1	2	2	2	1	2	3	3

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
ITH505-5 Design, build, debug Flutter Android and iOS Apps with Material Design Guidelines and Widgets.	2	1	2	2	2	1	2	3	-
ITH505-6 Get Flutter apps to communicate with a real time database - Firebase.	1	2	3	2	-	-	2	3	-

F. CONTENT:

I) Practical exercises

The following practical exercises shall be conducted in the *Laboratory for Mobile Application Development* by the Institute in practical sessions of batches of about 20- 22 students:

Sr. no	Laboratory experiences	CO
1	Write a Dart program to demonstrate variables, data types, type inference, arithmetic & logical operators.	1
2	Implement decision-making (if-else, switch-case) and loops (for, while, do-while) with examples.	1
3	Write a program to create functions (normal, named parameters, optional parameters, arrow functions).	1
4	Demonstrate class, object, constructor, inheritance, method overriding, and abstract classes.	2
5	Build a basic Flutter app using Stateful Widget and setState() with increment button.	2
6	Create a UI using multiple layout widgets.	3
7	Implement screen navigation using Navigator.push() & Navigator.pop().	3
8	Create a login form with TextFields, validation, and a submit button.	4
9	Display dynamic data using ListView and GridView.	4
10	Implement simple state management using Provider package.	5
11	Implement flutter program to fetch and display JSON data.	6
12	Implement flutter program to store and retrieve user data locally.	6

II) Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: ITH505-1 Install and use Flutter and Dart from the ground up, step-by-step.			
1	**Dart Programming** 1.1 Introduction, Importance of Flutter, Introduction to Dart, Dart Pad, Installing Dart SDK,, Dart Variables, Data Types, Input of Information to Dart Program, Writing Comments, Operators, flow control statements. 1.2 Advanced Dart Programming: Functions: Creating a Function, Function Return Data Types, Void Function, Function Returning Expression, Functions and Variable Scope, 1.3 Object-Oriented Programming (OOP), Objects and Classes, Creating a Class, Adding Methods to Classes, Providing Constructors for Your Classes, Getters and Setters, Inheritance, Abstract Class, Dart Project Structure and Dart Libraries	**6**	**-**
CO: ITH505-2 Use Dart Programming Language - Fundamentals and intermediate topics.			
2	**Introduction to Flutter** 2.1 Flutter SDK, Installing and Configuring Flutter SDK 2.2 Creating a New Flutter Project, Setup an Android Virtual Device 2.3 Run a Flutter App, Installing Flutter on Mac 2.4 Test Your Flutter App on iOS Phone with Windows O.S, 2.5 Android Studio Sugar and Spice, Run your Apps on a Hardware Device (Physical Phone) 2.6 Run your Flutter App on Android Phone, Run your Flutter App on Android Phone 2.7 Emulator Debug Mode, Introduction to Flutter Widgets, creating a Flutter App Using Widgets, What is a Material App widget	**5**	**-**
CO: ITH505-3 Build a robust apps with Flutter using Flutter widgets.			
3	**Flutter Widgets** 3.1 Scaffold Widget, Image Widget Container Widget, Column and Row Widgets 3.2 Icon Widget, Layouts in Flutter, Card Widget 3.3 App Icons for iOS and Android Apps, Hot Reload and Hotb Restart 3.4 Stateful and Stateless Widgets, Use a Custom Font	**5**	**-**

Section –II

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: ITH505-4 Create WebView widget in Flutter.			
4	**Navigation and Routing** 4.1 Button Widget, FloatingActionButton, RaisedButton, 4.2 FlatButton, and IconButton, DropdownButton, OutlineButton, ButtonBar, PopupMenuButton 4.3 App Structure and Navigation, Navigate to a New Screen and Back, Navigate with Named Routes, Send and Return Data 4.4 Among Screens, Animate a Widget Across Screens, WebView Widget in Flutter	**6**	**-**
CO: ITH505-5 Design, build, debug Flutter Android and iOS Apps with Material Design Guidelines and Widgets.			
5	**Material Design and Motion-Rich Widgets** 5.1 Material Design Guidelines Part 1, 5.2 Introduction,BottomNavigatorBarWidget, 5.3 DefaultTabController, TabBar, and TabBarView Widgets, ListTile Widget, ListView Widget, Drawer Widget, DataTable Widget, SelectableText Widget, Stack Widget, Material Design Guidelines - Part 2, Input and Selections, Text Field Widget., 5.4 Checkbox Group and RadioButtonGroup Widgets, Date Picker., Time Picker., Slider Widget., Switch Widget, Dialogs, Alerts, and Panels, 5.5 Alert Dialog Widget, Cupertino Alert Dialog Widget., Bottom Sheet., Modal Bottom Sheet, Persistent Bottom Sheet., Expansion Panel Widget., Snack Bar Widget.	**5**	**-**
CO: ITH505-6 Get Flutter apps to communicate with a real time database - Firebase.			
6	**Flutter and Firebase** 6.1 Introduction, What is the JSON?, 6.2 How does Firebase Database work? Firebase authentication (Signup and Login to Flutter App), 6.3 Configure Your App to use Firebase Services, Adding Firebase to Android App, Adding Firebase to iOS App, 6.4 Configuring Firebase Authentication 6.4 Login to an App Using Firebase User Accounts, Logout Configuration, Firebase Database, 6.5Which database is right for your project, Real Time Database, Cloud Fire store	**5**	**-**

** No questions will be asked on IKS learning subtopics in any question papers.

G: List of Assignments under SLA

(Assignments Marked in * are compulsory)

Any one of the below or simpler assignment should be completed.

1. Design and develop a Flutter application with at least three screens (Home, Details, and About). Implement navigation using Navigator.push() and Navigator.pop().
2. Design and develop a Weather Dashboard App in Flutter that fetches real-time weather data using a public REST API (e.g., OpenWeatherMap).
3. Develop a full-featured Expense Tracker App using Flutter and sqflite package.
4. Create a mini E-commerce application in Flutter with product catalog and cart functionality.

H: Specification table for setting question paper for semester end theory examination

NA

I: -Assessment Criteria

i) Formative Assessment of Practical: -

Every assignment shall be assessed for 25 marks as per following criteria:

Domain	Particulars	Marks out of 25
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	05
	Drawing / drafting skills	05
Affective	Discipline and punctuality	05
TOTAL		**25**

ii) Summative Assessment of Practical:

Every practical assignment shall be assessed for 25 marks as per following criteria:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Preparedness for practical	05
3	Neat & complete Diagram.	05
4	Observations & computer handling skill	05
5	Oral Based on Lab work and completion of task	05
TOTAL		**25**

J) Instructional Methods:

1. Lectures cum Demonstrations.
2. Class room practices.
3. Use of projector and soft material for demonstration
4. Laboratory experiences and laboratory interactive sessions
5. Regular Home Assignments

K) Teaching and Learning resources:

Chalk board, LCD presentations, Self-Learning Online Tutorials, Demonstrative charts.

L) Reference Books:

S.N.	Name of Book	Author	Publication
1	Flutter and Dart Cookbook: Developing Full-Stack Applications for the Cloud	Richard Rose	O'Reilly Media ISBN-13 978-1098119515
2	Flutter Cookbook: 100+ step-by-step recipes for building cross-platform, professional-grade apps with Flutter 3.10.x & Dart 3.x	Simone Alessandria and Brian Kayfitz	Packt Publishing Limited ISBN : 1803245433

M) Learning Website & Software

1. https://flutter.dev
2. https://dart.dev

***

COURSE ID : 19
COURSE NAME : AI & ML
COURSE CODE : ITH403
COURSE ABBREVIATION : HAIM

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	4	3
	Tutorial Learning	-	
	Laboratory Learning	2	
	SLH-Self Learning	-	
	NLH-Notional Learning	6	

B. ASSESSMENT SCHEME:-

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL Practical				BASED ON SLA		TOTAL
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	175
3	30	70	100	40	25	10	50@	20	-	-	

(Total IKS Hrs. for Sem.: 00 Hrs.)

C: ABBREVIATIONS: -

CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# on Line Examination, @$ Internal Online Examination.

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as"Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1(one) credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.

* Self learning includes micro project / assignment / other activities

D. i) RATIONALE: -

Artificial Intelligence (AI) includes the ability to carry out operations that have historically required human intelligence, such as speech recognition, visual perception, language translation, and decision-making. Machine Learning (ML) is a subset of Artificial Intelligence (AI) which is the study of patterns and structures in data analysis and interpretation. Students will be able to apply AI/ML techniques to real-world problems through projects and case studies.

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME

Classify real world problem and apply knowledge of AI and ML.

E. COURSE LEVEL LEARNING OUTCOMES (COS)

ITH403-1: Implement relevant search algorithms as applicable to Artificial Intelligence.
ITH403-2: Apply method for knowledge representation to make informed decisions for various applications.
ITH403-3: Analyze different forms of data with respect to different phases of Machine Learning.
ITH403-4: Create data model for Machine Learning Algorithms.
ITH403-5: Classify the data by performing different Regression Techniques.
ITH403-6: Classify the data by performing different Classification Techniques.

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
Competency: Design, develop, evaluate, and deploy machine learning models to solve practical problems	2	1	2	2	2	1	2	2	1
ITH403-1 Implement relevant search algorithms as applicable to Artificial Intelligence.	2	2	1	2	2	-	2	1	-
ITH403-2 Apply method for knowledge representation to make informed decisions for various applications.	2	1	2	2	2	1	2	1	-
ITH403-3 Analyze different forms of data with respect to different	2	1	2	1	2	1	2	2	-

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
phases of Machine Learning.									
ITH403-4 Create data model for Machine Learning Algorithms.	2	1	2	2	2	1	2	3	3
ITH403-5 Classify the data by performing different Regression Techniques.	2	1	2	2	2	1	2	3	-
ITH403-6 Classify the data by performing different Classification Techniques.	1	2	3	2	-	-	2	3	-

F. CONTENT:

I) Practical exercises

The following practical exercises shall be conducted in the *Laboratory for AI & ML* by the Institute in practical sessions of batches of about 20- 22 students:

Sr. no	Laboratory experiences	CO
1	* Install given Python IDE software and Python "scikit learn" for ML	ITH403-1
2	Write program to Implement Breadth First Search Algorithm (Uninformed) in Python	ITH403-1
3	*Write program to implement Depth First Search Algorithm (Uninformed) in Python	ITH403-1
4	Write program to implement Greedy Best-First (Informed Type) Search Algorithm in python	ITH403-1
5	* Write program to implement A* search (Informed Type) Algorithm in Python	ITH403-1
6	* Write program to implement Bayes' Theorem	ITH403-2
7	* Explore different dataset finders e.g. Google Dataset Search, Kaggle	ITH403-3
8	* Write program in python to split any dataset into train and tests sets	ITH403-3
9	Analyze E-mail spam and non-spam filtering using Machine Learning through case study	ITH403-3
10	*Create and display a Decision Tree on given dataset	ITH403-3
11	Write program to implement K-means Algorithm	ITH403-4

Sr. no	Laboratory experiences	CO
12	* Write program to calculate cross validation score for any Dataset like IRIS	ITH403-4
13	*Write program to implement Simple Linear Regression using Python	ITH403-4
14	Write program to implement Multiple Linear Regression using Python	ITH403-5
15	*Write program to create confusion matrix to calculate different measures to quantify the quality of the model	ITH403-6

II) Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: ITH403-1 Implement relevant search algorithms as applicable to Artificial Intelligence.			
1	**Basics of AI and Problem-Solving Techniques** 1.1 Basic Definition and Terminology: Foundation and Evaluation of AI, Scope of AI, Components of AI, Types of AI, Application of AI 1.2 Intelligent Agent in AI: Types of AI agent, Concept of Rationality, Nature of environment, Structure of agents, Turing Test in AI 1.3 Search Algorithms in Artificial Intelligence: Properties of Search Algorithms, Types of Search Algorithms 1.4 Heuristic Search Techniques: Generate-and-Test; Hill Climbing. Properties of A* algorithm, Depth-First Search, Best-First Search, Greedy Best-First, Problem Reduction 1.5 Beyond Classical Search: Local search algorithms and optimization problem, Local search in continuous spaces, Searching with nondeterministic action and partial observation, Online search agent and unknown environments	**10**	**10**
CO: ITH403-2 Apply method for knowledge representation to make informed decisions for various applications.			
2	**Knowledge and Reasoning** 2.1 Knowledge-Based Agent in Artificial intelligence: Architecture, Approaches to designing a knowledge-based agent, Techniques of knowledge representation, Propositional logic, Rules of Inference, First-Order Logic, Forward Chaining & Backward Chaining in AI 2.2 Reasoning in Artificial intelligence: Definition of Reasoning, Types of Reasoning Probabilistic reasoning in AI: Uncertainty, Causes of Uncertainty, Need of probabilistic reasoning in AI, Bayes' Theorem	**10**	**12**

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: ITH403-3 Analyze different forms of data with respect to different phases of Machine Learning.			
3	**Introduction to ML** 3.1 History and Evaluation of ML, AI vs ML 3.2 Machine Learning Life Cycle: Gathering data, Data Preparation, Data Wrangling, Data Analysis, Train Model, Test Model, Deployment 3.3 Different forms of Data: Data Mining, Data Analytics, Statistics Data, Statistics vs. Data Mining, Data Analytics vs Data Science 3.4 Dataset for ML: Training Dataset, Testing Datasets, Training vs Testing Data Cleaning: Missing Data, Outliers	**10**	**12**

Section –II

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: ITH403-4 Create data model for Machine Learning Algorithms.			
4	**Types of Learning** 4.1 Types of Learning: Supervised, Unsupervised, Semi-Supervised Learning 4.2 Supervised Learning: Learning a Class from Examples, Introduction of different types of Supervised Machine Learning Algorithms: Linear Regression, Logistic Regression, Decision Tree, K - Nearest Neighbors, Random Forest 4.3 Unsupervised Learning: Introduction of different types of Unsupervised Learning Algorithm: K-means clustering, KNN (k-Nearest Neighbors), Hierarchical Clustering, Neural Networks Model evaluation: Introduction of Cross-validation, benefits of cross-validation, Positive and Negative class cross-validation	**12**	**12**
CO: ITH403-5 Classify the data by performing different Regression Techniques.			
5	**Regression** 5.1 Linear Regression: Assessing performance of Regression – Error measures, Overfitting and Underfitting, Catalysts for Overfitting 5.2 Multiple Linear Regression: Multiple Linear regression equation, Implementation of multiple linear regression 5.3 Metrics for Regression: Mean Squared Error (MSE), Root Mean Squared Error (RMSE), Mean Absolute Error (MAE)	**10**	**12**

CO: ITH403-6 Classify the data by performing different Classification Techniques.			
6	**Classification** 6.1 Logistic Regression: Binary and Multiclass Classification, Assessing Classification Performance, Handling more than two classes, Multiclass Classification: One vs One, One vs Rest 6.2 Metrics for Classification: Confusion Matrix, AUC/ROC Curve 6.3 F1 Score, Accuracy, Precision, Recall	**08**	**12**

** No questions will be asked on IKS learning subtopics in any question papers.

G: List of Assignments under SLA

(Assignments Marked in * are compulsory)

NA

H: Specification table for setting question paper for semester end theory examination

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks	CO
		Remember	Understand	Apply		
I / 1	Basics of AI and Problem-Solving Techniques	2	4	4	10	ITH403-1
I / 2	Knowledge and Reasoning	2	4	6	12	ITH403-2
I / 3	Introduction to ML	2	4	6	12	ITH403-3
II /4	Types of Learning	2	4	6	12	ITH403-4
II /5	Regression	2	4	6	12	ITH403-5
II /6	Classification	2	4	6	12	ITH403-6
	Total Marks				70	

I:-Assessment Criteria

i) Formative Assessment of Practical:-

Every assignment shall be assessed for 25 marks as per following criteria:

Domain	**Particulars**	**Marks out of 25**
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	05
	Drawing / drafting skills	05
Affective	Discipline and punctuality	05
TOTAL		**25**

ii) Summative Assessment of Practical:

Every practical assignment shall be assessed for 25 marks as per following criteria:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Preparedness for practical	05
3	Neat & complete Diagram.	05
4	Observations & computer handling skill	05
5	Oral Based on Lab work and completion of task	05
TOTAL		**25**

J) Instructional Methods:

1. Lectures cum Demonstrations.
2. Classroom practices.
3. Use of projector and soft material for demonstration
4. Laboratory experiences and laboratory interactive sessions
5. Regular Home Assignments

K) Teaching and Learning resources:

Chalk board, LCD presentations, Self-Learning Online Tutorials, Demonstrative charts.

L) Reference Books:

S.N.	Name of Book	Author	Publication
1	Practical Machine Learning with Python A Problem-Solver's Guide to Building Real-World Intelligent Systems	Dipanjan Sarkar Raghav Bali Tushar Sharma	Apress publication ISBN-13 (pbk): 978-1-4842-3206-4 ISBN-13 (electronic): 978-1-4842-3207-1
2	Artificial Intelligence A modern Approach Third edition	Stuart Russell and Peter Norvig, Editors	Pearson Education, Inc ISBN-13: 978-0-13-604259-4 ISBN-10: 0-13-604259-7
3	Introduction to Machine Learning with Python	Dr. Jeeva Jose	Khanna Book Publishing Co.(P) Ltd. ISBN 9789389139068 ISBN 9789389139068
4	Introduction to Machine Learning with Python	Andreas C. Müller & Sarah Guido	O'Reilly Media, Inc ISBN 9352134575 ISBN 9789352134571

M) Learning Website & Software

1. https://www.python.org/downloads/
2. https://www.pdfdrive.com/machine-learning-step-by-step-guide-to-implement-machine-learning-algorithms-with-python-d15832 4853.html
3. https://www.geeksforgeeks.org/how-to-install-python-pycharm- on-windows

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COURSE ID : 19
COURSE NAME : NETWORK ADMINISTRATION
COURSE CODE : ITH404
COURSE ABBREVIATION : HNAD

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	4	3
	Tutorial Learning	-	
	Laboratory Learning	2	
	SLH-Self Learning	-	
	NLH-Notional Learning	06	

B. ASSESSMENT SCHEME:-

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL				BASED ON SLA		TOTAL
					Practical						
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	175
3	30	70	100	40	25	10	50@	20	-	-	

(Total IKS Hrs. for Sem.: 00 Hrs.)

C: ABBREVIATIONS: -

CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# on Line Examination, @$ Internal Online Examination.

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as"Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 (one) credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.

D. i) RATIONALE: -

In today's age of Information Technology almost every application sends information from one place to another place. This subject is network application-based subject. It gives the practical knowledge of designing computer network. This subject covers the installation and configuration of any network operating system. With the proper configuration of operating system on the server, the students will be able to manage and administer the network resources. This subject also covers network maintenance, troubleshooting tools and network security

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME

Apply software engineering principles to develop software product.

E. COURSE LEVEL LEARNING OUTCOMES (COS)

ITH404-1 Design network plan for home or small office.
ITH404-2 Describe IPv6 addressing and host configuration with DNS.
ITH404-3 Describe host configuration with DNS
ITH404-4 Illustrate Active directory architecture
ITH404-5 Troubleshoot network maintenance and virus problem
ITH404-6 Discuss protocols and firewalls for network security

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
COMPETENCY: Understanding and recalling network administration to design network for home or office									
ITH404-1 Design network plan for home or small office.	1	--	--	3	2		2	-	-
ITH404-2 Describe IPv6 addressing and host configuration with DNS.		--	--	--	--		2	-	-
ITH404-3 Describe host configuration with DNS		--	--	3	2			-	-
ITH404-4 Illustrate Active directory architecture	1	--	--	2	1		--	-	-
ITH404-5 Troubleshoot network maintenance and virus problem	1	--	--	3	2	2	2	-	1
ITH404-6 Discuss protocols and firewalls for network security	1	1	1	3	3	1	2	1	-

F. CONTENT:

I) Practical exercises

The following practical exercises shall be conducted in the *Laboratory for NETWORK ADMINISTRATION by* the Institute in practical sessions of batches of about 20- 22 students:

Sr. no	Laboratory experiences	CO
1*	Design Network Plan for given Scenario 1. Identifying client requirement 2. Planning cost and material for network 3. Detailing network Plan	ITH404-1
2*	Installation of Server Operating System 1. Installing any available server Operating System 2. Installation of Drivers and Settings	ITH404-1
3*	Installing and configuring a network capable print device. 1. Installing a printer 2. Print spooler service 3. Viewing printer preferences	ITH404-1
4*	Installing DHCP 1. Installing and configuring DHCP server (using any capable component)	ITH404-2
5*	Installing DNS 1. Installing and configuring DNS server (using any capable component	ITH404-3
6*	Installing Active directory 2. Installing and configuring DNS server (using any capable component) (E.g. Samba)	ITH404-4
7	User account management 1. Creating an Account 2. Disabling, renaming and enabling an Account 3. Moving an Account 4. Changing an Accounts password 5. Deleting an Account	ITH404-4
8*	Network troubleshooting 1. OS utilities – Execution of commands with all options.	ITH404-5
9*	Network troubleshooting 1. TCP/IP utilities – Execution of commands with all options	ITH404-5
10*	Configuring Firewall on PC 1. Configuring and setting firewall on Personal computer	ITH404-6
11	Network Backup 1. Performing Backup and restore in Linux using tar command	ITH404-5
12	Installation of Network Protocol analyzer 1. Installation of Network Protocol analyzer (opensource)	ITH404-6
*13	Industrial Visit 1. Prepare report based on visit.	ITH404-1,5,6

II) Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: ITH404-1 Design network plan for home or small office.			
1	**IMPLEMENTATION OF NETWORK** 1.1 Network Design Overview 1.1.1 Reasoning the need 1.1.2 Seeking approval 1.2 Designing a home or small office network 1.2.1 Selecting computers 1.2.2 Selecting a networking protocol - Choosing a network medium - Choosing a network speed 1.2.3 Expanding the network 1.3 Remote Network Access 1.3.1 Public Switched Telephone Network (PSTN) 1.3.2 Integrated Services Digital Network (ISDN) 1.3.3 Digital Subscriber Line (DSL)	08	10
CO: ITH404--2 Describe IPv6 addressing and host configuration with DHCP			
2	**NETWORK CONNECTION AND HOST CONFIGURATION** 2.1 IPv6 Addressing-notation, address space, three types of address 2.2 IPv6 Packet format Base Header, Flow Label, Comparison between IPv4 and IPv6 Headers Dynamic Host Configuration Protocol (DHCP) - RARP, BOOTP (introduction) - IP address allocation-static dynamic, Automatic - TCP/IP Client configuration - DHCP packet structure - DHCP Message Type option	10	12
CO: ITH404--3 Describe host configuration with DNS			
3	**DOMAIN NAME SYSTEM** 3.1 Need For DNS 3.2 Name Space 3.2.1 Flat Name Space 3.2.2 Hierarchical Name Space 3.2.3 Domain Name space 3.3 DNS in Internet 3.3.1 Generic top level domains 3.3.2 Country-code domains 3.3.2 Inverse Domain	12	12

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
	3.3.3 Registrar 3.4 DNS Resolution 3.4.1 Resolvers 3.4.2 DNS Message Header 3.4.3 Types of Records -Question Record - Resource Record 3.4.4 Root Name Server		

Section –II

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: ITH404--4 *Illustrate Active directory architecture*			
4	**ACTIVE DIRECTORY ARCHITECTURE** 4.1 Object types 4.2 Object Naming 4.2.1 Canonical Names 4.2.2 LDAP notation 4.2.3 Globally unique identifiers 4.2.4 User principle names 4.3 Domain, Trees and Forests 4.4 DNS and Active directory 4.5 Global Catalog Server	**10**	**12**
CO: ITH404--5 *Troubleshoot network maintenance and virus problem*			
5	**NETWORK MAINTENANCE AND TROUBLESHOOTING** 5.1 Backups 5.1.1 Backup Hardware and Backup Software Functions 5.2 Network Antivirus Policies 5.2.1 Types of Viruses 5.2.2 Preventing virus infections 5.3 Operating System Utilities for Network Troubleshooting 5.3.1 NET - NET CONFIG, NET DIAG, NET START and NET STOP, NET SESSION, Net Watcher 5.4 TCP/IP Utilities for Network troubleshooting 5.4.1 Ping 5.4.2 Traceroute 5.4.3 Route	**08**	**12**

	5.4.4 Netstat 5.4.5 Nslookup 5.4.6 Ipconfig		
***CO: ITH404--**6 Discuss protocols and firewalls for network security*			
6	**NETWORK SECURITY** 6.1 Firewalls 6.1.1 Types of firewalls 6.1.2 Firewall configuration 6.1.3 Limitations of firewalls 6.2 IP Security 6.2.1 Introduction 6.2.2 IPSec Overview - Introduction, IPSec protocols, -Introduction to Security Association 6.2.3 Authentication Header (AH) - AH format, Dealing with replay attacks, Modes of operation 6.2.4 Encapsulating Security Payload (ESP) - ESP format, Modes of operation 6.3 Virtual Private Networks (VPN) 6.3.1 Introduction 6.3.2 VPN Architecture	**12**	**12**

** No questions will be asked on IKS learning subtopics in any question papers.

G: Specification table for setting question paper for semester end theory examination

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks	CO
		Remember	Understand	Apply		
I / 1	Implementation of Network	2	4	4	10	ITH404-1
I / 2	Network connection and host Configuration	4	4	4	12	ITH404-2
I / 3	Domain name system	6	4	2	12	ITH404-3
II /4	Active directory architecture	4	4	4	12	ITH404-4
II /5	Network maintenance and Troubleshooting	4	4	4	12	ITH404-5
II /6	Network security	4	4	4	12	ITH404-6
	Total Marks				70	

I:-Assessment Criteria

i) Formative Assessment of Practical:-

Every assignment shall be assessed for 25 marks as per following criteria:

Domain	**Particulars**	**Marks out of 25**
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	05
	Drawing / drafting skills	05
Affective	Discipline and punctuality	05
TOTAL		**25**

ii) Summative Assessment of Practical:

Every practical assignment shall be assessed for 25 marks as per following criteria:

Sr. no	**Criteria**	**Marks allotted**
1	Attendance at regular practical	05
2	Preparedness for practical	05
3	Neat & complete Diagram.	05
4	Observations & computer handling skill	05
5	Oral Based on Lab work and completion of task	05
TOTAL		**25**

J) Instructional Methods:

1. Lectures cum Demonstrations.
2. Class room practices.
3. Use of projector and soft material for demonstration
4. Laboratory experiences and laboratory interactive sessions
5. Regular Home Assignments
6.

K) Teaching and Learning resources:

Chalk board, LCD presentations, Self-Learning Online Tutorials, Demonstrative charts.

L) Reference Books:

S.N.	Name of Book	Author	Publication
1	Data Communication and Networking	Behrouz, Forouzan	TMH 1999
2	TCP/IP Network administration	Creg Hunt	O'Reilly
3	Networking All in One Desk Reference For Dummies	Doug Lowe	John Wiley & Sons

M) Learning Website & Software

1. www.tutorialspoint.com//Network/
2. https://insights.sei.cmu.edu/library/
3. https://nptel.ac.in/courses/106105087
4. https://www.dnsstuff.com/free-network-monitoring-software
5. https://searchnetworking.techtarget.com/

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COURSE ID : 19
COURSE NAME : CLOUD COMPUTING
COURSE CODE : ITH405
COURSE ABBREVIATION : HCOM

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	4	3
	Tutorial Learning	-	
	Laboratory Learning	2	
	SLH-Self Learning		
	NLH-Notional Learning	06	

B. ASSESSMENT SCHEME:-

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL				BASED ON SLA		TOTAL
					Practical						
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				175
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
3	30	70	100	40	25	10	50@	20	-	-	

(Total IKS Hrs. for Sem.: 00 Hrs.)

C: ABBREVIATIONS: -

CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment
Legends: @ Internal Assessment, # External Assessment, *# on Line Examination, @$ Internal Online Examination.

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as"Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1(one) credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.

* Self learning includes micro project / assignment / other activities

D. i) RATIONALE: -

Cloud computing has evolved as a very important computing model, which enables information, software and other shared resources to be provisioned over the network as services in an on-demand manner. There are many aspects of cloud computing viz cloud types, storage in cloud, and security in cloud, cloud monitoring and management. Awareness in specific skills of these areas are necessary for diploma pass-outs to create and maintain cloud-based services. After learning this course student will be able to implement virtualization, create cloud based storage, implement security and manage cloud services.

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME

Apply software engineering principles to develop software product.

E. COURSE LEVEL LEARNING OUTCOMES (COS)

ITH405-1: Explain Basics of cloud, services and applications of cloud computing.
ITH405-2: Implement Virtualization in Cloud Computing
ITH405-3: Maintain storage system in cloud
ITH405-4: Use Cloud Services
ITH405-5: Implement security in Cloud Computing
ITH405-6: Analyze future of cloud

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
Competency- Use and maintain cloud based services				3	3				3
ITH405-1 Explain Basics of cloud, services and applications of cloud computing.	1	--	--	3	2	2	2	--	--
ITH405-2: Implement Virtualization in Cloud Computing	1	--	--	--	--	1	1	--	--
ITH405-3 Maintain storage system in cloud	1	--	--	3	2	2	2	--	2
ITH405-4 Use Cloud Services	1	--	--	2	1	2	1	--	3
ITH405-5 Implement security in Cloud Computing	1	--	--	3	2	2	1	--	--

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
ITH405-6 Analyze future of cloud	1	1	1	3	3	2	2	--	2

F. CONTENT:

I) Practical exercises

The following practical exercises shall be conducted in the Laboratory for CLOUD COMPUTING *by* the Institute in practical sessions of batches of about 20- 22 students:

Sr. no	Laboratory experiences	CO
1*	Install and configure any cloud (Google, Aws, Azure) and specific tool.	ITH405-1
2*	Use Google Forms, Google sheet and Notes	ITH405-4
3*	Use of JustCloud to use of different language.	ITH405-2
4*	Use Cloud Shell and gcloud: Discover the use of gcloud commands to manage Google Cloud resources from Cloud Shell	ITH405-2
5*	Use of Vmware to create and delete virtual machines	ITH405-2
6	Use Open Stack for file management	ITH405-3
6*	Monitor Cloud using open source tools	ITH405-3
7*	Create a small home automation application based on IOT using Arduino or Raspberry pi kit	ITH405-4
8	Create a small agriculture automation application based on IOT using Arduino or Raspberry pi kit	ITH405-4
9*	Implement Identity and Access Management using Openstack	ITH405-3
10	Implement Storage services on Cloud on Open stack	ITH405-4
11	Case study on Kubernetes	ITH405-5
12	Case study on Next cloud	ITH405-5

Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: ITH405-1 ***Explain Basics of cloud, services and applications of cloud computing.***			
1	**FUNDAMENTALS OF CLOUD COMPUTING** 1.1Cloud computing, Essential characteristics of cloud computing 1.2 Cloud Deployment Model: Public cloud, Private cloud, Community cloud, hybrid cloud 1.3 Cloud Service Models: IaaS, PaaS, SaaS 1.4Cloud Economics and benefits 1.5Architechture of Cloud computing 1.6 Cloud computing Infrastructure 1.7Cloud based Integrated development Environment(IDE) to write run and debug code with browser	**08**	**10**
CO: ITH405-2 Implement Virtualization in cloud computing			
2	**VIRTUALIZATION** 2.1 Virtualization in your organization-Characteristics, Why Virtualize? How to Virtualize? Concerns, Security 2.2 Server Solutions-Microsoft Hyper-V, VMware, VMware Infrastructure	**12**	**12**
CO: ITH405-3 Maintain storage system in cloud			
3	**STORAGE IN CLOUDS** 3.1 Overview-Basics,Storage As Service, Providers, Security, Reliability, Advantages, Caution, Outages, Theft 3.2 Cloud Storage Providers-Amazon Simple Storage Service(S3), Nirvanix, MobileMe, Live Mesh 3.4 Cloud File Systems: Google File System(GFS) and Hadoop distributed file system(HDFS)	**10**	**12**

Section –II

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: ITH405-4 Use Cloud Services			
4	**CLOUD MONITORING AND MANAGEMENT** 4.1 Service Provider and Users 4.2 An Architecture of federated cloud computing 4.3 Service Level Agreement(SLA) management: Types of SLA, Lifecycle of SLA 4.4 Service catalogue, management and functional interfaces of services 4.5Cloud portal and its functions 4.6Cloud service lifecycle phases: Service planning, service creation, service operation, service termination 4.7Cloud resource management	**10**	**12**
CO: ITH405-5 Implement Security in cloud computing			
5	**SECURITY IN CLOUD COMPUTING** 5.1Cloud security fundamentals 5.2Cloud Risk, Cloud Risk division 5.2.1 Polity and Organizational risks 5.2.2Technical Risks 5.2.3Legal Risks 5.3Technologies for Data Security, Data Security Risk 5.4 Digital Identity and access management 5.5Content level security 5.6Security-As-A-Cloud Service	**12**	**12**
CO: ITH405-6 Analyze security of cloud			
6	**MIGRATING TO THE CLOUD AND FUTURE** 6.1 Cloud services for individuals- available services, skytap solution, 6.2 Cloud services aimed at the mid-market, enterprise- class cloud offering, MS exchange, VMotion, VMware vCenter Converter 6.3 Migration, Sending existing data to cloud, use wave approach 6.4 Cloud Platforms-Amazon EC2 and S3,Microsoft Azure, Cloudstack, Intercloud, GoogleAppEngine etc.	**8**	**12**

** No questions will be asked on IKS learning subtopics in any question papers.

G: List of Assignments under SLA

(Assignments Marked in * are compulsory)

1) Assignment on explore and compare the similar type of services provided by AWS and Azure [Any ten services]
2) Comparative study of different hosted and bare metal Hypervisors
3) Case Study:- Cloud Portals
4) Case Study:- Netflix
5) Capital One

H: Specification table for setting question paper for semester end theory examination

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks	CO
		Remember	Understand	Apply		
I / 1	Fundamentals of cloud computing	2	4	4	10	ITH405-1
I / 2	Virtualization	4	4	4	12	ITH405-2
I / 3	Storage in clouds	2	8	2	12	ITH405-3
II /4	Cloud monitoring and management	2	4	6	12	ITH405-4
II /5	Security in cloud computing	4	4	4	12	ITH405-5
II /6	Migrating to the cloud and future	4	4	4	12	ITH405-6
	Total Marks				70	

I:-Assessment Criteria

i) Formative Assessment of Practical:-

Every assignment shall be assessed for 25 marks as per following criteria:

Domain	Particulars	Marks out of 25
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	05
	Drawing / drafting skills	05
Affective	Discipline and punctuality	05
TOTAL		**25**

ii) Summative Assessment of Practical:

Every practical assignment shall be assessed for 25 marks as per following criteria:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Preparedness for practical	05
3	Neat & complete Diagram.	05
4	Observations & computer handling skill	05
5	Oral Based on Lab work and completion of task	05
TOTAL		**25**

J) Instructional Methods:

1. Lectures cum Demonstrations.
2. Class room practices.
3. Use of projector and soft material for demonstration
4. Laboratory experiences and laboratory interactive sessions
5. Regular Home Assignments
6.

K) Teaching and Learning resources:

Chalk board, LCD presentations, Self-Learning Online Tutorials, Demonstrative charts.

L) Reference Books:

S.N.	Name of Book	Author	Publication
1	Cloud Computing Principles and Paradigms, Rajkumar Buyya Wiley 2.	Rajkumar Buyya (Editor), James Broberg (Editor), Andrzej M. Goscinski (Editor)	ISBN: 978-1-118-00220-9
2	Distributed and Cloud Computing, Kai Hwang, Mk	Kai Hwang Geoffrey C. Fox Jack J. Dongarra	ISBN: 978-0-12-385880-1
3	Cloud computing Black Book Dreamtech Publication	Kailash Jayaswal (Author), Jagannath Kallakurchi (Author), Donald J. Houde (Author), Deven Shah (Author), Kogent Learning Solutions (Author)	ISBN-13 978-935119418 7

M) Learning Website & Software

1. www.tutorialspoint.com//software_engineering/
2. https://insights.sei.cmu.edu/library/
3. https://nptel.ac.in/courses/106105087

***

COURSE ID : 27
COURSE NAME : DATA ANALYTICS
COURSE CODE : ITH506
COURSE ABBREVIATION : HDAS

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	04	3
	Tutorial Learning	-	
	Laboratory Learning	02	
	SLH-Self Learning	-	
	NLH-Notional Learning	06	

B. ASSESSMENT SCHEME :-

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL Practical				BASED ON SLA		TOTAL
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
03	30	70	100	40	25	10	50@	20	-	-	175

(Total IKS Hrs. for Sem.: 00 Hrs.)

C: ABBREVIATIONS: -

CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# on Line Examination, @$ Internal Online Examination.

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
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3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1(one) credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.

* Self learning includes micro project / assignment / other activities

D. i) RATIONALE:-

Data Analytics integrates statistical, computational, and visualization techniques to extract insights from data. This course emphasizes data cleaning, statistical analysis, visualization using Excel and Python, and interpretation for decision-making applications across domains.

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry identified outcome through various learning experiences-
1. Perform Data Analytics in various business domains for improved decision making.

E. COURSE LEVEL LEARNING OUTCOMES (COS)

ITH506-1: Elaborate the fundamental concepts of Data Analytics.
ITH506-2: Apply appropriate statistical techniques to analyze and interpret complex Datasets.
ITH506-3: Analyze numerical data by creating pivot table.
ITH506-4: Represent data in terms of various types of charts.
ITH506-5: Visualize the data using a Python library**.**
ITH506-6: Apply basic SQL queries for data extraction, filtering, aggregation and perform introductory data analytics operations using relational databases.

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
Competency: Apply data analytics techniques to collect, clean, analyze, interpret, visualize and present data for effective decision-making using Excel, Python, and SQL.	2	2	2	1	1	1	2	-	1
ITH506-1: Elaborate the fundamental concepts of Data Analytics.	2	-	-	1	1	-	2	-	1
ITH506-2: Apply appropriate statistical techniques to analyze and interpret complex Datasets.	2	2	-	1	1	-	1	-	1

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
ITH506-3: Analyze numerical data by creating pivot table.	2	1	1	2	-	-	2	-	1
ITH506-4: Represent data in terms of various types of charts.	2	2	2	1	-	1	1	1	
ITH506-5: Visualize the data using a Python library.	2	2	2	1	-	1	2	2	1
ITH506-6: Apply basic SQL queries for data extraction, filtering, aggregation and perform introductory data analytics operations using relational databases.	1	2	2	2	-	1	1	3	1

F. CONTENT:

I) Practical Exercises

The following practical exercises shall be conducted in the *laboratory for* Data Analytics by the Institute in practical sessions of batches of about 20- 22 students:

Sr. no	Laboratory Experiences	Course Outcome
1*	a. Calculate mean, median, and mode for a given dataset using Excel functions (AVERAGE, MEDIAN, MODE) b. Calculate the correlation coefficient between two variables using the CORREL function c. Identify Data Types & Measurement Scales in a Dataset- nominal, ordinal, interval, ratio data	ITH506-1
2*	a. Construct a box plot using the Insert Chart feature to identify the median, quartiles, and outliers of a dataset b. Perform a simple linear regression analysis c. Conduct a t-test to compare means between two groups d. Conduct a Chi-square test.	ITH506-2

Sr. no	Laboratory Experiences	Course Outcome
3*	**Create a Data Table** a. Import a sample dataset (e.g., sales data) into Excel. b. Converts the dataset into an Excel Table using the "Format as Table" feature and apply appropriate styles. c. Create a dashboard sheet that summarizes key metrics (e.g., total sales, average sales per region) using tables. **Data Cleaning** d. Identify and remove duplicates from a dataset. e. Use functions like TRIM, UPPER, LOWER and PROPER to clean text data. f. Find and replace values using the Find & Replace feature.	ITH506-3
4	**Create a Pivot Table** a. A basic pivot table from a dataset b. Specify and filter data in a pivot table c. Add a calculated field to a pivot table d. Group data within a pivot table. Refresh pivot table data after making changes to the source data. **Filter and sort a PivotTable** a**.** Apply a Filter to the PivotTable b. Sort Data in the Pivot Table. c. Add slicers to the PivotTable for interactive filtering.	ITH506-3
5*	**Create an Interactive Dashboard Using Slicers & Timelines** a. Import dataset b. KPI Cards (Total, Avg, Max) c. Slicers d. Timeline for date-based filtering	ITH506-3
6*	**Create a Simple Chart** a) A simple bar chart to visualize data sets b) A chart using non-adjacent cells to visualize c) Data from different ranges. **Create a Chart Using the Chart Wizard** **a.** Select the chart you created and experiment with the Chart Tools options b. Modifying Charts c. Moving an Embedded Chart d. Sizing an Embedded Chart	ITH506-4
7	**Change the Chart Type** a. Create a basic bar chart using a dataset and change its type to a different chart b. Experiment with different data display options, such as adding data labels, changing the axis format, and adjusting the gridlines c. Experiment with position and style of the legend	ITH506-4
8*	Create a Subplot Figure with 3 Different Visualizations and Write a Python script to save the plot in different formats a) Line chart b) Scatter plot c) Histogram d) Custom figure size, titles, labels	ITH506-5
9*	Create Interactive Visualizations using Widgets a) Use matplotlib.widgets (slider / button) b) Change chart values dynamically.	ITH506-5

Sr. no	Laboratory Experiences	Course Outcome
10*	Basic SQL Queries for Data Retrieval a) SELECT b) DISTINCT c) ORDER BY d) WHERE with operators e) Pattern matching (LIKE)	
11*	JOIN Two or More Tables to Generate a Business Report like INNER JOIN on employees & departments etc.	
12*	Generate a Summary Report using SQL like Top 5 selling products etc.	

II) Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: ITH506-1: Elaborate the fundamental concepts of Data Analytics.			
1	**Unit - I Introduction to Data Analytics** 1.1 Data Analytics: An Overview, Importance of Data Analytics 1.2 Types of Data Analytics: Descriptive Analysis, Diagnostic Analysis, Predictive Analysis, Prescriptive Analysis, Visual Analytics 1.3 Life cycle of Data Analytics, Quality and Quantity of data, Measurement 1.4 Data Types, Measure of central tendency, Measures of dispersion 1.5 Sampling Funnel, Central Limit Theorem, Confidence Interval, Sampling Variation	**6**	**10**
CO: ITH506-2: Apply appropriate statistical techniques to analyze and interpret complex Datasets.			
2	**Unit - II Statistical Analysis** 2.1 Graphical techniques, box plot, skewness and kurtosis, Descriptive Stats 2.2 Correlation and Regression, Data Cleaning 2.3 Imputation Techniques 2.4 Anova and Chi Square 2.5 Scatter Diagram 2.6 Estimation and Hypothesis Testing 2.7 Sampling Distributions, Counting 2.8 Probability, Probability Distributions	**12**	**12**
CO: ITH506-3: Analyze numerical data by creating pivot table.			
3	**Unit - III Data Analytics with Excel** 3.1 Excel Dashboard: Tables and Data Grids, Dynamic Filters and Controls, Trend Analysis and Forecasting	**12**	**12**

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
	3.2 Pivot Tables: Creating a Pivot Table Specifying Pivot Table Data 3.3 Changing a Pivot Tables, Calculation Filtering and Sorting a Pivot Table 3.4 Creating a Pivot Chart, Grouping Items 3.5 Updating a Pivot Table, formatting a Pivot Table using Slicers		

Section –II

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: ITH506-4: Represent data in terms of various types of charts.			
4	**Unit - IV Data Visualization** 4.1 Creating a Simple Chart, Charting Non-Adjacent Cells 4.2 Creating a Chart Using the Chart Wizard, Modifying Charts, Moving an Embedded Chart, Sizing an Embedded Chart 4.3 Changing the Chart Type, Changing the Way Data is Displayed, Moving the Legend 4.4 Formatting Charts, Adding Chart Items, Formatting All Text, Formatting and Aligning Numbers, Formatting the Plot Area, Formatting Data Markers 4.5 Pie Charts, Creating a Pie Chart Moving the Pie Chart to its Own Sheet Adding Data Labels, Exploding a Slice of a Pie Chart	**10**	**12**
CO: ITH506-5: Visualize the data using a Python library.			
5	**Unit - V Data Visualization using Python** 5.1 Overview of Matplotlib and its role in data visualization, Installing and setting up Matplotlib in Python 5.2 Basic plotting with Matplotlib, Line plot, Scatter plots, Bar charts, Histograms, adding titles, labels, and legends to plots 5.3 Changing figure size and aspect ratio, Customizing axes (limits, ticks, and labels) 5.4 Exporting and Saving Visualizations: Saving plots in different formats (PNG, PDF, SVG), Adjusting the resolution and quality of saved plots, creating interactive visualizations using Matplotlib widgets	**10**	**12**

CO: ITH506-6: Apply basic SQL queries for data extraction, filtering, aggregation and perform introductory data analytics operations using relational databases.			
6	**UNIT – VI Data Analytics Using SQL** 6.1 Introduction, Role of SQL, Advantages, Data retrieval & manipulation, SQL vs NoSQL – basic comparison 6.2 SQL Basics for Analytics, SELECT statement, Filtering data with WHERE, Sorting results using ORDER BY 6.3 Aggregate Functions for Analytics, Purpose, Column aliasing for clean report formatting 6.4 Group-based Analysis, GROUP BY for summarizing data, HAVING clause for filtering grouped results 6.5 Working with Multiple Tables, Concept of keys, INNER JOIN, LEFT JOIN	**10**	**12**

** No questions will be asked on IKS learning subtopics in any question papers.

G: List of Assignments under SLA

NA

H: Specification table for setting question paper for semester end theory examination

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks	CO
		Remember	Understand	Apply		
I / 1	Introduction to Data Analytics	2	4	4	10	ITH506-1
I / 2	Statistical Analysis	2	4	6	12	ITH506-2
I / 3	Data Analytics with Excel	2	4	6	12	ITH506-3
II /4	Data Visualization	2	4	6	12	ITH506-4
II /5	Data Visualization using Python	2	4	6	12	ITH506-5
II / 6	Data Analytics Using SQL	2	4	6	12	ITH506-6
	Total Marks				70	

I:-Assessment Criteria

i) Formative Assessment of Practical:-

Every assignment shall be assessed for 25 marks as per following criteria:

Domain	**Particulars**	**Marks out of 25**
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	05
	Drawing / drafting skills	05
Affective	Discipline and punctuality	05
TOTAL		**25**

ii) Summative Assessment of Practical:

Every practical assignment shall be assessed for 25 marks as per following criteria:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Preparedness for practical	05
3	Neat & complete Diagram.	05
4	Observations & computer handling skill	05
5	Oral Based on Lab work and completion of task	05
TOTAL		**25**

J) Instructional Methods:

1. Lectures cum Demonstrations.
2. Class room practices.
3. Use of projector and soft material for demonstration
4. Laboratory experiences and laboratory interactive sessions
5. Regular Home Assignments

K) Teaching and Learning resources:

Chalk board, LCD presentations, Self-Learning Online Tutorials, Demonstrative charts.

L) Reference Books:

S.N.	Name of Book	Author	Publication
1	Excel Data Analysis: Your visual blueprint for analyzing data, charts, and PivotTables	Jinjer Simon	Wiley Publication Edition: 3rd ISBN: 978- 0-470-59160-4
2	Data Analysis with Excel	A. J. Smalley	SAGE Publications Edition: 1st, 2007 ISBN 10: 0070139903 / ISBN 13: 9780070139909
3	Python Data Analytics: With Pandas, NumPy, and Matplotlib	Fabio Nelli	Apress pubication ISBN-13 :978-1484239124 ISBN-13978-1484247372
4	SQL for Data Analysis: Advanced Techniques for Transforming Data into Insights	Cathy Tanimura	O'Reilly Media ISBN-10 : 1492088781

M) Learning Website & Software

a. https://www.javatpoint.com/how-to-create-a-dashboard-in-exce
b. https://www.simplilearn.com/tutorials/excel-tutorial/data-an alysis-excel
c. https://www.freecodecamp.org/news/introduction-to-data-vizua lization-using-matplotlib/

***

COURSE ID : 27
COURSE NAME : Advanced Database Management System
COURSE CODE : ITH507
COURSE ABBREVIATION : HADB

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	04	3
	Tutorial Learning	-	
	Laboratory Learning	02	
	SLH-Self Learning	00	
	NLH-Notional Learning	06	

B. ASSESSMENT SCHEME :-

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL Practical				BASED ON SLA		TOTAL
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
03	30	70	100	40	25	10	50@	20	--	--	175

(Total IKS Hrs. for Sem.: 00 Hrs.)

C: ABBREVIATIONS: -

CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# on Line Examination, @$ Internal Online Examination.

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as"Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1(one) credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.

* Self learning includes micro project / assignment / other activities

D. i) RATIONALE:-

Advance Database Management Systems (ADBMS) encompass a wide range of topics related to database systems, including their design and management. This course curriculum extensively covers parallel and distributed database systems, database transactions, and recent developments in database technologies, providing knowledge of both structured and unstructured databases like MongoDB, SQL, and XML, while emphasizing the importance of database architecture, data mining, and techniques for managing large datasets in today's information-driven business world.

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry identified outcome through various learning experiences:

i) Identify parallel and distributed databases
ii) Define Big Data
iii) Execute different queries on advance database management systems

E. COURSE LEVEL LEARNING OUTCOMES (COS)

ITG507-1: Apply the concept of concurrency control
ITG507-2: Analyze various database architectures
ITG507-3: Use Object Oriented and XML queries on Database
ITG507-4: Manipulate data using NoSQL commands
ITG507-5: Use data mining and warehousing concepts
ITG507-6: Develop Big data solutions using Hadoop

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
Competency: Apply Advance Database Management Systems concepts using MongoDB and XML	3	2	2	3	2	3	2	-	3
ITH507-1 CO-1 Apply the concept of concurrency control	2	1	1	1	1	-	2	-	3
ITH507-2 CO-2 Analyze various database architectures.	2	2	2	1	1	-	2	-	3

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
ITH507-3 CO-3 Use Object Oriented and XML queries on Database	2	2	2	2	-	-	2	-	3
ITH507-4 CO-4 Manipulate data using NoSQL commands	2	2	2	2	-	-	2	-	3
ITH507-5 CO-5 Use data mining and warehousing concepts	2	2	1	1	1	-	2	-	3
ITH507-6 CO-6 Develop Big data solutions using Hadoop	2	2	3	3	2	2	3	-	3

F. CONTENT:

I) Practical Exercises

The following practical exercises shall be conducted in the *Laboratory for Advanced Database System* by the Institute in practical sessions of batches of about 20- 22 students:

'*' Marked Practical's Are mandatory

Sr. no	Laboratory Experiences	Course Outcome
*1	Install and configure database product(such as MySQL, Mongo DB or any other relational database product)	ITH507-1
*2	Implementation of different locking protocols	ITH507-1
3	Study Parallel and Distributed system using Case.	ITH507-2
4	Creation of database using XML attributes and elements	ITH507-3
*5	Implement queries based on FLOWER expressions and joins using XQuery.	ITH507-3
*6	Execute query using type inheritance and table inheritance	ITH507-4
*7	Execute query using Array and Multiset types in SQL	ITH507-4
*8	Execute MongoDB Query using basic operations	ITH507-4
*9	Implement aggregation Queries using MongoDB	ITH507-4
*10	Use Data warehousing tool (ETL) to Extract the relevant data from the source database	ITH507-5
11	Implement Classification Techniques in Data Mining	ITH507-5
*12	Setting up a cloud database on AWS, GCP, or Azure	ITH507-6
13	Configuring a database for web application hosting	ITH507-6

II) Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: ITH507-1: Apply the concept of concurrency control.			
1	**Database System Architecture** 1.1 Concurrency Control Techniques: Concurrency control protocols: Locked Based protocols, granting of locks, Two Phase Locking protocol 1.2 Database Model: Centralized Database System, Server System Architecture, Transaction Server, Data Server	**8**	**10**
CO: ITH507-2: Analyze various database architectures.			
2	**Parallel & Distributed Database System**. 2.1 Introduction to parallel Systems: Parallel database system architecture, Measure of Performance Throughput, Response time, scale up and speed up 2.2 Introduction to distributed database, Types of Distributed Database Systems, Benefits of distributed database system, Advantages and Disadvantages of Distributed Database 2.3 Transaction Processing in Parallel and Distributed Database Systems	**10**	**10**
CO: ITH507-3: Use Object Oriented and XML queries on Database.			
3	**Object Based Database & XML** 3.1 Object Based Database: Overview, Complex data types, Structured types and inheritance in SQL 3.2 Table inheritance 3.3 Array and multi set types in SQL 3.4 Object-oriented vs. Object-Relational database 3.5 XML: Introduction, Structure of Xml Data, Xml Document Schema, Xpath, XQuery: FLWOR Expressions, Joins, Nested Queries, Sorting of Functions, Functions and Type	**10**	**14**

Section –II

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: ITH507-4: Manipulate data using NoSQL commands			
4	**NoSQL & MongoDB** 4.1 Structured versus Unstructured Data 4.2 NoSQL database concepts: Types of NoSQL database, NoSQL data modeling, Benefits of NoSQL, comparison between SQL and NoSQL database system 4.3 NoSQL using MongoDB: Introduction to MongoDB Shell, Running the MongoDB shell, MongoDB client, Basic operations with MongoDB shell, Basic Data Types ,Arrays, Embedded Documents 4.4 Querying with MongoDB: find() function, specifying which keys to return, query criteria, OR queries, Types specific querying	**10**	**14**
CO: ITH507-5: Use data mining and warehousing concepts.			
5	**Data Mining & Warehousing** 5.1 Data warehousing: Components of a Data Warehouse, virtual warehouse 5.2 Functions of Data warehouse Tools: Extraction, Transformation and loading 5.3 Data Mining: Classification, Decision-Tree Classifiers, Regression, Validating a Classifier 5.4 Association Rules, Clustering, Other Forms of Data Mining 5.5 Introduction to Data Lake House	**10**	**12**
CO: ITH507-6: Develop Big data solutions using Hadoop			
6	**Big Data Management** 6.1 Integration with Big Data 6.2 Hadoop: Building Blocks and Components, Hadoop architecture, HBase, HIVE, Solid-State Drive 6.3 Cloudera, Oracle cloud 6.4 Database-as-a-Service (DBaaS)- Amazon RDS, Google Cloud SQL, Microsoft Azure SQL, Hybrid and Multi-cloud Database Architectures, Dynamo – a structured storage system, Hadoop Distributed Files System, Map Reduce framework, HIVE	**12**	**10**

G: List of Assignments under SLA --- NIL

H: Specification table for setting question paper for semester end theory examination

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks	CO
		Remember	Understand	Apply		
I / 1	Database System Architecture	2	4	4	10	ITH507-1
I / 2	Parallel & Distributed Database System.	2	4	4	10	ITH507-2
I / 3	Object Based Database & XML	2	4	8	14	ITH507-3
II /4	NoSQL & MongoDB	4	4	6	14	ITH507-4
II /5	Data Mining & Warehousing	4	4	4	12	ITH507-5
II / 6	Big data Management	2	4	4	10	ITH507-6
	Total Marks				70	

I:-Assessment Criteria

i) Formative Assessment of Practical:-

Every assignment shall be assessed for 25 marks as per following criteria:

Domain	**Particulars**	**Marks out of 25**
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	05
	Drawing / drafting skills	05
Affective	Discipline and punctuality	05
TOTAL		**25**

ii) Summative Assessment of Practical:

Every practical assignment shall be assessed for 25 marks as per following criteria:

Sr. no	**Criteria**	**Marks allotted**
1	Attendance at regular practical	05
2	Preparedness for practical	05
3	Neat & complete Diagram.	05
4	Observations & computer handling skill	05
5	Oral Based on Lab work and completion of task	05
TOTAL		**25**

J) Instructional Methods:

1. Lectures cum Demonstrations.
2. Class room practices.
3. Use of projector and soft material for demonstration
4. Laboratory experiences and laboratory interactive sessions
5. Regular Home Assignments

K) Teaching and Learning resources:

Chalk board, LCD presentations, Self-Learning Online Tutorials, Demonstrative charts.

L) Reference Books:

S.N.	Name of Book	Author	Publication
1	Database System Concepts	Korth Henery	McGraw Hill Education, New Delhi, 6th Edition ,ISBN -13:978-93-329-0138-4
2	Advanced Database Management System	Chakrabarti, Dasgupta, Shinde, KLSI	Dreamtech Press ,ISBN 13 :9789351194552
3	SQL, PL/SQL The Programming Language of ORACLE	Bayross Ivan	BPB Publications, New Delhi, 3rd Edition ISBN-13: 978-8176569644
4	Data Mining Concepts and Techniques	Jiawei Han,Micheline Kamber,Jian Pei	Morgan Kaufmann ,USA,3rd Edition, ISBN-978-0-12-381479-1
5	Complete Reference: Mysql	Complete Reference: Mysql	McGraw Hill Education, ISBN-13: 9780070586840

M) Learning Website & Software

a) https://docs.mongodb.com/manual/tutorial/install-mongodb-on-windows/
b) www.learn-with-video-tutorials.com/data-warehouse-tutorial-video
c) https://www.javatpoint.com/xml-database
d) https://www.javatpoint.com/data-warehouse

***

COURSE ID : 27
COURSE NAME : DATA WAREHOUSING & MINING
COURSE CODE : ITH508
COURSE ABBREVIATION : HDAS

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	04	3
	Tutorial Learning	-	
	Laboratory Learning	02	
	SLH-Self Learning	-	
	NLH-Notional Learning	06	

B. ASSESSMENT SCHEME :-

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL Practical				BASED ON SLA		TOTAL
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
03	30	70	100	40	25	10	50@	20	-	-	175

(Total IKS Hrs. for Sem.: 00 Hrs.)

C: ABBREVIATIONS: -

CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# on Line Examination, @$ Internal Online Examination.

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2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as"Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1(one) credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.

* Self learning includes micro project / assignment / other activities

D. i) RATIONALE:-

Data Mining and Data Warehousing are essential technologies used in modern industries to analyze patterns, trends, and knowledge from large datasets. This course builds the foundation for understanding big data, analytics, and business intelligence concepts. It helps learners understand how data is stored, processed, extracted, cleaned, and transformed into actionable information.

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry identified outcome through various learning experiences-

1. Perform data preprocessing, apply data mining techniques to generate insights for business decision-making.

E. COURSE LEVEL LEARNING OUTCOMES (COS)

ITH508-1: Identify the concepts, architecture, and schema of data warehousing.

ITH508-2: Identify difference between DBMS and Data warehouse

ITH508-3: Explain the basic concepts of data mining, data cleaning, integration, preprocessing

ITH508-4: Apply data mining techniques such as association rules.

ITH508-5: Apply classification and prediction techniques.

ITH508-6: Use clustering methods for grouping data.

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
Competency: Apply data mining and data warehousing techniques to preprocess data, extract patterns, design warehouses, and perform OLAP analysis for decision-making.	2	2	2	1	1	1	2	1	1
ITH508-1: Identify the concepts, architecture, and schema of data warehousing.	2	-	-	1	1	-	2	-	1
ITH508-2: Identify difference between DBMS and Data warehouse	2	2	-	1	1	-	1	-	1

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
ITH508-3: Explain the basic concepts of data mining, data cleaning, integration, preprocessing.	2	1	1	2	-	-	2	-	1
ITH508-4: Apply data mining techniques such as association rules.	2	2	2	1	-	1	1	1	
ITH508-5: Apply classification and prediction techniques.	2	2	2	1	-	1	2	2	1
ITH508-6: Use clustering methods for grouping data.	1	2	2	2	-	1	1	3	1

F. CONTENT:

I) Practical Exercises

The following practical exercises shall be conducted in the *Laboratory for Data Warehousing & Mining by* the Institute in practical sessions of batches of about 20- 22 students:

Sr. no	Laboratory Experiences	Course Outcome
1*	Perform Database Tool (SQL- Server/Oracle) Installation, Source & Target Data Structures 1. Create sample tables 2. import data 3. Verify table structure & constraints 4. Design Star Schema tables (Fact + Dimensions)	ITH508-1
2*	Perform OLAP operations such as Roll Up, Drill Down, Slice, Dice through SQL- Server	ITH508-2
3*	Install Data Mining Tool WEKA & Study GUI Explorer	ITH508-3
4*	Perform preprocessing on dataset Weather using WEKA Explorer. 1. Create and preprocess an ARFF file (Replace missing values / type conversion) 2. Apply Attribute Selection Techniques 3. Convert Attributes (Numeric ↔ Nominal ↔ Binary) 4. Perform Data Normalization and Standardization	ITH508-3
5*	Apply Apriori Algorithm for Frequent Itemset Mining on suitable Retail Data.	ITH508-4
6*	Implement Decision Tree Classifier (J48) on a Dataset	ITH508-5
7*	Perform Medical Diagnosis Classification	ITH508-5
8	Perform Preprocessing, Classification and Visualization techniques on suitable dataset.	ITH508-5

Sr. no	Laboratory Experiences	Course Outcome
9*	Apply Logistic Regression (Binary Classification) using WEKA	ITH508-5
10*	Perform Clustering technique on suitable dataset (k-Means Clustering)	ITH508-6
11*	Use Clustering to Identify Outliers with Sample Dataset.	ITH508-6

II) Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: ITH508-1: Identify basic concepts of data mining, data cleaning, integration, preprocessing			
1	**Unit - I Introduction to Data Warehouse and Data mining** 1.1 Concepts of Data Warehouse and Data Mining 1.2 Functionalities 1.3 stages of Knowledge discovery in database(KDD) 1.4 Setting up a KDD environment 1.5 Issues in Data Warehouse and Data Mining, 1.6 Application of Data Warehouse and Data Mining	**6**	**10**
CO: ITH508-2: Identify difference between DBMS and Data warehouse			
2	**Unit – II Data Warehouse and OLAP Technology** 2.1 DBMS vs. Data Warehouse 2.2 Data marts 2.3 Metadata 2.4 Multidimensional data model, Data Cubes 2.5 Schemas for Multidimensional Database: Stars, Snowflakes and Fact Constellations 2.6 Data Warehouse Architecture 2.7 Data Warehouse Manager, OLTP (online transaction processing), OLAP (online analytical processing) types of OLAP, Servers.	**12**	**12**
CO:ITH508-3: Explain the basic concepts of data mining, data cleaning, integration, preprocessing			
3	**Unit - III Data Mining** 3.1 Data Mining definition and Task 3.2 KDD versus Data Mining 3.3 Data Mining techniques, tools and application 3.4 Data mining query languages 3.5 Data specification, specifying knowledge, hierarchy specification 3.6 Pattern presentation & visualization specification 3.7 Data types, data objects, attributes	**12**	**12**

Section –II

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: ITH508-4: Apply data mining techniques such as association rules.			
4	**Unit - IV Mining Association Rules in Large Databases** 4.1 Association Rule Mining 4.2 Frequent Itemsets, Support, Confidence, Lift 4.3 Need of Association Mining 4.4 Pros and Cons of Association Rules 4.5 Apriori Algorithm 4.6 Applications: Market Basket Analysis, Recommendation Systems	**10**	**12**
CO: ITH508-5: Apply classification and prediction techniques.			
5	**Unit - V Classification and Prediction** 5.1 Issues regarding Classification & Prediction 5.2 Classification by Decision Tree Induction 5.3 Introduction to Regression 5.4 Types of Regression	**10**	**12**
CO: ITH508-6: Use clustering methods for grouping data.			
6	**UNIT – VI Clustering and Applications of Data Mining** 6.1 Cluster Analysis, Cluster evaluation 6.2 Categorization of Major Clustering Methods 6.3 K-means, Partitioning Methods 6.4 Hierarchical Methods 6.5 Density-Based Methods ,Grid Based Methods, Model-Based Clustering Methods 6.6 Data Mining Applications- Customer Segmentation, Image Processing	**10**	**12**

** No questions will be asked on IKS learning subtopics in any question papers.

G: List of Assignments under SLA

NA

H: Specification table for setting question paper for semester end theory examination

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks	CO
		Remember	Understand	Apply		
I / 1	Introduction to Data Warehouse and Data mining	2	4	4	10	ITH508-1
I / 2	Data Warehouse and OLAP Technology	2	4	6	12	ITH508-2
I / 3	Data Mining	2	4	6	12	ITH508-3
II /4	Mining Association Rules in Large Databases	2	4	6	12	ITH508-4
II /5	Classification and Prediction	2	4	6	12	ITH508-5
II / 6	Clustering and Applications of Data Mining	2	4	6	12	ITH508-6
	Total Marks				70	

I:-Assessment Criteria

i) Formative Assessment of Practical:-

Every assignment shall be assessed for 25 marks as per following criteria:

Domain	**Particulars**	**Marks out of 25**
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	05
	Drawing / drafting skills	05
Affective	Discipline and punctuality	05
TOTAL		**25**

ii) Summative Assessment of Practical:

Every practical assignment shall be assessed for 25 marks as per following criteria:

Sr. no	**Criteria**	**Marks allotted**
1	Attendance at regular practical	05
2	Preparedness for practical	05
3	Neat & complete Diagram.	05
4	Observations & computer handling skill	05
5	Oral Based on Lab work and completion of task	05
TOTAL		**25**

J) Instructional Methods:

1. Lectures cum Demonstrations.
2. Class room practices.
3. Use of projector and soft material for demonstration
4. Laboratory experiences and laboratory interactive sessions
5. Regular Home Assignments

K) Teaching and Learning resources:

Chalk board, LCD presentations, Self-Learning Online Tutorials, Demonstrative charts.

L) Reference Books:

S.N.	Name of Book	Author	Publication
1	Data Warehousing	Reema Thareja,	Oxford 13: 9780198096221
2	Data Mining Techniques	Arun K Pujari,	Universities Press, Second Edition 13:978 81 7371 672 0
3	Introduction to Data Mining	Ping-Ning Tan, Vipin kumar,	Steinbach, Pearson 13: 9780321321367
4	Introduction to Data Mining with Case Studies	G.K.Gupta,	PHI learning Pvt. Ltd. 13:9788120343269

M) Learning Website & Software

a. https://docs.oracle.com/cd/B28359_01/datamine.111/b28129/process.htm
b. https://dl.ebooksworld.ir/motoman/Cambridge.University.Press.Data.Mining.and.Data.Warehousing.www.EBooksWorld.ir.pdf
c. https://www.geeksforgeeks.org/big-data/data-warehousing/
d. https://www.youtube.com/watch?v=dGDuD10U4-M,assessed on 01 August 2016

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COURSE ID : 28
COURSE NAME : OPEN SOURCE LAB
COURSE CODE : ITH509
COURSE ABBREVIATION : HOSL

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	Nil	3
	Tutorial Learning	Nil	
	Laboratory Learning	4	
	SLH-Self Learning	2	
	NLH-Notional Learning	6	

B. ASSESSMENT SCHEME: -

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL				BASED ON SLA		TOTAL
					Practical						
-	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
	-	-	-	-	25	10	50#	20	25	10	100

(Total IKS Hrs. for Sem.: 00 Hrs.)

C: ABBREVIATIONS: -

CL- Classroom Learning, TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# on Line Examination, @$ Internal Online Examination.

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as"Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course, then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL) hrs.* 15 Weeks
5. 1(one) credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.

* Self learning includes micro project / assignment / other activities

D. i) RATIONALE: -

The course promotes self-learning, independent exploration, and continuous improvement by allowing students to work with tools directly used by the industry. By the end of the lab, learners acquire practical readiness for roles in ML engineering, DevOps support, MLOps pipelines, cloud deployment, and open-source development environments.

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME

Students can work in real development environments.

Cognitive: The students will be able to:

i. Understand open-source concepts, communities, and licenses.
ii. Analyze software requirements and choose suitable open-source tools.
iii. Apply logical thinking to debug errors and optimize code.

Psychomotor: i) Operate Linux OS using command-line and GUI. ii) Install, configure, and manage open-source software/tools iii) Write and execute programs using open-source languages

Affective: Attitude of i) precision ii) accuracy iii) punctuality

E. COURSE LEVEL LEARNING OUTCOMES (COS)

ITH509-1: Use modern open-source tools for ML, DevOps, and MLOps tasks.

ITH509-2: Perform data preprocessing, model training, and environment setup using ML frameworks.

ITH509-3: Apply Git/GitHub for version control, collaboration, and repository management.

ITH509-4: Build and automate ML workflows using CI/CD and scripting tools.

ITH509-5: Use Docker to package, deploy, and run ML applications reliably.

ITH509-6: Track, monitor, and manage ML experiments using MLOps and cloud-native tools.

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix

[Note: Correlation levels: 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"]

Competency and Cos	**Programme Outcomes POs and PSOs**								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
Competency: Ability to build, automate, version, containerize, deploy, and monitor machine learning workflows using modern open-source, DevOps, and MLOps tools.	2	3	3	2	1	3	1	3	-

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	**PO 2 Problem Analysis**	**PO 3 Design / Development of solutions**	**PO 4 Engineering Tools, Experimentation and Testing**	**PO 5 Engineering Practices for society, sustainability and Environment**	**PO 6 Project Management**	**PO 7 Life-long Learning**	**PSO1** Design and Development	**PSO2** Database and Network Management
ITH509-1: Use modern open-source tools for ML, DevOps, and MLOps tasks.	2	3	3	1	1	2	1	3	-
ITH509-2: Perform data preprocessing, model training, and environment setup using ML frameworks.	2	3	3	1	1	2	1	2	-
ITH509-3: Apply Git/GitHub for version control, collaboration, and repository management.	1	3	3	2	2	2	1	2	-
ITH509-4: Build and automate ML workflows using CI/CD and scripting tools.	1	3	3	2	1	2	1	3	-
ITH509-5: Use Docker to package, deploy, and run ML applications reliably.	1	3	3	2	1	2	1	3	-
ITH509-6: Track, monitor, and manage ML experiments using MLOps and cloud-native tools.	1	3	3	2	1	3	1	3	-

F. CONTENT:

I) Practical exercises

The following practical exercises shall be conducted in the *Open Source LAB by* the Institute in practical sessions of batches of about 20- 22 students:

Sr. no	Laboratory experiences	CO
1*	**Introduction to Open-Source ML & DevOps Tools** Identify and explore tools like Python, Git, Docker, MLflow, and understand their purpose.	ITH509-1
2*	**Setting Up Python & Virtual Environments** Install Python, create virtual environments, and manage dependencies using pip/conda.	ITH509-1
3*	**Exploratory Study of ML Libraries (NumPy, Pandas, Scikit-Learn)** Hands-on exploration of basic ML libraries with sample code.	ITH509-1
4*	**Data Preprocessing Techniques.** Perform cleaning, encoding, scaling, and splitting of datasets.	ITH509-2
5*	**Implementing a Basic ML Model (Regression/Classification)** Train a simple ML model using Scikit-Learn.	ITH509-2
6*	**Model Evaluation & Metrics** Evaluate models using accuracy, precision, recall, and confusion matrix.	ITH509-2
7*	**Environment Setup for ML Projects** Organize ML project structure with folders, requirements.txt, and environment setup	ITH509-2
8*	**Git Basics: Init, Add, Commit** Initialize a repository and perform version control operations.	ITH509-3
9*	**Branching & Merging** Create branches, merge changes, and resolve basic conflicts.	ITH509-3
10*	**Push ML Project to GitHub Repository** Upload an ML project, manage commits, and collaborate with pull requests.	ITH509-3
11*	**Writing Automation Scripts (Shell/Python)** Create simple scripts for automating ML tasks like preprocessing or training.	ITH509-4
12*	**GitHub Actions Workflow for ML Pipeline** Build a CI workflow to automatically test or train an ML model.	ITH509-4
13	**Automating Model Deployment Pipeline** Create a basic CI/CD pipeline that packages and deploys a model stub.	ITH509-4
14*	**Introduction to Docker & Container Commands** Learn Docker basics: pull images, run containers, inspect layers.	ITH509-5
15*	**Creating a Dockerfile for an ML Application** Containerize a simple ML model using a custom Dockerfile.	ITH509-5
16	**Running ML Containers in a Reproducible Environment** Execute the model inside Docker to ensure consistency.	ITH509-5
17	**MLflow Experiment Tracking** Log parameters, metrics, and artifacts of ML experiments	ITH509-6
18*	**Building a Simple MLOps Pipeline Using Open-Source Tools** Use MLflow/DVC/Git to manage data, model versions, and experiments.	ITH509-6

II) Theory: Nil

G: List of Assignments under SLA:

Sr. No	List of Assignment (under SLA)
1	Prepare a Latex based Technical report in comparison of **open-source tools** (e.g., Python, Scikit-Learn, MLflow) with their uses.
2	Find any public dataset from Kaggle/UCI and write: ● dataset name ● Number of rows & columns ● Type of data ● Possible ML applications
3	Create a GitHub account and list **10 basic Git commands** with their functions (add, commit, push, pull, etc.).
4	Write a simple Shell/Python script to automate a small task (file creation, backup, and folder organization). Add explanation of steps
5	Write a one-page summary on either: ● Docker architecture (images, containers, registry), OR ● MLflow features (experiment tracking, metrics, artifacts)
6	Any other micro project as suggested by subject faculty Sample Project Ideas: ◆ Docker-Based Machine Learning Model Deployment ◆ Automated ML Training Pipeline Using GitHub Actions ◆ MLflow Experiment Tracking and Model Registry ◆ Python Tool for Data Cleaning and Visualization ◆ Mini MLOps Pipeline for End-to-End Model Development

H: Specification table for setting question paper for semester end theory examination: Nil

I:-Assessment Criteria

i) Formative Assessment of Practical: -

Every Experiment shall be assessed as per following criteria:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Preparedness for practical	05
3	Neat & complete Diagram.	05
4	Observations & computer handling skill	05
5	Oral Based on Lab work and completion of task	05
TOTAL		**25**

ii) Summative Assessment of Practical:

Every student has to perform one practical at semester end practical exam which shall be assessed as per following criteria.

Sr. no	Criteria	Marks allotted
1	Algorithm/ Flowchart and Program	05
2	Results/Observations/Output	05
3	Logical thinking and approach	05
4	Observations & Programming skill	05
5	Oral Based on Lab work and completion of task	05
TOTAL		**25**

J) Instructional Methods:

1. Lectures cum Demonstrations.
2. Class room practices.
3. Use of projector and soft material for demonstration
4. Laboratory experiences and laboratory interactive sessions
5. Regular Home Assignments

K) Teaching and Learning resources:

Chalk board, LCD presentations, Self-Learning Online Tutorials, Demonstrative charts.

L) Reference Books:

S.N.	Name of Book	Author	Publication
1	Linux: The Complete Reference	Richard Petersen	McGraw Hill,6th Edition **ISBN:** 978-0071492478
2	Python for Everybody	Dr. Charles R. Severance	CreateSpace Independent Publishing, 1st Edition **ISBN:** 978-1530051120
3	Hands-On Machine Learning with ScikitLearn, Keras & TensorFlow	Aurélien Géron	O'Reilly Media,2nd Edition **ISBN:** 978-1492032649

M) Learning Website & Software

- https://python.org – Python tutorials & documentation
- https://git-scm.com – Git basics, commands, and guides
- https://mlflow.org – MLOps experiment tracking documentation

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