GOVERNMENT POLYTECHNIC, KOLHAPUR

(An Autonomous Institute of Government of Maharashtra)

Curriculum Document

CURRICULUM: MPECS 2023

(NEP 2020 Compliant & Outcome Based Curriculum)
For

DIPLOMA IN ELECTRONICS & TELECOMMUNICATION

Secretary **Chairman**

Programme wise Board of Studies (PBOS)
Electronics & Telecommunication Programme
Government Polytechnic, Kolhapur

CURRICULUM STRUCTURE: TEACHING AND EXAMINATION SCHEME OF SEMSTER I

Programme Code	**: ET**	**With Effect From Academic Year**	**: AY 2023-2024**
Duration of Programme	**: 6 Semesters**	**Duration**	**: 16 Weeks**
Semester	**: First**	**Scheme**	**: H**

Sr. No.	Name of Course	Course Abbrevia-tion	Course Type	Course Code	Level	IKS Hrs per Semester	Learning Scheme					Credits	Paper Duration (Hrs)	Assessment Scheme								Based on Self Learning		Total Marks
							CL	TL	LL	Self Learning (TW & Assignment)	Notional Learning Hrs / Week			Theory				Based on LL & TL				SLA		
														FA-TH	SA-TH	Total		FA-PR		SA-PR				
														Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
1	ENGINEERING PHYSICS	HPHA	DSC	CCH101	1	4	4	-	2	2	8	4	1.5	30	70*#	100	40	25	10	25@	10	25	10	175
2	BASIC MATHEMATICS	HBMT	AEC	CCH105	1	6	4	2	-	2	8	4	3	30	70	100	40	-	-	-	-	25	10	125
3	ENGINEERING GRAPHICS	HGRC	AEC	CCH109	1	2	2	-	2	0	4	2	-					50	20	50@	20			100
4	BASIC ELECTRONICS I	HBX1	DSC	ETH101	1	2	3	-	4	1	8	4	3	30	70	100	40	50	20	25@	10	25	10	200
5	ELECTRONICS WORKSHOP PRACTICE	HWET	SEC	ETH102	1	2	2	-	4	0	6	3	-	-	-	-	-	50	20	50@	20	-	-	100
6	FUNDAMENTALS OF ICT	HICT	SEC	CCH202	2	0	1	-	2	1	4	2	-	-	-	-	-	25	10	25@	10	25	10	75
7	YOGA AND MEDITATION	HYAM	VEC	CCH203	2	1	-	-	1	1	2	1	-	-	-	-	-	25	10	-	-	25	10	50
Total:						15	16	2	15	7	40	20	-	90	210	300		250		175		125		825

CURRICULUM STRUCTURE: TEACHING AND EXAMINATION SCHEME OF SEMSTER II

Programme Code : Electronics & Telecommunication	**With Effect From Academic Year : AY 2023-2024**
Duration of Programme : 6 Semesters	**Duration : 16 Weeks**
Semester : Second	**Scheme : H**

Sr. No.	Name of Course	Course Abbreviation	Course Type	Course Code	Level	IKS Hrs per Semester	Learning Scheme					Credits	Paper Duration (Hrs)	Assessment Scheme								Based on Self Learning		Total Marks
							CL	TL	LL	Self Learning (TW & Assignment)	Notional Learning Hrs / Week			Theory				Based on LL & TL				SLA		
														FA-TH	SA-TH	Total		FA-PR		SA-PR				
														Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
1	APPLIED MATHEMATICS	HAMT	AEC	CCH301	3	2	4	2	-	-	6	3	3	30	70	100	40	-	-	-	-	-	-	100
2	ENGINEERING CHEMISTRY	HCHA	DSC	CCH103	1	4	4	-	2	2	8	4	1.5	30*#	70*#	100	40	25	10	25@	10	25	10	175
3	COMMUNICATION SKILLS	HCMS	AEC	CCH201	2	0	4	-	2	2	8	4	3	30	70	100	40	25	10	-	-	25	10	150
4	BASIC ELECTRONICS II	HBX2	DSC	ETH103	1	0	4	-	2	-	6	3	3	30	70	100	40	25	10	25@	10	-	-	150
5	ELECTRICAL ENGINEERING	HEEG	DSC	ETH104	1	0	3	-	2	1	6	3	3	30	70	100	40	25	10	25@	10	25	10	175
6	C PROGRAMMING	HCPR	SEC	ETH105	1	-	2		2	-	4	2	-	-	-	-	-	25	10	25@	10	-	-	50
7	SOCIAL & LIFE SKILLS	HSLS	VEC	CCH204	2	-	-	-	-	2	2	1	-	-	-	-	-	25	10	-	-	25	10	50
Total:						6	21	2	10	7	40	20		150	350	500		125		75		150		850

ABBREVIATIONS :

CL- CLASSROOM LEARNING , TL- TUTORIAL LEARNING, LL-LABORATORY LEARNING, FA - FORMATIVE ASSESSMENT, SA -SUMMATIVE ASSESSMENT, IKS - INDIAN KNOWLEDGE SYSTEM

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.

    - SELF LEARNING HOURS SHALL NOT BE REflECTED IN THE TIME TABLE.

COURSE CATEGORY :

DISCIPLINE SPECIFIC COURSE CORE (DSC)
DISCIPLINE SPECIfiC ELECTIVE (DSE)
VALUE EDUCATION COURSE (VEC),
INTERN./APPRENTI./PROJECT./COMMUNITY (INP)
BILITY ENHANCEMENT COURSE (AEC)
SKILL ENHANCEMENT COURSE (SEC)
GENERIC ELECTIVE (GE)

SEMESTER I COURSES

COURSE ID:

Course Name : ENGINEERING PHYSICS (EE/ET/IT)
Course Code : CCH101
Course Abbreviation : HPHA
Course Type : DSC
Course Level : 1

LEARNING & ASSESSMENT SCHEME:

IKS Hrs per Semester	Learning Scheme					Credits	Paper Duration (Hrs)	Assessment Scheme								Based on Self Learning		Total Marks
								Theory				Based on LL & TL						
	CL	TL	LL	Self Learning (TW & Assignment)	Notional Learning Hrs / Week			FA TH	SA TH	Total		FA-PR		SA-PR		SLA		
								Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
4	4	-	2	2	8	4	3	30	70 *#	100	40	25	10	25 @	10	25	10	175

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.

COMPETENCY :

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

COURSE OUTCOMES:

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.

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

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

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	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: *Apply principles of Physics to solve engineering problems.*	*2*	*1*	*-*	*1*	*1*	*1*	*1*		
CCG101-1 Estimate errors in measurement of physical quantities.	2	1	-	1	1	1	1		
CCG101-2 Select proper material in engineering industry by analysis of its physical properties	2	1	-	1	1	1	1		
CCG101-3 Use basic principles of wave motion for related engineering applications	1	1	-	1	1	1	1		
CCG101-4 Apply principles of optics, electricity to solve engineering	2	1	-	1	1	1	1		

Competency and Cos	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
problems									
CCG101-5 Express the importance of Lasers, X-rays and nanotechnology .	1	-	-	-	1	-	1		
CCG102-6 Apply principles of fiber optics for related engineering applications	1	-	-	-	-	-	1		

PSO 1: Operate and Maintain: Competency to apply the concepts of Electronics & Telecommunication engineering in theoperation and maintenance of engineering application systems.
PSO 2: Supervision and providing solution: Ability to supervise work and reach appropriatesolution to simple practical problems in Electronics & Telecommunication engineering engineering industry.

CONTENT:

A) LABORATORY WORK : Laboratory work shall consist of the following :
Minimum 10 required (* represents as experiments to be carried out compulsory and 02 experiments should be from the remaining list)

List of Laboratory experiments and related skills to be developed:
(Each experiment 02 hours)

Sr. No.	Title of Experiment	Skills to be developed	Course Outcome
*1	To measure internal and external dimensions of hollow cylinder by using Vernier Caliper	i) Going through safety measures required ii) Determine least count and zero error in the measuring instrument. iii) Measuring internal and external dimensions of given objects iv) Handling the measuring instruments for measuring depth, thickness etc. v) Tabulating observations and calculations vi) Interpreting results	

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*2	To measure the diameter of bob and thickness of plate by using Vernier Caliper	i) Going through safety measures required ii) Determine least count and zero error in the measuring instrument. iii) Measuring dimensions of given objects iv) Handling the measuring instruments for measuring depth, thickness etc. v) Tabulating observations and calculations vi) Interpreting results	
*3	To measure the diameter of bob and thickness of plate by using Micrometer screw gauge	i) Going through safety measures required ii) Determine least count and zero error in the measuring instrument. iii) Measuring dimensions of given objects iv) Handling the measuring instruments for measuring depth, thickness etc. v) Tabulating observations and calculations vi) Interpreting results	
4	To determine static and dynamic resistance of PN junction diode	i) Going through safety measures required ii) Drawing the circuit diagram of the required experiment. iii) Connecting the instruments as per circuit diagram. iv) Measuring the value of potential difference & current in the circuit. v) Tabulating observations and calculations vi) Drawing forward bias and reverse bias I-V characteristics vii) Interpreting results	
5	To determine forbidden energy band gap in semiconductors	i) Going through safety measures required ii) Drawing the circuit diagram of the required experiment iii) Connecting the instruments as per circuit diagram iv) Measuring the value of potential difference & current in the circuit v) Tabulating observations and calculations vi) Interpreting results	
*6	To determine the viscosity of liquid by Stokes method.	i) Going through safety measures required ii) Measuring diameter of steel ball using micrometer screw gauge. iii) Measuring terminal velocity of steel ball in the liquid column. iv) Use of stop watch for measurement of time. v) Tabulating observations and calculations vi) Interpreting results	
7	To determine the buoyancy force on a solid immersed in a liquid	i) Going through safety measures required ii) Measuring dimensions of given solid using vernier caliper or micrometer screw gauge. iii) Measuring the volume of liquid collected iv) Tabulating observations and calculations v) Interpreting results	
*8	To measure unknown resistance of wire by Ohm's law	viii) Going through safety measures required ix) Drawing the circuit diagram of the required experiment. x) Connecting the instruments as per circuit diagram. xi) Measuring the value of potential difference & current in the circuit. xii) Tabulating observations and calculations xiii) Interpreting results	

9	To verify series law of resistances	i) Going through safety measures required ii) Drawing the circuit diagram for series connections of the resistances. iii) Connecting the resistances for series method as per circuit diagram. iv) Tabulating observations and calculations v) Interpreting results	
10	To verify parallel law of resistances	i) Going through safety measures required ii) Drawing the circuit diagram for parallel connections of the resistances. iii) Connecting the resistances for parallel method as per circuit diagram. iv) Tabulating observations and calculations v) Interpreting results	
*11	To draw magnetic lines of force for given magnet by using magnetic compass	i) Going through safety measures required ii) Plotting correct positions of N and S poles of compass needle iii) Drawing the magnetic lines of force iv) Interpreting results	
*12	To verify Snell's law using glass slab	iii) Going through safety measures required iv) Drawing necessary ray diagram v) Measuring angles of incidence and refraction vi) Tabulating observations and calculations vii) Interpreting results	
*13	To determine refractive index of prism by pin method	i) Going through safety measures required ii) Removing parallax between images and pins iii) Measuring the angle of refraction correctly iv) Drawing path of refracted ray through prism v) Drawing i-δ graph vi) Tabulating observations and calculations vi) Interpreting results	
14	To study Total Internal Reflection using glass slab	i) Going through safety measures required ii) Drawing necessary ray diagram iii) Measuring angles of incidence and refraction iv) Tabulating observations and calculations v) Interpreting results	
15	To determine velocity of sound by resonance tube	i) Going through safety measures required ii) Adjusting the resonating length by discriminating resonating sound from sound produced by the tuning fork. iii) Measuring internal diameter of resonating tube using vernier caliper iii) Drawing inference & confirming Law nL = constant iv) Tabulating observations and calculations v) Interpreting results	
16	To measure distance using ultrasonic meter	i) Going through safety measures required ii) Adjusting the screen-ultrasonic meter distance using meter-scale. iii) Tabulating observations iv) Interpreting results	
17	To determine the acceleration due to gravity by 'g' by simple pendulum	i) Going through safety measures required ii) Measuring length of pendulum iii) Finding least count of stopwatch iv) Measuring periodic time with the help of stop watch v) Tabulating observations and calculations	

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		vi) Interpreting results	
18	To be added by the subject teacher as per requirement		

B) THEORY :

SECTION I

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
Course Outcome 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 1.6 **SimpleNumerical problems**	**08**	**12**
Course Outcome CCH101-2 *Express 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** **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	**08** (06) (02)	**08** (06) (02)

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
	No numericals on above topic		
Course Outcome CCH101-3 *Select 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 Modulus of 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 of liquids 3.2.6 Applications of viscosity **No numericals on above topic**	**14** (08) (06)	**14** (10) (04)
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.			

SECTION II

Sr. No.	Topics / Subtopics	Lectures (Hours)	Theory Evaluation (Marks)
Course Outcome 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	**10** (06)	**12** (08)

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	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**	(04)	(04)
	Course Outcome 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 **Simple Numerical 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)
	Course Outcome 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**
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.			

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	Units and Measurement	2	4	6	CCH101-1	12
I/2	Introduction to Semiconductors and Nanotechnology	2	2	4	CCH101-2	08
I/3	Properties of Matter	4	2	8	CCH101-3	14
II/4	Electricity and Magnetism	2	4	6	CCH101-4	12
II/5	Optics	6	6	6	CCH101-5	18
II/6	Fiber Optics	2	2	2	CCH101-6	06
	Total	18	20	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.

ASSESSMENT CRITERIA FOR PRACTICAL WORK AND PRACTICAL EXAMINATION

a) Assessment Criteria for Practical work :

i) Continuous Assessment of Practical Assignments :

Every practical assignment shall be assessed for 25 marks as per given criteria.

Domain	**Particulars**	**Marks out of 25**
Cognitive	Understanding	05
	Observations, calculations & Result table	05
Psychomotor	Operating Skills	05
	Neat & complete circuit Diagram / schematic Diagram.	05
Affective	Discipline and punctuality Decency and presentation	5
TOTAL		**25**

ii) Progressive Skill Test:

One mid-term Progressive Skill Test of 25 marks shall be conducted as per criteria given below

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

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 Practical Work	05
	Total	25

b) Criteria for assessment at semester end practical exam :
Every student has to perform one practical within 2 hours at semester end practical exam 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 tables	10
4	Result table / calculations / graphs	10
5	Safety / use of proper tools	10
	Total	50

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.Slides 4. Item Bank 5. Charts

REFERENCE MATERIAL:

a) Books / Codes

Sr. No.	Author	Title	Publisher
1.	Narlikar	Text book of Physics for class XI & XII (Part-I, Part-II)	N.C.E.R.T Delhi
2.	P.V.Naik.	Engineering Physics	Pearson Edu. Pvt. Ltd, New Delhi.
3	Narkhede, Pawar, Sutar	Concepts in Physics, Vol. I & II.	Bharti Bhawan Ltd, New Delhi.
4	Walker, Halliday, Resnick	Principles of Physics.	Wiley Publication. , New Delhi.
5	B.L. Theraja	Engineering Physics	S. Chand Publishers – New

			Delhi
6	Beiser	Concept of modern physics	Tata Mc-Graw Hill
7	E. Zebro Wski	Physics for Technicians	Tata Mc-Graw Hill
8	V. Rajendran	Engineering Physics	Tata McGraw-Hill Publications

b) Websites

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

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COURSE ID:

Course Name : BASIC MATHEMATICS
Course Code : CCH105
Course Abbreviation : HBMT
Course Type : AEC
Course Level : 1

LEARNING & ASSESSMENT SCHEME:

IKS Hrs per Semester	Learning Scheme					Credits	Paper Duration (Hrs)	Assessment Scheme								Based on Self Learning		Total Marks
								Theory				Based on LL & TL						
	CL	TL	LL	Self Learning (TW & Assignment)	Notional Learning Hrs / Week			FA TH	SA TH	Total		FA-PR		SA-PR		SLA		
								Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
4	4	2	-	2	8	4	3	30	70	100	40	25	10	-	-	25	10	150

CO,S

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.

Section I

Unit No.	Topics / Sub-topics	Lectures (Hours)	SA-TH (Marks)
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	14
Unit 2 Statistics	***MEASURES OF DISPERSION*** 2.1 Range,coefficient of Range for Discrete & Grouped Data 2.2 Mean deviation and Standared Deviation about mean 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	10	12
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	06	08
Total		28	34

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Section II

Unit No.	Topics / Sub-topics	Lectures (Hours)	SA-TH (Marks)
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
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)	14	16
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 6.4 Radius of curvature	4	6
	Total	32	36

LIST OF TUTORIALS

Sr. no	Tutorial Title	No.of Hrs	Relevant CO
1	Solve Simple problems of Logarithms based on given application	2	CO1
2	Solve elementary problems on Algebra of Matrices	2	CO1
3	Solve simultaneous equations using Matrix inversion method	2	CO1
4	Resolve into Partial Fractions using linear non repeated, repeated and irreducible quadratic factors	2	CO1
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	2	CO3
6	Solve problems on finding range, coefficient of range and mean deviation	2	CO2
7	Solve problems on Standard deviation, coefficient of variation and comparison of two sets	2	CO2
8	Solve problems on Allied & Compound angles	2	CO4
9	Solve problems on Multiple & submultiple angles	2	CO4
10	Solve problems on factorization & De- factorization formulae	2	CO4
11	Solve problems on Inverse Trigonometric Functions	2	CO4
12	Solve examples on functions & rules of derivatives	2	CO5
13	Solve examples on Derivative of composite function ,inverse & parametric functions,	2	CO5
14	Solve examples on Derivative of exponential,implicit and logarithmic functions	2	CO5
15	Solve examples on Application of Derivatives	2	CO5

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COURSE ID:

Course Title : ENGINEERING GRAPHICS
Course Code : CCH109
Course Abbreviation : HGRC

I. COURSE LEVEL LEARNING OUTCOMES (COS)

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

- CO1 - Draw geometrical figures and engineering curves.
- CO2 - Apply principles of orthographic projections for drawing given pictorial views.
- CO3 - Apply basic CAD commands for drawing different entities.
- CO4 - Use various drawing codes, conventions and symbols as per IS SP-46 in engineering drawing.
- CO5 - Draw free hand sketches of given engineering elements.

II. TEACHING-LEARNING & ASSESSMENT SCHEME

IKS Hrs per Semester	Learning Scheme					Credits	Paper Duration (Hrs)	Assessment Scheme								Based on Self Learning		Total Marks
								Theory				Based on LL & TL						
	CL	TL	LL	Self Learning (TW & Assignment)	Notional Learning Hrs / Week			FA TH	SA TH	Total		FA-PR		SA-PR		SLA		
								Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
2	2	-	2	0	4	2	-					50	20	50 @	20			100

III. THEORY CONTENT

Sr.No	Topics/Sub-topics	Lectures	Theory
1	**Basic Elements of Drawing** 1.1 Drawing Instruments and supporting material: method to use them with applications. 1.2 Standard sizes of drawing sheets (ISO-A series) 1.3 I.S. codes for planning and layout. 1.4 Letters and numbers (single stroke vertical) 1.5 Convention of lines and their applications. 1.6 Dimensioning techniques as per SP-46 (Latest edition) – types and applications of chain, parallel and coordinate dimensioning 1.7 Geometrical constructions.		
2	**Engineering curves & Loci of Points.** 2.1 Concept and understanding of focus, directrix, vertex and eccentricity. Conic sections. 2.2 Methods to draw an ellipse by Arcs of circle method& concentric circles method. 2.3 Methods to draw a parabola by Directrix-Focus method & Rectangle method 2.4 Methods to draw a hyperbola by Directrix-Focus method. 2.5 Methods to draw involutes: circle & pentagon,		
3	**Orthographic projections** 3.1 Introduction of projections-orthographic, perspective, isometric and oblique: concept and applications. 3.2 Orthographic projection: First angle and Third angle method, their symbols. Conversion of pictorial view into Orthographic Views – object containing plain surfaces, slanting surfaces, slots, ribs, cylindrical surfaces.		
4	**Computer Aided Drafting** 4.1 Basic entities: line, circle, arc, polygon, ellipse, rectangle, multiline, polyline. 4.2 Commands: trim, delete, copy, offset, array, block, layers. 4.3 Dimensioning: linear, horizontal, vertical, aligned, rotated, baseline, continuous, diameter, radius, angular dimensions. 4.4 Text: Single line, multiline.		

	4.5 Standard sizes of sheet, selecting various plotting parameters such as paper size, paper units, drawing orientation, plot scale, plot offset, plot area, print preview.		
5	**Free Hand Sketches of EngineeringElements** 5.1 Free hand sketches of machine elements: Thread profiles, nuts, bolts, studs, set screws, washers, Locking arrangements. (For branches other than mechanical Engineering, the teacher should select branch specific elements for free hand sketching)		

I. PRACTICALS

Sr No	Laboratory Practical Exercise	Skills / Competencies to be Developed	Relevant COs
1	Draw horizontal, vertical, 30 degree, 45 degree, 60 & 75 degrees lines using Tee and Set squares/ drafter. (Sketch Book).		CO1
2	Draw different types of lines, dimensioning styles (Sketch Book)		CO1
3	Draw one figure showing dimensioning techniques, two problems on redraw the figures and one problem on lociof points - slider crank mechanism. (Sketch Book)		CO1
4	Draw one figure showing dimensioning techniques, two problems on redraw the figures (01 Sheet)		CO1
5	Draw any four Engineering Curves (Sketchbook)		CO1
6	Draw any four Engineering Curves – (01 Sheet)		CO1
7	Draw two problems on orthographic projections using first angle method of projection having plain surfaces, slanting surfaces and slots etc.- (Sketchbook)		CO2 CO4
8	Draw two problems on orthographic projections using first angle method of projection having plain surfaces, slanting surfaces and slots etc.		CO2 CO4
9	Draw two problems on orthographic projections usingfirst angle method of projection having cylindrical surfaces, ribs etc. (Sketchbook)		CO2 CO4

10	Draw two problems on orthographic projections usingfirst angle method of projection having cylindrical surfaces, ribs etc.- (01 Sheet)		CO2 CO4
11	Draw basic 2D entities like rectangle, rhombus, polygon, arcs, circles using CAD. Commands.		CO3
12	Draw basic 2D entities using rectangular and circular arrays.		CO3
13	Draw basic branch specific components using CAD commands		CO3 CO4
14	Draw complex branch specific components using CAD commands.		CO3 CO4
15	Problem Based Learning: Given the orthographic viewsof at least three objects with few missing lines, the student will try to imagine the corresponding objects, complete the views and draw these views (sketch book).		CO2 CO4
16	Draw freehand Sketches of 12 different standard components (Sketch book)		CO5
17	Draw freehand Sketches of 12 different standard components (1 Sheet)		CO5
18	Correlate ancient Indian sculptures, Indian temples, Monuments, etc. with Engineering Graphics		CO1 CO2 CO3 CO4 CO5

II. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher
1	Bureau of Indian Standards.	Engineering Drawing Practice for Schools and Colleges IS: SP-46	Third Reprint, October 1998 ISBN No. 81-7061-091-2
2	Bhatt, N.D.	Engineering Drawing	Charotar Publishing House, 2010 ISBN No. 978-93-80358-17-8
3	Bhatt, N.D.; Panchal, V. M	Machine Drawing	Charotar Publishing House, 2010 ISBN No. 978-93-80358-11-6
4	Jolhe, D.A.	Engineering Drawing	Tata McGraw Hill Edu. New Delhi, 2010, ISBN No. 978-0-07-064837-1
5	Dhawan, R. K.	Engineering Drawing	S. Chand and Company New Delhi, ISBN No. 81-219-1431-0
6	Pradhan, S.K Jain, K.K	Engineering Graphics	Khanna Book Publishing CO(P) LTD, New Delhi, ISBN No. 978-93-91505-50-9

7	Jeyapoovan T	Engineering Drawing and Graphicsusing AutoCAD	Vikas Publishing House Pvt. Ltd., First Reprint 2013, ISBN NO.978-81259-4000-5
8	Salunkhe R	AutoCAD 2013 2D & 3D for Civil and Mechanical Engineering	Aruta Publishers Chiplun, 2013, ISBN No. 978-81-902648-1-5

XIII . LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://www.youtube.com/watch?v=dmt6_n7Sgcg	Free Hand Sketches
2	https://www.youtube.com/watch?v=dmt6_n7Sgcg	Orthographic Projection
3	https://www.youtube.com/watch?v=3WXPanCq9LI	Basics of Projection
4	https://www.youtube.com/watch?v=fvjk7PlxAuo	Introduction to Engineering Graphics
5	https://www.youtube.com/watch?v=cmR9cfWJRUU	Basics of AutoCAD

COURSE ID :

COURSE NAME : BASIC ELECTRONICS I
COURSE CODE : ETH101
COURSE ABBREVIATION : HBX1

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	03	04
	Tutorial Learning	00	
	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						
03	**FA-TH**	**SA-TH**	**TOTAL**		**FA -PR**		**SA-PR**		**MAX**	**MIN**	
	MAX	**MAX**	**MAX**	**MIN**	**MAX**	**MIN**	**MAX**	**MIN**			
	30	**70**	**100**	**40**	**50**	**20**	**25@**	**10**	**25**	**10**	**200**

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: -

This course covers fundamental concepts of Electrical and Electronics Engineering. Section I covers AC fundamentals - voltage, current, power, phasor relations etc. It also covers Transformer, which plays very important role in power supplies. Diodes and its various applications such as rectifiers, wave shaping circuits and various filters are covered in section II. So, this course is the base of all electronic courses offered in forthcoming semesters.

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. Identify and measure electrical parameters of AC and DC.
2. Maintain and operate basic electronic circuits.

E. COURSE LEVEL LEARNING OUTCOMES (COs)

ETH101-1 Apply KCL, KVL to solve electric circuit problems.
ETH101-2 Calculate and measure parameters of AC waveforms.
ETH101-3 Describe construction, working, types and applications of transformers.
ETH101-4 Describe construction, working and characteristics of diodes.
ETH101-5 Describe working of rectifiers and filters.
ETH101-6 Demonstrate and analyze linear and nonlinear wave shaping circuits.

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**								
	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 Operate and Maintain**	**PSO2 Supervision and Providing Solution**
ETH101-1 Apply KCL, KVL to solve electric circuit problems.	3	2	-	3	-	-	--	2	--
ETH101-2 Calculate and measure	3	2	-	2	--	--	--	3	1

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 Operate and Maintain**	**PSO2 Supervision and Providing Solution**
parameters of AC waveforms.									
ETH101-3 Describe construction, working, types and applications of transformers.	3	-	-	2	-	--	--	3	1
ETH101-4 Describe construction, working and characteristics of diodes.	3	1	-	2	--	--	--	3	--
ETH101-5 Describe working of rectifiers and filters.	3	2	-	3	-	--	--	3	1
ETH101-6 Demonstrate and analyze linear and nonlinear wave shaping circuits	3	2	--	3	--	--	--	3	--

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	CO
1.	Verify Kirchhoff's voltage law.	ETH 101-1
2.	Verify Kirchhoff's current law.	ETH 101-1
3.	Verify voltage divider rule.	ETH 101-1
4.	Verify current divider rule.	ETH 101-1
5.	Verify properties of open circuit and short circuit.	ETH 101-1
6.	Measure period, frequency peak value, peak-to-peak value and compute RMS value of a sine wave and square wave.	ETH 101-2
7.	Calculate phase difference between two sine waves using CRO.	ETH 101-2
8.	Verify performance of step-down transformer.	ETH 101-3

Sr. No.	Laboratory experiences	CO
9.	Verify performance of step-up transformer.	ETH 101-3
10.	Compute the efficiency of transformer.	ETH 101-3
11.	Plot V-I characteristics of PN junction diode.	ETH 101-4
12.	Plot V-I characteristics of Zener diode.	ETH 101-4
13.	Verify performance of zener diode as voltage regulator.	ETH 101-4
14.	Test the performance of half wave rectifier.	ETH 101-5
15.	Test the performance of full wave center tapped rectifier.	ETH 101-5
16.	Test the performance of full wave bridge rectifier.	ETH 101-5
17.	Test the performance of full wave rectifier with capacitor filter.	ETH 101-5
18.	Test the performance of full wave rectifier with LC filter.	ETH 101-5
19.	Test the performance of full wave rectifier with π filter.	ETH 101-5
20.	Test the performance of RC differentiator and RC integrator.	ETH 101-6
21.	Observe performance of positive and negative clipper.	ETH 101-6
22.	Build and test performance of combinational clipper.	ETH 101-6
23.	Build and test performance of positive and negative clamper.	ETH 101-6
24.	Build and test voltages in voltage doubler circuits.	ETH 101-6

II) Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
	ETH101-1 Apply KCL, KVL to solve electric circuit problems.		
1	**Basics of Electric Circuits** 1.1 Voltage source, current source and their interconversions 1.2 Concept of ground 1.3 Power in resistive circuits 1.4 Kirchhoff's voltage law 1.5 Voltage divider rule 1.6 Open circuit and short circuit 1.7 Kirchhoff's current law 1.8 Current divider rule 1.9 Numericals based on each topic	**10**	**14**
	ETH 101-2 Calculate and measure parameters of AC waveforms.		
2	**AC Fundamentals** 2.1 Sinusoidal waveform, period and frequency of a sine wave. 2.2 Instantaneous value, peak value, peak-to-peak value, RMS value, average value of a sine wave. 2.3 Phase of sine wave, phase difference between two sine waves. 2.4 Equation of sine wave, cosine wave 2.5 Examples of ac waveforms i.e. triangular wave, square wave, saw-tooth wave	**6**	**10**

	2.6 Phase relationship between voltage and current through a resistor. 2.7 Simple numerical on time, frequency, instantaneous value, peak value, RMS value of sine wave		
	ETH 101-3 Describe construction, working, types and applications of transformer		
3	**Transformers** 3.1 Electromagnetic induction and Faraday's law, statically and dynamically induced EMF, mutually induced EMF 3.2 Basic transformer construction, symbols of air core, iron core and ferrite core transformers. 3.3 Dot convention used to show phase relations in transformer 3.4 EMF equation of a transformer, transformation ratio, step up and step-down transformer 3.5 Applications like impedance matching, providing isolation 3.6 Concept of current transformer and auto transformer 3.7 Simple numericals on transformer	**6**	**10**
	Sub-total	**22**	**34**

Section –II

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
	ETH101-4 Describe construction, working and characteristics of diodes.		
4	**Semiconductor Diodes** 4.1 P-N Junction with no external voltage, P-N Junction with forward and reverse Bias. 4.2 V-I characteristics of P-N junction diode. 4.3 Ideal diode and practical diode model. 4.4 Diode forward voltage drop in silicon and germanium diode, diode power dissipation. 4.5 Important specifications of diode. 4.6 Diode testing. 4.7 Zener diode: Breakdown mechanism, V-I characteristics, specifications and applications. 4.8 Construction, symbol and V-I characteristics of LED, photodiode, varactor diode and tunnel diode.	**7**	**12**
	ETH101-5 Describe working of rectifiers and filters.		
5	**Rectifiers and Filters** 5.1 Definition of rectifier, need of rectification, classification of rectifiers. 5.2 Half wave and full wave rectifier: Circuit diagram, operation and waveforms. 5.3 PIV rating, output DC voltage, ripple factor, rectification efficiency of HWR and FWR (Center tapped and Bridge) 5.4 Definition of filter and need of filter, types of filters i.e. shunt capacitor filter, series inductor filter, LC filter and CLC filter. 5.5 Operation of each filter w.r.t. full wave rectifier, ripple factor. 5.6 Comparison of filters 5.7 Numericals based on above topics.	**8**	**12**

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	ETH101-6 Demonstrate and analyze linear and nonlinear wave shaping circuits.		
6	**Wave-shaping Circuits** 6.1 Definition and need of wave-shaping, types of wave-shaping circuits. 6.2 Linear wave-shaping circuits: Differentiator and Integrator, applications of Differentiator and Integrator. 6.3 Non-Linear wave shaping circuits: Clippers- positive clippers and negative clippers, biased clippers, combination clippers. 6.4 Non-Linear wave-shaping circuits: Clampers- positive clamper and negative clamper. 6.5 Voltage multiplier circuits. 6.6 Numericals based on above topics.	**8**	**12**
	Sub-total	**23**	**36**

G : List of Assignments under SLA

Sr. No.	List of Assignment (under SLA)	Hours allotted
1.	Draw a chart showing types of AC waveforms and write their equations.	02
2.	Write procedure to measure AC and DC voltage, time period and frequency and phase using CRO	02
3.	Draw a chart showing types of transformers.	02
4.	Tabulate important characteristics of commonly available semiconductor diodes.	02
5.	Tabulate important characteristics of commonly available zener diodes.	02
6.	Tabulate important characteristics of commonly available LEDs.	02
7.	Write a procedure to test semiconductor diode using DMM	02
8.	Draw a chart showing symbols and VI characteristics of all types of diodes studied.	02
9.	Draw a chart showing circuit diagrams of half wave and full wave rectifiers with waveforms and equations.	02
10.	Draw a chart showing types clippers with waveforms	02
11.	Draw a chart showing types clampers with waveforms	02
12.	Draw a chart showing integrator and differentiator with waveform	02

**Out of 12, eight assignments covering all six 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	Basics of Electric Circuits	4	2	8	14	ETH101-1
I / 2	AC Fundamentals	2	2	6	10	ETH101-2
I / 3	Transformers	2	8	-	10	ETH101-3
II /4	Semiconductor Diodes	2	8	2	12	ETH101-4
II /5	Rectifiers and Filters	-	4	8	12	ETH101-5
II / 6	Wave-shaping Circuits	-	4	8	12	ETH101-6
Total Marks		10	28	32	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 & 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. 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	Electric Circuits	Bogart	TMH second edition
2	Electronic Devices and Circuits	Boylestad and Nashelsky	Pearson 11th Edition
3	Basic Electronics and Linear circuits	Bhargav and Kulshresth	NITTTR Chandigarh 2nd edition

M) Learning Website & Software

a. www.circuitstoday.com/
b. www.circuitlab.com/
c. www.vlab.com

COURSE ID :

COURSE NAME : ELECTRONICS WORKSHOP PRACTICE
COURSE CODE : ETH102
COURSE ABBREVIATION : HWET

C. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	02	03
	Tutorial Learning	--	
	Laboratory Learning	04	
	SLH-Self Learning	--	
	NLH-Notional Learning	06	

D. 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**				**100**
	MAX	**MAX**	**MAX**	**MIN**	**MAX**	**MIN**	**MAX**	**MIN**	**MAX**	**MIN**	
--	--	--	--	--	**50**	**20**	**50@**	**20**	--	--	

(Total IKS Hrs for Sem.: 02 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.

7. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
8. 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.
9. 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.
10. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
11. 1(one) credit is equivalent to 30 Notional hrs.
12. * 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:-

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Engineering diploma holders specializing in electronics are expected to handle various mechanical, electrical and electronics tools in the workshop in any industry in which they are employed. This course provides simulated industrial environment and enable students to perform a variety of operations in various shops using relevant electrical and electronic materials as well as use appropriate hand tools, equipment, tools and machinery. Through this course student will develop practical skills in identifying, testing, soldering, de-soldering, assembly, simulate, PCB design etc. of electronic components and circuits that will also be very useful for projects and other courses that he or she will undertake during the diploma programme as well as in the world of work.

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. Build simple electronic circuits on PCB.

G. COURSE LEVEL LEARNING OUTCOMES

ETH 102.1 Identify and measure the values of passive components.
ETH 102.2 Identify the different types of switches, relays and digital displays
ETH 102.3 Prepare the PCB using SMD component and ICs
ETH 102.4 Identify the different types of cables and connectors
ETH 102.5 Use digital meters and transducers in electronics circuits
ETH102-6 Identify and use oscilloscope and signal generator in electronics circuits.

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 Operate and Maintain:**	**PSO2 Supervision and providing solution:**
Competency: Build simple electronic circuits on PCB	3	1	2	2	0	0	2	2	-
ETH 102.1 CO-1 Identify and measure the values of passive components.	3	2	0	2	0	0	2	2	-
ETH 102.2 CO-2 Identify the different types of switches, relays and digital displays	3	0	0	2	0	0	2	2	-
ETH 102.3 CO-3 Prepare the PCB using SMD	3	0	2	2	0	2	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 Operate and Maintain:**	**PSO2 Supervision and providing solution:**
component and ICs									
ETH 102.4 CO-4 Identify the different types of cables and connectors	3	0	0	1	0	0	2	2	-
ETH 102.5 CO-5 Use digital meters and transducers in electronics circuits	3	1	0	1	0	0	2	2	-
ETH102-6 CO-6 Identify and use oscilloscope and signal generator in electronics circuits.	3	1	0	1	0	0	2	2	-

H. CONTENT:

II) Practical exercises

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

Sr. no	Laboratory experiences	CO
1	Safety symbols	ETH102-1
2	Fire extinguishers and accessories	ETH102-1
3	Identification and operation of DMM, Breadboard and Test different types of fixed resistors.	ETH102-1
4	Test different types of variable resistors.	ETH102-1
5	Test different types of fixed capacitors.	ETH 102.1
6	Test different types of variable capacitors.	ETH 102.1
7	Test different types of inductors.	ETH 102.1
8	Identification of windings of transformer	ETH 102.1
9	Test performance of relay	ETH 102.2
10	Test performance of Seven segment display	ETH 102.2
11	Test performance of LCD Displays	ETH 102.2

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Sr. no	Laboratory experiences	CO
12	Test performance of Switches	ETH 102.2
13	Build simple circuits on a breadboard using resistors, diode, switch and LED.	ETH 102.2
14	Design PCB(Demonstration using software tool or Video)	ETH 102.3
15	Design PCB using copper clad or zero PCB	ETH 102.3
16	Identification of SMDs and ICs	ETH 102.3
17	Identify the different types of cables	ETH 102.4
18	Identify the different types of connectors	ETH 102.4
19	Test the performance of RTD	ETH 102.5
20	Test the performance of LVDT	ETH 102.5
21	Use thermocouple to measure temperature of the given liquid	ETH 102.5
22	Test relation between Linear displacement and output voltage using LVDT	ETH 102.5
23	Identification and operation of Regulated Power Supply for amplitude measurement in basic electronics laboratory	ETH102-6
24	Identification and operation of CRO and Function Generator for amplitude measurement in basic electronics laboratory	ETH102-6
25	Identification and operation of CRO and Function Generator for frequency measurement in basic electronics laboratory	ETH102-6
26	Identification and operation of DSO to measure amplitude and frequency of given signal	ETH102-6
27	Visit the industry	All Cos

III) Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)
CO: ETH 102.1 Identify and measure the values of passive components.		
1	**Resistors:** 1.1 Components-discrete, non-discrete, Active, passive components. 1.2 Concept of Resistors, Classification of resistors, Resistors general specification: - maximum voltage rating, power rating, temperature coefficient, tolerance, Ohmic range, operating temperature 1.3 Color Coding with three, four and five bands of resistors **Capacitors:** 1.4 Concept of Capacitor 1.5 Classification of capacitors 1.6 Coding of capacitors using numerals and color band system. **Inductors:** 1.7 Concept of Inductor, Classification of Inductor	06

Sr. no.	Topics/Subtopics	Learning (Hours)
	1.8 Specifications:- self-inductance, mutual inductance, coefficient of coupling, Q factor, Inductive Reactance 1.9 Color coding of Inductor. **Transformers:** 1.10 Definition of transformer. Types of transformer: Step up and Step down transformer	
CO: ETH 102.2 Identify the different types of switches, relays and digital displays		
2	**Switches, Relays and Displays** **Switches:** 2.1 Types of Switches: SPST, SPDT, DPST, DPDT 2.2 Construction and application of Toggle, Rotary, push to on & push to off, Rocker switch, slide switch, limit switch, proximity switch, photo sensor switch. **Relays**: 2.3 Construction and working of electromechanical relay 2.4 Construction and working of solid state relay **Displays:** 2.5 Classifications of displays 2.6 Construction, operation & application of LED, Seven segment display-common cathode & common anode display, Dot matrix display, sixteen, fourteen segment display 2.7Construction, operation & applications of Liquid crystal display (LCD)-Dynamic Scattering Display Different types of switches (IKS learning)	04
3	**Introduction to PCB, SMD and IC** **PCB:** 3.1 Concept of PCB ,Advantages & disadvantages of PCB, Types of PCB 3.2 Base & Conducting material, types of laminates, Flowchart for preparation of single sided PCB **SMD:** . 3.3 Introduction to SMT,SMD 3.4 Advantages & disadvantages of SMD. **Integrated Circuit:** 3.5 Concept of IC, Advantages & disadvantages of ICs 3.6 Classification of IC's, Linear and Digital IC's and its examples, Flowchart for preparation of IC	04

Section –II

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: ETH 102.4 Identify the different types of cables and connectors			
4	**Cables and Connectors** **Cables:** 4.1 Types of cable 4.2 Construction, and applications of coaxial cable, telephone cable, FRC cable, Twin core cable(Twisted & Shielded type)cable used for CRO. **Connectors:** 4.3 Types of connectors 4.4 Construction and applications of BNC, TNC, Edge, FRC connectors, Phone Plug & Jacks	04	
CO: ETH 102.5 Use digital meters and transducers in electronics circuits			
5	**Digital meters and introduction to transducers.** 5.1 Concepts of ADC & DAC only 5.2 Advantages and Disadvantages of Digital Instruments , Comparison of digital and analog instruments 5.3 Resolution, Sensitivity and Accuracy of digital display. 5.4 Digital Multimeter: Measurement of electrical quantities. 5.5 Transducers: Definition, classification: Active, Passive, Primary, Secondary, Analog, Digital 5.6 Construction, Operation, Applications : LVDT, RTD.	06	
CO: ETH102-6 Identify and use oscilloscope and signal generator in electronics circuits.			
6	**Oscilloscope and Signal Generator** 6.1 CRO-Front panel control of CRO. 6.2 Digital storage oscilloscope: Function of DSO. 6.3 Uses of CRO & DSO- Amplitude, Frequency and Phase measurement 6.4 Signal / Function generator-AF and RF type- Block diagram and Operation only.	06	

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

G:-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 50 marks as per following criteria

Sr. no	**Criteria**	**Marks allotted**
1	Attendance at regular practical	10
2	Preparedness for practical	10
3	Neat & complete Diagram.	10
4	Observations & handling of instrument.	10
5	Oral Based on Lab work and completion of task	10
TOTAL		**50**

H) Instructional Methods:

4. Lectures cum Demonstrations,
5. Class room practices.
6. Use of projector and soft material for demonstration
4. Animation videos
5. Simulation software

I) Teaching and Learning resources:

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

J) Reference Books:

S.N.	Name of Book	Author	Publication
1	Raghuwanshi B.S.	A Course in Workshop Technology	Dhanpat Rai & Sons, New Delhi, 2017or latest edition
2	Sarathe A.K.	Engineering Workshop Practice	Khanna Book Publishing Co.(P) Ltd. ,New Delhi; 2021 or latest edition ISBN:978-9391505516
3	Gupta J.K., Khurmi R.S.	A Textbook of Manufacturing Process (Workshop Technology)	S. Chand and Co., New Delhi, 2021 or latest edition, ISBN: 978-8121908689
4	Jones, Thomas H.	Electronic Components Handbook	Reston Publishing, Virginia, US, latest edition, ISBN: 978-0879092221
5	Mehta V.K., Mehta Rohit	Principles of Electronics	S. Chand and Co., New Delhi-110 055,2014, ISBN: 978-8121924504
6	Glory Priyadarshini J. , Rani	Engineering	Notion Press, Mumbai, 2021 or

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	K.S.S., Maheswari M.P.,Gomathy S.	Workshop practice on Electrical & Electronics Engineering	latest edition, ISBN: 978-1639203819

K) Learning Website & Software

Sr.No	Link / Portal	Description
1	http://fireextinguishertraining.com/	Fire extinguisher
2	www.youtube.com/watch?v=WE-SislzSMY	Fire extinguisher
3	https://www.youtube.com/watch?v=lUojO1HvC8c	Fire extinguisher
4	https://www.youtube.com/watch?v=0jbFC8dvTVY	Electrical tools
5	https://www.electroschematics.com/tools/	Electronic tools
6	https://www.youtube.com/watch?v=Fwj_d3uO5g8	Diodes
7	http://www.eleccircuit.com	Electronic circuit
8	https://mightyohm.com/files/soldercomic/FullSolderComic_EN.pdf	Soldering
9	https://www.tinkercad.com/	3D modeling software
10	Multisim Live Online Circuit Simulator	Simulation software
11	EveryCircuit	Mobile Application

COURSE ID :

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	02	02
	Tutorial Learning	00	
	Laboratory Learning	02	
	SLH-Self Learning	01	
	NLH-Notional Learning	04	

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	MIN	
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN			
-	-	-	-	-	25	10	25@	10	25	10	75

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.

13. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
14. 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.
15. 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.
16. Notional Learning hours for the semester are (CL+LL+TL+SL) hrs.* 15 Weeks
17. 1(one) credit is equivalent to 30 Notional hrs.
18. * Self learning hours shall not be reflected in the Time Table.

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* 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. 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.

E. COMPETENCY:

Apply Fundamental knowledge of computer system to work with simpleapplications.

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

Psychomotor: i) Use computers for Internet services, Electronics Documentation, Data Analysis and Slide Presentation. ii) Appraise Application of ICT based Emerging Technologies.in different domain.

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

F. COURSE OUTCOMES:

CCH202-1 - Use computer system and its peripherals for given purpose

CCH202-2 - Prepare Business document using Word Processing Tool

CCH202-3 - Analyze Data and represent it graphically using preadsheet

CCH202-4 - Prepare professional Slide Show presentations

CCH202-5 – Use different types of Web Browsers and Apps

CCH202-6 - Explain concept and applications of Emerging Technologies

G. COURSE OUTCOMES AND PROGRAMME OUTCOMES (CO-PO) MATRIX

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
CCH202-1	1	-	-	-	-	-	1		
CCH202-2	-	-	-	3	-	-	1		
CCH202-3	-	2	1	3	-	-	1		
CCH202-4	-	-	-	3	-	-	1		
CCH202-5	1	-	-	3	-	-	3		
CCH202-6	1	-	-	3	-	-	3		

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

H. LABORATORY WORK:

Laboratory experiments and related skills to be developed:

Sr. No.	Title of Experiment	Skills to be developed	Course outcome
1.	a) Work with Computer System, Input/output devices,and peripherals. b)Work withfiles and folders	1.1 Identify various Input/output devices, connections and peripherals ofcomputer system 1.2 Work with Computer System, Input/output devices,	CCH202-1
2.	Work with document files: a) Create, editand save documentin Word Processing. b) Text, lines andparagraph level formatting	2.1 Create and manage word document. 2.2 Apply formatting featureson textat line, paragraph and page level.	CCH202-2
3.	Work with Images and Shapes in WordProcessing.	3.1 Insert and edit images, shapes in adocument file	CCH202-2
4.	Work with tables in Word Processing.	4.1 Insert table and apply various tableformatting features on it.	CCH202-2
5.	Working with layout and printing a)Document page layout, Themes, and printing. b) Use of mail merge with options.	5.1 Apply page layout features in wordprocessing. 5.2 Print a document by applyingvarious print options 5.3 Use mail merge in word processing	CCH202-2
6.	Create, open and edit Worksheet.	6.1 Enter and format data in aworksheet. 6.2 Insert and delete cells, rows andcolumns 6.3 Apply alignment feature oncell	CCH202-3
7.	Formulas and functions in Worksheet.	7.1 Create formula and “If” conditionon cell data 7.2 Apply various functions and namedranges in worksheet.	CCH202-3
8	Sort, Filter and validate data in Spreadsheet.	8.1 Implement data Sorting, Filtering and Data validation features in a worksheet.	CCH202-3
9	Charts for VisualPresentation in Spreadsheet.	9.1 Create charts using various chartoptions in spreadsheet.	CCH202-3

10	Worksheet Printing.	10.1 Print the worksheet by applyingvarious print optionsfor worksheet	CCH202-3
11	Make Slide Show Presentation.	11.1 Apply design themes tothe givenpresentation 11.2 Insert pictures text/images/shapesin slide 11.3 Use pictures text/images/shapesediting options.	CCH202-4
12	Use Tables and Charts in Slide	12.1 Add tables and charts in theslides. 12.2 Run slide presentation in differentmodes 12.3 Print slide presentation as handouts/notes	CCH202-4
13	a) Insert Animation effects to Text and Slides. b) Insert Audio and Video files in presentation	13.1 Apply animation effects to thetext and slides 13.2 Add/set audio and video files inthe presentation.	CCH202-4
14	a) Internet connection configuration b)Use Internetand Web Services.	14.1 Configure internet connection ona computer system 14.2 Use different web services oninternet	CCH202-5
15	Working with Browsers.	15.1 Configure different browsersettings 15.2 Use browsers for the givenpurpose	CCH202-5
16	Prepare Web Forms for Survey.	16.1 Create web forms for surveyusing different options.	CCH202-6
17	Prepare Web Forms for Quiz	17.1 Create web forms for Quiz usingdifferent options	CCH202-6

I. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNINGSKILLS DEVELOPMENT (SELF LEARNING)

Self Learning

Following are some suggestive self-learning topics: 1) Use ChatGPT/any other AI tool to explore informatUse Calendar to Schedule and edit activities. 3) Use Translate app to translate the given content from one langanother. 4) Use cloud based storage drive to store and share your files.

Assignment

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Prepare journal of practical performed in the laboratory.

Micro project

The microproject has to be industry application based, internet-based, workshop- based, laboratory-based obased as suggested by Teacher. 1) Perform a survey on various input and output devices available in market a its report. 2) Prepare Time Table, Prepare Notes on Technical Topics, Reports, Biodata with covering letter (S teacher shall assign adocument to be prepared by each students) 3) Prepare slides with all Presentation featur as: classroom presentation, presentation about department, presentation of Technical Topics. (Subject teacher assign a presentation to be prepared by each student). 4) StudentMarksheet, Prepare Pay bills, tax statement, assessment record using spreadsheet. (Teacher shall assign a spreadsheet to be prepared by each student). 5) C Survey on different web browsers. 6) Generate resume for different job profile, survey report of anyindustry ChatGPT/any other AI tool.

J. 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 Office Software c) Any Browser (Any General Purpose Computer available in the Institute)

K. CONTENT:

Sr. No.	Topics / Sub-topics	Lectures (Hours)
Course Outcome CCH202-1 - Use computer system and its peripherals for given purpose.		
1	**Unit - I Introduction to Computer System** 1.1 Basics of Computer System: Overview of Hardwareand Software: block diagram of Computer System, Input/Output unit CPU, Control Unit, Arithmetic logic Unit (ALU), MemoryUnit 1.2 Internal components: processor, motherboards, randomaccessmemory (RAM), read-only memory (ROM), video cards, sound cards and internal hard disk drives) 1.3 External Devices: Types of input/output devices, typesof monitors, keyboards, mouse, printers: Dot matrix, Inkjet and LaserJet, plotter and scanner, external storage devices 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 System Software compilers, linkers, devicedrivers, 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 manage file andfolders, Copy a file, renaming and deleting of filesand folders, Searching files and folders, application installation, creating shortcut of application on the desktop.	2

Course Outcome CCH202-2 - Prepare Business document using Word Processing Tool.		
2	**Word Processing** 2.1 Word Processing: Overview of Word processor Basicsof Fonttype, 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 redocommands, 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 apage break, Insert page numbers, Insert the dateand time, Insert	3
Sr. No.	**Topics / Sub-topics**	**Lectures (Hours)**
	special characters (symbols), Insert a picture from a file, Resizeand 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 ina table, Format a table, Insert and delete columns and rows, Borders and shading, Repeat table headings on subsequent pageorking with Columned Layouts and Section Breaks:a Columns, Section breaks, Creating columns, Newsletterstyle columns, Changing part of a document layout or formatting, Remove section break, Add columns to remainder of a document, Columnwidths, Adjust	
Course Outcome CCH202-3: Design files of word processors, spreadsheets, presentation software, and database application.		

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3	**Spreadsheets** 3.1 Working with Spreadsheets: Overview of workbook and worksheet, Create Worksheet Entering sample data, Save, CopyWorksheet, Delete Worksheet, Close and openWorkbook. 3.2 Editing Worksheet: Insert and select data, adjust row heightand column width, delete, move data, insert rows and columns,Copy and Paste, Find and Replace, Spell Check, 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, Text Alignments, Merge and Wrap, apply Borders and Shades,Sheet Options, Adjust Margins, Page Orientation, Headerand Footer, Insert PageBreaks, S 3.4 Working with Formula: Creating Formulas, Copying Formulas, Common spreadsheet Functions such as sum,average,min, max, date, In, And, or, mathematical functions 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 editingcharts. Using chart options: chart title, axis title, legend, data labels, Axes, grid lines, moving chart ina separate sheet. Advanced Operations: Conditional Formatting, DataFiltering, Data Sorting, Using Ranges, Data Validation, Adding Graphics,Printing Worksheets, print area, margins, header, footer and other page setup options.	3
Course Outcome CCH202-4 - Prepare professional Slide Show presentations		
4	**Presentation Tool** 4.1 Creating a Presentation: Outline of an effective presentation,Identify the elements of the User Interface,Starting a New Presentation Files, Creating a Basic Presentation, Working with textboxes, Apply Character Formats, Format Paragraphs, View a Prese 4.2 Inserting Media elements: Adding and Modifying GraphicalObjects to a Presentation - Insert Images into aPresentation,	4
Sr. No.	**Topics / Sub-topics**	**Lectures (Hours)**
	insert audio clips, video/animation, Add Shapes, Add Visual Styles to Text in a Presentation, Edit Graphical Objects on aSlide, Format 4.3 Working with Tables: Insert a Table in a Slide, FormatTables,and Import Tables from Other Office Applications. Working with Charts: Insert Charts in a Slide, Modify Chart, Import Charts from Other Office Applications.	

Course Outcome ***CCH202-5 - Use different types of Web Browsers and Apps*** ***CCH202-6 - Explain concept and applications of Emerging Technologies***		
5	**Basics of Internet and Emerging Technologies** 5.1 World Wide Web: Introduction, Internet, Intranet, Cloud, Web Sites, web pages, URL, web servers, basic settings of web browsers- history, extension, default page,default search engine, creating and retrieving bookmarks,use search engines effectivelyfor 5.2 Web 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. Tools: Docs, Drive, forms, quiz, Translate and otherApps	3

L. ASSESSMENT METHODOLOGIES/TOOLS

Formative assessment (Assessment for Learning)

- Lab performance, Assignment, Self-learning and Seminar/Presentation

Summative Assessment (Assessment of Learning)

- Lab. Performance, viva voce

M. PROGRESSIVE SKILLS TEST :

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	10
2.	Communication skill	5
3.	Logical approach	10
	TOTAL.	**25**

N. INSTRUCTIONAL STRATEGIES:

Instructional Methods:

a. Lectures cum Discussions
b. Regular Home Assignments.
c. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

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

O. REFERENCE MATERIAL:

a) Books / Codes

Sr.No	Author	Title	Publisher
1	Goel Anita	Computer Fundamentals	Pearson Education, New Delhi, 2014, ISBN-13: 978-8131733097
2	Miller Michael	Computer Basics Absolute Beginner's Guide, Windows10	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
6	Leete Gurdy, Finkelstein Ellen,Mary Leete	OpenOffice.org for Dummies	Wiley Publishing, New Delhi, 2003 ISBN : 978-0764542220

b) Suggested Websites and Portals

Sr.No	Link / Portal	Description
1	https://www.microsoft.com/en-in/learning/office-training.aspx	Office
2	http://www.tutorialsforopenoffice.org/	Open Office
3	https://s3-ap-southeast-1.amazonaws.com/r4ltue295xy0d/Special_Edition_Using_StarOffice_6_0.pdf	Open Office
4	https://ashishmodi.weebly.com/uploads/1/8/9/7/18970467/computer_fundamental.pdf	Computer Fundamental
5	http://www.tutorialsforopenoffice.org/	Open Office
6	https://www.tutorialspoint.com/computer_fundamentals/index.htm	Computer Fundamental
7	https://www.tutorialspoint.com/word/	Word Processing
8	https://www.javatpoint.com/ms-word-tutorial	Word Processing
9	https://support.microsoft.com/en-au/office/word-for-windows-training-7bcd85e6-2c3d-4c3c-a2a5-5ed8847	Word Processing

10	https://www.javatpoint.com/excel-tutorial	Spreadsheet
11	https://support.microsoft.com/en-au/office/excel-video-training-9bc05390-e94c-46af-a5b3-d7c22f6990bb	Spreadsheet
12	https://www.javatpoint.com/powerpoint-tutorial	Powerpoint Presentation
13	https://support.microsoft.com/en-au/office/powerpoint-for-windows-training-40e8c930-cb0b-40d8-82c4-b	Powerpoint Presentation
14	https://www.geeksforgeeks.org/ms-dos-operating-system/	Operating System
15	https://www.javatpoint.com/windows	Windows Operating System
16	https://www.javatpoint.com/what-is-linux	Linux Operating System
17	https://www.techtarget.com/iotagenda/definition/Internet-of-Things-IoT	IoT
18	https://www.geeksforgeeks.org/introduction-to-internet-of-things-iot-set-1/	IoT
19	https://www.javatpoint.com/machine-learning	AI & Machine Learning
Sr.No	**Link / Portal**	**Description**
20	https://www.skillrary.com/blogs/read/introduction-to-drone-technology	Drone Technology
21	https://www.cnet.com/tech/computing/what-is-3d-printing/	3D Printing
22	https://support.google.com/a/users/answer/9389764?hl=en	Apps

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COURSE ID:

Course Name : YOGA & MEDITATION
Course Code : CCH 203
Course Abbreviation : HYAM

TEACHING SCHEME:

Pre-requisite Course(s) : *<nil >*

Teaching Scheme:

Scheme component	Hours / week	Credits
Theory	NIL	
Practical	01	

I. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	RelevantCOs
LLO 1.1 Practice warming up for Yoga.	1	Introduction :- Presentations on Introduction to Yoga and its History. Omkar Chanting, prayer, padmasan, siddhasan, Vajrasan. Lab Exp: 1. Perform warming up exercises to prepare the body from head to toe for Yoga. i. Neck movement, ii. Shoulder movement, iii. Trunk movement, iv. Knee movement, v. Ankle movement.	3	CO1
LLO 2.1 Practice Sun salutaion	2	Lab Exp: 2. Perform all the postures of Sun salutation- one by one in a very slow pace, after warm up. Lab Exp 3. Perform multiple Surya Namaskar (Starting with three and gradually increasing it to twelve) in one go. Experiment 2 to 4 must be followed	4	CO1 CO2

		by Shavasana for self relaxation.		

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	RelevantCOs
LLO 3.1 Practice basic Asanas	3	Lab Exp: 4 Perform Sarvangasna,Halasana,Kandharasaa (setubandhasana), uttanpadasan, pavan muktasan. Lab Exp: 5 Perform Bhujangasana,Naukasana,Mandukasan Lab Exp: 6 Perform Shalabhasan, Dhanurasan, Vakrasan, Gomukhasan, Paschimottasana, Ardhamachendrasan. Lab Exp: 7 Perform Veerasan Veerbhadrasana, Vrukshasana,Trikonasana. Follow up experiment 5 to 7 with shavasana for self relaxation	4	CO2
LLO 4.1 Practice basic pranayama	4	Lab Exp: 8 Perform Deep breathing, Anulom Vilom Pranayam Kriya Lab Exp: 9 Practice Kapalbhati Pranayam Kriya, Bhastrika Lab Exp:10 Practice Bhramary and sheetali Pranayam.	2	CO3
LLO 5.1 Practice meditation	5	Lab Exp: 11 Perform sitting in Dhyan Mudra and meditating.Start with five minute and slowly increasing to higher durations. Introduction to Vipasshana, Anapan and Chakras. (Trainer will explain the benefits of Meditation before practice)	2	CO3

Note :

Note:

1. Start and end of each session can be with appropriate Yoga prayers and chanting of Omkar. 2. Trainers can add similar asanas in practical sessions.
3. Students are to be instructed to practice the experiment performed at least twice a week as part of self learning practices.
4. Live demonstration by the trainer needs to be carried out during practical hours. Yogic Videos can be used as well .

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

Micro project

i. Maintain a diary indicating date wise practice done by the student with a photograph of self in yogic posture.

ii. Write up details any five asans illustrating steps to perform, posture image, benefits and precautions.

Assignment

Prepare Diet and nutrition chart for self

Self Learning and Practice

- Practice at least thrice a week.
- Read books on different methods to maintain health, wellness and to enhance mood
- Watch videos on Yoga Practices.

SEMESTER II COURSES

COURSE ID :

COURSE NAME :APPLIED MATHEMATICS
COURSE CODE : CCH301
COURSE ABBREVIATION : HAMT

P. 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

(Total IKS Hrs for Sem.: 02 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)

19. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
20. 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.
21. 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.
22. Notional Learning hours for the semester are (CL+LL+TL+SL) hrs.*15Weeks

23. 1(one) credit is equivalent to 30 Notional hrs.
24. *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 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

I. COURSE LEVEL LEARNING OUTCOMES (COS)(TNR 14)

CCH1113-1 : To solve examples on integration using various techniques

CCH113-2 : To solve Differential equation of first order and first degree by various methods

CCH113-3 : To find approximate solution of algebraic equations and simultaneous equations by various methods.

CCH113-4:- To solve problems on Probability distributions

CCH113-5 :- 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		
CCH113-1-CO-1 : To solve examples on integration using various techniques	3	1	-	-	1	-	1		
CCH113-2-CO-2 : To solve Differential equation of first order and first degree by various methods	3	1	1	1	1	1	1		
CCH113-3-CO-3 : To find approximate solution of algebraic equations and simultaneous equations by	2	3	1	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** Maintain various types of electrical equipments	**PSO2** Maintain various sections of electrical power systems
various methods.									
CCH113-4-CO-4:- To solve problems on Probability distributions	2	2	2	2	2	1	2		
CCH113-5-CO-5:- Solve examples on Laplace Transform	2	1	1	1	1	1	1		

J. CONTENT:

III) 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.	CCH113-1
2	Solve integration using by parts.	CCH113-1
3	Solve examples on Definite Integral based on given methods.	CCH113-1
4	Solve problems on properties of definite integral.	CCH113-1

Sr. no	Tutorial experiences	CO
5	Solve given problems for finding the area under the curve and area between two curves . (Only for civil and mechanical engg. group)	CCH113-1
6	Solve examples on mean value and root mean square value.(only for Computer, Electrical and Electronics engg. group)	CCH113-1
7	Solve first order first degree differential equation using variable separable method.	CCH113-2
8	Solve first order first degree differential equation using exact differential equation and linear differential equation.	CCH113-2
9	Solve engineering application problems using differential equation.	CCH113-2
10	Solve problems on Bisection method, Regula falsi and Newton-Raphson method.	CCH113-3
11	Solve problems on Jacobi's method and Gauss Seidel method.	CCH113-3
12	Use Bakshali iterative methods for finding approximate value of square root.(IKS)	CCH113-3
13	Solve engineering problems using Binomial Distribution, Poisson Distribution and Normal Distribution.	CCH113-4
14	Solve problems on Laplace transform and properties of Laplace transform.	CCH113-5
15	Solve problems on Inverse Laplace transform and properties of Inverse Laplace transform.	CCH113-5

IV) Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: CCH113-1 : 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	14	16

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
	1.5 Integration by partial fractions (only linear non repeated factors at denominator of proper fraction)		
CO: CCH113-1 : 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: CCH113-2 : 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: CCH113-3 :- 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. 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	10	14

	root.(IKS)		
CO: CCH113-4:- To solve problems on Probability distributions			
Unit 5 **Probability Distribution**	**Probability Distribution** 5.1 Binomial distribution 5.2 Poisson's distribution 5.3 Normal distribution	8	8
CO: CCH113-5:- Solve examples on Laplace Transform .			
Unit 6 **Laplace Trancef orm**	**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	CCH113-1
I / 2	Definite Integration	-	4	4	8	CCH113-1
I / 3	Differential equation	2	4	4	10	CCH113-2
II /4	Numerical Methods	2	4	8	14	CCH113-3
II /5	Probability Distribution	-	4	4	8	CCH113-4
II/6	Laplace **Transform**	2	6	6	14	CCH113-5
	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:

7. Lectures cum Demonstrations

8. Classroom practices
9. Use of projector and soft material for demonstration
10. 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
7	Higher Engineering Mathematics	Grewal B.S.	Khanna publication New Delhi,2013 ISBN:8174091955
8	A textbook of Engineering Mathematics	Dutta.D.	New age publication New Delhi,2006 ISBN:978-81-224-1689-3
9	Advance Engineering Mathematics	Kreysizg,Ervin	Wiley publication New Delhi,2016 ISBN:978-81-265-5423-2
10	Advance Engineering Mathematics	Das H.K.	S Chand publication New Delhi,2008 ISBN:978-81-219-0345-5
11	Introductory Methods of Numerical Analysis	S.S.Sastry	PHI Learning Private Limited,New Delhi.ISBN:978-81-203-4592-8
12	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
13	Calculus & Its Applications	Marvin L.Bittinger David J.Ellenbogen Scott A. Surgent	Addison-Wesley 10th Edition ISBN-13:978-0-321-69433-1
14	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.wofram alpha.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

Q. 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	

R. 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

(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)

25. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
26. 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.
27. 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.

28. Notional Learning hours for the semester are (CL+LL+TL+SL) hrs.* 15 Weeks
29. 1(one) credit is equivalent to 30 Notional hrs.
30. * 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.

K. 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	-	-

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 – 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	-	-

L. CONTENT:

V) 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,	CCH103-1

Sr. no	Laboratory experiences	CO
	Oxalic acid, $FeSO_4$, etc.	
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

IV) 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. 1.6 Lewis and Langmuir's concept of stable electronic configuration. 1.7 Electrovalency and Co-valency. 1.8 Formation Of electrovalent compounds- NaCl, $CaCl_2$.	**07**	**08**

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
	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.	**13**	**16**

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
	3.2 COMPOSITE MATERIALS 3.2.1 Definition. 3.2.2 Classification, Properties & Application of composite materials. **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	Classroo

		(Hours)	m 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 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.	**09**	**12**
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.	**14**	**16**

	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		
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 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	**07**	**08**

** 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:

11. Lectures cum Demonstrations,
12. Class room practices.
13. 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.

LI) 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

S. 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	

T. 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- 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.

31. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
32. 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.
33. 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.
34. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks

35. 1(one) credit is equivalent to 30 Notional hrs.
36. * 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:-

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

M. COURSE LEVEL LEARNING OUTCOMES (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 and debate.	2	1	-	-	-	2	1		
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		

N. CONTENT:

VI) Practical Exercises

The following practical exercises shall be conducted in the Laboratory for *Communication Skills* developed by 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 Cycle and 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

V) 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 Language Barriers	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	Marks allotted
1	Attendance at regular practical	NA
2	Preparedness for practical	NA
3	Neat & complete Diagram.	NA
4	Observations & handling of instrument.	NA
5	Oral Based on Lab work and completion of task	NA
TOTAL		

J) Instructional Methods:

14. Lecture cum Demonstration,
15. Class room practices.
16. Use of projector and soft material for demonstration

K) Teaching and Learning Resources:

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

LII) Reference Books:

S.N.	Name of Book	Author	Publication
15	Communication Skills	Sanjay Kumar ad Pushp Lata	Oxford University Press
16	Personality Development and Soft Skills	Brun K. Mitra	Oxford University Press
17	Effective Communication Skills	M Ashraf Rizvi	Tata McGraw-Hill
18	Human Communication	Burgoon Michael	SAGE Publication Inc.
19	101 Ways to Better Communication	Elizabeth Hiemey	Pustak Mahal
20	Technical Writing and Professional Communication	Thomas Huckin and Leslie	McGraw-Hill College Division

M) Learning Website & Software

d. www.nptel.com/iitm/
e. https://www.britishcouncil.in/english/learn-online
f. https://www.vocabulary.com
g. www.newagegolden.com
h. https://www.internationalphoneticassociation.org

COURSE ID :

COURSE NAME : BASIC ELECTRONICS II

COURSE CODE : ETH104

COURSE ABBREVIATION : HBX2

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	04	03
	Tutorial Learning	00	
	Laboratory Learning	02	
	SLH-Self Learning	00	
	NLH- Notional Learning	06	

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		MAX	MIN	
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN			
	30	70	100	40	25	10	25@	10	-	-	150

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: -

Diploma engineers must deal with the various electronic components while maintaining various electronic equipment/systems. The use of basic electronics components and handling of various electronics systems will help them troubleshoot electronics equipment used in industry or in the consumer market etc. This course is developed to empower the students to apply their knowledge to solve broad electronic engineering application problems.

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME

The aim of this course is to attend following industry identified competency through various teaching learning experiences: • Maintain electronic equipment/systems comprising of discrete electronic components.

E. COURSE LEVEL LEARNING OUTCOMES (COs)

ETH104-1 Comprehend the construction and working of BJT.
ETH104-2 Use of BJT as amplifier.
ETH104-3 Comprehend feedback amplifiers.
ETH104-4 Analyze BJT Sinusoidal Oscillators.
ETH104-5 Analyze BJT Switching Circuits.
ETH104-6 Describe FET and MOSFET.

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								
	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 Operate and Maintain	PSO2 Supervision and Providing Solution
ETH104-1	3	2	-	3	-	-	--	2	--
ETH104-2	3	2	-	2	--	--	--	3	1
ETH104-3	3	-	-	2	-	--	--	3	1
ETH104-4	3	1	-	2	--	--	--	3	--
ETH104-5	3	2	-	3	-	--	--	3	1
ETH104-6	3	2	--	3	--	--	--	3	--

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:

(Any 10)

Sr. No.	Laboratory experiences	CO
1.	Plot Input characteristics of BJT in CE mode.	ETH 104-1
2.	Plot Output characteristics of BJT in CE mode.	ETH 104-1
3.	Plot the frequency response of single stage common emitter (CE) amplifier.	ETH 104-2
4.	Build and Test the performance of voltage series feedback amplifier.	ETH 104-3
5.	Build and Test the performance of Hartley Oscillator. Calculate the oscillator frequency and Verify calculated frequency with actual observed frequency	ETH 104-4
6.	Build and Test the performance of Colpitts Oscillator. Calculate the oscillator frequency and Verify calculated frequency with actual observed frequency	ETH 104-4
7.	Build and Test the performance of RC phase shift Oscillator. Calculate the oscillator frequency and Verify calculated frequency with actual observed frequency	ETH 104-4
8.	Build and Test the performance of BJT as Switch.	ETH 104-5
9.	Build and Test the performance of Astable multivibrator using transistor: time measurement and calculations.	ETH 104-5
10.	Build and test the performance of Monostable multivibrator using transistor: time measurement and calculations	ETH 104-5

Sr. No.	Laboratory experiences	CO
11.	Build and test the performance of Bistable multivibrator using transistor	ETH 104-5
12.	Build and Test the performance of Schmitt trigger using transistor	ETH 104-5
13.	Test the performance of FET drain characteristics	ETH 104-6
14.	Check the performance of FET transfer characteristics and calculate transconductance	ETH 104-6
15.	Build and Test the performance of common source FET amplifier	ETH 104-6

II) Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
	ETH104-1 Comprehend the construction and working of BJT		
1	**Bipolar Junction Transistor** 1.1 BJT-symbols, types, and Construction and Working Principles of PNP and NPN 1.2 Transistor configurations: CB, CE, CC Transistor i/p and o/p characteristics. Comparison between CB, CC, and CE. 1.3 Relation between alpha, beta, gamma. 1.4 Specifications of transistor: alpha, beta, Collector-base voltage (VCB), Collector-emitter voltage (VCEO), Maximum collector dissipation (PC) ,Collector current(Ic) ,Collector saturation voltage(Vce(sat)) 1.5 BJT biasing: Need of DC and AC load Line, Operating point, stabilization, thermal runaway, heat sink. 1.6 Types of biasing: fixed biasing, base bias with emitter feedback, voltage divider(Circuit diagram ,Equations, advantages & disadvantages) 1.7 Numericals based on relation of Ic,Ie & Ib.	**9**	**14**
	ETH 104-2* Use *of BJT as amplifier		
2	**BJT Amplifiers** 2.1 BJT as an amplifier. 2.2 Single Stage Amplifier: Circuit Diagram, Working, various currents (Ib, Ic,Ie), Voltage gain of CE amplifier (no derivations required), Frequency response of CE amplifier and bandwidth, Applications, Simple	**7**	**10**

	numericals. 2.3 Multistage amplifiers: General Multistage BJT based amplifiers 2.4 Types of BJT amplifier coupling: Circuit diagram, operation frequency response and applications of Direct coupled, RC coupled and transformer coupled.		
	ETH 104-3 Comprehend feedback amplifiers.		
3	**Feedback Amplifier** 3.1 Concept of feedback, Negative and positive feedback, Advantages of negative feedback and its effects 3.2 Types of negative feedback (block diagram , Circuit diagram and comparison) a) Current series feedback b) Voltage series feedback c) Voltage shunt feedback d) Current shunt feedback 3.3 Numericals problems based on feedback formula.	**6**	**10**
	Sub-total	**22**	**34**

Section –II

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
	***ETH104-4 Analyze* BJT Sinusoidal Oscillators**		
4	**Sinusoidal Oscillators** 4.1 Positive feedback in oscillators 4.2 Barkhausen's Criteria 4.3 Circuit Diagram, Working, frequency formula of following oscillators: - 4.3.1 Hartley Oscillator 4.3.2 Colpitts oscillator. 4.3.3 RC phase-shift oscillator, 4.3.4 Wein Bridge oscillator 4.4 Numericals based on above	**6**	**10**
	***ETH104-5 Analyze* BJT Switching Circuits**		

5	**BJT Switching Circuits** 5.1 Transistor as a switch, Transistor Switching Times Transistorized Multivibrators and its types: - Circuit Diagram, Operation, timing equations & applications of following: - 5.2.1 Astable multivibrator 5.2.2 Monostable multivibrator 5.2.3 Bistable Multivibrator 5.2.4 Schmitt Trigger 5.3 Numericals based on timing equations of above circuits	**7**	**12**
	ETH104-6 Describe FET and MOSFET		
6	**Field Effect Transistors** 6.1 Construction of JFET (N-channel and P- channel), symbol, working principle and characteristics (Drain and Transfer characteristics) of N-channel JFET. 6.2 JFET parameters-AC drain resistance(rd), transconductance (gm), amplification factor(μ), Relation between μ, rd & gm, 6.3 Advantages, disadvantages, applications of JFET 6.4 MOSFET: Types, symbol, Construction, working principle of Enhancement and depletion MOSFET, Applications of MOSFET 6.5 FET Biasing: Source self-bias, drain to source bias. 6.6 Common source FET amplifier.	**10**	**14**
	Sub-total	**23**	**36**

G : 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	Bipolar Junction Transistor	4	6	4	14	ETH104-1
I / 2	BJT Amplifiers	4	6	-	10	ETH104-2
I / 3	Feedback Amplifier	2	4	4	10	ETH104-3
II /4	Sinusoidal Oscillators	2	6	2	10	ETH104-4
II /5	BJT Switching Circuits	2	6	4	12	ETH104-5
II / 6	Field Effect Transistor	4	10	-	14	ETH104-6
Total Marks		18	38	14	70	

H :-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 & handling of instrument.	05
5	Oral Based on Lab work and completion of task	05
TOTAL		**25**

I) Instructional Methods:

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

J) Teaching and Learning resources:

Chalk board, LCD presentations, Demonstrative kits, Demonstrative charts

K) Reference Books:

Sr. No.	Name of Book	Author	Publication
1	Electronics Devices and Circuit Theory	Boylestad and Nashelsky	Prentic Hall
2	Basic Electronics and Linear Circuits	Kulshreshth and Bhargav	TTTI, Chandigad
3	A text book of Applied Electronics	R. S. Sedha	S. Chand
4	Electronics Principles	Malvino	McGraw Hill
5	V. K. Mehta	Electronics Devices and Circuit Theory	S. Chand

K) Reference Books:

Sr. No	Name of Book	Author	Publication
1	V. K. Mehta	Electronics Devices and Circuit Theory	S.Chand
2	B. L. Theraj	Basic Electronics	S.Chand
3	R.S.Sedha	A text book of Applied Electronics	S.Chand
4	Boylestad and Nashelsky	Applied Electronics	Khanna Publication
5	A. Motershed	Electronics Devices & Circuits	PHI Publication
6	Malvino	Electronics Principles	McGraw Hill

Learning Website & Software

i. www.nptel.iitm.ac.in
ii. www.learningaboutelectronics.com
iii. www.electronics-tutorials.com
iv. https://circuitdigest.com/electronic-circuits
v. https://www.tutorialspoint.com/basic_electronics/basic_electronics_transistors.htm
vi. https://www.youtube.com/watch?v=O_pqCNPs6xw
vii. https://www.youtube.com/watch?v=0nXEUkFBd8A

COURSE ID :

COURSE NAME : Electrical Engineering

COURSE CODE : ETH104

COURSE ABBREVIATION : HEEG

U. 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	

V. 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

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 ExaminationNote : (TNR 11 font)

37. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
38. 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.
39. 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.
40. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
41. 1(one) credit is equivalent to 30 Notional hrs.
42. * 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:-

The subject deals in understanding the basics of laws, working principle, construction, operation and applications of the various equipment, instruments and machines in electrical engineering.

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:

"**Apply the basic principles of electrical engineering to solve engineering problems".**

O. COURSE LEVEL LEARNING OUTCOMES (COS)

COURSE OUTCOMES:

ETH104-1. Apply basic laws and principles of electrical engineering to electrical applications.
ETH104-2. Use principles of magnetic circuits to calculate various parameters in magnetic circuits.
ETH104-3. Interpret basic principles of electromagnetic induction.
ETH104-4. Apply basic principles of AC circuits in electrical devices.
ETH104-5. Interpret circuit parameters in AC circuits.
ETH104-6. Apply basic laws of electromagnetic induction principles in transformer &electric machines.

COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

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

PO →	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PSO 1**	**PSO2**
CO									
ETH104-1	**3**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**
ETH104-2	**3**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**

ETH104-3	3	1	0	1	0	0	0	0	0
ETH104-4	3	1	0	1	0	0	0	0	0
ETH104-5	3	1	0	1	1	0	0	0	0
ETH104-6	3	1	0	1	1	0	1	1	0

P. CONTENT:-

VII) Practical exercises

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

Sr.No.	Title of Experiment	Skills to be developed	Course outcome
1.	Calculate the resistance of DC circuit by measuring voltage and current and verify using multi-meter. (Verify Ohm's law)	1.Identify different components in electrical Laboratory 2.Use voltmeter and ammeter.	1
2.	To measure the voltages across resistances in the circuit and verify the readings using Kirchhoff's Voltage Law.	Implement Kirchhoff's voltage law to solve electrical circuits.	1
3.	To measure the currents across resistances in the circuit and verify the readings using Kirchoff's Current Law.	Implement Kirchhoff's current law to solve electrical circuits.	1
4.	Connect resistances in series and parallel connection and measure its resistances by using Ohm's law.	Connect electrical loads in series and parallel.	1
5.	Determine the permeability of magnetic material by plotting its B-H curve.	1.Measure magnetic flux density and electric field intensity. 2.Plot B-H curve of a material.	2

6.	Observe and identify the direction induced emf in the coil with the moving magnet and moving coil. (Verify Faraday's law of electromagnetic induction and Lenz law)	Identify direction of induced emf in givenenvironment.	3
7.	Measure frequency, amplitude, time period, peak to peak value of alternating quantity.	Use CRO to measure different parameters.	5
8.	Calculate R, L and power factor of series RL circuit by measuring voltages and currents in circuit.	Identify AC meters. Measure AC quantities.	5
9.	Calculate R, C and power factor of series RC circuit by measuring voltages and currents in circuit.	Identify AC meters. Measure AC quantities.	5
10.	Calculate R, L, C and power factor of series RLC circuit by measuring voltages and currents in circuit.	1.Identify AC meters. 2. Measure AC quantities.	5
11.	Use transformer as step up and step down of single phase transformer.	Measure primary and secondary side voltages of transformer.	6

VI) Theory

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
	ETH104-1: Apply basic laws and principles of electrical engineering to electrical applications.		
1	**BASIC LAWS AND PRINCIPLES** 1. Basic terms:-electric current and potential difference. Concept of voltage drop and terminal voltage. 2. Concept of resistance and conductance Laws of resistance (Simple Numerical)Concept of resistivity and conductivity. 3. Classification of electric current: Direct current (DC) & alternating current (AC) 4. Concept of power and energy with simple numerical. (in DC circuit) 5. Series and parallel connection of resistances. (Simple numerical) 6. Theorems for DC circuits: Ohm's Law (Simple Numerical) Kirchhoff's Laws (Simple Numerical with maximum two equations)	08	12

ETH104-2: Use principles of magnetic circuits to calculate various parameters in magneticcircuits.			
2	**MAGNETIC CIRCUITS** 1. Magnetic Circuit - Ohm's law of magnetic circuit. 2. Definitions concerning magnetic circuit: Magneto-Motive-Force (MMF), Ampere Turns (AT), Reluctance, Permeance, Reluctivity. 3. Comparison between electric and magnetic circuit. 4. Calculations of ampere-turns for simple series magnetic circuit (SimpleNumerical) 5. Concept of magnetization curve (B - H Curve) Magnetization curve for magnetic and non-magnetic materials. 6. Concepts of magnetic hysteresis, hysteresis loop. Significance of areaof hysteresis loop, hysteresis loss. (No Derivation and No Numerical), Definition of eddy current loss and it formula. 8.Concepts of permanent magnet and electromagnet.	10	14
ETH104-3: Understand basic principles of electromagnetic induction.			
3	**ELECTROMAGNETIC INDUCTION** 1. Faraday's laws of electromagnetic induction. (Simple Numerical) 2. Induced E.M.F: Statically induced E.M.F., dynamically induced E.M.F.(Simple Numerical) 3. Direction of induced E.M.F. and currents. Fleming's right hand rule, Fleming's left hand rule. Lenz'slaw. 4. Basic concepts of self induction and mutual induction. (No numerical) 5. Basic principle of elementary alternator. 6. Energy stored in magnetic field (No Derivation and No Numerical) 7. Lorentz force principle (Simple numerical).	6	14
ETH104-4: Apply basic principles of AC circuits in electrical devices.			

4	**AC FUNDAMENTALS** 1. Generation of alternating EMFs. 2. Some important terms.: cycle, time period, frequency, amplitude, average values, rms value. 3. Equations of alternating voltages and currents. 4. Concept of effective or root mean square (R.M.S.) value of sinusoidal currentor voltage. 5. Peak factor and form factor. 6. Phasor representation of alternating quantities. 7. Phase and phase difference, concept of lagging and leading 8. Addition and subtraction of sinusoidal alternating quantities. (Simple=Numerical) 9. 9. Multiplication and division of sinusoidal alternating quantities. (SimpleNumerical)	10	16

	ETH104-5: Understand circuit parameters in AC circuit.		
5	**AC CIRCUITS (NO NUMERICAL)** 1. Polyphase Generation 2. Three phase power equation 3. Star and delta connections of resistive load. (No derivation) Comparison between star and delta connections of load. 4. A.C. circuits Purely resistive A.C. circuit. Purely inductive A.C. circuit.Purely capacitive A.C circuit. 5. Series A.C. circuits Circuit with resistance and inductance in series (Concept of power factor) Circuit with resistance and capacitance in series (Concept of power factor)Circuit with resistance inductance and capacitance in series (Concept of power factor) 6. Active and reactive power in single phase series circuit.	08	10
	ETH104-6: Apply basic laws of electromagnetic induction principles in electric machines.		

6	**TRANSFORMER & MACHINE (NO NUMERICAL)** 1. Basic principle of working of a single phase transformer. 2. Construction of a single phase transformer. 3. Types of transformer based on Construction of core of transformers Number of phases Voltage level Functions of transformer (instrument, power, isolation) 4. Application of transformers in electronic circuit. 5. Basic principle of working of single phase induction motor. 6. Basic principle of working of DC motor. Compare shunt and series DC motors. 7. Stepper Motor- reluctance type stepper motor – working and application 8.Basic principle of earthing, necessity of earthing, types of earthing (pipe earthing and plate earthing)	6	14

G : List of Assignments under SLA(Microproject/activity)

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	Basic Laws & Principles	4	4	4	12	ETH104-1
I / 2	Magnetic Circuits	4	4	6	14	ETH104-2
I / 3	Electromagnetic Induction	4	4	6	14	ETH104-3
II /4	AC Fundamentals	6	6	4	16	ETH104-4
II /5	AC Circuits	2	4	4	10	ETH104-5
II / 6	Transformer & Machine	4	6	4	14	ETH104-6
	Total Marks				70	

Sr.No	List of Assignment (under SLA)
1	Simple problems on Ohms law, Law of resistance, Power and energy.
2	Survey of different magnetic material.
3	Simple problems on magnetic circuits.
4	Simple problems on of induced E.M.F: Statically induced E.M.F., dynamically induced E.M.F.
5	Simple problems on Addition, subtraction, multiplication and division of sinusoidal alternating quantities.
6	Survey the electrical appliances which represents different types of load.(resistive, inductive and capacitive)
7	Compare types of transformer as per voltage level, construction, number of phases, applications.
8	Survey different types of earthing.

I :-Assessment Criteria

The assessment need to be done as per Proforma I & II

i) Formative Assessment of Practical and SLA:-

Every assignment/ Practical 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/Discipline and 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**	**Marks allotted**
1	Knowledge about the course	05
2	Preparedness for practical /Oral	05
3	Neat & complete Diagram/write up	05
4	Observations/Handling of instrument/ Communication/Presentation	05
5	Oral Based on Lab work and completion of task	05
TOTAL		**25**

J) Instructional Methods:

17. Lectures cum Demonstrations,
18. Class room practices.
19. Use of projector and soft material for demonstration

K) Teaching and Learning resources:

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

LIII) Reference Books:

S.N.	Name of Book	Author	Publication
21	Basic Electrical Engineering,	Mittle and Mittal	McGraw Education, New Delhi, 2015, ISBN :978-0-07-0088572-5

22	Electrical Technology Vol – I	Theraja, B. L	S. Chand Publications, New Delhi, 2015
23	Electrical Technology Vol – II,	Theraja, B. L	S. Chand Publications, New Delhi, 2015
24	Basic Electrical Engineering	V.K Mehta Author), Rohit Mehta	S. Chandpublications.

M) Learning Website & Software

a. www.nptel.com/iitm/
b. www.howstuffworks.com/
c. www.virtual lab.com
d. www.sskphdmm.com
http://www.youtube.com/watch?v=RAc1RYilugI

COURSE ID:

COURSE NAME : C PROGRAMMING

COURSE CODE : ETH105

COURSE ABBREVIATION : HCPR

W.LEARNING SCHEME:

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

X. ASSESSMENT SCHEME:-

Paper Duration (Hrs)	Assessment Scheme								Based on Self Learning		Total Marks
	Theory				Based on LL & TL						
	FATH	SATH	Total		FA-PR		SA-PR		SLA		
	Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
-	-	-	-	-	25	10	25@	10	-	-	50

(Total IKS Hrs for Sem. : 00 Hrs)

Y. 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.

43. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
44. 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.
45. 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.
46. Notional Learning hours for the semester are (CL+LL+TL+SL) hrs.* 15 Weeks
47. 1(one) credit is equivalent to 30 Notional hrs.
48. * 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)

Z. i) RATIONALE:

This course is designed to develop programming attitude and attract the interest of the students in the C Language. C is a very powerful, widely used, efficient and compact, which combines features of high-level language and low-level language. It is used in many scientific programming situations. It forms the core of the modern languages Java and C++. Almost every set up in software Engineering domain chooses C as a first priority programming language.

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME

Development of programming skills to solve engineering problems in procedural way. Understanding and implementing concepts of procedural programming. Operating Computer system efficiently. Development of attitude of precision, accuracy, safety, punctuality and aesthetic presentation.

AA. COURSE OUTCOMES:

ETH105-1 Identify C expressions with character set and operators.

ETH105-2 Apply decision making and branching and looping constructs in programming.

ETH105-3 Implement user defined functions and arrays.

ETH105-4 Implement library functions for string handling.

ETH105-5 Develop C programs using structures and pointers.

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	PO								
	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: Apply concepts of C Programming to solve engineering problems	3	3	3	2	2	2	1	3	-
ETH105-1	2	1	2	2	2	1	1	-	-
ETH105-2	2	3	3	3	2	1	1	2	-
ETH105-3	2	2	3	3	1	1	1	2	-
ETH105-4	2	2	3	3	1	1	1	2	-
ETH105-5	2	2	2	3	2	1	1	2	-

PSO 1: Operate and Maintain: Competency to apply the concepts of Industrial Electronics in the operation and maintenance of engineering application systems.
PSO 2: Supervision and providing solution: Ability to supervise work and reach appropriate solution to simple practical problems in Industrial Electronics engineering industry.

BB.CONTENT:

I) SUGGESTED PRACTICAL'S/ EXERCISE

The following practical exercises shall be conducted as practical's and assess the student for attainment of the competency. (any 10 out of 13 experiments)

Sr. No.	Title of Experiment	Skills to be developed	Course Outcome
01	Study of Flowchart and Algorithm	• Understanding an Algorithm • Understanding the Flowchart • Study of various Flowchart Symbols	ETH105-1

		• To draw Flowchart on any Practical routine	
02	Installation of C/C++ Compiler and study of its IDE	• Understanding Integrated development environment of any one C compiler • To create and save and compile a program file • To run the compiled program and see the output	
03	Usage of C character set, keywords, identifiers, variables, constants, and expressions	• Study of character set of C language • Study of identifiers, variables, constant, and Keyword • Rules for valid variables, identifiers, constants. • Identify valid and invalid variables, • Study of expressions and different types	ETH105-1
04	Usage of Operators	• Classification of operators in C • Understanding use of C different types operators • Writing imple C programs illustrating use of all category of C operators	ETH105-1
05	To use input and output library functions	Writing simple programs to illustrate the use of- • Standard Input function-scanf()	ETH105-1

		• Standard Output function- printf() • Character input and output functions getchar() ,putchar() • String input and output functions gets(), puts()	
06	Implementation of decision Making and branching using if, if-else, Nested if, ladder if-else structure	Writing simple programs to illustrate the use of- • If statement • If-else statement • Nested if..else • else..if ladder	ETH105-2
07	Implementation of multiple decision making using switch statement	Writing program to illustrate the use of- • switch statement • break statement • default statement	ETH105-2
08	Implementation of looping using for Statement	Writing a program to illustrate the use of- • for statement to implement loop • Nested for loop	ETH105-2
09	Implementation of looping using while and do---while statement	• Exit control and Entry control loop • program based on while loop and do-while	ETH105-2
10	To create and use of one dimensional and multi-dimensional array	Writing a program to illustrate- • creating one and multi-	ETH105-3

		dimensional array • Manipulation of elements of an array	
11	Program based on User Defined Functions	Writing a program to illustrate- • User defined function declaration or prototype • User defined function definition • Function call or reference • Passing parameters to a function- call by value and call by reference	ETH105-3
12	Strings and string manipulation functions	Writing a program to illustrate- • Ddeclaration and initialization of string variable • reading and writing a string from and to terminal. • String- handling Functions - strlen(),strcmp() strcpy(), strcat(), strupr(), strlwr(), strrev() etc.	ETH105-4
13	Study of Structure	Writing a program to illustrate- • Defining a structure • Declaring and iinitialization of structure variable • Accessing members of structure variable	ETH105-6
13	Implementation of Pointer	Writing a program to illustrate- • Ddeclaration of pointer • Initializing pointer variable	ETH105-6

		• Accessing data using pointer variable	

II) THEORY :

SECTION I

Sr. No.	Topics / Sub-topics	Lectures (Hours)
Course Outcome ETH105 – 1 Identify C expressions with character set and operators.		
1	**C FUNDAMENTALS** 1.1History of c 1.2 C character set 1.3 Identifiers & Keywords, 1.4 Data types 1.5 Variables 1.6 Declarations 1.7 Constants 1.8 Expressions 1.9 C Instructions 1.10 The first C program 1.11 Compilation & Execution	**05**
2	**OPERATORS& DATA INPUT AND OUTPUT FUNCTIONS** 2.1 Operators 2.1.1 Arithmetic Operators 2.1.2 Assignment Operator 2.1.2 Unary operators 2.1.3 Relational & Logical Operators, 2.1.4 Conditional & Comma Operator	**05**

	2.2 Input and Output Library Functions 2.2.1 printf() 2.2.2 scanf() 2.2.3 getchar() 2.2.4 putchar() 2.2.5 gets() 2.2.6 puts()	
Course Outcome ETH105 -2 Apply decision making and branching and looping constructs in programming.		
3	**CONTROL STATEMENTS** 3.1 Decision making and branching 3.1.1 if Statement(if, if-else, if-else ladder, nested if-else) 3.1.2 Switch, break, continue, goto statement 3.2 Decision making and looping 3.2.1 While, do – while, for Statements 3.2.2 Nested loops	**06**

SECTION II

Sr. No.	**Topics / Subtopics**	**Lectures (Hours)**
Course Outcome ETH105 -3 Implement user defined functions and arrays.		
4.	**ARRAYS & FUNCTIONS** 4.1 Defining an array, 4.2 One dimensional array ,Declaration and Initialization of Arrays, 4.3 Two Dimensional Arrays Declaration and Initialization of Arrays, 4.4 Defining a Function, Accessing a function, 4.5 Passing arguments to a Function(call by value and call by reference), Specifying argument data types 4.6 Scope and lifetime of variables 4.7 Function prototypes 4.8 Recursion	**06**
Course Outcome ETH105 -4 Implement library functions for string handling.		

5.	**CHARACTERS & STRINGS** 5.1 The char data type, using character variables, using string 5.2 Declaring and initializing string variables 5.3 Reading strings from terminal 5.4 Writing Strings to screen, putting strings together. 5.5 Comparison of two strings 5.6 String- handling Functions - strcmp(), strlen(), strcpy(), strcat(), strupr(), strlwr(), strrev()	**05**
Course Outcome ETH105 -5 Develop C programs using structures and pointers.		
6.	**Structures and Pointers** 6.1 Simple structures (Defining & declaring structures, accessing structure members) 6.2 Complex structures (structures that contain arrays) 6.3 Understanding pointers, declaring pointer variable, initialization of pointer variable, accessing address of a variable	**5**

CC. ASSESSMENT CRITERIA FOR PRACTICAL ASSIGNMENTS AND PRACTICAL EXAMINATION

c) Formative Assessment of Practical:

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

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/ Safety Measures/ Decency/ Presentation	05
TOTAL		**25**

d) Summative Assessment of Practical:

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

Sr. No	Criteria	Marks allotted
1	Neat & complete circuit Diagram / schematic Diagram/ Algorithm/ Flowchart/ Program	5
2	Procedure followed to achieve the result	5
3	Observations, Result, Output, Sample Calculations with relevant formulae	5
4	Proper Graphs, workmanship and Safety measures	5
5	Oral	5
	Total	**25**

INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Online/Offline Lectures cum Discussions
2. Regular home assignments
3. Laboratory work

Teaching and Learning Resources:

1. Chalk and Board 2. Video Clips 3.PPTs 4. Question Bank 5. Charts

REFERENCE MATERIAL:

a) Books / Codes

Sr. No.	Author	Title	Publisher
1.	E.Balgurusamy	Programming in ANSI C	Tata McGraw Hill Education
2.	Yashwant Kanetkar	Let us C	BPB Publication
3	Bryon Gottfried	Programming with C	Schaum's Outlines Series
4	kerninghan& Ritchie	The C Programming language	Prentice Hall

b) Websites

1) https://www.w3schools.in/c-tutorial/
2) www.cprogramming.com
3) www.learn-c.org
4) www.tutorialspoint.com/cprogramming
5) https://www.tutorialspoint.com/compile_c_online.php

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

DD. 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	

EE. 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	
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.

49. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
50. 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.
51. 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.
52. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
53. 1(one) credit is equivalent to 30 Notional hrs.

54. * 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 to easily 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 and eventually 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.

Q. COURSE LEVEL LEARNING OUTCOMES (COs)

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

CCH204-1 - Develop ability to adapt to new challenges.

CCH204-2 - Manage emotions effectively.

CCH204-3 - Follow workplace ethics and practices.

CCH204-4 - Manage time effectively.

CCH204-5 - 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: Exhibit psychosocial competencies, workplace ethics, resilience, positive attitude, integrity and self-confidence.									
CCH204-1 Develop ability to adapt to new challenges.						1	2		
CCH204-2 Manage emotions effectively.						1	2		
CCH204-3 Follow workplace ethics and practices.						1	2		
CCH204-4 Manage time effectively.						2	2		
CCH204-5 Increased self-confidence to handle stress.						2	2		

R. CONTENT:

VIII) Practical Exercises:
Not Applicable

VII) 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 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.	**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 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	Implementation Methodology: Considering the nature of the course designed, following points shall be considered while implementing the course. 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

		Observations of field visits and datacollected.	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,	(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

		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 selectedvillage / slum.	(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 TLO 4.3 Responsibility TLO 4.4 Gratitude andAppreciations TLO 4.5 Determination& Persistence TLO 4.6 Respect TLO 4.7 Team Spirit	**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 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	i) Video Demonstrations ii) Flipped Classroom iii) Case Study iv) Role Play v) Collaborative learning vi) Chalk-Board

	TLO 4.8 Caring & Sharing TLO 4.9 Honesty TLO 4.10 Forgive andForget	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, Topics for 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:

20. Group Discussion, Flipped Classroom
21. Demonstration, Case Study, Role Play, Collaborative Learning, Cooperative Learning
22. Field Visit, Survey
23. 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.

LIV) Reference Books:

S.N.	Name of Book	Author	Publication
25	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	IRAP, Hyderabad, CTARA, IIT Bombay and UNICEF, Mumbai	UNICEF

	IN MAHARASHTRA' Districts Economic survey reports		
26	Central Public Healthand Environmental Engineering Organisation	Manual on Water Supply and Treatment	Ministry of Urban Development, New Delhi
27	Specifications And Standards Committee	Indian Standards (IS) Codes and Indian Roads Congress (IRC) Codes	Bureau of Indian Standards and The Indian Road Congress
28	Prepared by each district administration	Districts Economic survey reports	Govt. of Maharashtra
29	Local college students,UMA staffs	Sample Case Studies on UMA website	IITB-UMA team

M) Learning Website & Software

i. https://gr.maharashtra.gov.in/Site/Upload/Government%20Resolutions/English/201601131501523808.pdf (Government Resolution of Government of Maharashtra regarding Unnat Maharashtra Abhiyan)

j. https://gr.maharashtra.gov.in/Site/Upload/Government%20Resolutions/English/201606151454073708.pdf (Government Resolution of Government of Maharashtra regarding Unnat Maharashtra Abhiyan Guidelines)

k. https://censusindia.gov.in/census.website/ (A Website of Census of India)

l. https://gsda.maharashtra.gov.in/english/ (A Website of Groundwater Survey and Development Agency, GoM)

m. https://mrsac.gov.in/MRSAC/map/map (A Website where district-wise maps showcasing different attributes developed by Maharashtra Remote Sensing Applications Centre.)

n. https://ejalshakti.gov.in/jjmreport/JJMIndia.aspx (A Website of Jal Jivan Mission, Government of India)

o. https://cpcb.nic.in/ (A Website of Central Pollution ControlBoard, Government of India)

p. http://www.mahapwd.com/# (A Website of Public WorksDepartment, GoM)

q. http://tutorial.communitygis.net/ (A Website for GIS data sets developed by Unnat Maharashtra Abhiyan)

r. https://youtu.be/G71maumVZ1A?si=TzDTxKUpLYaRos7U (A video record of lecture by Prof. Milind Sohoni, IIT Bombay, on Engineering, Development and Society)

s. https://youtu.be/TUcPNwtdKyE?si=wnSWrhGc9dJTC-ac (A keynote talk by Prof. Milind Sohoni,IIT Bombay, on Interdisciplinary Engineering: The Road Ahead)