Government Polytechnic Kolhapur

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

Programme Name	: Diploma in Electrical Engineering		
Programme Code	: EE	**With Effect From Academic Year**	: 2023-24
Duration Of Programme	: 6 Semester	**Duration**	: 16 WEEKS
Semester	: First	**Curriculum**	: MPECS 2023

Sr No	Course Title	Abbreviation	Course Type	Course Code	Total IKS Hrs for Sem.	CL	TL	LL	Self Learning (Activity/ Assignment /Micro Project)	Notional Learning Hrs /Week	Credits	Paper Duration (hrs.)	FA-TH Max	SA-TH Max	Total Max	Total Min	FA-PR Max	FA-PR Min	SA-PR Max	SA-PR Min	SLA Max	SLA Min	Total Marks
1	ENGINEERING PHYSICS	HPHA	DSC	CCH101	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	4	4	2	-	2	8	4	3	30	70	100	40	-	-	-	-	25	10	125
3	ENGINEERING GRAPHICS & AUTO-CAD	HGRA	DSC	CCH107	2	2	-	2	-	4	2	-	-	-	-	-	50	20	50@	20	-	-	100
4	FUNDAMENTALS OF ICT	HICT	SEC	CCH202	1	1	-	2	1	4	2	-	-	-	-	-	25	10	25@	10	25	10	75
5	YOGA AND MEDITATION	HYAM	VEC	CCH203	1	-	-	1	1	2	1	-	-	-	-	-	25	10	-	-	25	10	50
6	FUNDAMENTALS OF ELECTRICAL ENGINEERING	HFEE	DSC	EEH101	2	4	-	2	2	8	4	3	30	70	100	40	50	20	25@	10	25	10	200
7	ELECTRICAL WORKSHOP PRACTICE	HWEE	SEC	EEH102	2	2	-	2	2	6	3	-	-	-	-	-	50	20	25@	10	25	10	100
	Total				16	17	2	11	10	40	20		90	210	300		225		150		150		825

Abbreviations : CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, FA - Formative Assessment, SA -Summative Assessment, IKS - Indian Knowledge System, SLA - Self LearningAssessment

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

Note :

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

2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.

3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.

4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks

5. 1 credit is equivalent to 30 Notional hrs.

6. * Self learning hours shall not be reflected in the Time Table.

Course Category : Discipline Specific Course Core (DSC) : 2, Discipline Specific Elective (DSE) : 0, Value Education Course (VEC) : 1, Intern./Apprenti./Project./Community (INP) : 0, Ability EnhancementCourse (AEC) : 2, Skill Enhancement Course (SEC) : 2, Generic Elective (GE) : 0

Government Polytechnic Kolhapur
Learning and Assessment Scheme for Post S.S.C Diploma Courses

ProgrammeName	: Diploma In Electrical Engineering		
ProgrammeCode	: EE	With Effect From AcademicYear	: 2023-24
DurationOfProgramme	: 6 Semester	Duration	: 16WEEKS
Semester	: Second NCr FEntryLevel : 3.0	Scheme	: MPECS 2023 (Revised on 14/02//2024)

Sr No	Course Title	Abbreviation	Course Type	Course Code	Total IKS Hrs forSem.	CL	TL	LL	Self Learning(Activity/Assignment /Micro Project)	Notional Learning Hrs/Week	Credits	Paper Duration (hrs.)	FA-TH Max	SA-TH Max	Total Max	Total Min	FA-PR Max	FA-PR Min	SA-PR Max	SA-PR Min	SLA Max	SLA Min	Total Marks
	ENGINEERING CHEMISTRY	HCHA	DSC	CCH103	4	4	-	2	2	8	4	1.5	30*#	70*#	100	40	25	10	25@	10	25	10	175
1	COMMUNICATION SKILL	HCMS	AEC	CCH201		4	-	2	2	8	4	3	30	70	100	40	25	10			25	10	150
	SOCIAL AND LIFE SKILLS	HSLS	VEC	CCH204		-	-	-	2	2	1	-	-	-	-	-	-	-	-	-	50	20	50
2	APPLIED MATHEMATICS	HAMT	AEC	CCH301	2	4	2	-	-	6	3	3	30	70	100	40	-	-	-	-	-	-	100
3	BASIC ELECTRONICS	HBET	DSC	EEH103	1	2	-	2	-	4	2	1.5	15	35	50	20	50	20	25@	10			125
4	ELECTRICAL POWER GENERATION	HEPG	DSC	EEH301	2	3	-	2	1	6	3	3	30	70	100	40	25	10			25	10	150
5	BASIC MECHANICAL AND CIVIL ENGINEERING	HBMC	SEC	EEH302	2	2	-	4	-	6	3	-	-	-	-	-	50	20	50@	20	-	-	100
	Total				11	19	2	12	7	40	20		135	315	450		175		100		125		850

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

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.*15Weeks

5. 1 credit is equivalent to 30 Notional hrs.

6. *Self learning hours shall not be reflected in the Time Table.

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

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

COURSE NAME   : **ENGINEERING PHYSICS**
COURSE CODE   : **CCH101**
COURSE ABBREVIATION   : **HPHA**

A. LEARNING SCHEME:

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

B. ASSESSMENT SCHEME :-

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

(Total IKS Hrs for Sem.: 04 Hrs)

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

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

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

D. i) RATIONALE :-

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

ii) INDUSTRY/ EMPLOYER EXPECTED OUTCOME

Apply principles of Physics to solve engineering problems as follows:

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

Psychomotor : Handling of instruments, apparatus and tools

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

E. COURSE LEVEL LEARNING OUTCOMES (COS)

CCH101-1 Estimate errors in measurement of physical quantities.

CCH101-2 Express importance of semiconductors and nanotechnology.

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

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

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

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

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

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

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

F. CONTENT :

I)   Practical exercises

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

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

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

II)   Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: CCH101-1 Estimate errors in measurement in Physical quantities.			
1	**UNITS AND MEASUREMENT** 1.1 Unit, Physical Quantities : Fundamental and Derived Quantities and their units 1.2 Systems of units : CGS, MKS, FPS and SI 1.3 Errors , Types of errors : Instrumental, Systematic and Random error, Estimation of errors : Absolute, Relative and percentage errors 1.4 Significant figures 1.5 Ancient Astronomical Instruments : Chakra, Dhanuryantra, Yasti and Phalaka yantra (IKS learning) 1.6 **Simple Numerical problems**	**10**	**12**
CO: CCH101-2 Express the importance of Semiconductors and nanotechnology.			
2	**INTRODUCTION TO SEMICONDUCTORS AND NANOTECHNOLOGY**	**08**	**08**
	2.1 SEMICONDUCTORS 2.1.1 Conductors, insulators and semiconductors 2.1.2 Energy bands	(06)	(06)

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
	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 **No numericals on above topic**	(02)	(02)
CO: CCH101-3 Select proper material in engineering industry by analysis of its physical properties.
3	**PROPERTIES OF MATTER**	**12**	**14**
	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 **Simple Numerical problems**	(06)	(10)
	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	(06)	(04)

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
	No numericals on above topic		

Section –II

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: CCH101-4 Apply principles of electricity and magnetism to solve engineering problems			
4	**ELECTRICITY AND MAGNETISM**	**10**	**12**
	4.1 ELECTRICITY 4.1.1 Concept of charge, Coulomb's inverse square law, 4.1.2 Electric field, Electric field intensity 4.1.3 Electric potential and potential difference 4.1.4 Electric current, Resistance, Ohm's law 4.1.5 Specific resistance 4.1.6 Resistances in series and parallel 4.1.7 **Simple Numerical problems**	(06)	(08)
	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)
CO: CCH101-5 Apply principles of optics to solve engineering problems			
5	**OPTICS**	**14**	**18**
	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**	(06)	(08)
	5.2 LASER 5.2.1 Introduction of LASER 5.2.2 Properties of laser 5.2.3 Spontaneous and stimulated emission	(04)	(06)

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
	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**	(04)	(04)
CO: CCH101-6 Apply principles of fiber optics for related engineering applications			
6	**FIBER OPTICS** 6.1 Optical communication link 6.2 Principle of optical fiber (TIR) 6.3 Structure of optical fiber 6.4 Propagation of light in optical fiber 6.5 Advantages of optical fibers over conventional metal conductors 6.6 Applications of optical fibers **No numericals on above topic**	**06**	**06**

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

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

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

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

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

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

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks	CO
		Remember	Understand	Apply		
I / 1	Units and measurements	2	4	6	12	CCH101-1
I / 2	Introduction to	2	2	4	08	CCH101-2

	Semiconductors and Nanotechnology					
I / 3	Properties of matter (Elasticity and Viscosity)	4	2	8	14	CCH101-3
II /4	Electricity and Magnetism	2	4	6	12	CCH101-4
II /5	Optics (Properties of light, Laser & X-rays)	6	6	6	18	CCH101-5
II / 6	Fiber Optics	2	2	2	06	CCH101-6
	Total Marks				70	

I :-Assessment Criteria
i) Formative Assessment of Practical:-

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

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

ii) Summative Assessment of Practical :

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

Sr.no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Preparedness for practical	05
3	Neat & complete Diagram / observation table	05
4	Observations / Calculations / Result / Graph	05
5	Safety / use of proper tools	05
TOTAL		**25**

iii) Assessment of SLA :-
Every Self-learning assignment shall be assessed for 25 marks as per following criteria:

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

J) Instructional Methods:

1. Lectures cum Discussions
2. Regular Home Assignments
3. Laboratory work
4. Use of projector and soft material for demonstration

K) Teaching and Learning resources:

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

L)   Reference Books:

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

M) Learning Website & Software

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

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COURSE NAME   **: BASIC MATHEMATICS**
COURSE CODE   **: CCH105**
COURSE ABBREVIATION   **: HBMT**

C. LEARNING SCHEME:

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

B: ASSESSMENT SCHEME :-

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

(Total IKS Hrs for Sem.: 04 Hrs)

C: ABBREVIATIONS:-CL-ClassRoomLearning,TL-TutorialLearning,LL-LaboratoryLearning,SLH-SelfLearningHours,NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA -Self Learning Assessment
Legends:@Internal Assessment, #External Assessment,*#OnLine   Examination,@$Internal Online Examination(TNR 12 font)

FA-TH represents average of two class tests of 30 marks each conducted during the semester.
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.
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.
Notional Learning hours for the semester are (CL+LL+TL+SL) hrs.*15Weeks
1(one) credit is equivalent to 30 Notional hrs.
 *Self learning hours shall not be reflected in the Time Table.
*Self learning includes micro project /assignment/other activities. (The list of all   assignments are given in tabular format. At least 6 to 8 assignments to be given)

D. i) RATIONALE:-

Mathematics is an important prerequisite for the development and understanding of engineering and technological concepts. For an engineer and technologist, knowledge of mathematics is an effective tool to pursue and master the applications in the engineering and technological fields. Algebra provides the language and abstract symbols of mathematics. The topic Matrices is helpful for finding optimum solution of system of simultaneous equations which are formed in the various branches of engineering using different parameters .Trigonometry is the study of triangles and angles.

Contents of this subject will form foundation for further study in mathematics. Statistics can be defined as a type of mathematical analysis which involves the method of collection and analyzing the data and summing of the data in numerical form for a given set of real world observations. Calculus is a branch of mathematics that calculates how matter ,particles and heavenly bodies actually move. Derivatives are useful to find maxima & minima of a function, velocity & acceleration are also useful for many engineering problems. Hence the course provides the insight to analyze engineering problems scientifically using logarithms, matrices, trigonometry, straight line ,differential calculus and statistics.

ii) Competency:
Apply principles of Basic Mathematics to solve industry based technology problems.

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

G. COURSE LEVEL LEARNING OUTCOMES (COS)

CCH105-1 : To Apply concepts of algebra to solve engineering related problems

CCH105-2 : To Use techniques and methods of statistics to compare multiple sets of data

CCH105-3 : Solve area specific engineering problems under given conditions of straight lines

CCH105-4:- To memorize trigonometric formulae and solve problems based on them.

CCH105-5:- To solve the problems of maxima, minima, radius of curvature and geometrical applications.

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

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

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

H. CONTENT:

II)   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 Logarithms based on given application	CCH105-1
2	Solve elementary problems on Algebra of Matrices	CCH105-1
3	Solve simultaneous equations using Matrix inversion method	CCH105-1
4	Resolve into Partial Fractions using linear non repeated, repeated and irreducible quadratic factors	CCH105-1
5	Practice problems on equation of straight lines using different forms, Solve problems on perpendicular distance, distance between two parallel lines and angle between two lines	CCH105-3
6	Solve problems on finding range, coefficient of range and mean deviation	CCH105-2
7	Solve problems on Standard deviation, coefficient of variation and comparison of two sets	CCH105-2
8	Solve problems on Allied & Compound angles	CCH105-4
9	Solve problems on Multiple & sub multiple angles	CCH105-4
10	Solve problems on factorization & De- factorization formulae	CCH105-4
11	Solve problems on Inverse Trigonometric Functions	CCH105-4
12	Solve examples on functions & rules of derivatives	CCH105-5
13	Solve examples on Derivative of composite function ,inverse & parametric functions,	CCH105-5
14	Solve examples on Derivative of exponential, implicit and logarithmic functions	CCH105-5
15	Solve examples on Application of Derivatives	CCH105-5

II)Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CCH105-1 : To Apply concepts of algebra to solve engineering related problems			

Unit 1 Algebra	**1.1 LOGARITHMS**
	    1.1.1 Concept and laws of logarithm
	    1.1.2 Simple examples based on laws of Logarithms
	1.2 MATRICES
	    1.2.1 Definition of a matrix, Types of matrices, Algebra of matrices, Equality of two matrices, Transpose of a matrix,
	    1.2.3 Adjoint and Inverse of a matrix
	    1.2.4 Solution of simultaneous equations having 3 unknowns using Matrix inversion method
	1.3 PARTIAL FRACTIONS
	    1.3.1 Definition of rational, proper and improper fractions
	    1.3.2 Various cases of Partial fractions and Examples
	 1.4 Algebra of Indian Knowledge System: Solution of simultaneous equations using Vedic Mathematics
		12	16

CCH105-2 : To Use techniques and methods of statistics to compare multiple sets of data			
Unit 2 Statistics	**MEASURES OF DISPERSION** 2.1 Range,Coefficient of Range of Discrete and grouped data 2.2 Mean deviation and Standered Deviation aboutmean for Discrete & Grouped Data (except Assumed mean method and Step deviation method) 2.3 Variance and coefficient of Variance 2.4 Comparison of 2 sets of observations	6	10
CCH105-3 : Solve area specific engineering problems under given conditions of straight lines			
Unit 3 Coordinate Geometry	**THE STRAIGHT LINE** 3.1 Slope, intercepts & various methods of finding slope 3.2 Conditions for two straight lines to be parallel and Perpendicular to each others 3.3 Various forms of straight line 3.4 Perpendicular distance of a point from a line 3.5 Distance between two parallel lines 3.6 Angle between two straight lines 3.7 Geometry in Sulabh sutras in Indian Knowledge System	6	8

Section –II

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

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

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

G : List of Micro project /Assignments under SLA

Sr.No	List of Assignment (under SLA)
1	Create a function that takes a matrix as input and returns its inverse matrix if it exists. Also implement a program that finds the inverse of a square matrix.
2	Collect the Data of Marks obtained by your class in mid semester test. Compute the variance and coefficient of variance of the data and interpret the result using the free open source software ORANGE.
3	Prepare models using matrices to solve simple problems based on cryptography.
4	Collect Model on quality control analysis ,energy efficiency assessment ,environmental monitoring ,and process optimization for these models, analyse data and calculate variance and S.D. ,make a presentation including short videos.
5	Prepare a model using the concept of tangent and normal, bending of curves in case of sliding of a vehicle.Express geometrically the same through any open sourse software
6	Prepare charts of grouped and ungrouped data.
7	Collect statistical data on real world problems and find Mean Deviation & S.D.
8	Collect at least 10 examples based on real world applications which will be used to find S.D. /Variance.
9	Prepare models to explain different concepts.
10	Prepare a model using concept of radius of curvature of bending of railway tracks.
11	A window in the form of rectangle surmounted by a semicircular opening . The total perimeter the window to admit maximum light through the whole opening ,prepare a model using concept of Maxima & Minima for the above problem and verify the result.
12	Collect applications of radius of curvature on lens design and optics, mirror and reflective surface properties , road and highway design , structural behavior, roller coaster track design & make a video of 5- minutes duration.
13	Design a puzzle based on matrices . Create a grid of numbers and operations.

14	Develop a math game based on operations of matrices.
15	Collect examples based on real world applications of logarithm and prepare a pdf file.
16	Measure height of trees/buildings in surrounding locations using trigonometry and prepare presentation.
17	Apply trigonometric principles to calculate angles ,distances, dimensions relevant to the chosen area and make a poster presentation.
18	Find height of room or distance between two pillars by using concept of straight line.

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

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

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks	CO
		Remember	Understand	Apply		
I / 1	Algebra	2	6	6	14	CCH105-1
I / 2	Statistics	2	4	6	8	CCH105-2
I / 3	Coordinate Geometry	2	2	4	8	CCH105-3
II /4	Trigonometry	2	6	6	14	CCH105-4
II /5	Differential Calculus	2	6	8	20	CCH105-5
II/6	Application of Derivatives	2	2	2	6	CCH105-5
	Total Marks				70	

I) Instructional Methods:

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

J) Teaching and Learning resources:

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

K) Reference Books:

S.N.	Name of Book	Author	Publication
11	Electrical Technology Vol-II	Theraja B.L.	S. Chand, New Delhi, 2012 or latest
12	Electrical Machines	Despande M.V.	PHI Learning,, New Delhi,

			2012 or latest
13	Electrical Technology	Uppal, S.L.	Khanna Publication, New Delhi, 2012 or latest
14	Electrical Machine	Nagrath I.J. a Kothari, D.P.	Tata McGraw Hill, New Delhi, 2012 or latest
15	Electrical Machine-I	Gupta, J. B.	S. K. Kataria& Sons, New Delhi, 2012 or latest

L) Learning Website & Software

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

Course Name   :ENGINEERING GRAPHICS & AUTO-CAD
Course Code   :CCH107
Course Abbreviation : HGRA
Course Type   :DSC

D. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	**Classroom Learning**	**02**	**2**
	Tutorial Learning	**00**	
	Laboratory Learning	**02**	
	SLH-Self Learning	**-**	
	NLH-Notional Learning	**04**	

Assessment Scheme:

Theory				Based on LL & TL				Based on Self Learning		Total Marks
				Practical						
FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
--	--	--	--	50	20	50 @	20	-	-	100.

Total IKS Hrs for Semester:02 Hrs.
Abbreviations: CL- ClassroomLearning, 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

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

2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.

3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.

4. Notional Learning hours for the semester are (CL+LL+TL+SL) hrs.* 15 Weeks

5. 1(one) credit is equivalent to 30 Notional hrs.

6. * Self learning hours shall not be reflected in the Time Table.

D. RATIONALE: -

The electrical technician / supervisor are called upon to draw or interpret drawings of electrical systems that include machines, control panels, power system components such as transmission and distribution systems etc. This course aims to provide hands on practice in freehand sketches; drawing using relevant tools and

computer based software. The course also provides practice to read and interpret electrical engineering drawings.

E. 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:

"Prepare engineering drawing using prevailing drawing instruments& Use CAD for creating and editing electrical engineering related drawings".

Course Outcomes:

CCH107-1. Draw symbolic representation of electrical components manually.

CCH107-2. Sketches, isometric and orthographic views of electrical machines and components.

CCH107-3- Use free hand drawing and sketches to draw simple electrical objects.

CCH107-4. Use CAD tools to draw simple electrical objects.

CCH107-5. Create electrical CAD drawings.

CCH107-6. Edit electrical drawings in CAD.

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" : no correlation]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1 Maintain various types of electrical equipments	PSO2 Maintain various sections of electrical power systems
Competency The aim of this course is to help the student to attain the following industry and field related competency; Use CAD for creating and editing electrical engineering related drawings	3	-	2	3	-	1	2	2	2
CCH107-1. Draw symbolic representation of electrical components manually.	3	1	3	3	-	2	3	3	3
CCH107-2. Sketches, isometric and orthographic views of electrical machines and components.	3	2	3	3	-	3	2	3	3
CCH107-3. Use free hand drawing and sketches to draw simple electrical objects.	3	3	3	3	-	3	1	2	2

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Develop ment of solutions	PO 4 Engineeri ng Tools, Experime ntation and Testing	PO 5 Engineerin g Practices for society, sustainabili ty and Environme nt	PO 6 Project Manage ment	PO 7 Life-long Learnin g	PSO1 Maintain various types of electrical equipme nts	PSO2 Maintain various sections of electrical power systems
CCH107-4. Use CAD tools to draw simple electrical objects	3	2	3	3	-	3	3	1	1
CCH107-5.Create electrical CAD drawings	3	2	3	3	-	2	3	3	3
CCH107-6 Edit electrical drawings in CAD	3	2	3	3	-	2	3	3	3

F. CONTENT
I) LAB AND PRACTICAL WORK:
Practical Exercises and related skills to be developed:

The following practical exercises shall be conducted as Term Work as detailed inpractical sessions of batches of about 22 students

Sr. No.	Practical Exercises	Course Outcomes
	Using manual drawing tools	
1.	Names & Letters	CCH107-01
2	Draw different electrical (including electronics) symbols using drawing Instruments as per IS: 1032 or new equivalent IS.	CCH107-01
3	Draw the orthographic Projection of Machine parts or electrical components.	CCH107-2
4	Draw the isometric Projection of Electrical Machine parts or electrical Components.	CCH107-02
5	Draw the freehand drawing of Machine parts and electrical Components	CCH107-03
6	Draw labeled layouts of two types of electrical earthing systems.	CCH107-03
	Using CAD software	
8.	Locate components of CAD classic screen by creating new drawing: a. CAD screen layout, drawing area, menu and toolbars, status bar Working with toolbar and commands, changing drawing limits, creating rectangle etc. saving drawing for first time	CCH107-04
9.	Draw a line diagram using absolute coordinate method. Use LIMITS, UNITS, LINE, ARC Commands:	CCH107-05

	a. Absolute coordinate method	
	b. Drafting set-up: units, angle, area, coordinate system, limits, grid, object snap	
	c. Creating two dimensional drawings using draw commands- line and arc.	
10.	Draw a line diagram using relative coordinate and relative polar coordinate method. Use LIMITS, UNITS, LINE, ARC, Commands: a. Relative coordinate and relative polar coordinate method b. Draft set-up: units, angle, area, coordinate system, limits, grid, object snap c. Create two dimensional drawings using draw commands-line and arc.	CCH107-05
11.	Draw a 2D figure using Draw and Modify commands. Use LINE, CIRCLE, OFFSET, TRIM, FILLET commands: a. Create two dimensional drawings using draw commands- line and circle b. Modify two dimensional drawings using modify commands- offset, trim, fillet	CCH107-05
12.	Draw a 2D figure using Draw and Modify commands. Use LINE, ARC, POLYGON, ELLIPSE, COPY, MIRROR, TRIM, ROTATE, CHAMFER commands: a. Create two dimensional drawings using draw commands- line, arc, polygon, and ellipse. b. Modify two dimensional drawings using modify commands- copy, Mirror, trim, rotate, chamfer	CCH107-05
13.	Draw isometric drawing of electrical machine. Use LIMITS, UNITS, ZOOM, GRID, SNAP, LINE, COPY, ISOPLANE, ELLIPSE, TRIM, ERASE, PROPERTIES, SAVE commands, a. Draft set-up: units, limits, zoom, grid, object snap, ortho mode b. Snap and grid- snap spacing, grid spacing, isometric snap type	CCH107-05
14.	Create a simple drawing using electrical CAD software for the given electrical circuit diagram	CCH107-06
15.	Create a simple drawing using electrical CAD software for the given Single line diagram of various simple wiring	CCH107-06

II) THEORY			
SECTION – I			
Sr. N o	Topics	Teaching (Hours)	Theory Evaluatio n Marks
Course Outcome **CCH107-1** *Understand various fundamentals in engineering drawing*			
1.	**INTRODUCTION TO ENGINEERING DRAWING** 1.1 Drawing Instruments and their uses 1.2 Standard sizes of drawing sheets as per ISO – "A" series, Layout of Sheet(* IKS) 1.3 Letters and numbers (single stroke vertical), Convention of lines and their applications. 1.4 Dimensioning Technique as per SP-46 (Latest Edition), Elements of dimensioning, Types and applications of chain, parallel and Co-ordinate dimensioning	**03**	

Course Outcome **CCH107-2** *Draw the orthographic projections & Isometric projections of objects and machine components*			

2.	**Introduction of Orthographic Projections & Isometric Projections**
	2.1 First and Third angle Projection Method
	  2.2 Conversion of Pictorial view into orthographic Views.
	   (First angle Projection Method Only)
	   2.3 Orthographic projections of simple parts.
	   2.4 Introduction of isometric projections, isometric scale & natural scale.
	   2.5 Isometric view& Isometric projections of simple parts.
	   2.6 Isometric Projections of Electrical Machine parts or electrical components.
		09	

Course Outcome **CCH107-3***Draw free hand sketches & single line diagram of simple electrical engineering components*			
3.	**Free hand sketches & single line diagram** 3.1 Need for free hand sketching with its importance. 3.2 Freehand sketches of electrical machine parts or electrical components. 3.3 Single line diagram of various simple wiring. 3.4 Basic of earthing (*IKS) 3.5 Draw labeled layouts of two types of electrical earthing systems.	**03**	

SECTION – II			
Sr. N o	**Topics**	**Teaching (Hours)**	**Theory Evaluatio n Marks**
Course Outcome **CCH107 -4** *Use CAD tools to draw simple electrical objects.*			
4.	4.1Components of CAD classic screen, Identify components of CAD classic screen. 4.2Menu bar and status bar. Identify components of CAD screen. 4.3CAD tool bar. 4.4Identify toolbar and commands(*IKS)	**03**	
Course Outcome **CCH107-***5* *Create electrical CAD drawings*			
5.	5.1Absolute Coordinate Method: Commands: LIMITS, UNITS, LINE and ARC. Interpret line diagram using absolute coordinate method. 5.2Relative coordinate Method: Commands: LIMITS, UNITS, LINE and ARC. Interpret line diagram using relative coordinate and relative polar coordinate method. 5.3Relative polar coordinate method: Commands: LIMITS, UNITS, LINE and ARC. Interpret 2D figures using Draw and Modify commands. Use commands in CAD. 5.4 D figures: Commands: LINE, CIRCLE, OFFSET, TRIM,FILLET, ARC, POLYGON, ELLIPSE, COPY, MIRROR, TRIM, ROTATE and CHAMFER,. 5.5Isometric drawings: commands: LIMITS, UNITS, ZOOM, GID, SNAP, LINE, COPY, ISOPLANE, ELLIPSE, TRIM, ERASE,PROPERTIES and SAVE. 5.6 Interpret isometric drawing of electrical machine in CAD(*IKS)	**08**	
Course Outcome **CCH107-6** *Edit electrical drawings in CAD.*			
6.	Applications of electrical CAD software to: Draw circuit diagrams and layouts. 6.1 Use of electrical CAD to draw the given electrical circuit diagram. 6.2 Use electrical CAD to draw layouts of two types of earthing systems	**04**	

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

G: List of Assignments under SLA

……………..Not applicable ………

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	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	Marksallotted
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:
6. Lectures cum Demonstrations,
7. Classroom practices.
8. Use of projector and soft material for demonstration

K) Teaching and Learning resources:
Chalk board, LCD presentations, Demonstrative kits, Demonstrative charts.

L) REFERENCE MATERIAL:

a) Reference Books:

Sr. No.	Author	Title	Publisher
1.	N. D. Bhatt	Engineering Drawing	Charotar Publishing House 2010
2.	Amar Pathak	Engineering Drawing	Dreamtech Press, 2010
3.	D.Jolhe	Engineering Drawing	Tata McGraw Hill Edu., 2010
4.	M.B.Shah,	Engineering Drawing	Pearson, 2010

	B.C.Rana		
5.	K. Venugopal	Engineering Drawing and Graphics + AutoCAD	New Age Publication, Reprint 2006
6.	IS Code, SP – 46	Engineering Drawing Practice	Bureau Of Indian Standards

b) Web References:

i)   http://www.design-technology.info/IndProd/drawings/

ii)   http://graphicalcommunication.skola.edu.mt/syllabus/engineering-drawing/

iii) http://en.wikipedia.org/wiki/Engineering_drawing

iv)   http://www.engineeringdrawing.org/

v)   http://www.teachengineering.org/view_activity

vi) www.howtoread.co.in/2013/06/how-to-read-ed.html

vii) http://www.slideshare.net/akhilrocker143/edp

viii)   http://www.24framesdigital.com/pstulpule

* * *

Course Name : **Fundamentals of ICT (CE/ME/EE/MT/ET/IT)**

Course Code : **CCH202**

Course Abbreviation : **HICT**

1. TEACHING-LEARNING & ASSESSMENT SCHEME :

Scheme component	Hours / week	Credits
Theory	1	2
Practical	2	

Course Code	Course Title	Abbr	Course Category /s	Learning Scheme					Credits	Paper Duration	Assessment Scheme											Total Marks
				Actual Contact Hrs./Week			SLH	NLH			Theory				Based on LL & TSL				Based on SL			
				CL	TL	LL					FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA			
														Practical							
											Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
CCH202	FUNDAMENTALS OF ICT	ICT	SEC	1	-	2	1	4	2		-	-	-	-	25	10	25@	10	25	10	75

Total IKS Hrs for Sem. : 01 Hrs

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

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

Note :

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

♦ **Candidate remaining absent in practical examination of any one part of Basic Science course i.e. Physics,Chemistry will be declare as Absent in Mark List and has to appear for examination. The marthe part for which candidate was present will not be processed or carried forward.**

2. 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.

3. COMPETENCY:

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

Cognitive: i) State the basic parts of a computer system and relationships among component. ii) 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

4. 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 Spreadsheet
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

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

Course Outcomes (COs)	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

6. 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 with files and folders	1.1 Identify various Input/output devices, connections and peripherals of computer system 1.2 Work with Computer System, Input/output devices, and	CCH202-1
2.	Work with document files: a) Create, editand save document in Word Processing. b) Text, lines and paragraph levelformatting	2.1 Create and manage worddocument. 2.2 Apply formatting features on 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, andprinting. 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	CCH202-3

		andcolumns 6.3 Apply alignment feature on cell	
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 inSpreadsheet.	8.1 Implement data Sorting, Filtering and Data validation features in a worksheet.	CCH202-3
9	Charts for Visual Presentation in Spreadsheet.	9.1 Create charts using various chartoptions in spreadsheet.	CCH202-3
10	Worksheet Printing.	10.1 Print the worksheet by applyingvarious print options for worksheet	CCH202-3
11	Make Slide Show Presentation.	11.1 Apply design themes to the 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 inpresentation	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 Internet and 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	CCH202-6

		usingdifferent options	

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

Self Learning

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

Assignment

Prepare journal of practical performed in the laboratory.

Micro project

The micro project has to be industry application based, internet-based, workshop-based, laboratory-based o based as suggested by Teacher. 1) Perform a survey on various input and output devices available in market aits report. 2) Prepare Time Table, Prepare Notes on Technical Topics, Reports, Bio data with covering letter (S teacher shall assign a document to be prepared by each students) 3) Prepare slides with all Presentation feature as: classroom presentation, presentation about department, presentation of Technical Topics. (Subject teacher assign a presentation to be prepared by each student). 4) Student Mark sheet, 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 any industry ChatGPT/any other AI tool.

8. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications
1	a) Computer System with all necessary Peripherals and Internet connectivity. b) Any Office Software c) Any Browser (Any General Purpose Computer available in the Institute)

9. 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), Memory Unit 1.2 Internal components: processor, motherboards, randomaccess memory (RAM), read-only memory (ROM), video cards, sound cards and internal hard disk drives)	2

Sr. No.	Topics / Sub-topics	Lectures (Hours)
	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, device drivers, operating system	
	1.5 Network environments: network interface cards, hubs,switches, routers and modems, concept of LAN, MAN, WAN, WLAN, Wi-Fi and Bluetooth	
	1.6 Working with Operating Systems: Create and manage file and folders, Copy a file, renaming and deleting of filesand folders, Searching files and folders, application installation, creating shortcut of application on the desktop.	

Course Outcome CCH202-2 - Prepare Business document using Word Processing Tool.

Sr. No.	Topics / Sub-topics	Lectures (Hours)
2	**Word Processing** 2.1 Word Processing: Overview of Word processor Basicsof Font type, size, colour, Effects like Bold, italic, underline, Subscript and superscript, Case changing options, Previewing a document, Saving a document, Closing a document and exiting application. 2.2 Editing a Document: Navigate through a document,Scroll through text, Insert and delete text, Select text, Undo and redo commands, Use drag and drop to move text, Copy, cut and paste, Use the clipboard, Clear formatting, Format and align text, Formatting 2.3 Changing the Layout of a Document: Adjust page margins, Change page orientation, Create headers and footers, Set and change indentations, Insert and clear tabs 2.4 Inserting Elements to Word Documents: Insert and delete a page break, Insert page numbers, Insert the dateand time, Insert special characters (symbols), Insert a picture from a file, Resize and reposition a picture 2.5 Working with Tables: Insert a table, Convert a table totext, Navigate and select text in a table, Resize table cells,Align text in a table, Format a table, Insert and delete columns and rows, Borders and shading, Repeat table headings on subsequent page Working 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, Column widths, Adjust	3

Sr. No.	Topics / Sub-topics	Lectures (Hours)
	Course Outcome CCG201-3: Design files of word processors, spreadsheets, presentation software, and database application.	
3	**Spreadsheets** 3.1 Working with Spreadsheets: Overview of workbook and worksheet, Create Worksheet Entering sample data, Save, Copy Worksheet, Delete Worksheet, Close and openWorkbook. 3.2 Editing Worksheet: Insert and select data, adjust row height and 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 Page Breaks, S 3.4 Working with Formula: Creating Formulas, CopyingFormulas, 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 editing charts. 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 Graphical Objects to a Presentation - Insert Images into aPresentation, insert audio clips, video/animation, Add Shapes, Add Visual Styles to Text in a Presentation, Edit Graphical Objects on a Slide, Format 4.3 Working with Tables: Insert a Table in a Slide, FormatTables, and Import Tables from Other Office Applications. Working with Charts: Insert Charts in a Slide, Modify Chart, Import Charts from Other Office Applications.	4

Sr. No.	Topics / Sub-topics	Lectures (Hours)
	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 effectively for 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

10. **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

11. 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**

12. INSTRUCTIONAL STRATEGIES:
Instructional Methods:

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

Teaching and Learning resources:
1. Chalk board 2.Slides(PPT) 3. Self-learning Online Tutorials

13. REFERENCE MATERIAL:
a) Books / Codes

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, Windows 10	QUE Publishing; 8th edition August 2015, ISBN: 978-0789754516
3	Alvaro Felix	Linux: Easy Linux for Beginners	CreatevSpace Independent Publishing Platform- 2016, ISBN-13: 978-1533683731
4	Johnson Steve	Microsoft Office 2010: On Demand	Pearson Education, New Delhi India, 2010. ISBN :9788131770641
5	Schwartz Steve	Microsoft Office 2010 for Windows: Visual Quick Start	Pearson Education, New Delhi India, 2012, ISBN : 9788131766613
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

Sr.No	Link / Portal	Description
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
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

***

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

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	00	1
	Tutorial Learning	00	
	Laboratory Learning	01	
	SLH-Self Learning	01	
	NLH-Notional Learning	2	

B. ASSESSMENT SCHEME :-

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

       (Total IKS Hrs for Semester: 01Hr)

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

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

Note :

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

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

C. **RATIONALE**

Diploma Graduate needs a sound body and mind to face the challenging situations in career as employee or as an entrepreneur. Yoga and Meditation brings about the holistic development of an individual and equips with necessary balance to handle the challenges. The age of polytechnic student is appropriate to get introduced to yoga practice as this will help them in studies as well as his professional life. Moreover, Yoga inculcates discipline in all walks of the life of student. Pranayama practice regulates breathing practices of the student to improve stamina, resilience. Meditation empowers a student to focus and keep calm to get peace of mind.

World Health Organization (WHO) has also emphasized the role of yoga and meditations stress prevention measure. National Education Policy -2020 highlights importance of yoga and meditation amongst students of all ages. Therefore, this course for Diploma students is designed for the overall wellbeing of the student and aims to empower students to adopt and practice Yoga in daily life.

D. INDUSTRY/EMPLOYEREXPECTEDOUTCOME

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

E. COURSE LEVEL LEARNING OUT-COMES (COs)

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

CCH203-1 Practice basic Yoga and Pranayam in daily life to maintain physical and mental fitness.
CCH203-2- Practice meditation regularly for improving concentration and better handling of stress and anxiety.
CCH203-3- Follow healthy diet and hygienic practices for maintaining good health.

Competency, course outcomes and programme outcomes/programme specific outcomes
(cp-co-po/pso) matrix
[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"

Course Outcomes(COs)	PO-1Basic andDisciplineSpecificKnowledge	PO-2 ProblemAnalysis	PO-3 Design/DevelopmentofSolutions	PO-4 EngineeringTools	PO-5 EngineeringPracticesforSociety,SustainabilityandEnvironment	PO-6Project Management	PO-7 LifeLongLearning	PSO-1	PSO-2	
								ProgrammeSpecificOutcomes*(PSOs)		
CO1	-	-	-	-	3	-	1	-	-	
CO2	-	-	-	-	3	-	1	-	-	

CO3	-	-	-	-	3	-1	-	-	

Legends:-High:03,Medium:02,Low:01,NoMapping:-
*PSOs are to be formulated at institute level

F. CONTENT:

III) Practical exercises

Sr .No	Laboratory Experiment/PracticalTitles/TutorialTitles	Learning Of hrs.	Relevant COs
1	Introduction:- 1.1 Introduction to AshtangYog 1.2 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)Nack Movement ii)Shoulder Movement iii) Trunk Movement iv)Knee Movement v) Ankle Movement	03	CCH203-1
2	Lab Exp: 2. After warm up, perform all the postures of Surya Namaskar one by one in a very slow pace, Lab Exp 3. Perform multiple Surya-Namaskar (Starting with three and gradually increasing it to twelve) in one go. (Experiment 2to 4 must be followed by shavasana for self relaxation.)	4	CCH203-1,CCH203-2
3	Lab Exp: 4 Perform Sarvangasna,Halasana,Kandharasana (setubandhasana) , Uttanpadasan, Pavanmuttasan. LabExp:5 Perform Bhujangasana,Naukasana,Mandukasana. LabExp:6 Perform Shalbhasan, Dhanurasan, Vakrasan, Goumukhasan, Paschimottasana, Ardhamasendrasan LabExp: 7 PerformVeerasan, Veer-Bhadrasana, Vrukshasana, Trikonasana. (Follow up experiment 5 to7 with shavasana for self relaxation)	4	CCH203-2
4	Lab Exp: 8 Perform Deepbrathing , Anulom Vilom Pranayam Kriya LabExp:9 Practice Kapalbhati Pranayam Kriya, Bhastrika LabExp:10 Practice Bhramary Pranayam and Sheetali Pranayam	2	CCH203-3
5	Lab Exp: 11 Perform sitting in Dhyan Mudra and meditating. Start with five minute and slowly increasing to higher durations. Introduction to Vippasanna , Anappan& Chakras. (Trainer will explain the benefits of Meditation before practice)	2	CCH203-3

III) Theory : (Not Applicable)

Section I NA

Section –II NA

G. List of Assignments under SLA

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

- Maintain a diary indicating date wise practice done by the student with a photograph of selfi in yogic posture. Prepare Diet for and nutrition chart self

Assignment:

Prepare Diet for and nutrition chart for your self

- Self-Learning

  - Practice atleast thrice a week.
  - Read booksondifferentmethodstomaintainhealth,wellnessandtoenhancemood
  - Watch videos onYogaPractices.

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

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

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks	CO
		Remember	Understand	Apply		
NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA

I. Assessment Criteria

i) **Formative Assessment of Practical:-**

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

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

ii) Summative Assessment of Practical: NA

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

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

J. Instructional Methods:

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

K. Teaching and Learning resources:

Presentations, Yoga kits, Demonstrative charts, Actual Practice demonstration

L. Reference Books:

S. N.	Name of Book	Author	Publication
1	Patanjalis Yoga Sutras	SwamiVivekananda	Fingerprint Publishing (2023) Prakash BooksIndiaPvtLtd,NewDelhiISBN-13?:?978-9354407017
2	Yoga for Every Body: A beginner's guide to the practice of yoga	LuisaRay,AngusSutherland	VitalLifeBooks (2022) ISBN-13?:?978-1739737009

	postures, breathing Exercises and me		
3	Mudras for Modern Living: 49inspiring cards to boost your health, enhance your yoga and deepen your mind	Swami Saradananda	WatkinsPublishing(2019) ISBN-13?:?978-1786782786
4	The Relaxation and Stress Reduction Workbook	Martha Davis, ElizabethRobbi ns,MatthewMc Kay,Eshelman MSW	ANewHarbingerSelf-HelpWorkbook(2019)
5	Science of Yoga: Understand the Anatomy and Physiology to Perfect Your Practice	AnnSwanson	ISBN-13?:?978-1465479358

M) Learning Website & Software

1   https://onlinecourses.swayam2.ac.in/aic19_ed28/preview- introduction to Yoga and Applications of Yoga

2   https://onlinecourses.swayam2.ac.in/aic23ge09/preview - YogaforCreativity

3   https://onlinecourses.swayam2.ac.in/aic23   e05/preview- YogaforCreativity

4   https://onlinecourses.nptel.ac.in/noc2lhs29/preview- Psychology of Stress, Health and Well-being

5   https://onlinecourses.swayam2.ac.in/ncel9sc04/preview-Food Nutrition for Healthy Living Course — Swayam

6.https://onlinecourses.swayam2.ac.in/aic2306/ preview- yoga for memory development

Course Name : **FUNDAMENTALS OF ELECTRICAL ENGINEERING**
Course Code : **EEH101**
Course Abbreviation : **HFEE**
Course Type :**DSE**

A. TEACHING-LEARNING & ASSESSMENT SCHEME :

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

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

Total IKS = 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

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

  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.

  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.

  Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks

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

  * 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)

B.. RATIONALE:

The Diploma Course in Electrical Engineering mainly involves the study of Electrical machines, equipments and instruments. In order to understand the working principle, construction, operation and applications of the various Electrical machines, equipments and instruments; the basic concepts, rules and laws of Electric and Magnetic Circuits be understood by the students of Electrical Engineering Course.

This subject will help the students to study, understand and comprehend the fundamentals of various facts, the basic concepts, rules and laws of Electric and Magnetic Circuits. This subject is classified as Engineering Science subject.

C.COMPETENCY:

"Use basic principles of electrical engineering in electrical system."

Cognitive: Understand electrical charges, magnetism and electromagnetism.

Psychomotor: Use the basic electrical components in various applications.

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

E. COURSE LEVEL LEARNING OUTCOMES (COS)

COURSE OUTCOMES:

EEH101-1: Apply the principles of electricity in different applications.

EEH101-2: Solve simple resistive networks in electrical engineering applications.

EEH101-3: Use by calculations relevant capacitors in electric circuits.

EEH101-4: Apply the principles of electromagnetism due to conductors and coils with currents

EEH101-5: Solve magnetic circuits used in electrical machine/device applications.

EEH101-6: Use the principles of electromagnetic induction in electrical engineering applications.

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

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

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO2
	Basic and discipline specific knowledge	Problem Analysis	Design/Development of solutions	Engineering Tools,experimentation and testing	Engineering practices for society, sustainability and environment	Project Management	Lifelong Learning	Maintainace of equipment	Maintance of sections of electrical
COMPENTENCY-Apply Fundamental knowledge of electrical engineering and maintain computer network in healthy condition	3	1	1	2	1	-	1	-	-
EEH101-1	3	-	-	2	-	-	1	-	-
EEH101-2	3	1	-	2	-	-	1	-	-
EEH101-3	3	-	-	-	-	-	1	-	-
EEH101-4	3	-	-	-	-	-	1	-	-
EEH101-5	3	1	1	2	1	-	1	-	-
EEH101-6	3	1	-	2	1	-	1	-	-

F. CONTENT
I) Practical exercises

Laboratory experiments and related skills to be developed:

Sr. No.	Title of Experiment	Skills to be developed	Course outcome
1.	Introduction to electrical Laboratory	Identify different types of electrical supply sources, equipments. Interpret circuit diagram.	EEH101-1
2.	Use Ohm's Law to determine current in simple circuit.	. Connect the various components as per thecircuit diagrams by using wires. . Calculate the resistance from the	EEH101-1
3.	Observe the effect of temperature on resistance of copper	Calculate temperature coefficient of material.	EEH101-1
4.	To verify current division in parallel resistive circuit	. Connect the various components as per the circuit diagrams by using wires. . Verify theoretical and practical reading.	EEH101-2
5.	To verify voltage division in seriesresistive circuit.	. Connect the various components as per the circuit diagrams by using wires. . Verify theoretical and practical reading.	EEH101-2
6.	To verify Kirchhoff's current law(KCL)	Connect the various components as per the circuit diagrams by using wires. . Verify theoretical and practical reading.	EEH101-2
7	To verify Kirchhoff's Voltage Law(KVL)	Connect the various components as per the circuit diagrams by using wires. . Verify theoretical and practical reading.	EEH101-2
8	To plot the B H curve for a given magnetic material and determine therelative Permeability	. Connect the various components as per thecircuit diagrams by using wires . Plot the B-H curve from the readings . Determine the relative Permeability of thematerial.	EEH101-5
9	a) Use Faraday first law of electromagneticinduction to analyze behavior of statically induced emf in given circuit. Verify Faraday's law of electromagneticinduction.	. Connect the apparatus as per the circuit diagrams . . Observe the deflection of galvanometer with respect to magnitude & direction. . Analyze the observations.	EEH101-6
10	b)Use Faraday first law of electromagnetic induction to analyse behavior of dynamically induced emf ina given circuit.	. Connect the apparatus as per the circuit diagrams . . Observe the deflection of galvanometer with respect to magnitude & direction. . Analyze the observations.	EEH101-6

II) THEORY

SECTION I

Sr. No.	Topics / Sub-topics	Lecture (Hours)	Theory Evaluation(Marks)
EEH101-1 Apply the principles of electricity in different applications.		

1	**ELECTRICITY CONCEPT**
	#Generation of Electricity in India (IKS Learning)
	1.1 Electric Charge
	1.4 Electric Potential
	1.5 Electric Current
	1.6 Electromotive Force(EMF)
	1.7 Resistance and resistivity.
	1.7.1 Concept of Resistance & Resistivity
	1.7.2 Effect of Temperature on Resistance, Temp coefficient of Resistance(simple numerical)
	1.8 Classification of Electric current
	1.8.1 Direct current with waveforms.
	1.8.2 Alternating current with waveforms.
	1.9 Electric Sources
	1.9.1 Concept of Voltage Source: Ideal and Practical
	1.9.2 Concept of Current Source: Ideal and Practical
	1.9.3 Source Conversion. (simple numerical)
	1.10 Effects of Electric Current
	   1.10.1 Heating effect
	   1.10.2 Magnetic effect
	   1.10.3 Chemical effect with its application.
	1.11 Concept of electrical Work, Power and Energy. Their S.I. Unit
	   (Simple Numerical)
	1.12
		10	12

EEH101-2 Solve simple resistive networks in electrical engineering applications.		
2	**Resistive Networks:** 2.1 Ohm's Law, Concept of Voltage drop and Terminal Voltage. 2.2 Revision of resistance in series and parallel 2.3 Concept of voltage division and current division in simple resistive circuit with its derivation(Numerical) 2.4 Star Delta conversion of resistive networks	10	12

	2.5 Calculations of Equivalent Resistance of simple Series, Parallel , Series Parallel Circuits and star-delta network (Simple Numerical) 2.6 Kirchhoff's Laws 2.6.1 Kirchhoff's Current Law 2.6.2 Kirchhoff's Voltage Law (Numericals based on only Two loop)		
	EEH101-3 Use by calculations relevant capacitors in electric circuits.		
3	**Capacitors:** 3.1 Concept and Definition of Capacitance. 3.2 Electric Field 3.2.1 Electric Lines of force, Electric Flux 3.2.2 Electric Field Strength 3.2.3 Concept of electric flux density. 3.3 Construction & development of Capacitance in dielectrics. 3.4 Parallel Plate Capacitor. (Uniform Di-electric Medium) 3.5 Capacitors in Series & Parallel. 3.6 Calculations of Equivalent Capacitance of simple Series, Parallel and Series Parallel Combinations. (Simple Numerical) 3.7 Energy Stored in Capacitor. (No Derivation Only Simple Numerical) 3.8 Concept of Breakdown Voltage and Di-electric strength 3.9 Types of Capacitor & its application **#Manufacturing of capacitors in India in various Industries(IKS Learning)**	**08**	**10**
	Total	**28**	**34**

SECTION II

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
EEH101-4 Apply the principles of electromagnetism due to conductors and coils with currents			
4	**ELECTROMAGNETISM** **#Earth and its relevance with Magnetic Field** 4.1 Concept of Magnetic Field (definitions & relations of terms) 4.1.1 Magnetic Flux 4.1.2 Magnetic Flux Density 4.1.3 Magnetic field due to a Current carrying Conductor 4.1.4 Direction of Magnetic Field- Right hand rule, Cork Screw rule 4.1.5 Permeability 4.1.6 Relation between Magnetic flux Density and Field Intensity 4.2 Magnetic field due to current carrying Solenoid(Multi turn coil) 4.3 Concept of Toroid and its applications.	6	10
EEH101-5: Solve magnetic circuits used in electrical machine/device applications.			
5	**MAGNETIC CIRCUIT** 5.1 Definitions Concerning Magnetic Circuit. Magneto-Motive-Force (MMF), Reluctance, Reluctivity, Permeance ,Permeability. 5.2 Magnetic Circuit - Ohm's law of Magnetic Circuit 5.3 Comparison Between Electric and Magnetic circuit. 5.4 Parallel Magnetic Circuit. (Only Introduction No derivation and No Numerical) 5.5 Calculations of Amp.-Turns for simple Series Magnetic circuit(Simple Numerical) 5.6 Concept of Leakage Flux, Useful Flux & Fringing, Leakagecoefficient. 5.7 Magnetization Curve (B - H Curve) 5.7.1 Magnetization Curve for Magnetic and Non-Magnetic material. 5.8 Magnetic Hysteresis, Hysteresis Loop. 5.8.1 Hysteresis Loops for Hard & Soft Magnetic Material. 5.8.2 Area of Hysteresis Loop, Hysteresis Loss.(No Derivation and No Numerical) 5.9 Eddy current Loss (No derivation only formula). 5.10 Types of Magnets and their applications.Permanent Magnet and Electromagnet. **#Bar Magnet and its application like Compass(IKS Learning)**	14	12

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation(Marks)
6	**ELECTROMAGNETIC INDUCTION.** 6.1 Relation Between Magnetism and Electricity. 6.2 Production of Induced E.M.F. and Current. 6.3 Faraday's Laws of Electromagnetic Induction. (No Numerical) 6.4 Statically Induced E.M.F. & Dynamically Induced E.M.F.(Simple Numerical) 6.5 Direction of Induced E.M.F. (induced Currents). 6.5.1 Fleming's Right Hand Rule 6.5.2 Lenz's Law 6.5.3 Self Induced E.M.F. 6.5.4 Mutually Induced E.M.F. 6.6 Self Inductance (definition & unit) 6.7 Coefficient of Self-induction (L) (Simple Numerical) 6.8 Mutual Inductance (definition & unit) 6.9 Coefficient of Mutual Inductance (M) (Simple Numerical) 6.10 Energy Stored in Magnetic Field (expression only)(No Derivation and No Numerical) 6.11 AC fundamentals Cycle,Time Period,Amplitude,Frequency,Phase	12	14
	Total	32	36

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

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

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.Survey the electrical appliances which represents different types of load.(resistive, inductive and capacitive)

6.Compare types of transformer as per voltage level, construction, number of phases, applications.

7.Survey different types of Capacitors.

H. TEACHING SCHEME

Section /Topic no.	Name of topic	Distribution of marks (level wise)			Total marks	CO
		Remember	Understand	Apply		
I / 1	Electricity Concepts	6	4	2	12	EEH101-1
I / 2	Resistive Networks	4	4	4	12	EEH101-2
I / 3	Capacitors	2	4	4	10	EEH101-3
II / 4	Electromagnetism	6	2	2	10	EEH101-4
II / 5	Magnetic Circuits	6	2	4	12	EEH101-5
II / 6	Electromagnetic Induction	6	4	4	14	EEH101-6
Total		30	20	20	70	

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 STRATEGIES:

I) Instructional Methods:
1. Lectures cum Discussions
2. Class room practices.
3. Use of projector for ppt

II) Teaching and Learning resources:

1.Chalkboard

2.Slides(PPT)

3.Self learning Online Tutorial

4.Virtual Lab

K. REFERENCE MATERIAL
I) Books / Codes

Sr. No.	Author	Title	Publisher
1.	B. L. Theraja A. K. Theraja	A Text Book of Electrical Technology Vol-I (Basic Electrical Engg)	S. Chand and Co.
2.	V.N. Mittle	Basic Electrical Engg.	Tata McGraw-Hill
3.	V.K. Mehta	Electrical Technology	S. Chand and Co.
4.	Edward Hughes	Electrical Technology	Pearson Education, New Delhi

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

Course Name   : **Electrical Workshop practice.**
Course Code   : **EEH-102.**
Course Abbreviation : **HWEE.**
Course Type   :**SEC**

A.   LEARNING SCHEME:

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

B.   ASSESSMENT SCHEME

PAPER DURATION IN HRS	THEORY				BASED ON LL & TL				BASED ON SLA		TOTAL
					Practical						100
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
	00	00	00	00	50	20	25@	10	25	10	

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 Note : (TNR 11 font)

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.*15Weeks
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: RATIONAL:

This course is important for candidates to learn practical approach to various electrical materials, electrical wiring accessories, tools, wiring circuits, protections of circuits with basic study of electrical concepts and correspondingly practically working. This encourages students to get hands on experiences of handling electrical apparatus which will be helpful for learning of next courses in consecutive semesters.

E. COURSE LEVEL LEARNING OUTCOMES(COS):

EEH102-1-Useparticular material for electrical circuit or application.
EEH 102-2-Select proper electrical wires & accessory in electrical wiring work.
EEH 102-3-Make connections in circuit of electrical meters.
EEH 102-4-Identify electrical machines & their spare parts.

Competency: Identify, select & use various electrical materials, wires, insulators, & Electrical accessories.

Competency, course outcomes and programme outcomes (cp-co-po) matrix
[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High),"-" : no correlation

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1 Maintain various types of electrical equipments	PSO2 Maintain various sections of electrical power systems
Competency: Able to identify, select & use various electrical materials wires insulators &equipments.	3	1	1	2	3	1	3	1	-
EEH 102 -1 Use particular material for electrical circuit or application.	3	1	1	1	1	-	3	1	-
EEH 102 -2 Select proper electrical wires & accessory in electrical wiring work.	3	1	1	1	1	-	3	1	-
EEH 102 -3 Make connections in circuit of electrical meters.	3	1	1	1	1	-	3	1	-
EEH 102 -4 Identify electrical machines & their spare parts.	3	1	1	1	1	-	3	1	-

F. CONTENT:

I. Practical exercises and related skills to be developed:

The following practical exercises shall be conducted in the *Laboratory for Electrical workshop practice* developed by the Institute in practical sessions of batches of students:

Sr No.	Title of Practical Exercise	Skills / Competencies to be developed	Course Outcome
01	**To draw various electrical symbols useful in electrical engineering field.	Able to identify meaning of symbol	**EEH 102 -1**
02	**Perform experiment on measurement of length, cross sectional area and resistance of copper conductor.	Able to measure electrical parameter values	**EEH 102 –1**
04	**Demonstrate various magnetic materials used in electrical equipment's& machines.	Able to identify & select electrical material	**EEH 102 -1**
05	**Demonstrate various insulating materials used in electrical equipment's & machines.	Identify , select & use electrical material	**EEH 102 -1**
06	Demonstrate different tools used in electrical wiring system.	Identify , select & use electrical wiring tools.	**EEH 102 -2**
07	**Demonstrate function of one way & two way switch in lamp control.	Make connections & Use electrical apparatus.	**EEH 102 -2**
08	**Connect MCB in simple single phase circuit.	Make connections & Use electrical apparatus.	**EEH 102 -2**
09	Connect ELCB in simple single phase circuit.	Make connections & Use electrical apparatus.	**EEH 102 -2**
10	**Testing of specific fuses for given load. (Up to 5 Amp)	Make connections & Use electrical apparatus.	**EEH 102 -2**
11	Demonstrate different DC and AC Ammeter, Voltmeter & Wattmeter & Energy meter.	Able to use electrical apparatus	**EEH 102 -3**
12	Demonstrate hands on operations of Clamp on meter, Digital multimeter.	Able to handle & use electrical equipment's	**EEH 102 -3**
13	**Demonstrate identification of components, constructional, circuit diagram & function of following equipment's: 1) Tube light, 2) Ceiling fan, 3) Electric Iron,4) Electric geyser, 5) Electrical Mixer. 6) Auto transformer or Dimmerstat.	Identify spare parts, equipment's & machines	**EEH 102 -4**

**** Compulsory 08assignments to be completed + Any 01from remaining = 09.**

II) THEORY: SECTION-I

Sr. No.	Topics / Sub-topics	Lectures (Hours)
EEH 102 -1-Useparticular material for electrical circuit or application.		

1	**Chapter 1: Electrical Materials.**
	1.1 Conducting Materials--
	    1.1.1 Types-Copper & Aluminium.
	    1.1.2 Specific resistance & Resistivity
	    1.1.3 Temperature coefficient to resistance for metals
	1.2 Magnetic materials--
	    1.2.1 Types of magnetic materials: Paramagnetic, Diamagnetic and
	        Ferromagnetic materials, Applications of magnetic materials
	1.3 Insulating Material--
	  1.3.1 Classification of Insulating Material- Typical examples of
	    gaseous, liquid and solid insulating materials.
	  1.2.2 Applications of some important insulating materials
	    viz.Mica,porcelain,cotton,silk,Bakelite,mineraloil/transformer
	    oiland asbestos.
		08

EEH 102 – 2-Select proper electrical wires & accessory in electrical wiring work.		

2.	**Chapter 2. Electrical Wiring Components.**
	2.1 Electrical useful symbols for wiring.
	2.2 Wiring Tools & equipments.
	2.3 Wiring components:
	    2.3.1 Various electrical points, Switches,
	      Sockets, Switch boards(*IKS)
	    2.3.3 Applications & connections
	       of Fuses, MCB, ELCB.
	2.4 Simple wiring and single line diagrams.
	    2.4.1 One lamp control by one switch.
	    2.4.2 One lamp control by two way switch.
	    2.4.3 Godown wiring.
		07

	Total	**15**

SECTION- II

Sr. No.	Topics / Sub-topics	Lectures (Hours)
EEH 102 -3- Make connections in circuit of electrical meters.		
3	**Chapter 3. Electrical Measuring Instruments.** 3.1 Identification of AC-DC meter, their symbols& selection of rating. 3.2 Connections of Ammeter, Voltmeter & Wattmeter, and Energy meter. 3.3 Handling of Clamp on meter, Digital multimeter.	**07**

Sr. No.	Topics / Sub-topics	Lectures (Hours)
EEH 102 -4- Identify electrical machines & their spare parts.		

04	**Chapter 4. Electrical equipment's.**
	4.1 Electrical safety-
	    4.1.1 IE safety rules,(*IKS)
	    4.1.2 Safety measures.
	    4.1.3 Necessity of earthing system.
	(From following given equipment's.)
	4.2 Identify components & their connection diagram-----
	4.3 Study Construction &their function ---
	4.4Study of open & short circuit faults & their causes.
	Equipment's: 1) Tube light 2) Ceiling fan, 3) Electric Iron, 4) Electric geyser, 5) Electrical Mixer, 6) Auto transformer or Dimmerstat.
		08

	Total	**15**

(*No questions will be asked for IKS)

A. **List of Assignments under SLA**
   1. Survey on different types of wires.
   2. Comparative survey on different wires
   3. Survey on different types of lamps
   4. Survey on electrical wiring accessories
   5. Survey on different instruments

B. **Specification table for setting question paper**

   For semester end theory examination…………………Not Applicable

C. **Assessment criteria for practical assignments and oral examination**

   i) **Continuous Assessment of Practical Assignments :**

   Every practical 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) **Progressive Skill Test :**

   One mid-term *Progressive Skill Test* of 25 marks

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Preparedness for Practical/Drawing/	05
3	Neat & complete Diagram.	05

4	Observations & handling of instrument.	05
5	Oral Based on Lab work/Drawing work and completion of task	05
	TOTAL	25

iii) Final marks of ORAL examination shall be awarded as per Assessment Pro-forma I,II,III.

D.   Instructional Methods:

1. Lectures cum Demonstrations   2. Laboratory practicals. 3. Term write up.

E.   Teaching and Learning resources:

1. Chalk board. 2. Demonstrations by Visual/LCD presentations. 3. Practical work in laboratory.

F.   Ref. Books / Journals / IS Codes

Sr. No.	Title	Author	Publisher
01	An Introduction toElectrical EngineeringMaterials	C. S. Indulkarand S.Thiruvengadam	S.Chand Publishing, 2008
02	K.B. Raina, S.K.Bhattacharya	Electrical Design, Estimating and costing	New Age Int (p)Ltd,New Delhi
03	Electrical Measuring Instruments	byD.B.Dhar.	Tata McGraw-Hill P. Co. Ltd
04	Basic Electrical Engineering	V. N. Mittle	Tata McGraw-Hill P. Co. Ltd

G.   Software/learning websites:

   i. www.ntpc.co.in,
  ii. www.nhpcindia.com,
 iii. www.nptel.ac.in,
 iv. ISO, IS, BS standards, Data Sheets,
  v. IE Rules HandbookS/International code: IS5909, 7733, 2174, 732, 4648

Websites:
   i. http://www.bestestimatepro.com/bieap.gov.in/estimatingandcosting.pdf
  ii. http://indiacatalog.com/web_directory/electrical/electrica
 iii. www.howstuffworks.com
 iv. www.electrical4u.com
  v. www.meda.com

* **

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

a. LEARNING SCHEME:

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

b. ASSESSMENT SCHEME :-

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

(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)

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.

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

D. i) RATIONALE:-

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

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME

Apply principles of advanced chemistry to solve engineering problems.

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

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

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

E. COURSE LEVEL LEARNING OUTCOMES (COS)

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

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

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

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

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

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

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix
[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"

	Programme Outcomes POs and PSOs

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

F. CONTENT:
IV) 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

Sr. no	Laboratory experiences	CO
2	Volumetric analysis of solution.	CCH103-1
3	Preparation of 1 N, 0.5 N & 0.1 N Solutions of different chemicals like NaOH, HCl, Oxalic acid, $FeSO_4$, etc.	CCH103-1
4	Titration of strong acid and strong bases (HCl X NaOH)	CCH103-1
5	Double titration of strong acid, strong base & weak acid (HCl 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, $CaCl_2$. 1.9 Formation of Covalent compounds- H_2O, CO_2.	**07**	**08**

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
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 (Hours)	Classroom learning evaluation Marks
CO - CCH103-4 Use of water in Domestic purpose, Industrial purpose and its relevant treatment to solve industrial problems.			

4	**WATER**	**09**	**12**
	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.		

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**	**14**	**16**
	5. 1.1 Occurrence of metals		
	5.1.2 Distinction between mineral & ore		
	5.1.3 Definition of flux, Gangue & Slag		
	5.1.4 Steps involved in metallurgy-Flow chart Concentration of ores— A) Physical Methods 1. Gravity Separation Method 2. Electromagnetic separation 3. Froth floatation method B) Chemical Methods 1. Calcination 2. Roasting .		
	5.1.6 Important ores of copper Metallurgy of copper-Extraction of copper from copper pyrites by concentration, roasting, smelting, Bessemerisation, Electrorefining.		
	5.1.7 Physical properties & uses of Copper.		
	5.2 SOLDERS		
	5.2.1 Definition of alloy, classification of alloys & purposes of making alloy.		
	5.2.2 Composition, properties & applications of Soft solder.		
	A) Tinmann's solder,		
	B) Brazing alloy ,		
	C) Plumber's solder		
	D) Rose metal		
	E) Woods metal		

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

6	**CELL AND BATTERIES**	**07**	**08**
	6.1 Definition of Electrochemical cell, Battery, Charge, Discharge, Closed Circuit Voltage,		

	Electrochemical couple, Internal resistance, Open Circuit Voltage, Separator, E.M.F. 6.2 Classification of Batteries such as – Primary & Secondary Batteries 6.3 Construction, Working and Applications of a Primary Cell such as Dry Cell , Secondary Cell such as Lead Acid Storage Cell 6.4 Charging and Discharging of Lead Acid Storage Cell 6.5 Hydrogen-Oxygen fuel cell, its chemical reactions & advantages 6.6 Introduction of solar cell		

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

G : List of Assignments under SLA (25 marks)

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,	02

	5. Rose metal, 6. Wood's metal	
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

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

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	

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

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:
4. Lectures cum Demonstrations,
5. Class room practices.
6. 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 NAME   : COMMUNICATION SKILLS
COURSE CODE   : CCH201
COURSE ABBREVIATION : HCMS

A. LEARNING SCHEME:

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

B. ASSESSMENT SCHEME :-

PAPER DURATION IN HRS	THEORY				BASED ON LL&TL				BASED ON SLA		TOTAL
					Practical						
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
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-LaboratoryLearning, 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 assignmentshere 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 outcomethrough various learning experiences:

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

E. 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		

CH201-4 Make effective use of body language & graphical communication.	2	-	-	-	-	2	2		
CCH201-5 Write letters, reports, e-mails and technical description in correct language.	2	-	-	-	-	2	1		
CCH201-6 Prepare and present effective media aided presentation.	1	1	-	-	-	1	1		

F. CONTENT:

I)   Practical Exercises

The following practical exercises shall be conducted in the Laboratory for *CommunicationSkills* 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

II)   Theoy

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 6.1Media aids for Presentation: Strengths and Precautions 6.2Planning, Preparing and Making a Presentation 6.3Use 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 guidanceof 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:
1. Lecture cum Demonstration,
2. Class room practices.
3. Use of projector and soft material for demonstration

K) Teaching and Learning Resources:

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

L)   Reference Books:

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

M)   Learning Website & Software

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

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

A. LEARNING SCHEME:

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

B. ASSESSMENT SCHEME :-

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

(Total IKS Hrs for Sem. : 00 Hrs)

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

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

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

D. i) RATIONALE:-

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

Note: The course offers four different alternatives (modules) for achieving above outcomes. Students must complete any one module from the following given options.
- A) MODULE-I : Unnat Maharashtra Abhiyan (UMA)
- B) MODULE-II : National Service Scheme (NSS)
- C) MODULE-III : Universal Human Values
- D) MODULE-IV: Value Education (Unati Foundation)
- E) MODULE-V : Financial Literacy (NABARD)

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

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME
Exhibit psychosocial competencies, workplace ethics, resilience, positive attitude, integrity and self-confidence.

E. COURSE LEVEL LEARNING OUTCOMES (COs)

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

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		

F. CONTENT:

    I)   **Practical Exercises:**
              Not Applicable

II)   Theory

Sr. No.	Theory Learning Outcomes (TLOs) Aligned to COs.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
	TLO 1.1 Explain developmental needs and connection of various stakeholders TLO 1.2 Enlist the localproblems TLO 1.3 Design a methodology for fieldwork	**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	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

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

			Summary Visit - Closure afteranalysis
2	TLO 2.1 Adoption of Village or Slum TLO 2.2 Survey and Problem IdentificationTLO 2.3 Conduct Project / Programs in the selected village / slum TLO 2.4 Undertake Special Camping Programme	**Unit - II MODULE II : National Service Scheme (NSS)** 2.1 Contacting Village/Area Leaders 2.2 Primary socio economic survey of few villages in the vicinity of the institute. 2.3 Selection of the village for adoption - conduct of activities 2.4 Comprehensive Socio Economic Survey of the Village/Area 2.5 Identification of Problem(s) 2.6 Dissemination of information about the latest developments in agriculture, watershed management, wastelands development, non-conventional energy, low cost housing, sanitation, nutrition and personal hygiene, schemes for skill development, income generation, government schemes, legal aid, consumer protection and allied fields. A liaison between government and other development agencies for the implementation of various development schemes in the selected village / slum.	(i) The teachers should visit the village / slum before adopting it for NSS activities. (ii) The selected area should be compact. (iii) The community people should be receptive to the ideas of improving their living standard. They should also be ready to coordinate and involve in the projects undertaken by theNSS for their up-liftment (iv) The areas where political conflicts are likely to arise should be avoided by the NSS units. The area should be easily accessible to the NSS volunteers to undertake frequent visits to slums;
3	TLO 3.1 Love and Compassion (Prem andKaruna) TLO 3.2 Truth (Satya) TLO 3.3 Non-Violence (Ahimsa) TLO 3.4 Righteousness (Dharma) TLO 3.5 Peace (Shanti)TLO 3.6 Service (Seva)TLO 3.7 Renunciation (Sacrifice) Tyaga TLO 3.8 Gender Equality and Sensitivity	**Unit - III MODULE-III : Universal Human Values** 3.1 Love and Compassion (Prem and Karuna): Introduction, Practicing Love and Compassion (Prem and Karuna) 3.2 Truth (Satya) : Introduction, Practicing Truth (Satya) 3.3 Non-Violence (Ahimsa) : Introduction, Practicing Non-Violence (Ahimsa) 3.4 Righteousness (Dharma) : Introduction, Practicing Righteousness (Dharma) 3.5 Peace (Shanti) : Introduction, Practicing Peace (Shanti) 3.6 Service (Seva) : Introduction, Practicing Service (Seva) 3.7 Renunciation (Sacrifice) Tyaga : Introduction, Practicing Renunciation (Sacrifice) Tyaga Gender Equality and Sensitivity: Introduction, Practicing Gender Equality andSensitivity	i) Lectures ii) Demonstration iii) Case Study iv) Role Play v) Observations vi) Portfolio Writing vii) Simulation viii) Motivational talks byPractitioners Site/Industry Visit
4	TLO 4.1 Punctuality TLO 4.2 Cleanliness, Hygiene and Orderliness TLO 4.3	**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	i) Video Demonstrations ii) Flipped Classroom iii) Case Study iv) Role Play v) Collaborative learning vi) Chalk-Board

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

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

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

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

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

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

(a) Environment Enrichment and Conservation:

The activities under this sub-theme would inter-alia, include:
(i) plantation of trees, their preservation and upkeep
(ii) Construction & maintenance of village streets, drains
(iii) Cleaning of village ponds and wells;
(iv) Popularization and construction of Gobar Gas Plants, use of non-conventional energy;
(v) Disposal of garbage & composting;

(vi) Prevention of soil erosion and work for soil conservation,
(vii) Watershed management and wasteland development
(viii) Preservation and upkeep of monuments, and creation of consciousness about the preservation of cultural heritageamong the community.

(b) Health, Family Welfare and Nutrition Programme:

(i) Programme of mass immunization;
(ii) Working with people in nutrition programmes with the help of Home Science and medical college students;
(iii) Provision of safe and clean drinking water;
(iv) Integrated child development programmes;
(v) Health education, AIDS Awareness and preliminary health care.
(vi) Population education and family welfare programme;
(vii) Lifestyle education centres and counselling centres.
© Programmes aimed at creating an awareness for improvement of the status of women: (i) programmesof 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 opento them provided theyacquire the requisite skills; and
(iv) imparting training to women in sewing, embroidery, knitting and other skills wherever possible.

(d) Social Service Programmes:

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

(e) Production Oriented Programmes:

(i) working with people and explaining and teaching improved agricultural practices;
(ii) rodent control land pest control practices;
(iii) weed control;
(iv) soil-testing, soil health care and soil conservation;
(v) assistance in repair of agriculture machinery;
(vi) work for the promotion and strengthening of cooperative societies in villages;
(vii) assistance and guidance in poultry farming, animal husbandry, care of animal health etc.;
(viii) popularisation of small savings and assistance in procuring bank loans

(f) Relief & Rehabilitation work during Natural Calamities:

(i) assisting the authorities in distribution of rations, medicine, clothes etc.;
(ii) assisting the health authorities in inoculation and immunisation, supply of medicine etc.;

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

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

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

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

I:-Assessment Criteria

i) Formative Assessment of Practical:-

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

ii) Summative Assessment of Practical:

(Assessment of Learning)

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

K) Teaching and Learning Resources:

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

L)   Reference Books:

S.N.	Name of Book	Author	Publication

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

M) Learning Website & Software

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

different attributes developed by Maharashtra Remote Sensing Applications Centre.)

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

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

A.LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	04	3
	Tutorial Learning	02	
	Laboratory Learning	-	
	SLH-Self Learning	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	100
03	30	70	100	40	--	--	--	--	--	--	

(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 Learning Assessment

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

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

G. COURSE LEVEL LEARNING OUTCOMES (COS)

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

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

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

CCH301-4:- To solve problems on Probability distributions

CCH301-5 :- Solve examples on Laplace Transform

Competency, course outcomes and programme outcomes/programme specific outcomes (cp-co-po/pso) matrix
 [Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"

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

H. CONTENT:

V) Tutorial exercises

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

Sr. no	Tutorial experiences	CO
1	Solve simple problems of Integration by substitution.	CCH301-1
2	Solve integration using by parts.	CCH301-1
3	Solve examples on Definite Integral based on given methods.	CCH301-1
4	Solve problems on properties of definite integral.	CCH301-1
5	Solve given problems for finding the area under the curve and area between two curves . (Only for civil and mechanical engg. group)	CCH301-1

Sr. no	Tutorial experiences	CO
6	Solve examples on mean value and root mean square value.(only for Computer, Electrical and Electronics engg. group)	CCH301-1
7	Solve first order first degree differential equation using variable separable method.	CCH301-2
8	Solve first order first degree differential equation using exact differential equation and linear differential equation.	CCH301-2
9	Solve engineering application problems using differential equation.	CCH301-2
10	Solve problems on Bisection method, Regula falsi and Newton-Raphson method.	CCH301-3
11	Solve problems on Jacobi's method and Gauss Seidel method.	CCH301-3
12	Use Bakshali iterative methods for finding approximate value of square root.(IKS)	CCH301-3
13	Solve engineering problems using Binomial Distribution, Poisson Distribution and Normal Distribution.	CCH301-4
14	Solve problems on Laplace transform and properties of Laplace transform.	CCH301-5
15	Solve problems on Inverse Laplace transform and properties of Inverse Laplace transform.	CCH301-5

II)Theory

Section I

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

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
	4.3.1 Variable separable form 4.3.2 Exact Differential equations 4.3.3 Linear Differential Equations		

Section –II

Sr. no.	Topics/Subtopics	Learning Hours	Classroom learning evaluation Marks
CO: CCH301-3 :- To find approximate solution of algebraic equations and simultaneous equations by various methods.			
Unit 4 **Numerical Methods**	**Numerical Methods** 4.1Numerical solution of Algebraic Equations 4.1.1 Bisection Method 4.1.2 Regula- Falsi Method 4.1.3 Newton –Raphson method. 4.2 Numerical solution to simultaneous equations 4.2.1 Jacobi's Method 4.2.2 Gauss-Seidel method Bakhshali iterative method for finding approximate square root.(IKS)	10	14
CO: CCH301-4:- 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: CCH301-5:- Solve examples on Laplace Transform .			
Unit 6 **Laplace Transform**	**Laplace Transform** 6.1 Definition , Linearity property 6.2 Laplace Transforms of Standard functions (without proof) and examples 6.3 First shifting property and examples 6.4 Examples on Multiplication by t^n 6.5 Inverse Laplace Transform, Definition 6.6 Standard formulae(without proof) and examples 6.7 Inverse L.T.by using First shifting property 6.8 Inverse L.T. by using Partial fraction method	12	14

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

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

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

H :-Assessment Criteria

i) **Formative Assessment (Assessment for Learning)**
- **Tests**

ii) **Summative Assessment (Assessment of Learning)**
- **End term exam**

I) Instructional Methods:

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
16	Higher Engineering Mathematics	Grewal B.S.	Khanna publication New Delhi,2013 ISBN:8174091955
17	A textbook of Engineering Mathematics	Dutta.D.	New age publication New Delhi,2006 ISBN:978-81-224-1689-3
18	Advance Engineering Mathematics	Kreysizg,Ervin	Wiley publication New Delhi,2016 ISBN:978-81-265-5423-2
19	Advance Engineering Mathematics	Das H.K.	S Chand publication New Delhi,2008 ISBN:978-81-219-0345-5
20	Introductory Methods of Numerical Analysis	S.S.Sastry	PHI Learning Private Limited,New Delhi.ISBN:978-81-203-4592-8
21	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
22	Calculus & Its Applications	Marvin L.Bittinger	Addison-Wesley 10th Edition ISBN-13:978-0-321-69433-1

		David J.Ellenbogen Scott A. Surgent	
23	An Introduction to Statistical Learning with Application in R	Gareth James,Hastie Robert & Tibshirani	Springer New York Heidelberg Dordrecht London ISBN:978-1-4614-7138-7(eBook)

L) Learning Website & Software

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

COURSE NAME   : BASIC ELECTRONICS
COURSE CODE   : EEH 103
COURSE ABBREVIATION   : HBET

A. 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	

B. ASSESSMENT SCHEME:-

PAPER DURA TION IN HRS	THEORY				BASED ON LL&TL				BASED ON SLA		Total
							Practical				
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
1.5	15	35	50	20	50	20	25@	10	-	-	125

 (Total IKS Hrs for Sem.: 01 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.

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

D. i) RATIONALE: -

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)

EEH 103 -1 Identify and use relevant diode in electronic circuits

EEH 103 -2 Examine and operate rectifier and filter.

EEH 103 -3 Identify and illustrate use bipolar junction transistor in electronic circuits.

EEH 103 -4 Convert the decimal number into other number system and use logic gates in electronics circuit.

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
EEH 103 -1	3	2	-	3	-	-	--	2	--
EEH 103 - 2	3	2	-	2	--	--	--	3	1
EEH 103 - 3	3	-	-	2	-	--	--	3	1
EEH 103 - 4	3	1	-	2	--	--	--	3	--

F. CONTENT:
I)   Practical exercises

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

Sr. No.	Laboratory experiences	CO
1.	Identification electronic equipment in basic electronics laboratory 1) Identify different electronic equipment. 2) Operate DMM, power supply, CRO, function generator. 3) Illustrate the use of breadboard	**EEH 103-1**
2.	Find the value of given resistor, capacitor and inductor using color codes 1) Calculate the value of resistor by color code. 2) Find the value of given capacitor and inductor	**EEH 103-1**
3.	Measure amplitude, time period and frequency of sine wave using CRO 1) Use of function generator to generate sine wave. 2) Measure the amplitude, time period and frequency of sine wave	**EEH 103-1**
4.	Test the performance of PN junction diode 1) Build the circuit as per circuit diagram 2) Record the measured readings in observation table 3) Draw the forward & reverse characteristics	**EEH 103-2**
5.	Test the performance of Zener diode 1) Build the circuit as per circuit diagram 2) Record the measured readings in observation table 3) Draw the forward & reverse characteristics	**EEH 103-2**
6.	Test Zener voltage regulator for given voltage (With varying input voltage) 1) Build the circuit as per circuit diagram 2) Record the readings in observation table	**EEH 103-2**
7.	Test Zener voltage regulator for given voltage With varying load 1) Build the circuit as per circuit diagram 2) Record the readings in observation table	**EEH 103-2**
8.	Test the half wave circuits on breadboard 1) Construct the circuit as per circuit diagram 2) Record the waveform displayed on the oscilloscope according to the setting of VOLT/DIV 3) Record readings measured in observation table	**EEH 103-2**
9.	Test the full wave center tapped circuit on breadboard 1) Construct the circuit as per circuit diagram 2) Record the waveform displayed on the oscilloscope according to the setting of VOLT/DIV 3) Record readings measured in observation table	**EEH 103-2**
10.	Test the full wave bridge circuit on breadboard 1) Construct the circuit as per circuit diagram 2) Record the waveform displayed on the oscilloscope according to the setting of VOLT/DIV 3) Record readings measured in observation table	**EEH 103-2**
11.	Test the operation of transistor as a switch 1) Construct the circuit as per circuit diagram 2) Record the reading in observation table.	**EEH 103-3**

Sr. No.	Laboratory experiences	CO
	3) Sketch the graph of input & output characteristics.	
12.	Plot input –output characteristic of common emitter amplifier 1) Construct the circuit as per circuit diagram 2) Record the reading in observation table. 3) Sketch the graph of input & output characteristics	**EEH 103-3**
13.	Test the performance of logic gate ICs of AND,OR,NOT. 1) Build the circuit as per circuit diagram 2) Verify the truth-table	**EEH 103-4**
14.	Test the performance of logic gate ICs of NAND,NOR. 1) Build the circuit as per circuit diagram 2) Verify the truth-table.	**EEH 103-4**
15.	Test the performance of logic gate ICs of XOR,XNOR. 1) Build the circuit as per circuit diagram. 2) Verify the truth-table.	**EEH 103-4**

II)   Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
	EEH103-1 Identify and use relevant diode in electronic circuits		
1	**1.1 Semiconductor Diode** 1.0 Conductor , Insulator, semiconductor 1.0.1 Band theory 1.0.2 Intrinsic semiconductor : Si, Ge 1.0.3Doping 1.0.4 Extrinsic semiconductor : P type , N type 1.1 P.N. junction diode – Ge & Si 1.1.1 Constructional features. 1.1.2 Operating principle. 1.1.3 Characteristics. 1.1.4 Applications. 1.1.5 Specifications. 1.2 Zener diode 1.2.1 Constructional features. 1.2.2 Operating principles. 1.2.3 Characteristics 1.2.4 Specifications. 1.2.5 Applications-Zener as a voltage regulator 1.2.6 **Voltage regulators (*IKS)**	**8**	**12**

	EEH103-2 Examine and operate rectifier and filter.		

2	**Rectifiers and filters**
	2.0 Block diagram of regulated power supply
	   2.1 Rectifiers:
	   2.1.1 Definition: Rectification, Rectifier
	   2.1.2 Need of rectification
	   2.1.3 Classification of rectifier
	2.2 Half wave rectifier and full wave rectifier (Center-tapped and bridge)
	   2.2.1 Circuit diagram and waveforms
	   2.2.2 Operation
	   2.2.3 Parameters its definition and values for corresponding rectifier-
	   (i) Average output voltage and current
	   (ii) Ripple factor
	   (iii) Rectifier efficiency
	   (iv) Peak Inverse Voltage
	   (v) Transformer Utilization Factor
	   2.2.4 Comparison of rectifier
	   2.3 Filter
	   2.3.1 **Need of filter(*IKS)**
	   2.3.2 Types of filter-
	   (i) Shunt capacitor filter
	   (ii) Series inductor filter
	   (iii) LC filter
	   (iv) CLC filter
	2.3.2 Operation of each filter w.r.t. full wave bridge Rectifier only
	   2.3.3 Comparison of filters
		12	**10**

	EEH103-3 : Identify and illustrate use bipolar junction transistor in electronic circuits.		
3	**Bipolar Junction Transistor(BJT)** 3.0 BJT-.Types, symbols 3.1 Construction of BJT. 3.2 Operating principles of NPN & PNP Transistor 3.3 Transistor configurations & Modes of operation 3.4 Transistor input & output characteristic of CE & CB configuration. 3.5 Relation between α & β 3.6 Switching action of transistor 3.7 Applications of transistor.	**6**	**7**
	EEH103-4; Convert the decimal number into other number system and use logic gates in electronics circuit.		
4	**Number Systems and Logic gates** 4.1 Number System: binary, octal, decimal and hexadecimal 4.2 Conversion of given decimal number into binary, octal and hexadecimal (simple numerical with no fractions) 4.3 **Boolean logic (*IKS)** 4.4 Digital logic gates symbol and truth table:	**4**	**6**

	AND,OR,NOT,NAND,NOR,XOR,XNOR		
	Sub-total:	**30**	**35**

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

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	Semiconductor Diode	4	6	2	12	EEH103-1
II	Rectifiers and filters	2	8	-	10	EEH103-2
III	Bipolar Junction Transistor (BJT)	1	4	2	07	EEH103-3
IV	Number Systems and Logic gates	-	2	4	06	EEH103-4
Total Marks		07	20	08	35	

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	V. K. Mehta	Principles of Electronics	S.Chand
2	B. L. Theraj	Basic Electronics	S.Chand
3	R.S.Sedha	A text book of Applied Electronics	S.Chand
4	G. K. Mithal	Applied Electronics	Khanna Publication
5	A. Motershed	Electronics Devices & Circuits	PHI Publication
6	Malvino	Electronics Principles	McGraw Hill

M)   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

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COURSE NAME   : ELECTRICAL POWER GENERATION
COURSE CODE   : EEH 301
COURSE ABBREVIATION   : HEPG

I. LEARNING SCHEME:

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

Total IKS Hrs for Sem.: 02 Hrs.

J. ASSESSMENT SCHEME:

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

K. 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 Note : (TNR 11 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.

(Provide list of all assignments here in tabular format At least 6 to 8 assignments to be given)

D: RATIONALE:

This course deals in detail about generation of electric power using conventional and nonconventional power plants like Thermal (Coal), Hydro, Nuclear fuels, Solar, Wind, Geothermal, Tidal and Magneto-hydro dynamic. These types of power plants need highly skilled technicians who are capable of operating various control equipment to supply uninterrupted power. This course attempts to develop the basic skills required to take appropriate actions to maintain the various generating and auxiliary equipment of power plants.

Competency: Able to compare & explain different types of electric power generating plants.
Cognitive   : Understand the operation of different types of electric power generating plants.
Psychomotor: Explain different types of electric power generating plants.
Affective: Attitude of i) Safety ii) Punctuality iii) Accuracy iv) Precision v) Aesthetic presentation.

E:COURSE LEVEL OUTCOMES:

EEH 301 -1: Suggest which electrical power generation is safe & environment friendly.
EEH 301 -2: Select the power generation plant based on economy.
EEH 301 -3: Infer components & operation of different power plants.
EEH 301 -4: Demonstrate wind and solar power plants.
EEH 301 -5: Illustrate & use Bio-mass, bio-gas & Ocean power plant.
EEH 301 -6: Explain geothermal power plant & fuel cell energy.

Competency, course outcomes and programme outcomes (cp-co-po) matrix
[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0" : no correlation

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1 Maintain various types of electrical equipments	PSO2 Maintain various sections of electrical power systems
Able to compare & explain different types of electric power generating plants.	3	1	-	1	2	0	2	-	-
EEH 301 -1: Suggest which electrical power generation is safe & environment friendly.	3	1	-	0	2	0	2	-	-
EEH 301 -2: Select the power generation plant based on economy.	3	1	0	0	2	0	2	-	-
EEH 301 -3: Infer components & operation of different power plants.	3	0	0	1	2	0	2	-	-
EEH 301 -4: Demonstrate wind and solar power plants.	3	1	-	1	2	0	2	-	-
EEH 301 -5: Illustrate & use Bio-mass, bio-gas & Ocean power plant.	3	0	0	1	1	0	2	-	-
EEH 301 -6: Explain geothermal power plant & fuel cell energy.	3	0	0	1	1	0	2	-	-

F. CONTENT:
I) Practical Exercises:

The following practical exercises shall be conducted in the Laboratory for Electrical Power Generation developed by the Institute in practical sessions of batches of about 22 students:

Note-Use half imperial drawing sheets

Sr No.	Title of Practical Exercise	Skills / Competencies to be developed	C O
01	Draw labeled layout of Coal based thermal power plant.	To realize/ identify the various equipment's in thermal power plant.	EEH 301-2
02	Draw labeled layout of Hydroelectric power plant.	………As above………	EEH 301-2
03	Draw labeled layout of Nuclear power plant.	………As above………	EEH 301-3
04	Draw labeled basic diagrams & block diagrams of Wind power plant.	………As above………	EEH 301-4
05	Draw labeled basic diagrams & block diagrams of Solar power plant.	………As above………	EEH 301-4
06	Draw labeled basic diagrams & block diagrams of Ocean power plant.	………As above………	EEH 301-5
07	Draw labeled basic diagrams & block diagrams of Tidal power plant.	………As above………	EEH 301-5
08	Draw labeled basic diagrams & block diagrams of Geothermal.	………As above………	EEH 301-6
09	Draw labeled basic diagrams & block diagrams of Biogas.	………As above………	EEH 301-6

Two or three industrial Visits to Electrical power generation plant.

II) THEORY
SECTION-I

Sr. No	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
EEH 301 -1: Suggest which electrical power generation is safe & environment friendly.			
	Basics of power generation:		

1	1.1. Importance of electrical power in day-to-day life. 1.2 Various sources of energy 1.3 Environmental issues of electrical power generation. 1.4 **India Scenario of Power Generation(IKS*)**	**03**	**06**
EEH 301 -2: Select the power generation plant based on economy.			
2	**Economics Aspects:** 2.1 Related terms: Connected Load, firm power, cold reserve, hot reserve, spinning reserve. Base load and peak load plants, load curve, load duration curve, integrated duration curve. 2.2 Cost of generation: Average demand, maximum demand, demand factor, plant capacity factor, plant use factor, diversity factor, load factor and plant load factor.	**06**	**08**
EEH 301 -3: Infer components & operation of different power plants.			
3	**Generating Stations:** **History of Power Generation (IKS*)** **3.1 Thermal Power Plant:** 3.1.1 Sources of Conventional Thermal Power Plant. 3.1.2 Block diagram. 3.1.3 Working and function of auxiliary component. 3.1.4 Advantages and Disadvantages. 3.1.5 Application. 3.1.6 Major TPS in Maharashtra state with their capacity. **3.2 Hydro Power Plant:** 3.2.1 Sources of Conventional Hydro Power Plant. 3.2.2 Classification & Layouts. 3.2.3 Working and function of auxiliary component. 3.2.4 Advantages and Disadvantages. 3.2.5 Application. 3.2.6 Major HPS in Maharashtra state with their capacity. **3.3 Nuclear Power Plant:** 3.3.1 Nuclear fuels, Chain reaction. 3.3.2 Block Diagram Conventional Power Plant. 3.3.3 Working and Functions of auxiliary component. 3.3.4 Advantages and Disadvantages. 3.3.5 Application. 3.3.6 Major NPS in Maharashtra state with their capacity.	**15** **(05)** **(05)** **(05)**	**20** **(06)** **(06)** **(08)**
Total		**24**	**34**

SECTION-II

Sr.No	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
EEH 301 -4: Demonstrate wind and solar power plants.			
4	**4.1 Solar Power Plant (Electrical)** 4.1.1 Photovoltaic cell: Construction, Types. 4.1.2 Series and parallel connections: Cell, module, array. 4.1.3 Performance: Influencing factors-tilt angle, solar radiation, I-V, P-V characteristics.	03	**16** (08)
	4.2 Wind Power Plant **Basic of Wind Energy (IKS*)** 4.2.1 Site Selection for wind plant. 4.2.2 Basic Components: Block diagram, 4.2.3 Functions of each part. 4.2.4 Classification of wind turbines: horizontal and vertical Axis Turbine.	06	(08)
EEH 301 -5: Illustrate & use Bio-mass, bio-gas & Ocean power plant.			
5	**5.1 Bio-gas energy& Bio-mass Energy.** 5.1.1 Introduction of Bio-gas & its calorific value. 5.1.2 Types Of Bio Gas plant (KVIC & Pragati). 5.1.3 Block diagram of Bio-mass based power Generation plant.	05	**12** (08)
	5.2 Energy from the oceans. 5.2.1 Ocean energy: Principle of ocean thermal electric conversion. (Only principle & no types) 5.2.2 **Types of OTEC(IKS*)** 5.2.2 Tidal Power: Basic principle and operation of single basin tidal power plant, site requirements.	04	(04)
EEH 301 -6: Explain geothermal power plant & fuel cell energy.			
6	**Energy from other Sources** **6.1 Geothermal Energy.** 6.1.1 Geothermal energy sources, working principle of Power generation. 6.1.2 Advantages, limitations & applications geothermal.	03	**08** (04)
	6.1.3 **Sites of Geothermal energy in India (IKS*)**	03	(04)

	6.2 Fuel cell. 6.2.1 Construction & working of Hydrogen Fuel cell. 6.2.2 Advantages, limitations & applications.]		
Total		**24**	**36**

*No questions will be asked for IKS subtopics.

G: UNDER SLA LIST ASSIGNMENT / MICRO PROJECT:

Sr No.	Title of Exercise/Practices
1	Prepare list of major Conventional power plants (TPS, HPS & NPS) in Maharashtra state with their capacity
2	Prepare a load curve as per data given & show fitting of power generated & supplied to load by thermal, hydroelectric & Nuclear power plant or any other power plants in that load curve suggested by concerned faculty.
3	Study of environment scenario due to conventional power generation plants.
4	Study basic terms related to power generation system like firm power, hot & cold reserve capacity, Connected load, Maximum demand, Average demand, Plant capacity factor, Plant use factor Demand factor , Load curve, Base load & Peak load.
5	Prepare list of major Non conventional power plants in Maharashtra state with their capacity
6	Market survey of list of components of solar water heating scheme for home utility.
7	Prepare a visit report on the Hydro Power station
8	Prepare a visit report on Wind/Solar Power plant

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

Topic No.	Name of topic	Distribution of marks (Cognitive level-wise)			Course Outcome	Total Marks
		Remember	**Understand**	**Application**		
1	Basics of power generation	04	02	00	EEH301-1	06
2	Economics aspects	02	02	04	EEH 301-2	08
3	Generating stations	04	08	08	EEH 301-3	20
4	Solar (electrical)&wind power plant	04	04	08	EEH 301-4	16
5	Bio-gas, Bio-mass & oceans energy.	04	04	04	EEH 301-5	12
6	Energy from other Sources.	02	02	04	EEH 301-6	08

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.

I: ASSESSMENT CRITERIA FOR PRACTICAL- ASSIGNMENTS AND ORAL EXAMINATION

iv) Formative Assessment of Practical Assignments :

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/Drawing/Assignment	05
3	Neat & complete diagram with proper labels.	05
4	Lab work handling of instrument, observations & calculations.	05
5	Lab work/Drawing work and Assignment completion in proper manner with topic wise knowledge.	05
	TOTAL	25

Self Learning Assessment of exercises given :

Every exercise 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/Drawing/Assignment	05
3	Neat & complete diagram with proper labels.	05
4	Lab work handling of instrument, observations, calculations.	05
5	Lab work/Drawing work and Assignment completion in proper manner and with topic wise knowledge.	05
	TOTAL	25

v) Final marks of Practical/oral examination shall be awarded as per *Assessment Pro-forma I*

J: Instructional Methods:
1. Lectures cum Demonstrations.
2. Classroom practices.
3. Drawing sheet preparation.

Teaching and Learning resources:
1. Chalk board
2. LCD presentations.
3. Audio presentations.
4. Item/ Question Bank.

K: REF. BOOKS / JOURNALS / IS CODES

Sr. No.	Title	Author	Publisher
01.	Generation of electrical energy	Dr. Gupta BR	S.Chand & Co. New Delhi, 1983,
02.	A course in electrical power	Gupta JB	S. K Kataria and sons, 2014,
03.	A course in electrical power.	Soni, Gupta, Bhatnagar	Dhanpat rai and sons
04.	Principles of power system	Mehta VK and Rohit Mehta	S.Chand & Co. New Delhi, 1982,
05	Power plant engineering	Nag P K	Tata McGraw Hill, New Delhi

SOFTWARE/LEARNING WEBSITES

    i.   www.ntpc.co.in,
   ii.   www.nhpcindia.com,
  iii.   www.nptel.ac.in,
  iv.   www.mnre.org.in
   v.   www.powergridindia.com,
  vi.   www.howstuffworks.com
 vii.   www.electrical4u.com
viii.   www.meda.com

* * *

COURSE NAME   **: BASIC MECHANICAL AND CIVIL ENGINEERING**
COURSE CODE   **: EEH302**
COURSE ABBREVIATION   **: HBMC**

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	**02**	**3**
	Tutorial Learning	**00**	
	Laboratory Learning	**04**	
	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						100
	FA-TH	SA-TH	TOTAL		FA -PR		SA-PR				
	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
Nil	Nil	Nil	Nil	Nil	**50**	**20**	**50@**	**20**			

(Total IKS Hrs for Sem. : 02 Hrs)

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

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

1. FA-TH represents an average of two class tests of 30 marks each conducted during the semester.
2. If a 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 a 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 projects / assignments / other activities. (Provide list of all assignments here in tabular format At least 6 to 8 assignments to be given)

i) RATIONALE:-

Exposure to basic mechanical engineering subjects equips electrical engineering students with a well-rounded skill set. This interdisciplinary knowledge enhances their ability to design, analyze, and optimize electrical systems within the broader context of mechanical considerations, fostering a holistic approach to engineering. Understanding power plant engineering is valuable for electrical engineers working on power distribution and generation systems.Fluid mechanics is relevant in cooling systems for electrical devices and the design of transformers., Gears, Belt drives, Chain drives, Bearings, Coupling gives understanding of industrial material handling system.

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME (TNR 14)

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

 "Use the principles of mechanical and civil engineering in electrical engineering"

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

EEH302-1 Identify basic components of thermal power plants. EEH302-2 Select suitable Industrial power transmission system

EEH302-3 Identify basic components & their specifications in hydraulic equipment. EEH302-4 Identify Different parts of Hydroelectric Power plant.

EEH302-5 Identify/Study Different component parts of the building EEH302-6 Assist in infrastructure works.

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, sustability 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 Pumps	3	2	2	2	2	2	2	-	-
EEH-302-1 Identify basic components of thermal power plants	3	2	1	2	2	1	2	-	-

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustability 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
EEH-302-2 Select suitable Industrial power transmission system	3	3	2	2	1	2	1	-	-
EEH-302-3 Identify basic components & their specifications in hydraulic equipment.	3	2	2	2	2	1	2	-	-
EEH-302-4 Identify Different parts of Hydroelectric Power plant.	3	2	2	0	1	1	1	-	-
EEH-302-5 Identify/Study Different component parts of the building	3	2	2	1	2	1	2	-	-

EEH-302-6 Assist in infrastructure works.	3	1	2	1	1	1	1	-	-

F. CONTENT:

I)   Practical exercises

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

Sr. no	Basic Mechanical Engineering	CO
1	*Identify steam boilers using models and charts	EEH302-1
2	*Identify steam turbines using models and charts	EEH302-1
3	Measure temperature of different equipment using temperature measuring devices	EEH302-1
4	Measure pressure of different equipment using pressure measuring devices	EEH302-1
5	Measure speed of different rotating elements using sped measuring devices	EEH302-1
6	*Identify drive system using models/ actual set up	EEH302-2
7	Calculate Velocity Ratio of given gear/belt drive of suitable mechanical system.	EEH302-2
8	*Demonstrate Working of Hydraulic Power plant using pelton wheel turbine set up.	EEH302-3
9	*Identify different components of Reciprocating Pump	EEH302-3

Sr. no	Basic Civil Engineering	CO
1	*Study of Layout plan for Hydroelectric power plant.	EEH302-4
2	*Study the different types of buildings.	EEH302-5
3	Reading of a working drawing for Different types of buildings.	EEH302-5
4	Introduction of different building component	EEH302-5
5	Different types of openings and ducts in the Residential buildings.	EEH302-5
6	*Study of different construction activity sequence.	EEH302-5&6
7	Study Requirements of concealed wirings in the construction activities	EEH302-5
8	*Study of foundation used in residential and industrial works.	EEH302-5 & 6
9	*Study of different types of Concrete grades.	EEH302-5
10	Identify the structures for the electrification in the infrastructure development.	EEH302-6

II)   Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: EEH-1: Identify the different parts of a thermal power plant.			
1	Power plants equipment 1.1 Layout of Thermal Power Plant, Major thermal power plants in India(*IKS) 1.2 Introduction to steam boilers- Difference between water tube & fire tube boiler. Babcock Wilcox boilers, 1.3 Introduction to steam Turbines- Impulse and reaction turbine.	07	16

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
	1.4 Introduction to portable generators: Basic components and working of four stroke petrol & diesel I.C engine 1.6 Mechanical parameters measurement 1.6.1Pressure measurement: Bourdon tube pressure gauge 1.6.2Temperature measurement: Optical pyrometer, Thermocouple 1.6.3Heat measurement: Calorimeter 1.6.4Speed measurement of rotating elements: Tachometer, Stroboscope		
CO: EEH-2: Select suitable Industrial power transmission system			
2	Power Transmission systems ; 2.1 Gears: Spur, helical, bevel, and worm gears. 2.2 Belt drives: Flat belt, V-belt 2.3 Chain drives; Roller chains, Inverted Tooth Chains 2.4 Bearings; Ball Bearing, Roller Bearing. 2.5Couplings Flexible Couplings, Rigid Couplings	04	08
CO: EEH-3: Identify basic components & their specifications in hydraulic equipment.			

| 3 | Hydraulic pumps, turbines, and Air Compressor
3.1 Layout of Hydraulic Power Plant,
3.2 Major hydraulic power plants in India(*IKS)
3.3 Introduction to hydraulic turbines: construction and working of Pelton wheel,
3.4 Introduction to hydraulic pumps: construction and working of centrifugal pump, reciprocating pump
3.5 Air Compressor; construction and working of two stage reciprocating air compressor, centrifugal air compressor. | 05 | 12 |

Section –II

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: EEH307-4**. Identify Different parts of Hydroelectric Power plant.**			
4	1.1 Layout of Hydroelectric Power Plant 1.2 Major Hydroelectric power plants in India(*IKS) 1.3 Civil works structures and their uses	02	00
CO: EEH307-5 **Identify/Study Different component parts of the building**			
5	**Building Construction & drawing:-** 5.1 Types of building Component parts of the building. 5.2 Stone Masonry & Brick masonry and Plastering 5.3 Openings: doors and windows their types. 5.4 Introduction to building drawing. 5.5 Circulation: Horizontal and vertical (passages and staircases) 5.6 Types of structure load bearing, framed & industrial 5.7 Terms Related to Built up Area: plinth area, carpet area, built-up area and FSI. **Foundation and soil mechanics::** 5.8 Types of soils and bearing capacities.(*IKS) 5.9 Different Types of foundations. **Concrete technology:** 5.10 Ingredients of concrete 5.11 Different types of concrete grade and its application. 5.12 Concreting procedure & centering works.	08	00
CO: EEH307-6: **Assist in infrastructure works.**			

6	Introduction to various infrastructure Projects.
	 6.1 Need of Infrastructure
	 6.2 Role of Civil & Electrical engineer in development.
	 6.3 Different sectors in the infrastructure
	 6.4 Transportation Engineering.
	     6.4.1 Railway
	     6.4.2 Roads
	     6.4.3 Bridges
	     6.4.4 Tunnels
	 6.5 Water supply and Sanitary Engineering
	 6.5.1 Water treatment plant and supply network
	 6.5.2 Collection of waste water & sewage treatment plant
	 6.6 Irrigation engineering
	 6.6.1 Intake structure
	 6.6.2 Types of irrigation projects. Lift irrigation
	 6.7 Modern Infrastructure work
	 6.7.1 Modern public transport system like metro
		06	00

6.7.2 Renewable energy plants like solar energy wind energy(*IKS)		

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

G : List of Assignments under SLA

Not applicable.

H : Specification table for setting question paper for semester end theory examination
---------------------Not applicable.------------------

I :-Assessment Criteria
i) Formative Assessment of Practical:-

Every 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	Discipline and punctuality	05
	TOTAL	**25**

ii) Summative Assessment of Practical:

Every candidate 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. Classroom practices.
3. Use of projector and soft material for demonstration

K) Teaching and Learning resources:

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

L)   Reference Books:

S.N.	Name of Book	Author	Publication
1	A Textbook of Thermal Engineering,	R. S/ Khurmi	S. Chand, New Delhi, 2012 or latest
2	A Textbook of Basic Mechanical Engineering.	D.K.Gupta	Dhanpat rai Publication.
3	Basic Mechanical Engineering.	S. C. Sharma	Khanna Publication, New Delhi, 2012 or latest
4	Electrical Machine	Nagrath I.J. a Kothari, D.P.	Tata McGraw Hill, New Delhi, 2012 or latest
5	Electrical Machine-I	Gupta, J. B.	S. K. Kataria& Sons, New Delhi, 2012 or latest
6	Basic Civil Engineering	G.K.Hiraskar	Dhanpat rai Publication.
7	Basic Civil Engineering	S.S.Bhavikatti	New age international Publication.

M)   Learning Website & Software

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