GOVERNMENT POLYTECHNIC, KOLHAPUR

(An Autonomous Institute of Government of Maharashtra)

Curriculum Document

CURRICULUM: MPECS-2023

(Outcome Based Curriculum)

for

DIPLOMA IN MECHANICAL ENGINEERING

Secretary   **Chairman**

Programme-wise Board of Studies (PBOS)
Mechanical Engineering Programme
Government Polytechnic, Kolhapur

GOVERNMENT POLYTECHNIC KOLHAPUR

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

Programme Name	: Diploma In Mechanical Engineering		
Programme Code	: ME	**With Effect From Academic Year**	: 2023-24
Duration Of Programme	: 6 Semester	**Duration**	: 15 WEEKS
Semester	: First	**Scheme**	: MPECS 2023

Sr No	Course Title	Abbreviation	Course Type	level	Course Code	Total IKS Hrs for Sem.	Actual Contact Hrs./Week CL	TL	LL	Self Learning (Activity/ Assignment /Micro Project)	Notional Learning Hrs /Week	Credits	Paper Duration (hrs.)	Theory FA-TH Max	SA-TH Max	Total Max	Min	Practical FA-PR Max	Min	SA-PR Max	Min	SLA Max	Min	Total Marks
1	BASIC MATHEMATICS	HBMT	AEC	1	CCH105	4	4	2	-	2	8	4	3	30	70	100	40	-	-	-	-	25	10	125
2	ENGINEERING CHEMISTRY- B	HCHB	DSC	1	CCH104	4	4	-	2	2	8	4	1.5	30*#	70*#	100	40	25	10	25@	10	25	10	175
3	ENGINEERING GRAPHICS	HGRB	DSC	1	CCH106	2	2	-	4	-	6	3	4	30	70	100	40	50	20	-	-	-	-	150
4	COMMUNICATION SKILLS	HCMS	AEC	2	CCH201	0	4	-	2	2	8	4	3	30	70	100	40	25	10	-	-	25	10	150
5	MECHANICAL WORKSHOP PRACTICES	HMWP	SEC	1	MEH101	2	-	-	4	-	4	2		-	-	-	-	50	20	50@	20	-	-	100
6	FUNDAMENTALS OF ICT	HICT	SEC	2	CCH202	0	1	-	2	1	4	2		-	-	-	-	25	10	25@	10	25	10	75
7	YOGA AND MEDITATION	HYAM	VEC	2	CCH203	1	-	-	1	1	2	1		-	-	-	-	25	10	-	-	25	10	50
Total						**13**	**15**	**2**	**15**	**8**	**40**	**20**		**120**	**280**	**400**		**200**		**100**		**125**		**825**

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

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

Note:

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

Course Category: Discipline Specific Course Core (DSC): 2, Discipline Specific Elective (DSE): 0, Value Education Course (VEC): 1, Intern. /Apprentice. /Project. /Community (INP): 0, Ability Enhancement Course (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

Programme Name	**: Diploma In Mechanical Engineering**		
Programme Code	**: ME**	**With Effect From Academic Year**	**: 2023-24**
Duration Of Programme	**: 6 Semester**	**Duration**	**: 15 WEEKS**
Semester	**: Second**	**Scheme**	**: MPECS 2023**

Sr No	Course Title	Abbreviation	Course Type	level	Course Code	Total IKS Hrs for Sem.	Actual Contact Hrs./Week CL	TL	LL	Self Learning (Activity/Assignment /Micro Project)	Notional Learning Hours /Week	Credits	Paper Duration (hrs.)	Theory FA-TH Max	SA-TH Max	Total Max	Min	Based on LL & TL Practical FA-PR Max	Min	SA-PR Max	Min	Based on Self Learning SLA Max	Min	Total Marks
1	APPLIED MATHEMATICS	HAMT	AEC	3	CCH301	2	4	2	-	-	6	3	3	30	70	100	40	-	-	-	-	-	-	100
2	ENGINEERING PHYSICS-B	HPHB	DSC	1	CCH102	4	4	-	2	2	8	4	1.5	30*#	70*#	100	40	25	10	25@	10	25	10	175
3	ENGINEERING DRAWING (ME/MT)	HEDR	AEC	1	CCH110	4	2	-	4	2	8	4	4	30	70	100	40	25	10	25@	10	25	10	175
4	APPLIED MECHANICS	HAPM	DSC	1	CCH108	2	4	-	2	2	8	4	3	30	70	100	40	25	10	25@	10	25	10	175
5	MANUFACTURING PROCESSES	HMPR	SEC	3	MEH301	1	3	-	4	1	8	4	3	30	70	100	40	25	10	25@	10	25	10	175
6	SOCIAL AND LIFE SKILLS	HSLS	VEC	2	CCH204	-	-	-	-	2	2	1	-	-	-	-	-	-	-	-	-	50	20	50
	Total					13	17	2	12	9	40	20		150	350	500		100		100		150		850

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

Note:
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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 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 Enhancement Course (AEC) : 2, Skill Enhancement Course (SEC) : 2, Generic Elective (GE) : 0

SEMESTER 1 CURRICULUM

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

A. LEARNING SCHEME:

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

B: ASSESSMENT SCHEME: -

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

(Total IKS Hrs. for Sem.: 06 Hrs.)

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

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

D. i) RATIONALE: -

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

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

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

E. COURSE LEVEL LEARNING OUTCOMES (COS)

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

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

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Develo pment of solutions	PO 4 Engine ering Tools, Experi mentati on and Testing	PO 5 Enginee ring Practice s for society, sustaina bility and Environ ment	PO 6 Projec t Mana gemen t	PO 7 Life-long Learni ng	PSO1 Work in mfg& service sector	PSO 2 Start entrepreneurial activity
Competency: Use DC machines and transformers.	3	2	1	-	1	-	2		

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1 Work in mfg& service sector	PSO 2 Start entrepreneurial activity
CCH105-1	3	1	-	-	-	-	1		
CCH105-2	3	1	-	-	1	-	1		
CCH105-3	3	-	-	-	-	-	1		
CCH105-4	3	1	1	-	-	-	1		
CCH105-5	3	2	1	-	1	-	1		

F. CONTENT:

i) Tutorial exercises

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

Sr. no	Tutorial experiences	CO
1	Solve Simple problems of 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

Sr. no	Tutorial experiences	CO
12	Solve examples on functions & rules of derivatives	CCH105-5
13	Solve examples on Derivative of composite function, inverse & parametric functions,	CCH105-5
14	Solve examples on Derivative of exponential, implicit and logarithmic functions	CCH105-5
15	Solve examples on Application of Derivatives	CCH105-5

II)Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: CCH105-1: *To Apply concepts of algebra to solve engineering related problems*			
Unit 1 Algebra	**1.1 LOGARITHMS** 1.1.1 Concept and laws of logarithm 1.1.2 Simple examples based on laws of Logarithms **1.2 MATRICES** 1.2.1 Definition of a matrix, Types of matrices, Algebra of matrices, Equality of two matrices, Transpose of a matrix, 1.2.3 Adjoint and Inverse of a matrix 1.2.4 Solution of simultaneous equations having 3 unknowns using Matrix inversion method **1.3 PARTIAL FRACTIONS** 1.3.1 Definition of rational, proper and improper fractions 1.3.2 Various cases of Partial fractions and Examples 1.4 Algebra of Indian Knowledge System: Solution of simultaneous equations using Vedic Mathematics	12	16
CO: CCH105-2: *To Use techniques and methods of statistics to compare multiple sets of data*			
Unit 2 Statistics	**MEASURES OF DISPERSION** 2.1 Range, Coefficient of Range of Discrete and grouped data 2.2 Mean deviation and Standard Deviation about mean for Discrete & Grouped Data (except Assumed mean method and Step deviation method) 2.3 Variance and coefficient of Variance 2.4 Comparison of 2 sets of observations	6	10
CO: CCH105-3 : *Solve area specific engineering problems under given conditions of* straight lines			

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
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 other 3.3 Various forms of straight line 3.4 Perpendicular distance of a point from a line 3.5 Distance between two parallel lines 3.6 Angle between two straight lines 3.7 Geometry in Sulabh sutras in Indian Knowledge System	6	8

Section –II

Sr. no.	Topics/Subtopics	Learning Hours	Classroom learning evaluation Marks
CO: CCH105-4:- To memorize trigonometric formulae and solve problems based on them.			
Unit 4 Trigono metry	***TRIGONOMETRY*** 4.1 Fundamental Identities (Only state, No examples) 4.2 Conversion of degree into radian and vice versa of standard angles 4.3 Trigonometric ratios of Compound Angles (Without Proof), Examples 4.4 Trigonometric ratios of Allied Angles (Without Proof), Examples 4.5 Trigonometric ratios of Multiple and Submultiple Angles (Without Proof), Examples 4.6 Factorization and De-Factorization Formulae (Without Proof), Examples 4.7 Inverse Trigonometric ratios, Principle values and simple problems 4.8 Trigonometry in Indian Knowledge System: The evolution of sine function in India 4.9 Trigonometry in Indian Knowledge System: Indian Trigonometry-From ancient beginning to Nilakantha 4.10 Trigonometry in Indian Knowledge System: Ancient Indian Astronomy 4.11 Trigonometry in Indian Knowledge System: Pythagorean to triples in Sulabhsutras	14	14
CO: CCH105-5:- To solve the problems of maxima, minima, radius of curvature and geometrical applications.			

	5.1 **Functions**:Concept of Functions and simple examples		
Unit 5 Differential Calculus	5.2 **Limits**: Concept of Limits without examples 5.3 **Derivatives:** 5.3.1 Derivative of sum, difference, product and quotient of two or more functions 5.3.2 Derivative of composite functions 5.3.3 Derivative of Inverse functions 5.3.4 Derivative of Implicit functions 5.3.5 Derivative of Parametric functions 5.3.6 Derivative of exponential and logarithmic functions 5.3.7 Calculus in Indian Knowledge system " Discovery of Calculus by Indian Astronomers (Indian Mathematics)	16	16
CO: CCH105-5:- To solve the problems of maxima, minima, radius of curvature and geometrical applications.			
Unit 6 Application of Derivatives	***APPLICATIONS OF DERIVATIVES*** 6.1 Second Order Derivatives (without examples) 6.2 Equation of Tangent & Normal 6.3 Maxima & Minima (only for algebraic functions) 6.4 Radius of curvature	06	06

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

G: LIST OF MICROPROJECT /ASSIGNMENTS UNDER SLA

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

11	Develop a math game based on operations of matrices.	
12	Collect examples based on real world applications of logarithm and prepare a pdf file.	
13	Measure height of trees/buildings in surrounding locations using trigonometry and prepare presentation.	
14	Apply trigonometric principles to calculate angles, distances, dimensions relevant to the chosen area and make a poster presentation.	
15	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	4	6	6	16	CCH105-1
I / 2	Statistics	2	4	4	10	CCH105-2
I / 3	Coordinate Geometry	2	2	4	8	CCH105-3
II /4	Trigonometry	2	6	6	14	CCH105-4
II /5	Differential Calculus	2	6	8	16	CCH105-5
II/6	Application of Derivatives	2	2	2	6	CCH105-5
	Total Marks				70	

I): -ASSESSMENT CRITERIA

Formative Assessment of Tutorial: -

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

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

J) INSTRUCTIONAL METHODS:

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

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

| 13 | Sansar ke Mahan Ganitagya | Gunakar Muley | Raj kamal Prakashan ISBN-13. 978-8126703579 |
| 14 | An Introduction to Statistical learning with applications in R | Gareth James & others | Springer New York Heidelberg Dordrecht London ISBN:978-1-4614-7137-0 |

M) Learning Website & Software

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

COURSE ID:
COURSE NAME   **: ENGINEERING CHEMISTRY**
COURSE CODE   **: CCH 104**
COURSE ABBREVIATION   **: HCHB**

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	25	10	175

(Total IKS Hrs for Sem.: 04 Hrs)

C: ABBREVIATIONS: -

CL- Class Room Learning, TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment
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4. Notional Learning hours for the semester are (CL+LL+TL+SL) hrs.* 15 Weeks
5. 1(one) credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.

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

D. i) RATIONALE: -

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

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME

Apply principles of advanced chemistry to solve engineering problems.

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

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

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

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E. COURSE LEVEL LEARNING OUTCOMES (COS)

CCH104-1 Apply the basic knowledge of atom, molecules and compounds in Engineering Chemistry.
CCH104-2 Apply the concepts of Electrochemistry to interpret the reasons of corrosion with its remedies.
CCH104-3 Select the relevant catalyst, alloys, insulators, adhesives, composite materials, plastic and rubber for different applications in the field of engineering.
CCH104-4 Use of water in Domestic purpose, Industrial purpose and its relevant treatment to solve industrial problems.
CCH104-5 Explain the method of Extraction of Iron.
CCH104-6 Choose appropriate with relevant method of lubrication to solve industrial problem and applications of Paint and Varnish.

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 solution	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 Work in mfg & service sector	PSO 2 Start entrepreneurial activity
CCH104-1	3	2	-	1	3	1	3	1	1
CCH104 -2	3	2	-	1	2	1	3	-	-
CCH104 -3	3	1	-	-	2	1	3	-	-
CCH104 –4	3	2	-	1	3	1	3	-	-
CCH104-5	3	1	-	-	2	1	3	-	-
CCH10- 6	3	2	-	1	2	1	3	-	-

F. CONTENT:

i) PRACTICAL EXERCISES

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

Sr. no	Laboratory experiences	CO
1	Introduction to Chemistry laboratory	CCH104-1
2	Volumetric analysis of solution.	CCH104-1
3	Preparation of 1 N, 0.5 N & 0.1 N Solutions of different chemicals like NaOH, HCI, Oxalic acid, $FeSO_4$, etc.	CCH104-1
4	Titration of strong acid and strong bases (HCl X NaOH)	CCH104-1
5	Double titration of strong acid, strong base & weak acid (HCI X NaOH X $H_2C_2O_4.H_2O$)	CCH103-1
6	Titration of weak base, strong acid & strong base (Na_2CO_3 X H_2SO_4 X KOH)	CCH103-1
7	Estimation of chloride content in water by Mohr' s method	CCH103-4
8	Determination of amount of Ca and Mg ions present in given sample of water by E.D.T.A method	CCH103-4

Sr. no	Laboratory experiences	CO
9	Estimation of viscosity of oils/solutions by Ostwald's method	CCH103-6
10	Estimation of Ca in limestone.	CCH103-5
11	Titration of $KMnO_4$ & $FeSO_4$ (Redox titration)	CCH103-5
12	Estimation of % of Fe in given sample of steel.	CCH103-3
13	Determination of alkalinity of water.	CCH103-4
14	Determination of Electrochemical equivalent (ECE) by copper volt meter.	CCH104-2
15	To estimate volumetrically the percentage of copper in a given sample of Brass.	CCH104- 5
16	To demonstrate the different types of Solders.	CCH104-3

ii. THEORY

SECTION I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO - CCH104-1 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**
CO - CCH104-2 Apply the concepts of Electrochemistry to interpret the reasons of corrosion with its remedies.			
2	**ELECTROCHEMISTRY AND CORROSION.** 2.1 Definitions- 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.	**10**	**10**

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
	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.		
	CO - CCH104-3 Select the relevant catalyst, alloys, insulators, adhesives, composite materials, plastic and rubber for different applications in the field of engineering.		
3	**CHEMISTRY OF ENGINEERING MATERIALS AND CATALYSIS.** **3.1 INSULATORS** 3.1.1 Definition & Characteristics of insulator. 3.1.2 Preparation, properties & uses of Glass wool, Thermocole. **3.2 COMPOSITE MATERIALS** 3.2.1 Definition. 3.2.2 Classification, Properties & Application of composite materials. **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	13	16

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

	- 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 - CCH104-4 Use of water in Domestic purpose, Industrial purpose and its relevant treatment to solve industrial problems.			
4	**WATER** 4.1 Impurities in natural water. 4.2 Hard water & Soft water. 4.3 Hardness of water- Temporary & Permanent. 4.4 Reactions of hard water with soap. 4.5 Disadvantages of hard water for domestic & Industrial purpose - Textile Industry, Sugar Industry, Paper Industry Dying Industry. 4.6 Sterilization of water - Chlorination –by Cl_2, bleaching powder, Chloramines with chemical reactions. 4.7 Ion Exchange method to remove total hardness of Water.	**09**	**12**
CO - CCH104-5 Explain the method of Extraction of Iron.			

5	**METALLURGY AND ALLOYS**
	5.1 Occurrence of metals, Definition of minerals, Ore, Flux, Gangue & Slag.
	5.2 Flow chart of metallurgical processes.
	5.3 Concentration of ores –
	 Physical methods –
	  1. Gravity separation method
	  2. Electromagnetic separation method
	  3. Froth floatation method
	 Chemical methods –
	  1. Calcination
	  2. Roasting
		12	**14**

	5.4 Ores of Iron.
	5.5 Extraction of Iron from its ore –
	    Blast furnace – Construction, working, reactions &
	    Products.
	5.6 Definition of alloys.
	5.7 Classification & purposes of making of alloys.
	5.8 Composition, properties & engineering application of –
	    Non- ferrous alloys – Duralumin, Monal metal &
	    Woods metal.
	    Ferrous alloys – Heat resisting steel, magnetic
	    steel, Stainless steel.		

CO - CCH104-6 Choose appropriate with relevant method of lubrication to solve industrial problem and applications of Paint and Varnish.			

6	**LUBRICANTS, PAINT AND VARNISH**
	6.1.1 Definition, Classification & Functions of lubricants.
	6.1.2 Characteristics of lubricants –
	    Viscosity, Viscosity index, Oiliness, Volatility,
	    Cloud point & Pour point, Flash & Fire point, Acid
	    value.
	6.2 Oil paint – Definition & characteristics of oil
	    paint.
	6.3 Purpose of using oil paint.
	6.4 Ingredients of oil paint with suitable example
	    & its functions – Drying oil (Vehicle), Drier,
	    Pigment, Thinner, Filler (Extenders),
	    Plasticizer.
	6.5 Varnish – Definition, types, constituents,
	    Properties & applications.
	6.6 Distinction between paint & varnish.
		09	**10**

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

G : LIST O F ASSIGNMENTS UNDER SLA

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	Explain ingredients present in Paints	02

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

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

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks	CO
		Remember	Understand	Apply		
I / 1	Atomic Structure and Chemical Bonding	4	2	2	08	CCH104-1
I / 2	Electrochemistry & Corrosion	4	4	2	10	CCH104-2
I / 3	Chemistry of Engineering materials & catalysis	6	6	4	16	CCH104-3
II /4	Water	4	4	4	12	CCH104-4
II /5	Metallurgy & Alloys	6	4	4	14	CCH104-5
II / 6	Lubricants, Paints & Varnish	4	4	2	10	CCH104-6
	Total Marks				70	

I: - ASSESSMENT CRITERIA

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

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

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

ii) Summative Assessment of Practical: -

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

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

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

K) TEACHING AND LEARNING RESOURCES: -

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

L) REFERENCE BOOKS:

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

M) LEARNING WEBSITE & SOFTWARE

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

*****

COURSE ID: ME
Course Name : **ENGINEERING GRAPHICS (CE/ME/MT)**
Course Code : **CCH106**
Course Abbreviation: HGRB
Course Type : **DSC**

A. LEARNING SCHEME:

Pre-requisite Course(s): Nil
Teaching Scheme:

Scheme component	Actual Contact Hours / week	Credits
Classroom Learning (CL)	02	
Tutorial Learning (TL)	-	
Laboratory Learning (LL)	04	**3**
Self-Learning Hours (SLH)	-	
Notional Learning (NLH)	06	

B. 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	
30	70	100	40	50	20	-	-	-	-	150

Total IKS Hrs for Sem: 2 Hrs

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

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

* Self learning includes micro project / assignment / other activities. (Provide list of all 5 assignments here in tabular format)

D. i) RATIONAL:

Engineering graphics is the language of engineers. The concepts of graphical language are used in expressing the ideas, conveying the instructions, which are used in carrying out the jobs on the sites, shop floor etc. This course is useful in developing drafting and sketching skills in the student. It covers the knowledge & application of drawing instruments & also familiarizes the learner about Bureau of Indian Standards related to engineering drawing. The curriculum aims at developing the ability to draw and read various engineering curves, projections and dimensioning styles. The subject mainly focuses on use of drawing instruments, developing imagination and translating ideas into sketches. The course also helps to develop the idea of visualizing the actual object or part on the basis of drawings and blue prints. This preliminary course aims at building a foundation for the further courses related to engineering drawing and other allied courses in coming semesters

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry identified outcome through various learning experiences:
- Prepare simple engineering drawing manually using drawing instruments.

E. COURSE LEVEL LEARNING OUTCOMES (CO'S)

CCH106-1 Understand various fundamentals in engineering drawing.
CCH106-2 Produce different types of engineering curves.
CCH106-3 Produce the projection of point & lines inclined to one reference plane.
CCH106-4 Produce the projection of different planes.
CCH106-5 Produce orthographic drawing and sectional orthographic drawing from given pictorial view.

Competency, course outcomes and programme outcomes/programme specific outcomes (CP-CO-PO/PSO) matrix

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

Competency and COs	Programme outcome POs and PSO's								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO3 Design/development of solutions	PO 4 Engineering Tools, Experimentation & testing	PO 5 Engineer ing Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long learning	PSO1 Work in mfg& service sector	PSO 2 Start entrepreneurial activity
CCH106-1	3	-	-	-	-	-	-	-	-
CCH106-2	3	-	1	-	-	-	-	-	-
CCH106-3	3	-	-	1	1	-	-	-	-
CCH106-4	3	-	1	-	-	-	-	-	-
CCH106-5	3	-	1	1	-	-	-	-	-

F. CONTENT:

i) Practical exercises
Practical Exercises and related skills to be developed:
The following practical exercises shall be conducted in the *Drawing Hall for Engineering drawing* in practical sessions of batches of about 20- 22 students:

Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
1	Draw horizontal, vertical, 30-degree, 45 degrees, 60 & 75-degrees lines using Tee and Set squares/ drafter.	2	CO1
2	Draw different types of lines, dimensioning styles	2	CO1
3	Draw one figure showing dimensioning techniques, two problems on redraw the figures. (Sketch Book)	2	CO1
4	Draw one figure showing dimensioning techniques, two problems on redraw the figures and one problem on Scales. (01 Sheet)	4	CO1
5	Draw any four Engineering Curves (Sketchbook)	2	CO2
6	Draw any four Engineering Curves – (01 Sheet)	4	CO2
7	Draw any four problems on Line parallel to both the principal planes Line parallel to one principal planes & perpendicular to other Principal planes using first angle method of projection. (Sketchbook)	2	CO3 CO5
8	Draw any four problems on Line parallel to one principal plane & inclined to other principal planes using first angle method of projection - (01 Sheet)	4	CO3 CO5
9	Draw any four problems on Plane parallel to one principal plane & perpendicular to another Principal plane, Plane perpendicular to both the principal planes using first angle method of projection. (Sketchbook)	4	CO4 CO5
10	Draw any four problems on Plane inclined to one principal plane and perpendicular to other principal plane using first angle method of projection - (01 Sheet)	4	CO4 CO5

11	Draw two problems on orthographic projections using first angle method of projection having plain surfaces, slanting surfaces and slots etc.	2	CO5
12	Draw two problems on orthographic projections using first angle method of projection having cylindrical surfaces, ribs etc. (Sketchbook)	2	CO5
13	Draw two problems on orthographic projections using first angle method of projection having plain surfaces, slanting surfaces cylindrical surfaces, ribs and slots etc.- (01 Sheet)	2	CO5
14	Draw different types of sections of simple objects (Sketchbook)	2	CO5 CO6
15	Draw two problems on sections of solids having ribs, cylindrical surface etc. (01 Sheet)	4	CO5 CO6
16	Correlate ancient Indian sculptures, Indian temples, Monuments, etc. with Engineering Graphics. (IKS)	2	CO1 CO2 CO3 CO4 CO5 CO6

ii) **THEORY**

SECTION – I

Sr. No	Topics	Teaching (Hours)	Theory Evaluation Marks
Course Outcome **CCH106-1** *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. 1.3 Letters and numbers (single stroke vertical) Convention of lines and their applications. 1.4 Scale (reduced, enlarged & full size) Plain scale and Diagonal scale. 1.5 Dimensioning technique as per SP-46 (Latest Edition), Elements of dimensioning, Types and applications of chain, parallel and Co-ordinate dimensioning	**04**	**06**

Course Outcome CCH106-2 *Produce different types of engineering curves*			
2.	**ENGINEERING CURVES** 2.1 Conic sections and their applications 2.2 Ellipse by Arc's of circle method & Concentric circles method. 2.3 Parabola by Directrix and focus method & Rectangle method 2.4 Hyperbola by Transverse Axis focus Method & Rectangular hyperbola (Inclined axes). 2.5 Involutes of circle, & pentagon, hexagon 2.6 cycloid, epicycloids, hypocycloid 2.7 Helix & Archimedean spiral.	**09**	**18**
Course Outcome CCH106-3 *Produce the projection of point & lines inclined to one reference plane*			
3.	**PROJECTION OF POINT AND LINES** 3.1 Projection of points when point is in first quadrant only 3.2 Orientation of Line with respect to principal planes (Both ends of line should be in first quadrant) • Line parallel to both the principal planes • Line parallel to one principal planes & perpendicular to other Principal planes • Line parallel to one principal plane & inclined to other principal planes	**05**	**10**

SECTION – II

Sr. No	Topics	Teaching (Hours)	Theory evaluation Marks
Course Outcome CCH106-4 *Produce the projection of different planes.*			
4.	**PROJECTION OF PLANES** 4.1 Types of Planes - Circular, Square, Triangular, Rectangular, Pentagonal, Hexagonal. 4.2 Orientation of plane with respect to principal planes (Planes in First Quadrant Only) – • Plane parallel to one principal planes & perpendicular to another Principal plane • Plane perpendicular to both the principal planes • Plane inclined to one principal plane and perpendicular to other principal plane	**03**	**10**
Course Outcome CCH106-5 *Produce orthographic drawing and sectional orthographic drawing from given pictorial view.*			
5.	**ORTHOGRAPHIC PROJECTIONS** 5.1 Introduction to Orthographic Projections -First and Third angle Projection Method, their symbols 5.2 Conversion of Pictorial view into Orthographic Views. (First angle Projection Method Only)	**05**	**14**

6.	SECTIONAL VIEWS 6.1 Types of sections 6.2 Conversion of pictorial view into sectional Orthographic views. (First Angle Projection Method only)	04	12

Course Outcome CCH106-5 Produce orthographic drawing and sectional orthographic drawing from given pictorial view

Total	**30**	**70**

1. Summative assessment – Theory 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.

G. SUGGESTED MICRO PROJECTS / ASSIGNMENTS/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING) UNDER SLA
- **NOT APPLICABLE**

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	Introduction To Engineering Drawing	00	06	00	CCH106-1	06
2	Engineering curves	00	12	06	CCH106-2	18
3	Projection of Point and Lines	00	10	00	CCH106-3	10
4	Projection of Planes	00	00	10	CCH106-4	10
5	Orthographic Projection	00	00	14	CCH106-5	14
6	Sectional Views.	00	00	12	CCH106-5	12
	Total	00	28	42		**70**

I. ASSESSMENT CRITERIA

Formative Assessment of Practical: -

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

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

J. INSTRUCTIONAL METHODS:

i)   Lectures cum Demonstrations,
ii) Class room practices.
iii) Use of projector and soft material for demonstration

K. TEACHING AND LEARNING RESOURCES:

Chalk board, Power Point presentations and Demonstrative kits.

L. REFERENCE MATERIAL:

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, B. C. Rana	Engineering Drawing	Pearson, 2010
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

M. LEARNING WEBSITE & SOFTWARE: -

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

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	04	4
	Tutorial Learning	00	
	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					150
	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	

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

C: ABBREVIATIONS: -

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

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

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

D. i) RATIONALE: -

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

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME

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

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

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 Engineerin g Tools, Experiment ation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Manage ment	PO 7 Life- long Learning	PSO1 Work in mfg& service sector	PSO 2 Start entrepre neurial activity
Competency:	2	-	-	-	-	1	2		
CCH201-1	1	1	-	-	-	2	1		
CCH201-2	2	1	-	-	-	2	2		
CCH201-3	2	1	-	-	-	2	1		
CCH201-4	2	-	-	-	-	2	2		
CCH201-5	2	-	-	-	-	2	1		
CCH201-6	1	1	-	-	-	1	1		

F. CONTENT:

I) PRACTICAL EXERCISES

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

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

II) THEORY

Section I

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

Section II

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

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

G : LIST OF ASSIGNMENTS/ACTIVITIES/MICRO-PROJECT UNDER SLA

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

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

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

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

I: -ASSESSMENT CRITERIA

i) Formative Assessment of Practical: -

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

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

ii) Summative Assessment of Practical:

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

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

J) INSTRUCTIONAL METHODS:
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 ID : **ME**
Course Name : **MECHANICAL WORKSHOP PRACTICES**
Course Code : **MEH101**
Course Abbreviation : **HMWP**

A. LEARNING SCHEME:

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

B. 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 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, *#OnLine Examination,
@$InternalOnlineExamination .

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 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:

Mechanical Workshop Practices mainly deals with Fitting, Plumbing and Wood working. A technician has to work in such an environment with his peers, superiors and subordinates for a major part of his life. Therefore, the emphasis on the practical work is needed for the primary experience of working in the team.

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME

Use different engineering tools for performing shop floor activities.

E. COURSE OUTCOMES:

MEH101-1: Practice safety in workshop and use firefighting tools and equipment.

MEH101-2: Prepare job using different tools in fitting shop

MEH101-3: Perform various operations using plumbing tools.

MEH101-4: Preparing simple components using carpentry tools.

MEH101-5: Produce simple job using different sheet metal operations.

F. 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	PSO 1 Work in mfg & service sector	PSO 2 Start entrepreneurial activity
Competency	1	-	-	3	-	-	-	2	-
MEH101-1	1	-	-	3	-	-	-	2	-
MEH101-2	1	-	-	3	-	-	-	2	-
MEH101-3	1	-	-	3	-	-	-	2	-
MEH101-4	1	-	-	3	-	-	-	2	-
MEH101-5	1	-	-	3	-	-	-	2	-

G. CONTENT

i) PRACTICAL EXERCISES:

Sr. No.	Topics/ Sub-Topics	Skills/ Competencies to be developed	Practical (Hours)/ Evaluation (Marks)
Course outcome: MEH101-1: Practice safety in workshop and use firefighting tools and equipment.			
01	**General Workshop Practice** 1.1 Safety Practices, Causes of accidents, General safety rules, Safety signs and symbols 1.2 First Aid 1.3 Fire, Causes of Fire, Basic ways of extinguishing the fire, Classification of fire, Class A, B, C, D, Firefighting equipment, fire extinguishers, and their types. 1.4 Workshop Layout 1.5 Issue and return system of tools, equipment and consumables	A. Follow safety practices B. Explain the different types of fire extinguisher and their uses C. Use firefighting equipment D. Locate various machines and equipment in workshop E. Follow good housekeeping	04/–
Course outcome: MEH101-1: Practice safety in workshop and use firefighting tools and equipment. *MEH101-2: Prepare job using different tools in fitting shop*			
02	**Fitting Shop** 2.1 Demonstration of different fitting tools-holding tools, marking & measuring tools, cutting tools, finishing tools, drilling and power tools and their specifications 2.2 Demonstration of different operations like marking, filing, cutting, drilling, tapping, dieing, chipping, scraping, grinding, sawing, reaming etc. 2.3 fitting shop machineries-care and maintenance, safety practices 2.4 One simple fitting job involving following operations- marking, punching, filing, chamfering, sawing, drilling, tapping etc. 2.5 One simple fitting job (Male Female assembly type) involving following operations- marking, punching, filing, chamfering, sawing, drilling, tapping etc.	A. Study of fitting tools, identifying materials B. Measuring dimensions C. Interpretation of drawing D. Selection of tools E. Time management and observing safety habits F. Operate drilling machine, saw machine	14/14
Course outcome: MEH101-1: Practice safety in workshop and use firefighting tools and equipment. *MEH101-3: Perform various operations using plumbing tools.*			
03	**Plumbing shop** 3.1 Demonstration of Plumbing tools -pipe vice, pipe bending equipment, pipe wrenches, dies and their Specifications 3.2 Pipe fittings- bends, elbows, tees, cross, coupler, socket, reducer, cap, plug, nipple and their Specifications	A. Study of plumbing tools, identifying materials B. Interpretation of drawing C. Threading with dies	14/12

	3.3 Operation of Machineries in plumbing shops- pipe bending machine their specifications and maintenance. Basic process cutting, threading. 3.4 Demonstration of PVC pipe joint with various PVC fittings & accessories 3.5 One job on simple pipe joint with nipple coupling for Standard pipe, Pipe threading using standard die set (One job per one group of 04 students) 3.6 One job on T joint/elbow joint pipe fitting job as per given drawing. (One job per one group of 04 students)	on pipe D. Time management and observing safety habits E. Selection of pipe joint & fittings.	

Course outcome: MEH101-1: Practice safety in workshop and use firefighting tools and equipment.
MEH101-4: Preparing simple components using carpentry tools.

04	**Wood Working shop: -**		
	4.1 Demonstration of types of artificial woods such as plywood, block board, hardboard, laminated board, Veneer, fiber boards and their applications 4.2 Demonstration of different wood working tools such as carpentry vice, marking and measuring tools, holding tools, planning tools, cutting tools, drilling and boring tools saws, claw hammer, mallet, chisels, jack plane, smoothening plane, etc. 4.3 Demonstration of different wood working processes like marking, sawing, planning, chiseling, grooving, boring, Turning of wood etc. 4.4 Operate different machines & equipments in carpentry shop, their specifications and maintenance, safe practices. 4.5 One simple job involving measuring, marking, cutting, assembly etc. operations. (One job per one group of 04 students) 4.6 One simple job involving cutting, planing, wood turning, joining, finishing, varnishing, etc. operations (One job per one group of 04 students)	A. Study of wood working tools, Identifying materials B. Measuring dimensions C. Interpretation of drawing D. Operating planning, cutting, drilling machines. E. Time management and observing safety habits F. Prepare furniture or article with carpentry joints	14/12

Course outcome: Course outcome: MEH101-1: Practice safety in workshop and use firefighting tools and equipment.
MEH101-5: Produce simple job using different sheet metal operations.

05	**Sheet Metal Shop**		
	5.1 Demonstration of different sheet metal tools and machines. 5.2 Demonstration of sheet metal operations like Sheet cutting, Bending, Edging, End curling,	A. Study of sheet metal tools, identifying materials B. Measuring dimensions	

| | | C. Interpretation of drawing
D. Operating sheet cutting bending machines
E. Time management and observing safety habits
F. Prepare utility article | 14/12 |

Lancing, Riveting etc.
5.3 One Job involving sheet metal operations from Dustbin, Letter Box, Tray, Bucket etc.
(One job per one group of 04 students)

The students will submit the following.

Workshop record book showing the details of the job viz. Drawing, Raw material size, time required completing the job. The journal consisting of the neat sketches, specifications, use of the hand tool, and hand operations based on the demonstration in all the trades during the practical work.

H. ASSESSMENT CRITERIA

i) Formative Assessment of Practical: -

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

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

ii) Summative Assessment of Practical:

Every student has to perform one practical within 2 hours at term end practical which shall be assessed as per following criteria.

Sr. no	Criteria	Marks allotted
1	Preparedness for practical	10
2	Correct figures / diagrams	10
3	Skill (Finishing in dimensions)	20
4	Safety / use of proper tools	10
	Total	50

I. INSTRUCTIONAL STRATEGIES: -

    i)   Demonstration during Practicals.

    ii) Workshop Record Book

J. TEACHING AND LEARNING RESOURCES: -

    i)   Shop Demonstration

    ii) Hands on training on machine

K. REFERENCE BOOKS:

Sr. No.	Author	Title	Publisher
1	S. K. Hajra Chaudhary, Bose, Roy	Elements of workshop Technology – Volume I & II	Media Promoters and Publishers limited
2	B.S. Raghuvanshi	Elements of workshop Technology – Volume I & II	Dhanpat Rai & Co.

L. LEARNING WEBSITE & SOFTWARE

    i)   http://nptel.ac.in

    ii) https://www.vlab.co.in/

    iii) https://ecoursesonline.iasri.res.in/

    iv) www.egr.msu.edu/~pkwon/me478

*****

COURSE ID:
Course Name   : Fundamentals of ICT (CE/ME/EE/MT/ET/IT)
Course Code   : CCH202
Course Abbreviation: HICT

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	01	02
	Tutorial Learning	00	
	Laboratory Learning	02	
	SLH-SelfLearning	01	
	NLH-Notional Learning	04	

B. ASSESSMENT SCHEME:

Paper Duration	Theory				Based on LL &TSL				Based on SL		Total Marks
					Practical						
	FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
	Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
	-	-	-	-	25	10	25@	10	25	10	75

C. ABBREVIATIONS: -

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

Legends: @Internal Assessment, #External Assessment, *#OnLine Examination, @$InternalOnlineExamination   .

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

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

E. COMPETENCY:

Apply Fundamental knowledge of computer system to work with 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

F. COURSE OUTCOMES:

CCH202-1 - Use computer system and its peripherals for given purpose
CCH202-2 - Prepare Business document using Word Processing Tool
CCH202-3 - Analyze Data and represent it graphically using 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

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

	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)	
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO 1 Work in mfg & service sector	PSO 2 Start entrepre neurial activity
CCH202-1	1	-	-	-	-	-	1		
CCH202-2	-	-	-	3	-	-	1		
CCH202-3	-	2	1	3	-	-	1		
CCH202-4	-	-	-	3	-	-	1		
CCH202-5	1	-	-	3	-	-	3		
CCH202-6	1	-	-	3	-	-	3		
Legends: - High:03, Medium:02, Low:01, No Mapping: - *PSOs are to be formulated at institute level									

H. LABORATORY WORK:

Laboratory experiments and related skills to be developed:

Sr. No.	Title of Experiment	Skills to be developed	Course outcome
1.	a) Work with Computer System, Input/output devices, and peripherals. b)Work with files and folders	1.1 Identify various Input/output devices, connections and peripherals ofcomputer system 1.2 Work with Computer System, Input/output devices, and peripherals for manages files and folders for data storage.	CCH202-1
2.	Work with document files: a) Create, edit and save document in Word Processing. b) Text, lines and paragraph level formatting	2.1 Create and manage word document. 2.2 Apply formatting features on textat line, paragraph and page level.	CCH202-2
3.	Work with Images and Shapes in Word Processing.	3.1 Insert and edit images, shapes in a document file	CCH202-2
4.	Work with tables in Word Processing.	4.1 Insert table and apply various table formatting 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 word processing. 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 a worksheet. 6.2 Insert and delete cells, rows andcolumns 6.3 Apply alignment feature on cell	CCH202-3
7.	Formulas and functions in Worksheet.	7.1 Create formula and "If" conditionon cell data 7.2 Apply various functions and namedranges in worksheet.	CCH202-3
8	Sort, Filter and validate data in Spreadsheet.	8.1 Implement data Sorting, Filtering and Data validation features in a worksheet.	CCH202-3

9	Charts for 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 given presentation 11.2 Insert pictures text/images/shapesin slide 11.3 Use pictures text/images/shapesediting options.	CCH202-4
12	Use Tables and Charts in Slide	12.1 Add tables and charts in theslides. 12.2 Run slide presentation in differentmodes 12.3 Print slide presentation as handouts/notes	CCH202-4
13	a) Insert Animation effects to Text and Slides. b) Insert Audio and Video files in presentation	13.1 Apply animation effects to thetext and slides 13.2 Add/set audio and video files inthe presentation.	CCH202-4
14	a) Internet connection configuration b)Use 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 using different options	CCH202-6

I. 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 information 2) UseCalendar to Schedule and edit activities. 3) Use Translate app to translate the given content from one langanother. 4) Use cloud-based storage drive to store and share your files.

Assignment

Prepare journal of practical performed in the laboratory.

Micro project

The microproject 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, Biodata with covering letter (S teacher shall assign a document to be prepared by each student) 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 Marksheet, Prepare Pay bills, tax statement, assessment record using spreadsheet. (Teacher shall assign a spreadsheet to be prepared by each student). 5) CSurvey on different web browsers. 6) Generate resume for different job profile, survey report of any industry ChatGPT/any other AI tool.

J. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

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

K. CONTENT:

Sr. No.	Topics / Sub-topics	Lectures (Hours)
Course Outcome CCH202-1 - Use computer system and its peripherals for given purpose.		
1	**Unit - I Introduction to Computer System** 1.1 Basics of Computer System: Overview of Hardwareand Software: block diagram of Computer System, Input/Output unit CPU, Control Unit, Arithmetic logic Unit (ALU), Memory Unit 1.2 Internal components: processor, motherboards, randomaccess memory (RAM), read-only memory (ROM), video cards, sound cards and internal hard disk drives) 1.3 External Devices: Types of input/output devices, 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,	2

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

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

Course Outcome CCH202-4 - Prepare professional Slide Show presentations

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

Course Outcome
CCH202-5 - Use different types of Web Browsers and Apps
CCH202-6 - Explain concept and applications of Emerging Technologies

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

L. ASSESSMENT METHODOLOGIES/TOOLS

Formative assessment (Assessment for Learning)
- Lab performance, Assignment, Self-learning and Seminar/Presentation

Summative Assessment (Assessment of Learning)
- Lab. Performance, viva voce

M. PROGRESSIVE SKILLS TEST:
i) 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.

ii) Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Technical ability	10
2.	Communication skill	5
3.	Logical approach	10
	TOTAL	**25**

N. INSTRUCTIONAL STRATEGIES:
Instructional Methods:
1. Lectures cum Discussions
2. Regular Home Assignments.
3. Laboratory experiences and laboratory interactive sessions

O. TEACHING AND LEARNING RESOURCES:
1. Chalk board 2. Slides (PPT) 3. Self-learning Online Tutorials

P. 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	Createv Space 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

Q. 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

Sr. No	Link / Portal	Description
10	https://www.javatpoint.com/excel-tutorial	Spreadsheet
11	https://support.microsoft.com/en-au/office/excel-video-training-9bc05390-e94c-46af-a5b3-d7c22f6990bb	Spreadsheet
12	https://www.javatpoint.com/powerpoint-tutorial	Powerpoint Presentation
13	https://support.microsoft.com/en-au/office/powerpoint-for-windows-training-40e8c930-cb0b-40d8-82c4-b	Powerpoint Presentation
14	https://www.geeksforgeeks.org/ms-dos-operating-system/	Operating System
15	https://www.javatpoint.com/windows	Windows Operating System
16	https://www.javatpoint.com/what-is-linux	Linux Operating System
17	https://www.techtarget.com/iotagenda/definition/Internet-of-Things-IoT	IoT
18	https://www.geeksforgeeks.org/introduction-to-internet-of-things-iot-set-1/	IoT
19	https://www.javatpoint.com/machine-learning	AI & Machine Learning
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 ID:
COURSE NAME   **: YOGA &MEDITATION.**
COURSE CODE   **: CCH203**
COURSE ABBREVIATION   **: HYAM**

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	00	01
	Tutorial Learning	00	
	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	MAX	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
-	-	-	-	-	25	10	-	-	25	10	

(Total IKS Hrs for Semester: 01Hr)

C: ABBREVIATIONS: -

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

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

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for these muster are(CL+LL+TL+SL)hrs.*15Weeks
5. 1(one)credit is equivalents to30 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

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

World Health Organization (WHO) has also emphasized the role of yoga and meditations 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.

ii) INDUSTRY/EMPLOYEREXPECTEDOUTCOME

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

E. 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 Out comes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)	
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6Project Management	PO-7 Life Long Learning	PSO 1 Work in mfg & service sector	PSO 2 Start entrepre neurial activity
CO1	-	-	-	-	3	-	1	-	-
CO2	-	-	-	-	3	-	1	-	-
CO3	-	-	-	-	3	-	1	-	-
Legends: -High:03, Medium:02, Low:01, No Mapping: - *PSOs are to be formulated at institute level									

F.CONTENT:

i) PRACTICAL EXERCISES

Sr.No	Laboratory Experiment/Practical Titles/Tutorial Titles	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 warmup, 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 Deep brathing , 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)

G: LIST OF ASSIGNMENTS UNDER SLA

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	15 hrs

**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 self 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 books on different methods to maintain health, wellness and to enhance mood
  - Watch videos on Yoga Practices.

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

I: -ASSESSMENT CRITERIA

i) Formative Assessment of Practical: -
Every assignment shall be assessed for 25 marks as per 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**

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 Books India Pvt Ltd, NewDelhiISBN-13?:?978-9354407017
2	Yoga for Every Body: A beginner's guide to the practice of yoga postures, breathing Exercises and me	LuisaRay,AngusSutherland	VitalLifeBooks (2022) ISBN-13?:?978-1739737009
3	Mudras for Modern Living: 49inspiring cards to boost your health, enhance your yoga and deepen your mind	Swami Saradananda	WatkinsPublishing(2019) ISBN-13?:?978-1786782786
4	The Relaxation and Stress Reduction Workbook	Martha Davis, ElizabethRobbins,MatthewMcKay, 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
6 Swayam https://onlinecourses.swayam2.ac.in/aic23e0
7 preview- yoga for memory development

SEMESTER 2 CURRICULUM

COURSE ID:
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-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 micro project /assignment/other activities. (The list of all assignments is 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) INDUSTRY / EMPLOYER EXPECTED OUTCOME:

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.

E. COURSE LEVEL LEARNING OUTCOMES (CO'S)

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	PSO 1 Work in Mfg & service sector	PSO2 Start entrepreneurial activity
Competency:									
CCH301-1	3	1	-	-	1	-	1		
CCH301-2	3	1	1	1	1	1	1		
CCH301-3	2	3	1	1	1	1	1		
CCH301-4	2	2	2	2	2	1	2		
CCH301-5	2	1	1	1	1	1	1		

F. CONTENT:

i) TUTORIAL EXERCISES

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

Sr. no	Tutorial experiences	Number of hrs.	Relevant COs
1	Solve simple problems of Integration by substitution.	02	CCH301-1
2	Solve integration using by parts.	02	CCH301-1
3	Solve examples on Definite Integral based on given methods.	02	CCH301-1
4	Solve problems on properties of definite integral.	02	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)	02	CCH301-1
6	Solve examples on mean value and root mean square value. (Only for Computer, Electrical and Electronics engg. group)	02	CCH301-1
7	Solve first order first degree differential equation using variable separable method.	02	CCH301-2
8	Solve first order first degree differential equation using exact differential equation and linear differential equation.	02	CCH301-2
9	Solve engineering application problems using differential equation.	02	CCH301-2
10	Solve problems on Bisection method, Regula falsi and Newton-Raphson method.	02	CCH301-3
11	Solve problems on Jacobi's method and Gauss Seidel method.	02	CCH301-3
12	Use Bakshali iterative methods for finding approximate value of square root. (IKS)	02	CCH301-3
13	Solve engineering problems using Binomial Distribution, Poisson Distribution and Normal Distribution.	02	CCH301-4
14	Solve problems on Laplace transform and properties of Laplace transform.	02	CCH301-5
15	Solve problems on Inverse Laplace transform and properties of Inverse Laplace transform.	02	CCH301-5

ii) Theory

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
Course Outcome CCH301-1: To solve examples on integration using various techniques.			
1	**Indefinite Integration** 1.1 Definition, Standard formulae 1.2 Rules of Integration (without proof), Examples 1.3 Integration by substitution 1.4 Integration by parts	14	16

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
	1.5 Integration by partial fractions (only linear non repeated factors at denominator of proper fraction)		
Course Outcome CCH301-1: To solve examples on integration using various techniques		
2	**Definite Integration** 2.1 Definition, Examples 2.2 Properties of Definite Integration (without proof), Examples based on properties	**8**	**8**
Course Outcome CCH301-2: To solve Differential equation of first order and first degree by various methods		

3	**Differential equation**
	4.1 Definition of differential equation
	4.2 Order & degree of Differential equations
	4.3 Methods of solving Differential equations of first order & first degree of following types:
	    4.3.1 Variable separable form
	    4.3.2 Exact Differential equations
	    4.3.3 Linear Differential Equations
		8	**10**

Section –II

Sr. no.	Topics/Subtopics	Learning Hours	Classroom learning evaluation Marks
Course Outcome CCH301-3: - To find approximate solution of algebraic equations and simultaneous equations by various methods.		

4	**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**

Course Outcome CCH301-4: - To solve problems on Probability distributions		
5	**Probability Distribution** 5.1 Binomial distribution 5.2 Poisson's distribution 5.3 Normal distribution	**8**	**8**

Course Outcome CCH301-5: - Solve examples on Laplace Transform.					
6	**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)
-   **Not Applicable**
    ii) Summative Assessment (Assessment of Learning)
-   **Not Applicable**

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

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

K. Reference Books:

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

L) Learning Website & Software
1. http://nptel.ac.in/courses/106102064/1
2. https://www.woframalpha.com/
3. http://www.sosmath.com/
4. http://mathworld.wolfram.com
5. https://www.brilliant.org/
6. https://ocw.mit.edu/index.htm

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COURSE ID:
COURSE NAME : ENGINEERING PHYSICS (CE/ME/MT)
COURSE CODE : CCH102
COURSE ABBREVIATION : HPHB

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	175
1.5	30*#	70*#	100	40	25	10	25@	10	25	10	

(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)

CCH102-1 Estimate errors in measurement of physical quantities.

CCH102-2 Express importance of semiconductors and nanotechnology.

CCH102-3 Select proper material in engineering industry by analysis of its physical properties.

CCH102-4 Apply principles of electricity and magnetism to solve engineering problems.

CCH102-5 Apply principles of optics to solve engineering problems.

CCH102-6 Apply principles of acoustics and ultrasonics 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 / Develop ment of solutions	PO 4 Engineering Tools, Experiment ation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Manage ment	PO 7 Life-long Learning	PSO 1 Work in Mfg. & service sector	PSO2 Start entrepre neurial activity
CCH102-1	3	1	-	1	1	1	1		
CCH102-2	3	-	-	-	1	1	1		
CCH102-3	3	1	-	1	1	1	1		
CCH102-4	3	1	-	1	1	1	1		
CCH102-5	3	1	-	-	1	1	1		
CCH102-6	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	Number of hrs.	CO
1	To measure internal and external dimensions of hollow cylinder by using Vernier Caliper	02	CCH102-1
2	To measure the diameter of bob and thickness of plate by using Vernier Caliper	02	CCH102-1
3	To measure the diameter of bob and thickness of plate by using Micrometer screw gauge	02	CCH102-1
4	To determine forbidden energy band gap in semiconductors	02	CCH102-2
5	To determine the viscosity of liquid by Stokes method.	02	CCH102-3
6	To determine the buoyancy force on a solid immersed in a liquid	02	CCH102-3
7	To measure unknown resistance of wire by Ohm's law	02	CCH102-4
8	To verify series law of resistances	02	CCH102-4
9	To verify parallel law of resistances	02	CCH102-4
10	To draw magnetic lines of force for given magnet by using magnetic compass	02	CCH102-4
11	To verify Snell's law using glass slab	02	CCH102-5
12	To study variation of δ with i for a prism by pin method	02	CCH102-5
13	To determine velocity of sound by resonance tube	02	CCH102-6
14	To measure distance using ultrasonic meter	02	CCH102-6
15	To be added by the subject teacher as per requirement		

ii) THEORY

Section I

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
Course Outcome CCH102-1 Estimate errors in measurement in Physical quantities.			
1	**UNITS AND MEASUREMENT** 1.1 Unit, Physical Quantities: Fundamental and Derived Quantities and their units 1.1 Systems of units: CGS, MKS, FPS and SI 1.1 Errors, Types of errors: Instrumental, Systematic and Random error, Estimation of errors: Absolute, Relative and percentage errors 1.1 Significant figures 1.1 Ancient Astronomical Instruments: Chakra, Dhanuryantra, Yasti and Phalaka yantra (IKS learning)	10	12

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
	1.1 **Simple Numerical problems**		

*Course Outcome CCH***102-2** Express the importance of Semiconductors and nanotechnology.

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
2	**INTRODUCTION TO SEMICONDUCTORS AND NANOTECHNOLOGY**	**08**	**08**
	2.1 SEMICONDUCTORS 2.1.1 Conductors, insulators and semiconductors 2.1.2 Energy bands 2.1.3 Intrinsic and extrinsic semiconductors 2.1.4 Minority and majority charge carriers 2.1.5 P and N type semiconductors 2.1.6 Properties of semiconductors 2.1.7 Applications of semiconductors **No numericals on above topic**	(06)	(06)
	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)

Course Outcome CCH102-3 Select proper material in engineering industry by analysis of its physical properties.

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
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	(06)	(04)

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
	3.2.4 Derivation of expression for coefficient of viscosity of liquid by Stokes method 3.2.5 Effect of temperature and adulteration on viscosity of liquids 3.2.6 Applications of viscosity **No numericals on above topic**		

Section –II

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
Course Outcome CCH102-4 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	(06)	(08)
	4.1.7 **Simple Numerical problems**	(04)	(04)
	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**		
Course Outcome CCH102-5 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	(04)	(06)

	5.2.3 Spontaneous and stimulated emission 5.2.4 Population inversion and optical pumping 5.2.5 Applications of LASER **No numericals on above topic** **5.3 X-RAYS** 5.3.1 Nature and properties of x-rays. 5.3.2 Production of x-rays by Coolidge tube 5.3.3 Applications of x-rays **No numericals on above topic**	(04)	(04)

Course Outcome CCH102-6 Apply principles of acoustics and ultrasonics for related engineering applications.

6	**ACOUSTICS AND ULTRASONICS** **6.1 ACOUSTICS** 6.1.1 Echo and reverberation of sound 6.1.2 Sabine's formula 6.1.3 Requirements of good acoustics 6.1.4 Acoustical planning of an auditorium **No numericals on above topic** **6.2 ULTRASONICS** 6.2.1 Limits of audibility 6.2.2 Ultrasonic waves 6.2.3 Ultrasonic transducers: Piezoelectric and Magnetostriction 6.2.4 Applications of ultrasonic waves **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 (e.g. sugar, salt etc.) and list the physical/electrical/optical/chemical/mechanical characteristics for each of them.	02
6	Prepare chart showing the three types of modulus of elasticity developed in a material.	02
7	Prepare working model to differentiate liquids on the basis of viscosity.	02

8	Prepare chart/models to demonstrate magnetic lines of force of different types of magnets.	02
9	Prepare chart/models for series and parallel combination of resistances of different values.	02
10	Prepare a model to demonstrate the variation of angle of refraction with respect to angle of incidence.	02
11	Use keychain laser to differentiate laser with ordinary light.	02
12	Prepare a presentation for application of x-rays in different fields.	02
13	Collect information using internet about ancient acoustic architecture. (For CE/ME/MT 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	Write the information of factors to be considered while planning of an auditorium. (For CE/ME/MT students).	02
AND		
Sr. No	**List of Activity (Compulsory activity under SLA)**	**Hrs Allotted**
	Write importance and significance of calibration of measuring instruments. Collect information of related industries in nearby industrial areas.	02

**One microproject/ assignment and 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	CCH102-1
I / 2	Introduction to Semiconductors and Nanotechnology	2	2	4	08	CCH102-2
I / 3	Properties of matter (Elasticity and Viscosity)	4	2	8	14	CCH102-3
II /4	Electricity and Magnetism	2	4	6	12	CCH102-4
II /5	Optics (Properties of light, Laser & X-rays)	6	6	6	18	CCH102-5
II / 6	Acoustics and Ultrasonics	2	2	2	06	CCH102-6
	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

*****

COURSE ID : ME
Course Name : **ENGINEERING DRAWING (ME/MT)**
Course Code : **CCH110**
Course Abbreviation: HEDR
Course Type : **AEC**

A. LEARNING SCHEME:

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

B. 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	
30	70	100	40	25	10	25@	10	25	10	175

(Total IKS Hrs for Sem: 4 Hrs)

C. ABBREVIATIONS:

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

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

* Self learning includes micro project / assignment / other activities. (Provide list of all 5 assignments here in tabular format)

D. i) RATIONALE:

Engineering drawing is the graphical language of Engineers. This is a graphical tool used by the Designers, Planners, Supervisors and Technicians to express their thoughts, ideas and concepts. It offers students an insight into the methods of dealing with engineering drawing problems. This course aims at developing the ability to read and draw Isometric view of a solid, also intends to develop the ability to visualize and draw curves of development of lateral surfaces of various solids. The main focus of the course is in developing imagination, drafting and sketching skills of students, also aims at building a foundation for further course in machine drawing and other allied subjects.

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME

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

1) Use different drawing instruments for solving broad based engineering problems.
2) Improved drafting skills, imagination and planning of drawings.

E. COURSE LEVEL LEARNING OUTCOMES (CO'S)

CCH110-1 Draw projections of given solids for various orientations.
CCH110-2 Draw isometric views of given component or from orthographic projections.
CCH110-3 Interpret the views & complete the missing view.
CCH110-4 Draw development of lateral surfaces of various solids.
CCH110-5 Draw proportionate free hand sketches.

Competency, course outcomes and programme outcomes/programme specific outcomes (CP-CO-PO/PSO) matrix
[Note: Correlation levels: 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), "0"]

Competency and Cos	Programme outcome POs and PSO's								
	PO 1 Basic and discipline specific knowledge	PO 2 Problem analysis	PO 3 Design/ development of solutions	PO 4 Engineering tools, experimentation & testing	PO 5 Engineering practices for society, sustainability and environment	PO 6 project manage-ment	PO 7 Life-long learning	PSO 1 Work in Mfg & service sector	Ps 2 Start entrepre neurial activity
Competency									
CCH110-1	3	-	-	-	-	-	1	2	
CCH110-2	3	-	1	1	-	-	1	2	1
CCH110-3	3	-	-	-	-	-	1	1	
CCH110-4	3	-	1	1	-	-	1	2	1
CCH110-5	3	-	-	-	-	-	1	2	

F. CONTENT:

i) Practical exercises

The following practical exercises shall be conducted in the *Drawing Hall for Engineering drawing* in practical sessions of batches of about 20- 22 students:

Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
1	Draw any two problems on projection of solids with axis perpendicular to one of the principal projection planes.	04	CO1
2	Draw any two problems on projection of solids with axis inclined to one of the principal planes and parallel to the other. (Sketchbook)	04	CO1
3	Draw any two problems on projection of solids with axis parallel to both principal planes. (Sketchbook)	04	CO1
4	*Draw any four problems on projection of solids with axis inclined to one of the principal planes and parallel to the other. **(01 sheet)**	04	CO1
5	Draw two problems on Isometric view of simple objects having plain and slanting surfaces by using natural scale. (Sketchbook)	04	CO2
6	Draw two problems on Isometric Projection of objects having cylindrical surfaces and slots on slanting surfaces by using isometric scale. (Sketchbook)	04	CO2
7	*Draw one problem on Isometric Projection of objects having cylindrical surfaces and slots on slanting surfaces by using isometric scale, and one problem of isometric view by using natural scale **(01 sheet)**	04	CO2
8	Problem Based Learning: Given the orthographic views of at least three objects with few missing lines, the student will try to imagine the corresponding objects, complete the views and draw these views (sketch book).	04	CO3
9	Draw two problems on Missing view having plain and slanting surfaces, cylindrical surfaces and slots on slanting surfaces (Sketchbook)	04	CO3
10	Draw two problems on Missing view having cylindrical surfaces and slots on slanting surfaces **(01 sheet)**	04	CO3
11	Draw two problems on developments of lateral surfaces of cube, prisms.	04	CO4
12	Draw two problems on development of lateral surfaces of cylinder, pyramids.	04	CO4
13	*Draw four problems on developments of lateral surfaces of solids. **(01 sheet)**	04	CO4
14	*Draw freehand Sketches of 12 different standard components **(1 Sheet)**	04	CO5

Sr. No		Learning (Hours)	CO
15	Prepare a report on the use of various solid geometrical shapes employed in ancient Indian constructions (IKS).	04	CO1 CO2 CO3 CO4 CO5

ii) THEORY

SECTION – I

Sr. No	Topics/ Subtopics	Learning (Hours)	Classroom learning evaluation Marks
Course Outcome CCH110-1 *Draw projections of given solids for various orientations.*			
1.	**Projection of Solids** Projection of Solids like Cube, Prisms, Pyramids, Cone, Cylinders and Tetrahedron. 1.1. Axis of Solids perpendicular to one reference plane and Parallel to another Reference Plane) 1.2. Axis of Solids inclined to one reference plane and Parallel to another Reference Plane) **various solid geometrical shapes employed in ancient Indian constructions (IKS).	08	16
Course Outcome CCH110-2 *Draw isometric views of given component or from orthographic projections.*			
2.	**Isometric Projection** 2.1. Isometric Axes 2.2. Isometric scale 2.3. Isometric view and Isometric Projection 2.4. Conversion of Orthographic Views into Isometric View/Projection (Including rectangular, cylindrical objects, representation of slots on sloping as well as plane surfaces)	08	18

SECTION – II

Sr. No	Topics/ Subtopics	Learning (Hours)	Classroom learning evaluation Marks
Course Outcome CCH110-3 *Interpret the views & complete the missing view.*			
3.	**Missing View** 3.1 Interpretation of the given two orthographic views and draw missing view from the given two Orthographic views. (First Angle Projection Method only)	06	14
Course Outcome CCH110-4 *Draw development of lateral surfaces of various solids.*			
4.	**Developments of Surfaces** 4.1 Methods of Development 4.2 Developments of Lateral surfaces of right solids Prism, Cylinder, Pyramid and Cone.	06	12

Course Outcome **CCH110-5** *Draw proportionate free hand sketches.*			
5.	**Free Hand Sketches** 5.1 Profiles of Screw Threads (V (BSW, Sellers), Square, ACME, Buttress, Knuckle Thread) Conventional representation of threads. 5.2 Free hand sketches of nuts and bolts, Washer, Locking arrangement of nuts, Foundation bolts (Eye, Rag, Lewis), Riveted Joints.	**02**	**10**
Total		**30**	**70**
Summative assessment – Theory paper should be such that total marks of questions on each topic are one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.			

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

G. SUGGESTED MICRO PROJECTS / ASSIGNMENTS/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING) UNDER SLA

Complete all assignments mentioned below or any one microproject or activity given by subject teacher.

List of Assignments

Sr. No.	List of Assignment (under SLA)
1	Projection of solids. One problem for each type of solids.
2	Isometric Projection. Two problems on Conversion of orthographic views into isometric View/projection.
3	Missing View. Two problems on drawing missing view from the given two Orthographic views.
4	Development of lateral surfaces of solids. One problem for each type of solids.
5	Free Hand Sketches. Draw freehand Sketches of 8 different standard components.

Note: Assignments are aimed at enhancing the imagination and drawing skills of students. Separate books are recommended for assignments.

Suggested List of Microprojects

1. Collect industrial part/job and draw its Orthographic Views.
2. Prepare Wooden models of various solids.
3. Draw Development of various given solids by collecting component, job/sample from nearby workshops/industries.
4. Prepare a model of sheet metal from given development.
5. Prepare isometric drawing from any industrial drawing.

Suggested Activity for Students

Each student will assess at least one sheet of other students (May be a group of 4 students identified by teacher can be taken) and will note down the mistakes committed by them. Student will also guide the students for correcting the mistakes, if any. Similar other activities can also be considered.

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	Projection of Solids	0	0	16	**16**	CO1
I/2	Isometric Projection	0	0	18	**18**	CO2
II/3	Missing View	0	14	0	**14**	CO3
II/4	Developments of Surfaces	0	0	12	**12**	CO4
II/5	Free Hand Sketches	0	10	0	**10**	CO5
	TOTAL		**22**	**48**	**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	Understanding	05
2	Preparedness for practical	05
3	Neat & complete Drawing	05
4	Drawing / drafting skills	05
5	Drawing / drafting skills	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 for Parctical	05
3	Presentation (neat figures/ drawing etc.)	05
4	Drawing / drafting skills	05
5	Understanding	05
	TOTAL	**25**

J. INSTRUCTIONAL METHODS:
 i) Lectures cum Demonstrations,
 ii) Class room practices.
 iii) Use of projector and soft material for demonstration

K. TEACHING AND LEARNING RESOURCES:
Chalk board, Power Point presentations and Demonstrative kits.

L. REFERENCE BOOKS:

Sr. No.	Name of Book	Author	Publication
1.	Engineering Drawing	N. D. Bhatt	Charotar Publishing House 2010
2.	Engineering Drawing	Dhawan, R. K.	S. Chand and Company New Delhi
3.	Engineering Drawing	D. A. Jolhe	Tata McGraw Hill Edu., 2010
4.	Engineering Drawing	M. B. Shah, B. C. Rana	Pearson, 2010
5.	Engineering Drawing	Agrawal Basant, Agrawal C.M.	McGraw Hill Education, New Delhi
6.	Engineering Drawing Practice	IS Code, SP – 46	Bureau of Indian Standards

M. LEARNING WEBSITE & SOFTWARE: -
1. http://www.design-technology.info/IndProd/drawings/
2. http://graphicalcommunication.skola.edu.mt/syllabus/engineering-drawing/
3. http://en.wikipedia.org/wiki/Engineering_drawing
4. http://www.engineeringdrawing.org/
5. http://www.teachengineering.org/view_activity
6. www.howtoread.co.in/2013/06/how-to-read-ed.html
7. http://www.slideshare.net/akhilrocker143/edp
8. http://www.24framesdigital.com/pstulpule

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COURSE ID :
COURSE NAME : APPLIED MECHANICS (CE/ME/MT)
COURSE CODE :CCH108
COURSE ABBREVIATION :HAPM

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. LEARNING 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	MIN	175
03	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MIN			
	30	70	100	40	25	10	25@	10	25	10	

(Total IKS hours for sem: 02 hours)

C. ABBREVIATIONS: -

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

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

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

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

D. RATIONALE:

The role of an engineer is to dream a mechanism for the present and the future generation. Understand the concept of existing mechanism thoroughly. An engineer in his initial stages of learning need to understand the basics of components of the machine, then forces in those components, interaction of these forces resulting in an engineering marvel or a mechanism. The contents of this most versatile basic course for engineering curriculum aims at providing fundamental meaning of various engineering principles and concept in engineering applications. The contents also form basic or primary set for higher level of subject such as strength of material, analysis of structures and design of steel structures and RCC structures. The subject being first and foremost entry level curriculum for the various programs in engineering it acts as gateway for engineering career. With the learning outcomes of the subject, learner can get clues for various fields such as mechanical, civil, metallurgical and varied courses like aerodynamics, space mechanics, marine structures. The subject being interdisciplinary in nature it comes under allied department applied mechanics.

E. COURSE LEVEL LEARNING OUTCOMES (COs):

CCH108-1 Understanding mechanisms for the interaction of various forces in their components with types and corresponding effects. With due focus on rigid body concept, principle of superposition resolution and composition of forces.

CCH108-2 Study of equilibrium for concurrent and non-concurrent force system and finding resultant and equilibrant graphically and analytically.

CCH108-3 Problems on equilibrium condition involving friction and support reactions in beams graphically and analytically.

CCH108-4 Knowing simple lifting mechanisms establishing law of machine, evaluating efficiency for set of loads.

CCH108-5 Studying equations of motion for rectilinear and circular motion, establishing relation between linear and angular motion parameters.

CCH108-6 Understanding effect of force for executing work, energy principles and conservation of energy concept.

Competency, 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"]

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	PSO 1 Work in Mfg & service sector	Ps 2 Start entrepreneurial activity
Competency: Applied Mechanics	3	2	2	2	3	1	2	2	2
CCH108-1	3	2	-	2	-	1	2	2	1
CCH108-2	3	2	1	2	-	1	2	3	1
CCH108-3	3	2	1	2	-	1	2	3	1

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 Engineering Tools, Experimenta tion and Testing	PO 5 Engineering Practices for society, sustainabilit y and Environmen t	PO 6 Project Manage ment	PO 7 Life-long Learning	PSO 1 Work in Mfg & service sector	Ps 2 Start entrepre neurial activity
CCH108-4	3	2	1	3	2	1	2	2	2
CCH108-5	2	1	1	2	-	1	2	1	1
CCH108-6	2	2	1	2	-	1	2	2	2

F. CONTENT:
i) LABORATORY WORK

Practical Exercise and related skills to be developed
The following exercises shall be conducted as practical work as detailed in laboratory manual for Applied Mechanics developed by the institute in practical sessions of batches of about 20- 22 students. In the list, Expt. No.1 to7 exercises are compulsory and from 8 to 12, any three exercises shall be conducted. in all 10 experiments are mandatory.

Sr no	Title of practical exercise	Course Outcome
1	Verification Law of parallelogram of forces	CCH108-1
2	Verification Law of polygon of forces	CCH108-1
3	Verification of Lamis theorem	CCH108-2
4	Determination of Beam reaction (Graphically and Analytically)	CCH108-2
5	Graphic statics (To find resultant of concurrent and non-concurrent force system)	CCH108-2
6	Determination of centroid (regular and irregular laminas)	CCH108-2
7	Determination of coefficient of friction between different surfaces	CCH108-3
8	Simple lifting machine introduction of basic terms Study of differential axle and wheel	CCH108-4
9	Screw jack Application and finding efficiency and its law	CCH108-4
10	Study of worm and worm wheel	CCH108-4
11	Gear mechanism (Either single or double)	CCH108-4
12	Experiment on simple pendulum to know dynamic characteristics	CCH108-5

ii) THEORY:

Section I

Sr no	Course content	Lecture hours (class room learning)	Theory Assessment marks
CO: CCH108-1 Understanding mechanisms for the interaction of various forces in their components with types and corresponding effects. With due focus on rigid body concept, principle of superposition resolution and composition of forces.			
1	**Force systems and principles** 1.1 Rigid body concepts, physical quantities and their units 1.2 Free body diagram for various mechanisms 1.3 Force characteristics, definition, force and force system- principles and laws 1.4 Different type of actions and their representation, with their effect (resultant moment, couple etc.) 1.5 Application on force system – numerical on law of parallelogram of forces, law of polygon of forces	8 hours	12 marks
CO: CCH108-2 Study of equilibrium for concurrent and non-concurrent force system and finding resultant and equilibrant graphically and analytically.			
2	**Equilibrium of bodies** 2.1 Two force system resultant and equilibrium inference 2.2, Lami's theorem for three force system and its application 2.3 Varignos principle and its application 2.4 Solving graphically and analytically beams with roller and hinge support 2.5 Definition of centroid and centroid for standard areas / sections. Its determination experimentally for irregular areas	12 hours	12 marks
CO: CCH108-3 Problems on equilibrium condition involving friction and support reactions in beams graphically and analytically.			
3	**Friction on bodies and beam statics** 3.1 Laws of dry friction 3.2 Free body diagram to derive expression for μ_s & μ_k 3.3 Problems on block and ladder friction 3.4 Reaction in beams carrying point load and udl with hinge and roller support. 3.5 Beam carrying transverse loads and couple	10 hours	10 marks
	Total	**30**	**34**

Section II

Sr. no.	Topics/Subtopics	Learning (Hours)	Classroom learning evaluation Marks
CO: CCH108-4 Knowing simple lifting mechanisms establishing law of machine, evaluating efficiency for set of loads.			
4	**Simple Lifting machines** 4.1 Basic definition of terms involved in lifting mechanisms. 4.2 Different types of simple lifting machines such as simple gears differential axial and wheel, screw jack 4.3 Inclined plane and evaluating coefficient of static friction	12 hours	14 marks
CO: CCH108-5 Studying equations of motion for rectilinear and circular motion, establishing relation between linear and angular motion parameters.			
5	**Kinematics and kinetics** 5.1 Kinamatics and kinetic equations of motion 5.2 D Alembert's principle for dynamic equilibrium 5.3 Kinetics for circular motion 5.4 Evaluating dynamic characteristics of simple pendulum	10 hours	12 marks
CO: CCH108-6 Understanding effect of force for executing work, energy principles and conservation of energy concept			
6	**Work, power and energy** 6.1 Definition of work done and dot product of force and displacement vectors 6.2 Energy types and law of conservation of energy 6.3 Collision of bodies and problem solving 6.4 Power and its interpretation in different mechanism	8 hours	10 marks
	Total	**30**	**36**

G. List of Assignments/Microprojects under SLA

Sr. No	List of Microproject objectives	Format	Assessment criteria
1	Mechanism –free body diagrams, force equations and efficiency	Title: Objectives: Study scheme: 2* 15 = 30 hours planning Procedure: theory/ modeling Observations: Inference:	Objectives:5 marks Methodology:10 marks Presentation /inferences:10 marks
2	Equilibrium of static force systems - Buildings, Dams, Engineering structures case studies		
3	Gear systems –case studies		
4	Rope drives, weighing machines case studies		

5	Rolling, sliding friction field applications.	Conclusion Bibliography	
6	Machine foundation aspects		
7	Vibration analysis of simple motions		
8	Motion of bodies, projectile, space mechanics preliminary studies		
9	Energy principles, fly wheel machine concept and applications		

**assignments/Microproject are 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	Force systems and principles	4	4	4	12	CCH108-1
I / 2	Equilibrium of bodies	4	4	4	12	CCH108-2
I / 3	Friction on bodies and beam statics	4	2	4	10	CCH108-3
II /4	Simple Lifting machines	4	2	8	14	CCH108-4
II /5	Kinematics and kinetics	4	4	4	12	CCH108-5
II / 6	Work, power and energy	4	2	4	10	CCH108-6
	Total Marks				**70**	

I: -Assessment Criteria

i) Formative Assessment of Practical: -

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

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

ii) Summative Assessment of Practical:

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

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

iii) Assessment of SLA: -
Every Self-learning assignment/microproject shall be assessed for 25 marks as per assessment shown in table of criteria G.

J. Instructional Methods:
1. Lectures cum Demonstrations,
2. Class room practices.
3. Use of projector and soft material for demonstration

K. Teaching and Learning resources:
1. Chalk board   2.LCD presentations
3.Demonstrative kits   4. Demonstrative charts
5. Question Bank   6. Digital learning resources

L. REFERANCE BOOKS
a) Book / journals / IS code

Sr no	Name of Book	Author	Publication
1	Engineering Mechanics	S Timoshenko and young	McGraw- Hill,1995
2	Vector Mechanics for Engineer	Beer, Johnston	McGraw- Hill,1995
3	Engineering Mechanics	S S BHAVIKATTI S.S and Rajashekharappa K.G.	New age international publisher
5	Engineering Mechanics	K L KUMAR	Tata McGraw- Hill Publishing company Limited
6	Text book on engineering mechanics	Khurmi R .S.	S. Chand Publications, New Delhi
7	Engineering Mechanics	Singer F.L.	Harper and Row Pub. York.

M. Learning Website & Software
a. www.nptel.com/iitm/
b. www.howstuffworks.com/
c. www.vlab.com
d. https:// en.wikipedia.org/wiki/applied mechanics

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COURSE ID	: ME
Course Name	: MANUFACTURING PROCESSES
Course Code	: MEH301
Course Abbreviation	: HMPR

A. LEARNING SCHEME:

Scheme component		Hours	Credits
Actual Contact Hours / week	Classroom Learning	03	**04**
	Tutorial Learning	00	
	Laboratory Learning	04	
	SLH-Self Learning	01	
	NLH-Notional Learning	08	

B. ASSESSMENT SCHEME: -

PAPER DURATION IN HRS	Theory				Based on LL & TL				Based on 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	
--	30	70	100	40	25	10	25@	10	25	10	175

(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, *# 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 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:

Diploma graduates frequently encounter diverse manufacturing processes. This core manufacturing processes course aims to enhance student's comprehension of manufacturing methods, like turning, drilling, milling, casting, forming, and joining, etc.

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME

Produce a given component using various manufacturing processes

E. COURSE OUTCOMES:

MEH301-1: Prepare a wooden pattern and Prepare a mould for given pattern

MEH301-2: Produce a part using casting processes as per given drawing.

MEH301-3: Produce a part using joining processes as per given drawing.

MEH301-4: Produce a part using forming processes as per given drawing.

MEH301-5: Produce a part using a lathe and drilling machine as per given drawing.

F. 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	PSO 1 Work in mfg & service sector	PSO 2 Start entrepreneurial activity
Competency	3	2	2	2	-	2	2	2	-
MEH301-1	3	2	2	2	-	2	2	2	-
MEH301-2	3	2	2	2	-	2	2	2	-
MEH301-3	3	2	2	2	-	2	2	2	-
MEH301-4	3	2	2	2	-	2	2	2	-
MEH301-5	3	2	2	2	-	2	2	2	-

G. PRACTICAL WORK:

Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Skills / Competencies to be Developed	Relevant COs
1	*Produce a simple wooden pattern for the given component.	i. Select material and tool for preparing pattern. ii. Prepare wooden pattern as per given drawing.	CO1
2	*Produce a simple wooden job involving measuring, marking, cutting, assembly etc. operations.	i. Study of wood working tools, Identifying materials ii. Prepare wooden job with carpentry joints	CO1

3	*Produce a sand mould for the given pattern.	i. Choose appropriate sand and tools for moulding a given pattern. ii. Prepare a mould for given pattern.	CO1
4	*Produce a casting from the given mould.	i. Select suitable material and melt it for required casting. ii. Prepare casting as per given drawing.	CO2
5	*Fabricate structure using arc welding machine as per given drawing.	i. Prepare material for fabricating structure. ii. Select suitable equipment and tool for welding. iii. Fabricate structure as per given drawing.	CO3
6	Demonstrate soldering/brazing operations.	i. Prepare joint for soldering/brazing by applying flux. ii. Perform soldering/brazing operations on the given components.	CO3
7	Identify various welding defects from given castings.	i. Enlist various welding defects and their causes. ii. Identify casting defects in the given welded joints.	CO3
8	Demonstrate components of a forging machine and its safety considerations.	i. Identify various components of forging machine. ii. Enlist various forging operations. iii. Identify need of safety while working in forging shop.	CO4
9	*Produce a bolt head/cold chisel/hook using forging.	i. Select tool for producing given job. ii. Prepare a bolt head/a cold chisel/hook as per given drawing.	CO4
10	Demonstrate the various parts of rolling mill/machine and various safety aspects of it.	i. Identify various components of rolling mill/machine. ii. Enlist rolling methods used in industries. iii. Identify need of safety while working rolling shop.	CO4
11	Demonstrate production process of washer.	i. Identify various components of Press tool. ii. Identify type of die used for production of washer. iii. Identify need of safety while working in press shop.	CO4
12	*Produce a job on a lathe machine that comprises facing, plain turning and step turning operations as per the given drawing.	i. Setup a lathe machine for a given job as per operations. ii. Select suitable cutting parameters for operations as per given job. iii. Prepare a turning job as per given drawing.	CO5
13	*Produce a job on a lathe machine that comprises taper turning and	i. Setup a lathe machine for taper turning operations.	CO5

	grooving operations as per the given drawing.	ii. Calculate taper angle for taper turning operations as per given job. iii. Prepare a taper turning job as per given drawing.	
14	*Produce a job on a lathe machine that comprises knurling and chamfering operations as per the given drawing.	i. Setup a lathe machine for chamfering and knurling operations. ii. Select suitable cutting parameters for chamfering and knurling operations. iii. Prepare a chamfering and knurling job as per given drawing.	CO5
15	*Produce a job on a drilling machine comprising drilling and reaming operations as per the given drawing.	i. Setup a drill machine for given job as per operations. ii. Prepare a drilling job as per given drawing.	CO5
16	*Produce a job on drilling machine comprising tapping operation as per the given drawing.	i. Setup a drill machine and tool for given job as per operations. ii. Prepare a tapping job as per given drawing.	CO5
17	Produce a job on a drilling machine comprising counter-boring operation as per the given drawing.	i. Setup a drill machine and tool for given job as per operations. ii. Prepare a counter-boring job as per given drawing.	CO5

Note: Out of above Practicals -
- '*' Marked Practicals Are mandatory.
- Minimum 80% of above list of lab experiment are to be performed.
- Judicial mix of Practicals are to be performed to achieve desired outcomes.

The students will submit the following.

Workshop record book showing the details of the job viz. Drawing, Raw material size, time required completing the job. The journal consisting of the neat sketches, specifications, use of the hand tool, and hand operations based on the demonstration in all the trades during the practical work.

H. THEORY

SECTION I

Sr. No	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
Course Outcome- **MEH301-1**: Prepare a wooden pattern and prepare a mould for given pattern			
1	**Unit - I Pattern making and Moulding** **Pattern making:** 1.1 Basic steps in making pattern 1.2 Pattern making materials (wood, plastics, rubbers, Plasters, waxes, metallic pattern)	09	14

	1.3 Types of patterns: Single piece pattern, Split pattern, Match plate pattern, Sweep pattern, Skeleton pattern		
	1.4 Pattern making allowances: Shrinkage, draft, machining, distortion, rapping		
	1.5 Color coding for patterns and core boxes.		
	Moulding:		
	1.6 Molding sand: Green, Dry, Loam, Facing, baking, Parting, Core		
	1.7 Properties of Molding sand		
	1.8 Core prints: Horizontal, vertical, hanging, balancing wing		
	1.9 Molding processes: Green sand, Dry sand, Machine and Shell Molding		
	1.10 Gating and risering system		
Course Outcome- **MEH301-2**: Produce a part using casting processes as per given drawing.			
2	**Unit - II Casting**	**05**	**08**
	2.1 Casting in Indus valley civilization (IKS),		
	2.2 Centrifugal casting, investment casting, shell moulding and applications,		
	2.3 Die casting methods: Hot chamber die casting method, Cold chamber die casting method		
	2.4 Defects in casting: Causes and remedies		
	2.5 Safety practices/ precautions in foundry shop.		
Course Outcome- **MEH301-3**: Produce a part using joining processes as per given drawing			
3	**Unit - III Metal joining processes**	**08**	**12**
	3.1 Welding Processes: welding and weldability, types and classification of welding processes.		
	3.2 Gas welding: gas welding equipments, oxy-acetylene welding, types of flame.		
	3.3 Arc welding: arc welding equipments, flux shielded metal arc welding, TIG and MIG welding.		
	3.4 Resistance welding: Spot, Projection, Seam, Percussion.		
	3.5 Soldering and brazing process, Comparison, fillers, merits, demerits and applications.		
	3.6 Defects in welding joints: causes and remedies.		
	3.7 Safety practices/ precautions in welding shop.		

SECTION II

Sr. No	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
Course Outcome- **MEH301-4**: Produce a part using forming processes as per given drawing.			
4	Unit - IV Forming processes	**09**	**14**
	4.1 Drop forging: Introduction to forging, upset forging, press forging, open die and closed die, forging operations- Fullering, Edging, Bending, Blocking		
	4.2 Rolling: Principle of rolling, hot and cold rolling and applications, rolling mill.		

	4.3 Extrusion: Principles of extrusion, methods of extrusion: Direct, Indirect, Backward & Impact Extrusion		
	4.4 Press working operations: Cutting, bending, drawing, punching, blanking, notching, lancing		
	4.5 Press tool, simple, progressive and forming dies and applications.		
	4.6 Die set components: Punch and die shoe, guide pin, Bolster plate, Stripper, stock guide, feed stock, pilot		
	4.7 Safety practices/ precautions in forging and press shop.		

Course Outcome- **MEH301-5**: Produce a part using a lathe and drilling machine as per given drawing.

5	**Unit - V Fundamentals of Lathe**	**09**	**14**
	5.1 Basics of Machining: Single point cutting Tool and its nomenclature		
	5.2 Cutting tool materials, Tool signature, Tool angles		
	5.3 Mechanics of Chip formation, Types of Chips, Cutting fluids or coolants		
	5.4 Lathe machine: Classification, specification of centre lathe		
	5.5 Basic parts and accessories like chucks (three jaw, four jaw, and magnetic chuck), mandrels, rests, faceplate, centres and angle plate of centre lathe and their functions.		
	5.6 Lathe operations: facing, plain turning, taper turning, thread cutting, chamfering, grooving, knurling		
	5.7 Cutting parameters like speed, feed, depth of cut and machining time.		

Course Outcome- **MEH301-5**: Produce a part using a lathe and drilling machine as per given drawing.

6	**Unit - VI Drilling machines**	**05**	**08**
	6.1 Drill machine: Classification, specification of drilling machine		
	6.2 Basic parts of radial drilling machine, Sensitive drilling and their function.		
	6.3 Drilling machine operations: Drilling, reaming, boring, counter sinking, counter boring, spot facing		
	6.4 Cutting parameters- speed, feed, depth of cut and machining time.		
	6.5 Twist drill nomenclature, Types of drills		

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

Assignment
  i. Justify why lathe machine is called mother of all machines.
 ii. Collect information regarding car bonnet manufacturing in automobile industry.
iii. Collect information of material used for preparation of pattern.
 iv. Justify necessity of safety precaution in industries.
  v. Prepare a list of machine tools seen in the industry during industrial visit.

Micro project
  i. Prepare a list of machine tools available in the workshop of the institute.
 ii. Prepare list of similar operations that can be performed on different machine tools.
iii. Collect specification of machine tools available in the institute workshop.
 iv. Collect different welding equipments required for a welding shop.
  v. Collect a information about operations required for key manufacturing.

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

Topic No.	Name of topic	Distribution of marks (Cognitive level-wise)			Total Marks	Course Outcome
		Remember	Understand	Application		
1	Pattern making and Moulding	2	8	4	14	
2	Casting processes	2	2	4	08	CO1
3	Metal joining processes	4	4	4	12	CO1
4	Forming processes	2	4	8	14	CO2
5	Fundamentals of Lathe machines	2	4	8	14	CO3
6	Drilling machines	2	2	4	08	CO4
	TOTAL	**14**	**24**	**32**	**70**	

K. ASSESSMENT CRITERIA

i) Formative Assessment of Practical: -

Every practical assignment shall be assessed for 50 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 student has to perform one practical within 2 hours at term end practical which shall be assessed as per following criteria.

Sr. no	Criteria	Marks allotted
1	Preparedness for practical	05
2	Correct figures / diagrams	05
3	Skill (Finishing in dimensions)	10
4	Safety / use of proper tools	05
	Total	25

L. INSTRUCTIONAL STRATEGIES: -

    i) Lectures
    ii) Model and Video Demonstration
    iii) Demonstration during Practicals.
    iv) Hands on training on machine

M. TEACHING AND LEARNINGRESOURCES: -
   i) Chalk-Board
   ii) LCD Projector

N. REFERENCE BOOKS:

Sr. No	Author	Title	Publisher with ISBN Number
1	P N RAO	Manufacturing Technology Vol-1	McGraw Hill, New Delhi. ISBN-1259062570, 9781259062575
2	P N RAO	Manufacturing Technology Vol-2	McGraw Hill, New Delhi, ISBN: 9789353160524
3	S K Hajra Choudhury, A K Hajra Choudhury, Nirjhar Roy	Elements Of Workshop Technology Vol-1	Media Propoters & Publisher PVT. LMT. ISBN-13 5551234102415
4	S K Hajra Choudhury, A K Hajra Choudhury, Nirjhar Roy	Elements Of Workshop Technology Vol-2	Media Propoters & Publisher PVT. LMT., ISBN: 978-8-185-09915-6.
5	D.P. Agrawal	Ancient Metal Technology and Archaeology of South Asia: a Pan-Asian perspective	Aditya Prakashan, New Delhi. ISBN: 9788173051777

O. LEARNING WEBSITE & SOFTWARE:

Sr. No	Link / Portal	Description
1	https://www.youtube.com/watch?v=Wc2gpWcmGK4	Lathe Machine Operations
2	https://www.youtube.com/watch?v=DGsV6RhBnbM	Radial drilling machine
3	https://www.youtube.com/watch?v=zzXdddrV2so	Simple Job on milling machine
4	https://www.youtube.com/watch?v=2CIcvB72dmk	Basics of Metal Casting
5	https://www.youtube.com/watch?v=-w7E88zox6w	Closed die forging
6	https://www.youtube.com/watch?v=RyLvVMg84xs	Basics of welding process

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COURSE ID :
COURSE NAME   : SOCIAL AND LIFE SKILLS
COURSE CODE   : CCH114
COURSE ABBREVIATION: HSLS

A. LEARNING SCHEME:

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

B. ASSESSMENT SCHEME: -

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

(Total IKS Hrs for Sem.: 00 Hrs)

C: ABBREVIATIONS: -

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

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

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

D. i) RATIONALE: -

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

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

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

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

ii) INDUSTRY / EMPLOYER EXPECTED OUTCOME

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

E. COURSE LEVEL LEARNING OUTCOMES (COs)

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

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

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

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

	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life- long Learning	PSO 1 Work in Mfg & service sector	PSO 2 Start entrepreneurial activity
Competency:									
CCH114-1							2		
CCH114-2							2		
CCH114-3							2		
CCH114-4						2	2		
CCH114-5							2		
CCH114-6						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.
1	TLO 1.1 Explain developmental needs and connection of various stakeholders TLO 1.2 Enlist the local problems	**Unit - I MODULE I : Activities Under Unnat Maharashtra Abhiyan (UMA)** 1.1 Introduction to Societal Needs and respective stakeholders: Regional societal issues that need engineering intervention	Implementation Methodology: Considering the nature of the course designed, following points shall be considered while implementing the course.
		1.2 Multidisciplinary approach-linkages of academia, society and technology 1.3 Stakeholders' involvement 1.4 Introduction to Important secondary data sets available such as census, district economic surveys, cropping pattern, rainfall data, road network data etc. 1.5 Problem Outline and stakeholders: Importance of activity and connection with Mapping of system components and stakeholders (engineering / societal)	

TLO 1.3 Design a methodology for fieldwork TLO 1.4 Select the attributes of engineering and social system 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.	1.6 Key attributes of measurement 1.7 Various instruments used for data collection - survey templates, simple measuring equipments .8 Format for measurement of identified attributes/ survey form and piloting of the same .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 .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 data collected.	i) Regroup in the batches of 5-6 students for conducting the fieldwork from the bigger group. ii) Assign a few batches of the students for this course to all the faculty 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 teachers will 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 sessions and 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 survey instrument Survey Visit 1 - Data gathering / Information Collection 3. Survey Visit 2 - Data gathering 1. Summary Visit - Closure after analysis

| 2 | TLO 2.1 Adoption of Village or Slum TLO 2.2 Survey and Problem Identification TLO 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 the NSS 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 and Karuna) 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 TLO3.8Gender Equality and Sensitivity | **Unit - III MODULE-III: Universal Human Values**
.1 Love and Compassion (Prem and Karuna): Introduction, Practicing Love and Compassion (Prem and Karuna)
.2 Truth (Satya) : Introduction, Practicing Truth (Satya)
.3 Non-Violence (Ahimsa) : Introduction, Practicing Non-Violence (Ahimsa)
.4 Righteousness (Dharma) : Introduction, Practicing Righteousness (Dharma)
.5 Peace (Shanti) : Introduction, Practicing Peace (Shanti)
.6 Service (Seva) : Introduction, Practicing Service (Seva)
.7 Renunciation (Sacrifice) Tyaga: Introduction, Practicing Renunciation (Sacrifice) Tyaga | i) Lectures
ii)Demonstration
iii) Case Study
iv) Role Play
v)Observations
vi) Portfolio Writing
vii) Simulation
Motivational talks by Practitioners Site/Industry Visit |

		Gender Equality and Sensitivity: Introduction, Practicing Gender Equality and Sensitivity	
4	TLO 4.1 Punctuality TLO 4.2 Cleanliness, Hygiene and Orderliness TLO 4.3 Responsibility TLO 4.4 Gratitude and Appreciations 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 and Forget	**Unit - IV MODULE-IV: Value Education (Unnati Foundation)** 4.1 Punctuality, Icebreaker and Simple Greeting, Understanding & Managing Emotions, Introducing Self, The power of a Positive Attitude, talking about one's Family, talking about one's Family, making a Positive Impression, give word list for a Word based .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 .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 Gratitude and Appreciation, Asking Simple Questions & Asking for the price, Stress Management, Student Referral process, Comprehending & Paraphrasing Information, A Plate of Rice and Dignity of Labour, Topics for Public Speaking, Placement Process, OCSEM- E-Newspaper, Critical Thinking to overcome challenges .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	i) Video Demonstrations ii) Flipped Classroom iii) Case Study iv) Role Play v) Collaborative learning vi) Chalk-Board

		person/Objects, Refusal Skills, Word List for Word based Learning	
		.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	
		.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 .8 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 Importance of Insurance
TLO 5.8 Literacy About the Dos and Don'ts in finances | **Unit - V MODULE-V: Financial Literacy**
.1 Introduction - Life Goals and financial goals
.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
.3 Retirement planning
.4 Cashless transactions
.5 Income, expenditure and budgeting – Concepts and Importance
.6 Inflation- Concept, effect on financial planning of an individual
.7 Loans – Types, Management of loans, Tax benefits
.8 Insurance – Types, Advantages, selection
Dos and Don'ts in Financial planning and Transactions | i) Online/Offline Mode of Instructions
ii) Video Demonstrations
iii) Presentations
iv) Case Study
v)Chalk-Board
Collaborative learning |

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** 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 heritage among 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.
(viii)

(c) Programmes aimed at creating an awareness for improvement of the status of women:

(i) programmes of educating people 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 the community;
(iii) creating awareness among women that there is no occupation or vocation which is not open to them provided they acquire 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 of patients discharged from the hospital by making home visits and places of work, assistance in running dispensaries etc.
   (ii) work with the organizations of child welfare;
   (iii) work in institutions meant for physically and mentally handicapped;
   (iv) organizing blood donation, eye pledge programmes;
   (v) work in Cheshire homes, orphanages, homes for the aged etc.;
   (vi) work in welfare organizations 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) popularization 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 immunization, 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 for instruction and recreation, programmes of community singing, dancing etc.;

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(vi) organization 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)

   i) 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

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2	Central Public Health and Environmental Engineering Organization	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 maps showcasing 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 Control Board, Government of India)

h. http://www.mahapwd.com/# (A Website of Public Works Department, GoM)

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

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

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