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B.E.CIVIL ENGINEERING

CURRICULUM

REGULATION-2024

CHOICE BASED CREDIT SYSTEM (CBCS)

DEPARTMENTOFCIVILENGINEERING

MAHENDRAENGINEERINGCOLLEGE

(AUTONOMOUS)

MALLASAMUDRAM WEST, TAMILNADU-637503

DEPARTMENT OF CIVIL ENGINEERING

Regulation-2024-Curriculum(CBCS)

I Semester

Sl. No.	Course Code	Course Title	Category	L	T	P	C
THEORY							
1	24MA12101	Engineering Mathematics– I	BS	3	1	0	4
2	24CY12001	Engineering Chemistry	BS	3	0	0	3
3	24HS11001	Communicative English	HS	3	0	0	3
4	24GE13101	Engineering Drawing	ES	2	0	2	3
5	24HS11002	Heritage of Tamil	HS	1	0	0	1
6	-	Induction Program	MC	-	-	-	-
PRACTICAL							
7	24CY22001	Chemistry Laboratory	BS	0	0	3	1.5
8	24HS21001	Personality Development Practice	HS	0	0	2	1
9	24GE23101	Computer Aided Drafting and Modeling Laboratory	ES	0	0	3	1.5
			TOTAL	**12**	**1**	**10**	**18**

Head of the Department,
Department of Civil Engineering,
Mahendra Engineering College,
Mallasamudram (W),
Namakkal (Dt).

DEPARTMENT OF CIVIL ENGINEERING

Regulation-2024-Curriculum(CBCS)

II Semester

Sl. No.	Course Code	Course Title	Category	L	T	P	C
THEORY							
1	24MA12201	Engineering Mathematics–II	BS	3	1	0	4
2	24PY12001	Engineering Physics	BS	3	0	0	3
3	24CS13001	Problem Solving Techniques using C	ES	3	0	0	3
4	24EE13001	Basics of Electrical and Electronic Engineering	ES	3	0	0	3
5	24GE13201	Engineering Mechanics	ES	3	0	0	3
6	24HS11003	Tamil and Technology	HS	1	0	0	1
PRACTICAL							
7	24PY22001	Physics Laboratory	BS	0	0	3	1.5
8	24CS23001	Problem solving Techniques using C laboratory	ES	0	0	3	1.5
9	24GE23001	Engineering Practices Laboratory	ES	0	0	3	1.5
			TOTAL	**16**	**1**	**9**	**21.5**

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Namakkal (Dt).

DEPARTMENT OF CIVIL ENGINEERING

Regulation-2024-Curriculum(CBCS)

III Semester

Sl. No.	Course Code	Course Title	Category	L	T	P	C
THEORY							
1	24MA12301	Transforms And Partial Differential Equations	BS	3	1	0	4
2	24CE13301	Engineering Geology	ES	3	0	0	3
3	24CE14301	Mechanics of Solids	PC	3	0	0	3
4	24CE14302	Construction Materials, Techniques and Practices	PC	3	0	0	3
5	24CE14303	Surveying	PC	3	0	0	3
6	-	Open Elective–1	OE	3	0	0	3
7	24CY11001	Environmental Science and Sustainability	MC	2	-	-	-
PRACTICAL							
8	24CE24301	Strength of Materials Laboratory	PC	0	0	3	1.5
9	24CE24302	Surveying Laboratory	PC	0	0	2	1.0
10	24CE24303	Computer Aided Building Drawing	PC	0	0	2	1.0
			TOTAL	**20**	**1**	**7**	**22.5**

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DEPARTMENT OF CIVIL ENGINEERING

Regulation-2024-Curriculum(CBCS)

IV Semester

Sl. No.	Course Code	Course Title	Category	L	T	P	C
THEORY							
1	24MA12404	Numerical Methods	BS	3	1	0	4
2	24CE14401	Strength of Materials	PC	3	0	0	3
3	24CE14402	Fluid Mechanics and Machinery	PC	3	0	0	3
4	24CE14403	Water Supply Engineering	PC	3	0	0	3
5	24CE14404	Computer Aided Modelling and Design of Structures	PC	3	0	0	3
6		Open Elective –2	OE	3	0	0	3
7	24HS11006	Universal Human Values	HS	3	0	0	3
PRACTICAL							
8	24CE24401	Hydraulics Engineering Laboratory	PC	0	0	2	1
9	24CE34401	Advanced Surveying and Camp	PC	1	0	2	2
10	24HS21002	Professional Communication Skills	HS	0	1	2	2
			TOTAL	**21**	**2**	**8**	**27**

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DEPARTMENT OF MATHEMATICS

CURRICULUM – REGULATION 2024

S. No	Subject Code	Subject Name	Department	Semester	L-T-P	Credits
THEORY (UG)						
1	24MA12101	ENGINEERING MATHEMATICS - I	Common to all B.E./B.Tech. Programmes	I	3-1-0	4

MAHENDRA ENGINEERING COLLEGE(Autonomous)						
Syllabus					**Regulations 2024**	
Department	**MATHEMATICS**	**Programme Code**				
SEMESTER – I						
Course code	**Course Name**	**Hours/week**			**Credit**	**Maximum marks**
		L	**T**	**P**	**C**	
24MA12101	**ENGINEERING MATHEMATICS-I (Common to all Branches)**	3	1	0	4	**100**
Objectives	To enable the students to: • Learn the types of matrices and linear algebra in a comprehensive manner. • Familiarize with functions of several variables and its applications to engineering. • Define the geometric aspects of curvature, radius of curvature, evolutes and envelopes as application of differential calculus. • Explain various techniques of integration. • Learn double and triple integrals and give their representation as area and volume.					
Outcomes	At the end of the course the students will be able to: • Determine the rank of a matrix, eigenvalues, eigenvectors and inverse of a given matrix and diagonalize symmetric matrix by orthogonal transformations, solve system of linear equations. • Determine maxima and minima of functions of several variables. • Apply the concepts of differential calculus in physical problems. • Apply different methods of integration in solving practical problems. • Compute the area and volume by using multiple integrals.					
UNIT – I	**MATRICES**					**9+3**
Matrix and its types – Rank of matrix –Solving system of linear equations - Characteristic equation - Eigenvalues and Eigenvectors of the matrix - Cayley-Hamilton Theorem, Diagonalization of real and symmetric matrices by Orthogonal transformation – Reduce the quadratic form to canonical form.						
UNIT – II	**DIFFERENTIAL CALCULUS OF SEVERAL VARIABLES**					**9+3**
Differentiation of implicit functions – Partial derivatives – Total derivative – Euler's theorem – Jacobian and properties – Taylor's series for functions of two variables – Maxima and minima of functions of two variables – Lagrange's method of undetermined multipliers.						

UNIT – III	APPLICATIONS OF DIFFERENTIAL CALCULUS	9+3
Curvature in Cartesian co-ordinates– Centre and radius of curvature – Circle of curvature – Evolutes – Envelopes – Evolute as envelope of normals and their properties.		
UNIT – IV	**INTEGRAL CALCULUS**	**9+3**
Definite and Indefinite integrals - Substitution rule - Techniques of Integration: Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Integration of irrational functions - Improper integrals – Applications to Engineering problems.		
UNIT – V	**MULTIPLE INTEGRALS**	**9+3**
Double integrals in Cartesian co-ordinates – Change of order of integration – Area as double integral – Triple integral in Cartesian co-ordinates – Volume as triple integral – Change of variables in double integrals. Applications to Engineering problems.		
Total	**(L:45+T:15):60 Periods**	

TEXT BOOK:	
1	B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 2017.
2	James Stewart, Calculus with Early Transcendental function, Cengage, 2013.
REFERENCES:	
1	Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 2016.
2	Ray Wylie, Louis C. Barrett, Advanced Engineering Mathematics, McGraw-Hill, 2013.
3	Ben Orlin, Change is the Only Constant: The Wisdom of Calculus in a Madcap World, Pearson 2018.

I – B.E/B.Tech., DEGREE

ENGINEERING CHEMISTRY

AND

ENVIRONMENTAL SCIENCE AND SUSTAINABILITY

SYLLABUS FOR
CHOICE BASED CREDIT SYSTEM

REGULATION 2024

DEPARTMENT OF CHEMISTRY

MAHENDRA ENGINEERING COLLEGE

(AUTONOMOUS)

MALLASAMUDRAM WEST, TAMIL NADU 637503

MAHENDRA ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF SCIENCE AND HUMANITIES

REGULATION 2024 (CBCS)

CURRICULUM – CHEMISTRY

S. No	Sub. Code	Subject Name	Department	Semester	L-T-P	Credits
THEORY						
1	24CY12001	Engineering Chemistry	For Non – Circuit Streams	I	3-0-0	3
			For Circuit Streams	II	3-0-0	3
2	24CY11001	Environmental Science And Sustainability	For Non – Circuit Streams	III	2-0-0	2
			For Circuit Streams	IV	2-0-0	2
PRACTICAL						
3	24CY22001	Chemistry Laboratory	For Non – Circuit Streams	I	0-0-3	1.5
			For Circuit Streams	II	0-0-3	1.5

1) P.Dhanakodi 12/4/24

2) N.G 12/4/24

MEMBERS

1. Dr.P.Dhanakodi
2 Dr.M.Gunasekaran

SUBJECT EXPERT

Dr.V.Thangaraj M.Sc., Ph.D.
Assistant Professor (Sr.Gr)/Chemistry
Anna University BIT campus
Trichy

12/4/24

CHAIRMAN

Board of Studies-Science & Humanities

Dr.J.Kavitha M.A., M.Phil., Ph.D
HEAD / ENGLISH
MAHENDRA ENGINEERING COLLEGE

MAHENDRA ENGINEERING COLLEGE (Autonomous)-Syllabus						R 2024
DEPARTMENT:	SCIENCE & HUMANITIES			Programme Code & Name		CY&CHEMISTRY
SEMESTER – I (For Non Circuit Branches & ECE) & SEMESTER – II (For Circuit Branches & Except ECE)						
COURSE CODE	COURSE NAME	HOURS/WEEK			CREDIT	MAXIMUM MARKS
		L	T	P	C	
24CY12001	ENGINEERING CHEMISTRY	3	0	0	3	100

Objectives	To make the students familiar with: 1. The treatment of water used for domestic and industrial purpose. 2. Various types of polymers in our day today life. 3. The basic principle and preparation methods of Nanomaterials. 4. The Construction and applications of different types of batteries. 5. The preparation, properties and combustion method of fuels.
Outcomes	At the end of the course the student will be able to 1. Explain the various water quality parameters and their treatments for domestic and industrial applications. 2. Classify the reaction mechanism, synthesis and application of polymers. 3. Develop the essential concepts of nanoscience and nanotechnology in designing the nanomaterial for Engineering. 4. Compare the working principles of batteries and super capacitors. 5. Illustrate the suitable fuels for engineering processes and applications.

UNIT-I	WATER TECHNOLOGY	9 Hrs

Types of water - Alkalinity, types and determination - Hardness, types and Estimation by EDTA method. Domestic water treatment – disinfection methods (Chlorination, ozonation, UV treatment) – Boiler feed water – requirements – Decreased efficiency of using hard water in boilers – external conditioning – demineralization process, Electro dialysis process, reverse osmosis - Internal conditioning (phosphate, calgon and carbonate conditioning methods) – Conservation of Water using 3R method– WHO and BIS guidelines for drinking water.

UNIT-II	POLYMER CHEMISTRY	9 Hrs

Introduction - Classification of polymers – Natural and synthetic - Thermoplastic and Thermosetting - Functionality – Degree of polymerization - Types and mechanism of polymerization: Addition (Free Radical); condensation and copolymerization - Preparation, properties & applications of selected commodity and engineering polymers (Polyester, Polystyrene, PVC, Nylon, Teflon, Bakelite and Epoxy resin).

UNIT-III	NANOCHEMISTRY	9 Hrs

Basic - Distinction between molecules, nanoparticles and bulk materials - size-dependent properties (optical, electrical, mechanical and magnetic) - Types of nanomaterials: Definition, properties and uses of –nanoparticles , nanocluster, nanorod, nanotube and nanowire - Synthesis of nanomaterials: laser ablation, Sol gel, Synthesis of Carbon nano tubes by CVD Method- SWCNT and MWCNT- Applications (Medicine, Agriculture and Electronics).

UNIT-IV	ENERGY STORAGE DEVICE	9 Hrs
Types of batteries - Primary battery - dry cell - Secondary battery - Construction and application of lead acid battery and Lithium ion batteries – Battery used in EV application – Nuclear energy – Fission and Fusion reactions – Light water nuclear reactor for power generation (block diagram only) - Fuel cell (H_2-O_2) - Super Capacitors.		
UNIT-V	**FUELS AND COMBUSTION**	9 Hrs
Introduction - classification of fuels - Coal - analysis of coal (proximate and ultimate) - carbonization - manufacture of metallurgical coke (Otto Hoffmann method) - Petroleum - manufacture of synthetic petrol (Bergius process) - calorific value - higher and lower calorific values- theoretical calculation of calorific value - ignition temperature - spontaneous ignition temperature - flue gas analysis (ORSAT Method).		
	TOTAL	**45 Hrs**

TEXT BOOK :

1.	Jain P.C. and Monica Jain, "Engineering Chemistry", Dhanpat Rai Publishing Company (P) Ltd., New Delhi, 2022.
2.	Kannan P., Ravikrishnan A., "Engineering Chemistry", Sri Krishna Hi-tech Publishing Company Pvt. Ltd. Chennai, 2021.
3.	Dara S.S, Umare S.S, "Engineering Chemistry", S. Chand & Company Ltd., New Delhi 2019.
4.	Lindsay S.M., "Introduction to Nanoscience" Oxford University, 2009.

REFERENCES

1.	Dr.C.K.Charles and Dr.G.Ramachandran, "Applied Chemistry", CARS Publishers,Chennai,2015
2.	Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company, Ltd., New Delhi, 2012.
3.	Linden's "Handbook of Batteries", Thomas B. Reddy, Fourth Edition McGraw-Hill, New York, 2011.
4.	Shikha Agarwal,"Engineering Chemistry-Fundamental and Application",Cambridge University press,Delhi,Second Edition,2019.

S.No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C01	2	-	-	1	-	-	1	-	-	-	-	1	-	-	-
C02	2	-	-	1	-	-	1	-	-	-	-	1	-	-	-
C03	3	-	-	1	-	-	-	-	-	-	-	1	-	-	-
C04	3	-	-	-	-	-	1	-	-	-	-	1	-	-	-
C05	3	1	1	-	-	-	1	-	-	-	-	1	-	-	-
Avg.	**2.6**	**1**	**1**	**1**	-	-	**1**	-	-	-	-	**1**	-	-	-

MEMBERS
1. Dr.P.Dhanakodi
2 Dr.M.Gunasekaran

SUBJECT EXPERT
Dr.V.Thangaraj M.Sc., Ph.D.
Assistant Professor (Sr.Gr)/Chemistry
Anna University BIT campus
Trichy

MAHENDRA ENGINEERING COLLEGE (Autonomous)-Syllabus						R 2024
DEPARTMENT:	SCIENCE & HUMANITIES		Programme Code & Name			CY & CHEMISTRY
SEMESTER – I (For Non Circuit Branches & ECE) & SEMESTER – II (For Circuit Branches (Except ECE))						
COURSE CODE	COURSE NAME	HOURS/WEEK			CREDIT	MAXIMUM MARKS
24CY22001	CHEMISTRY LABORATORY (Any eight experiments to be conducted)	L	T	P	C	100
		0	0	3	1.5	
Objectives	▪ To inculcate experimental skills to test basic understanding of water quality parameters, such as, alkalinity, hardness, DO and chloride. ▪ To induce the students to familiarize with electro analytical techniques such as, pH metry, potentiometry and conductometry in the determination of impurities in aqueous solutions. ▪ To design and plan the experimental procedure and to record and process the results.					
Outcomes	On completion of this course, students will have the knowledge in ▪ Explain the essential principles and their analysis of water quality parameters, like hardness, alkalinity, DO, and chloride. ▪ Experiment with different types of instruments for analysis of materials using small quantities involved for quick and accurate results. ▪ Analyze the normality of different types of materials such as PVA and Ferrous ion.					
1.	Determination of Total, Temporary & Permanent hardness of water using EDTA method.					
2.	Determination of the Alkalinity level of a water sample.					
3.	Determination of Chloride content of water sample by Argentometry.					
4.	Determination of DO content of water sample using Winkler's method.					
5.	Determination of molecular weight of polyvinyl alcohol using Viscometry.					
6.	Estimation of Iron content of the given solution using Potentiometry.					
7.	Determination of strength of given hydrochloric acid using pH meter.					
8.	Conductometric titration of strong acid vs strong base.					
9.	Determination of strength of acids in a mixture using Conductometry.					
10.	Estimation of sulphate in a solution using Conductometry (precipitation).					
TEXT BOOK						
1.	Chemistry lab Manual, Department of Chemistry, Mahendra Engineering College, Mallasamudram, 2022.					
2.	Chemistry lab Manual, Department of Chemistry, Mahendra Engineering College, Mallasamudram, 2020.					
REFERENCES						
1.	Applied chemistry theory and practice by O. P. Vermani and A. K. Narula, second edition.					
2.	J. Mendham, R. C. Denney, J.D. Barnes, M. Thomas and B. Sivasankar, Vogel's Textbook of Quantitative Chemical Analysis (2009).					
3.	Kolthoff I.M. and Sandell E.B. et al. Quantitative chemical analysis, Mcmillan, Madras 1980					

S.No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C01	2	-	-	-	-	-	-	1	2	-	-	-	-	-	-
C02	3	-	-	2	-	-	-	1	2	-	-	-	-	-	-
C03	2	3	-	2	-	-	-	1	2	-	-	-	-	-	-
Avg.	2.3	3	-	2	-	-	-	1	2	-	-	-	-	-	-

1) P 12/4/24

2) H. G 12/4/24

MEMBERS

1. Dr.P.Dhanakodi
2 Dr.M.Gunasekaran

SUBJECT EXPERT

Dr.V.Thangaraj M.Sc., Ph.D.
Assistant Professor (Sr.Gr)/Chemistry
Anna University BIT campus
Trichy

MAHENDRA ENGINEERING COLLEGE (Autonomous)-Syllabus						R 2024
DEPARTMENT:	**SCIENCE & HUMANITIES**	Programme Code & Name				**CY& CHEMISTRY**
SEMESTER-III (For Non Circuit Branches) & SEMESTER- IV (For Circuit Branches)						
COURSE CODE	**COURSE NAME**	HOURS/WEEK			CREDIT	**MAXIMUM MARKS**
		L	T	P	C	
24CY11001	**ENVIRONMENTAL SCIENCE AND SUSTAINABILITY**	2	0	0	2	**100**

Objectives	To make the students familiar with : 1. The importance of Environment, Ecosystem and Biodiversity. 2. The causes, effects and prevention measures of environmental pollution. 3. The social issues of the environment and National laws for environment protection. 4. The green environment and associated issues. 5. The concept of sustainable development goals and appreciate the interdependence of economic and social aspects of sustainability, recognize and analyze.
Outcomes	At the end of the course the student will be able to 1. Explain the importance of Environment, Ecosystem and various types of Biodiversity. 2. Identify the different types of Pollution and be familiar with control measures. 3. List out the environmental issues and essential legislation on environmental laws. 4. Develop the concept of green synthesis method in environment and related problems. 5. Recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.

UNIT-I	**ENVIRONMENT, ECOSYSTEM & BIODIVERSITY**	12 Hrs

Definition, Scope and Importance of Environment – Need for public awareness – Ecosystem: concept of an ecosystem – structure and function of an ecosystem – energy flow in the ecosystem – Biodiversity: Introduction – definition - genetic, species and ecosystem diversity – value of biodiversity – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity – Field visit to local area.

UNIT-II	**ENVIRONMENTAL POLLUTION & DISASTER MANAGEMENT**	9 Hrs

Definition – causes, effects and control measures of: (a) Air, (b) Water, (c) Soil, (d) Noise, (e) Thermal pollution– solid waste management: causes, effects and control methods of municipal solid wastes – disaster management: floods, earthquake and landslides– E-waste and plastic waste: recycling and reuse - role of an individual in prevention of pollution – pollution case studies (vizag gas leakage) – Field visit to local polluted area.

UNIT-III	**SOCIAL ISSUES & ENVIRONMENTAL IMPACT ASSESMENT**	9 Hrs

Social issues – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies (Global warming). – EPA: Environment protection act - EIA: EIA structure- methods of baseline data acquisition. Planning and management of impact studies - operational aspects of EIA - methods for impact identification- Role of NGOs in creating awareness among people regarding environmental issues.

UNIT-IV	GREEN ENVIRONMENTAL ISSUES	9 Hrs
Introduction – Clean development mechanism – carbon emission-carbon foot printing - carbon credits - carbon sequestration and Polluter pay principle – Sustainable green building practices – Carbon Neutrality in India - Geneva Conventions and their Additional Protocols.		
UNIT-V	**SUSTAINABILITY AND MANAGEMENT**	6 Hrs
Development , GDP ,Sustainability- concept, needs and challenges - economic, social and aspects of sustainability - from unsustainability to sustainability - millennium development goals, and protocols- Sustainable Development Goals - targets, indicators and intervention areas.		
	TOTAL	**45 Hrs**

TEXT BOOKS :

1.	Rajagopalan, R, "Environmental Studies-From Crisis to Cure", Oxford University Press (2015)
2.	Benny Joseph, "Environmental Science and Engineering", Tata McGraw-Hill, New Delhi, 2017.
3.	Dr.A.Ravikrishnan, "Environmental Science and Engineering" , Sri Krishna Hi-tech Publishing Company Pvt. Ltd. Chennai, 2014.
4.	Allen, D. T. and Shonnard, D. R., Sustainability Engineering: Concepts, Design and Case Studies, Prentice Hall.

REFERENCES

1.	R.K. Trivedi, "Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards", Vol. I and II, Enviro Media.
2.	Gilbert M.Masters, "Introduction to Environmental Engineering and Science", 3rd Edition, Pearson Education, 2023.
3.	Dharmendra S. Sengar, "Environmental law", Prentice hall of India PVT LTD, New Delhi, 2007.

S.No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C01	2	-	-	-	-	1	2	2	-	-	-	1	-	-	-
C02	2	-	-	-	-	1	2	-	-	-	-	1	-	-	-
C03	3	-	-	-	-	2	3	-	-	-	-	1	-	-	-
C04	3	-	-	-	-	2	3	-	-	-	-	1	-	-	-
C05	3	-	-	-	-	2	3	-	-	-	-	1	-	-	-
Avg.	2.6	-	-	-	-	1.6	2.6	2	-	-	-	1	-	-	-

1) P Dhana 12/4/24

2) M.G 12/04/24

MEMBERS
1. Dr.P.Dhanakodi
2 Dr.M.Gunasekaran

SUBJECT EXPERT
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DEPARTMENT OF ENGLISH

REGULATION 2024 (CBCS)

SEMESTER - I & II

THEORY

S. No.	Course Code	Course Title	L	T	P	C
01	24HS11001	COMMUNICATIVE ENGLISH (Common to all B.E./ B.Tech Programmes) SEMESTER- I (For Non - Circuit Branches) SEMESTER- II (For Circuit Branches)	3	0	0	3

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SYLLABUS - REGULATION - 2024

SEMESTER – I (Non-Circuit Branches) **SEMESTER- II (Circuit Branches)**

Course Code	Course Name	Hours / Week			Credit	Maximum Marks
		L	T	P	C	
24HS11001	**COMMUNICATIVE ENGLISH** (Common to all B.E/B.Tech Degree Programmes)	3	0	0	3	100

Objectives	• To help learners to improve their knowledge of grammar • To enable them to use vocabulary appropriately in different academic and professional contexts • To support learners to acquire listening and speaking skills • To facilitate them to develop their reading skills by familiarizing different types of reading strategies • To equip them with writing skills needed for academic as well as professional context
Outcomes	At the end of the course, the learners will be able to • Develop listening and reading skills and comprehend the academic articles in English • Develop vocabulary skills and use words appropriately in different academic contexts. • Analyze and interpret the data with correct usage of grammar • Demonstrate effective LSRW skills with emerging technology • Create strong communication skills in both personal and professional life

UNIT I	**9 Hrs**

Listening- Listening to Short Conversations (Formal and Informal)
Speaking – Introducing Oneself and Others
Reading – Skimming and Scanning-Reading Comprehension Passages and Answering Multiple Choice Questions
Writing - Leave/On Duty application, Bonafide Certificate-requisition, Check list, Instructions
Grammar & Vocabulary – Parts of Speech, Articles, Prefixes and Suffixes

UNIT II	**9 Hrs**

Listening – Listening to Telephonic Conversations
Speaking –Word Building Activity
Reading – Short stories
Writing- Recommendations, Composing E-Mail(Formal & Informal), Letter Writing- Letter to the Editor
Grammar & Vocabulary – Sentence Pattern, Tenses, British Terms and American Equivalents

UNIT III	**9 Hrs**

Listening - Listening to TED Talks and Note taking
Speaking – Role Play
Reading –Cloze Reading and Fill up the Gaps
Writing - Letter Writing – Permission Letter (In-Plant Training/Industrial Visit), Business letters- Calling for Quotation and Placing Order
Grammar & Vocabulary – Modal Verbs, Voice- Active Voice, Passive Voice and Impersonal Passive, Numerical Expressions

UNIT IV	9 Hrs
Listening - Listening to Audio Lectures **Speaking** – Taking part in Casual Conversation **Reading -** Reading Advertisements **Writing** – Poster Making, and Job Application **Grammar & Vocabulary** – Cause and Effect Expressions, Question tags, Gerunds and Infinitives, One word substitution	
UNIT V	**9 Hrs**
Listening – Listening to Academic lectures **Speaking** – Describing Objects **Reading** – Transcoding (Conversion of Flow Chart, Bar chart, Pie chart into a paragraph) **Writing** –Review writing (Films & Books), Essay Writing **Grammar & Vocabulary** – If Conditionals, Concord, Same Word used as Noun and Verb, Nominal Compounds	
Total Hours	**45**

Textbook:	
1	Murphy, Raymond, *English Grammar in Use*, Fifth Edition. Cambridge University Press, New Delhi, 2019
2	N.P.Sudharshana and C.Savitha, *English For Technical Communication*, Cambridge University Press, New Delhi, 2016
Reference Books:	
1	Lewis Norman, *Word Power Made Easy,* Goyal Publishers: New Delhi. 2020.
2	Ashraf Rizvi. *Effective Technical Communication*, Tata McGraw Hill, 2017.
3	Jack C. Richards with Jonathan Hull and Susan Proctor, *Interchange*. 4th Edition, Cambridge University Press, New Delhi, 2016
Extensive Reading:	
1	Khera, Shiv. *You can Win*. Macmillan, Delhi. 2014
Websites:	
1	http://www.englishclub.com
2	http://www.talkenglish.com
3	https:// www.ted.com/talks
4	https://nptel.ac.in/

MAHENDRA ENGINEERING COLLEGE
(Autonomous)

Syllabus

Department	Mechanical Engineering	Programme Code	5082

I Semester

Course code	Course Name	Hours/week			Credit	Maximum marks
		L	T	P	C	
24GE13101	ENGINEERING DRAWING (Common to Non circuit Branches)	3	0	0	3	100

Objective(s)	• Increase ability to communicate with people through drawing skills as per the BIS standard. • Learn to sketch and take field dimensions. • Learn to take data and transform it into graphic drawings. • Learn basic engineering drawing formats.

UNIT-I	**Plane Curves and Free Hand Sketching**	**9**

Importance of drawing in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning. Basic Geometrical constructions, Curves used in engineering practices: Conics –Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid –construction of involutes of square and circle – Drawing of tangents and normal to the above curves, Scales: Construction of Diagonal and Vernier scales.

Visualization concepts and Free Hand sketching: Visualization principles –Representation of Three Dimensional objects – Layout of views- Free hand sketching of multiple views from pictorial views of objects.

UNIT-II	**Projection of Points, Lines and Plane Surfaces**	**9**

Orthographic projection- principles-Principal planes-First angle projection-projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes -Determination of true lengths and true inclinations by rotating line method and traces Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

UNIT-III	**Projection of Solids**	**9**

Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to one of the principal planes by rotating object method and auxiliary plane method.

UNIT-IV	**Projection of Sectioned Solids and Development of Surfaces**	**9**

Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids cylinders and cones. Development of lateral surfaces of solids with cut-outs and holes.

UNIT-V	**Isometric and Perspective Projections**	**9**

Principles of isometric projection – isometric scale –Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions and miscellaneous problems. Perspective projection of simple solids-Prisms, pyramids and cylinders by visual ray method.

Total hours to be taught	**45**

Outcome(s)	• Students' ability to indicate proper dimensions on drawings will improve • Students' ability to perform basic sketching techniques will improve. • Students will become familiar with office practice and standards. • Students will be able to improve their visualization skills so that they can apply these skills in developing new products.

TEXT BOOK :

1 S.Gowri &K.Jayapoovan, "Engineering Graphics" 6th Edition, Vikas Publication New Delhi

2	N S Parthasarathy and Vela Murali, “Engineering Drawing” Oxford University Press 2015.
3	K. Venugopal & V. Prabhu Raja, “Engineering Graphics”, New Age International (P) Limited, 2011.

REFERENCES:	
1	M.B. Shah and B.C. Rana, “Engineering Drawing”, Pearson Education 2005.
2	K. R. Gopalakrishnana, “Engineering Drawing” (Vol.I&II), Subhas Publications 1998.
3	Basant Agarwal and Agarwal C.M., “Engineering Drawing”, Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
4	Dhananjay A.Jolhe, “Engineering Drawing with an introduction to AutoCAD” Tata McGraw Hill Publishing Company Limited 2008.

CO MAPPING WITH POs AND PSOs

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	2	2	3	-	2	1	-	1	-	3	-	2	2	2	-
CO2	2	2	3	-	2	1	-	1	-	3	-	2	2	2	-
CO3	2	2	3	-	2	1	-	1	-	3	-	2	2	2	-
CO4	2	2	3	-	2	1	-	1	-	3	-	2	2	2	-
CO5	2	2	3	-	2	1	-	1	-	3	-	2	2	2	-

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DEPARTMENT OF HUMANITIES AND SCIENCES

REGULATION 2024 (CBCS)

SEMESTER - I

THEORY

S. No.	Course Code	Course Title	L	T	P	C
01	24HS11002	தமிழர் மரபு / HERITAGE OF TAMILS (Common to all B.E./ B.Tech Programmes)	1	0	0	1

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Regulations 2024

Semester - I
(Common to all B.E./B.Tech. Programmes)

Course Code	Course Name	Periods/Week			Credit	Maximum Marks
		L	T	P	C	
24HS11002	தமிழர் மரபு	1	0	0	1	100

அலகு 1	மொழிமற்றும் இலக்கியம்	3

இந்தியமொழிக் குடும்பங்கள்–திராவிடமொழிகள்–தமிழ்ஒருசெம்மொழி–தமிழ்செவ்வியக்கங்கள்–சங்கஇலக்கியத்தின் சமயச் சார்பற்றதன்மை–சங்கஇலக்கியத்தில் பகிர்தல் அறம் – திருக்குறளில்மேலாண்மைக் கருத்துக்கள்–தமிழ்க் காப்பியங்கள், தமிழகத்தில்சமணபௌத்தசமயங்களின் தாக்கம் –பக்திஇலக்கியம், ஆழ்வார்கள்மற்றும் நாயன்மார்கள்– சிற்றிலங்கியங்கள்–தமிழில்நவீனஇலக்கியத்தின் வளர்ச்சி –தமிழ்இலக்கிய வளர்ச்சியில்பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.

அலகு 2	மரபு–பாறைஓவியங்கள்முதல்நவீனஓவியங்கள்வரை–சிற்பக் கலை	3

நடுகல்முதல்நவீனசிற்பங்கள்வரை–ஐம்பொன் சிலைகள்–பழங்குடியினர் மற்றும் அவர்கள்தயாரிக்கும் கைவினைப் பொருட்கள்,பொம்மைகள்–தேர் செய்யும் கலை–சுடுமண் சிற்பங்கள்–நாட்டுப்புறத் தெய்வங்கள்– குமரிமுனையில்திருவள்ளுவர் சிலை–இசைக் கருவிகள்–மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் – தமிழர்களின் சமூகபொருளாதாரவாழ்வில்கோவில்களின் பங்கு.

அலகு 3	நாட்டுப்புறக் கலைகள்மற்றும் வீரவிளையாட்டுகள்	3

தெருக்கூத்துகரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஒயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

அலகு 4	தமிழர்களின் திணைக் கோட்பாடுகள்	3

தமிழகத்தின் தாவரங்களும் விலங்குகளும் – தொல்காப்பியம் மற்றும் சங்கஇலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள்–தமிழர்கள்போற்றிய அறக்கோட்பாடு–சங்ககாலத்தில்தமிழகத்தில்எழுத்தறிவும் கல்வியும் – சங்ககாலநகரங்களும் துறைமுகங்களும் – சங்ககாலத்தில்ஏற்றுமதிமற்றும் இறக்குமதி– கடல்கடந்தநாடுகளில்சோழர்களின் வெற்றி.

அலகு 5	இந்தியதேசியஇயக்கம் மற்றும் இந்தியபண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு	3

இந்தியவிடுதலைப்போரில்தமிழர்களின் பங்கு–இந்தியாவின் பிறப்பகுதிகளில்தமிழ்ப் பண்பாட்டின் தாக்கம் – சுயமரியாதைஇயக்கம் – இந்தியமருத்துவத்தில்,சித்தமருத்துவத்தின் பங்கு–கல்வெட்டுகள்,கையெழுத்துப்படிகள்– தமிழ்ப் புத்தகங்களின் அச்சுவரலாறு.

TOTAL – 15 PERIODS

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Regulations 2024

Semester - I

(Common to all B.E./B.Tech. Programmes)

Course code	Course Name	Periods/week			Credit	Maximum marks
		L	T	P	C	
24HS11002	HERITAGE OF TAMILS	1	0	0	1	100

UNIT-I	**LANGUAGE AND LITERATURE**	3

Language Families in India - Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan

UNIT-II	**HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE**	3

Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.

UNIT-III	**FOLK AND MARTIAL ARTS**	3

Therukoothu, Karagattam, VilluPattu, KaniyanKoothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.

UNIT-IV	**THINAI CONCEPT OF TAMILS**	3

Flora and Fauna of Tamils &Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas.

UNIT-V	**CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE**	3

Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.

TOTAL HOURS	**15**

	TOTAL – 15 PERIODS
TEXT BOOK ANDREFERENCE BOOKS	
1.	தமிழகவரலாறு–மக்களும் பண்பாடும் – கே.கே. பிள்ளை (வெளியீடுதமிழ்நாடுபாடநூல்மற்றும் கல்வியியல்பணிகள்கழகம்)
2.	கணினித் தமிழ்–முனைவர் இல. சுந்தரம் (விகடன் பிரசுரம்)
3.	கீழடி–வைகைநதிக்கரையில்சங்ககாலநகரநாகரிகம் (தொல்லியல்துறைவெளியீடு)
4.	பொருநை–ஆற்றங்கரைநாகரிகம் (தொல்லியல்துறைவெளியீடு)
5.	Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6.	Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7.	Historical Heritage of the Tamils (Dr.S.V.Subaramanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8.	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9.	Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Publishedby: The Author)
11.	Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Bookand Educational Services Corporation, Tamil Nadu)
12.	Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

I – B.E/B.Tech., DEGREE

ENGINEERING CHEMISTRY

AND

ENVIRONMENTAL SCIENCE AND SUSTAINABILITY

SYLLABUS FOR
CHOICE BASED CREDIT SYSTEM

REGULATION 2024

DEPARTMENT OF CHEMISTRY

MAHENDRA ENGINEERING COLLEGE

(AUTONOMOUS)

MALLASAMUDRAM WEST, TAMIL NADU 637503

MAHENDRA ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF SCIENCE AND HUMANITIES

REGULATION 2024 (CBCS)

CURRICULUM – CHEMISTRY

S. No	Sub. Code	Subject Name	Department	Semester	L-T-P	Credits
THEORY						
1	24CY12001	Engineering Chemistry	For Non – Circuit Streams	I	3-0-0	3
			For Circuit Streams	II	3-0-0	3
2	24CY11001	Environmental Science And Sustainability	For Non – Circuit Streams	III	2-0-0	2
			For Circuit Streams	IV	2-0-0	2
PRACTICAL						
3	24CY22001	Chemistry Laboratory	For Non – Circuit Streams	I	0-0-3	1.5
			For Circuit Streams	II	0-0-3	1.5

1) P.Dhanakodi 12/4/24

2) N.G 12/4/24

MEMBERS

1. Dr.P.Dhanakodi
2 Dr.M.Gunasekaran

SUBJECT EXPERT

Dr.V.Thangaraj M.Sc., Ph.D.
Assistant Professor (Sr.Gr)/Chemistry
Anna University BIT campus
Trichy

12/4/24

CHAIRMAN

Board of Studies-Science & Humanities

Dr.J.Kavitha M.A., M.Phil., Ph.D
HEAD / ENGLISH
MAHENDRA ENGINEERING COLLEGE

MAHENDRA ENGINEERING COLLEGE (Autonomous)-Syllabus						R 2024
DEPARTMENT:	SCIENCE & HUMANITIES			Programme Code & Name		CY&CHEMISTRY
SEMESTER – I (For Non Circuit Branches & ECE) & SEMESTER – II (For Circuit Branches & Except ECE)						
COURSE CODE	COURSE NAME	HOURS/WEEK			CREDIT	MAXIMUM MARKS
		L	T	P	C	
24CY12001	ENGINEERING CHEMISTRY	3	0	0	3	100

Objectives	To make the students familiar with: 1. The treatment of water used for domestic and industrial purpose. 2. Various types of polymers in our day today life. 3. The basic principle and preparation methods of Nanomaterials. 4. The Construction and applications of different types of batteries. 5. The preparation, properties and combustion method of fuels.
Outcomes	At the end of the course the student will be able to 1. Explain the various water quality parameters and their treatments for domestic and industrial applications. 2. Classify the reaction mechanism, synthesis and application of polymers. 3. Develop the essential concepts of nanoscience and nanotechnology in designing the nanomaterial for Engineering. 4. Compare the working principles of batteries and super capacitors. 5. Illustrate the suitable fuels for engineering processes and applications.

UNIT-I	WATER TECHNOLOGY	9 Hrs

Types of water - Alkalinity, types and determination - Hardness, types and Estimation by EDTA method. Domestic water treatment – disinfection methods (Chlorination, ozonation, UV treatment) – Boiler feed water – requirements – Decreased efficiency of using hard water in boilers – external conditioning – demineralization process, Electro dialysis process, reverse osmosis - Internal conditioning (phosphate, calgon and carbonate conditioning methods) – Conservation of Water using 3R method– WHO and BIS guidelines for drinking water.

UNIT-II	POLYMER CHEMISTRY	9 Hrs

Introduction - Classification of polymers – Natural and synthetic - Thermoplastic and Thermosetting - Functionality – Degree of polymerization - Types and mechanism of polymerization: Addition (Free Radical); condensation and copolymerization - Preparation, properties & applications of selected commodity and engineering polymers (Polyester, Polystyrene, PVC, Nylon, Teflon, Bakelite and Epoxy resin).

UNIT-III	NANOCHEMISTRY	9 Hrs

Basic - Distinction between molecules, nanoparticles and bulk materials - size-dependent properties (optical, electrical, mechanical and magnetic) - Types of nanomaterials: Definition, properties and uses of –nanoparticles , nanocluster, nanorod, nanotube and nanowire - Synthesis of nanomaterials: laser ablation, Sol gel, Synthesis of Carbon nano tubes by CVD Method- SWCNT and MWCNT- Applications (Medicine, Agriculture and Electronics).

UNIT-IV	ENERGY STORAGE DEVICE	9 Hrs
Types of batteries - Primary battery - dry cell - Secondary battery - Construction and application of lead acid battery and Lithium ion batteries – Battery used in EV application – Nuclear energy – Fission and Fusion reactions – Light water nuclear reactor for power generation (block diagram only) - Fuel cell (H_2-O_2) - Super Capacitors.		
UNIT-V	**FUELS AND COMBUSTION**	9 Hrs
Introduction - classification of fuels - Coal - analysis of coal (proximate and ultimate) - carbonization - manufacture of metallurgical coke (Otto Hoffmann method) - Petroleum - manufacture of synthetic petrol (Bergius process) - calorific value - higher and lower calorific values- theoretical calculation of calorific value - ignition temperature - spontaneous ignition temperature - flue gas analysis (ORSAT Method).		
	TOTAL	**45 Hrs**

TEXT BOOK :

1.	Jain P.C. and Monica Jain, "Engineering Chemistry", Dhanpat Rai Publishing Company (P) Ltd., New Delhi, 2022.
2.	Kannan P., Ravikrishnan A., "Engineering Chemistry", Sri Krishna Hi-tech Publishing Company Pvt. Ltd. Chennai, 2021.
3.	Dara S.S, Umare S.S, "Engineering Chemistry", S. Chand & Company Ltd., New Delhi 2019.
4.	Lindsay S.M., "Introduction to Nanoscience" Oxford University, 2009.

REFERENCES

1.	Dr.C.K.Charles and Dr.G.Ramachandran, "Applied Chemistry", CARS Publishers,Chennai,2015
2.	Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company, Ltd., New Delhi, 2012.
3.	Linden's "Handbook of Batteries", Thomas B. Reddy, Fourth Edition McGraw-Hill, New York, 2011.
4.	Shikha Agarwal,"Engineering Chemistry-Fundamental and Application",Cambridge University press,Delhi,Second Edition,2019.

S.No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C01	2	-	-	1	-	-	1	-	-	-	-	1	-	-	-
C02	2	-	-	1	-	-	1	-	-	-	-	1	-	-	-
C03	3	-	-	1	-	-	-	-	-	-	-	1	-	-	-
C04	3	-	-	-	-	-	1	-	-	-	-	1	-	-	-
C05	3	1	1	-	-	-	1	-	-	-	-	1	-	-	-
Avg.	**2.6**	**1**	**1**	**1**	-	-	**1**	-	-	-	-	**1**	-	-	-

MEMBERS
1. Dr.P.Dhanakodi
2 Dr.M.Gunasekaran

SUBJECT EXPERT
Dr.V.Thangaraj M.Sc., Ph.D.
Assistant Professor (Sr.Gr)/Chemistry
Anna University BIT campus
Trichy

MAHENDRA ENGINEERING COLLEGE (Autonomous)-Syllabus						R 2024
DEPARTMENT:	SCIENCE & HUMANITIES		Programme Code & Name			CY & CHEMISTRY
SEMESTER – I (For Non Circuit Branches & ECE) & SEMESTER – II (For Circuit Branches (Except ECE))						
COURSE CODE	COURSE NAME	HOURS/WEEK			CREDIT	MAXIMUM MARKS
24CY22001	CHEMISTRY LABORATORY (Any eight experiments to be conducted)	L	T	P	C	100
		0	0	3	1.5	
Objectives	▪ To inculcate experimental skills to test basic understanding of water quality parameters, such as, alkalinity, hardness, DO and chloride. ▪ To induce the students to familiarize with electro analytical techniques such as, pH metry, potentiometry and conductometry in the determination of impurities in aqueous solutions. ▪ To design and plan the experimental procedure and to record and process the results.					
Outcomes	On completion of this course, students will have the knowledge in ▪ Explain the essential principles and their analysis of water quality parameters, like hardness, alkalinity, DO, and chloride. ▪ Experiment with different types of instruments for analysis of materials using small quantities involved for quick and accurate results. ▪ Analyze the normality of different types of materials such as PVA and Ferrous ion.					
1.	Determination of Total, Temporary & Permanent hardness of water using EDTA method.					
2.	Determination of the Alkalinity level of a water sample.					
3.	Determination of Chloride content of water sample by Argentometry.					
4.	Determination of DO content of water sample using Winkler's method.					
5.	Determination of molecular weight of polyvinyl alcohol using Viscometry.					
6.	Estimation of Iron content of the given solution using Potentiometry.					
7.	Determination of strength of given hydrochloric acid using pH meter.					
8.	Conductometric titration of strong acid vs strong base.					
9.	Determination of strength of acids in a mixture using Conductometry.					
10.	Estimation of sulphate in a solution using Conductometry (precipitation).					
TEXT BOOK						
1.	Chemistry lab Manual, Department of Chemistry, Mahendra Engineering College, Mallasamudram, 2022.					
2.	Chemistry lab Manual, Department of Chemistry, Mahendra Engineering College, Mallasamudram, 2020.					
REFERENCES						
1.	Applied chemistry theory and practice by O. P. Vermani and A. K. Narula, second edition.					
2.	J. Mendham, R. C. Denney, J.D. Barnes, M. Thomas and B. Sivasankar, Vogel's Textbook of Quantitative Chemical Analysis (2009).					
3.	Kolthoff I.M. and Sandell E.B. et al. Quantitative chemical analysis, Mcmillan, Madras 1980					

S.No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C01	2	-	-	-	-	-	-	1	2	-	-	-	-	-	-
C02	3	-	-	2	-	-	-	1	2	-	-	-	-	-	-
C03	2	3	-	2	-	-	-	1	2	-	-	-	-	-	-
Avg.	2.3	3	-	2	-	-	-	1	2	-	-	-	-	-	-

1) P 12/4/24

2) H. G 12/4/24

MEMBERS

1. Dr.P.Dhanakodi
2 Dr.M.Gunasekaran

SUBJECT EXPERT

Dr.V.Thangaraj M.Sc., Ph.D.
Assistant Professor (Sr.Gr)/Chemistry
Anna University BIT campus
Trichy

MAHENDRA ENGINEERING COLLEGE (Autonomous)-Syllabus						R 2024
DEPARTMENT:	**SCIENCE & HUMANITIES**	Programme Code & Name				**CY& CHEMISTRY**
SEMESTER-III (For Non Circuit Branches) & SEMESTER- IV (For Circuit Branches)						
COURSE CODE	**COURSE NAME**	HOURS/WEEK			CREDIT	**MAXIMUM MARKS**
		L	T	P	C	
24CY11001	**ENVIRONMENTAL SCIENCE AND SUSTAINABILITY**	2	0	0	2	**100**

Objectives	To make the students familiar with : 1. The importance of Environment, Ecosystem and Biodiversity. 2. The causes, effects and prevention measures of environmental pollution. 3. The social issues of the environment and National laws for environment protection. 4. The green environment and associated issues. 5. The concept of sustainable development goals and appreciate the interdependence of economic and social aspects of sustainability, recognize and analyze.
Outcomes	At the end of the course the student will be able to 1. Explain the importance of Environment, Ecosystem and various types of Biodiversity. 2. Identify the different types of Pollution and be familiar with control measures. 3. List out the environmental issues and essential legislation on environmental laws. 4. Develop the concept of green synthesis method in environment and related problems. 5. Recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.

UNIT-I	**ENVIRONMENT, ECOSYSTEM & BIODIVERSITY**	12 Hrs

Definition, Scope and Importance of Environment – Need for public awareness – Ecosystem: concept of an ecosystem – structure and function of an ecosystem – energy flow in the ecosystem – Biodiversity: Introduction – definition - genetic, species and ecosystem diversity – value of biodiversity – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity – Field visit to local area.

UNIT-II	**ENVIRONMENTAL POLLUTION & DISASTER MANAGEMENT**	9 Hrs

Definition – causes, effects and control measures of: (a) Air, (b) Water, (c) Soil, (d) Noise, (e) Thermal pollution– solid waste management: causes, effects and control methods of municipal solid wastes – disaster management: floods, earthquake and landslides– E-waste and plastic waste: recycling and reuse - role of an individual in prevention of pollution – pollution case studies (vizag gas leakage) – Field visit to local polluted area.

UNIT-III	**SOCIAL ISSUES & ENVIRONMENTAL IMPACT ASSESMENT**	9 Hrs

Social issues – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies (Global warming). – EPA: Environment protection act - EIA: EIA structure- methods of baseline data acquisition. Planning and management of impact studies - operational aspects of EIA - methods for impact identification- Role of NGOs in creating awareness among people regarding environmental issues.

UNIT-IV	GREEN ENVIRONMENTAL ISSUES	9 Hrs
Introduction – Clean development mechanism – carbon emission-carbon foot printing - carbon credits - carbon sequestration and Polluter pay principle – Sustainable green building practices – Carbon Neutrality in India - Geneva Conventions and their Additional Protocols.		
UNIT-V	**SUSTAINABILITY AND MANAGEMENT**	6 Hrs
Development , GDP ,Sustainability- concept, needs and challenges - economic, social and aspects of sustainability - from unsustainability to sustainability - millennium development goals, and protocols- Sustainable Development Goals - targets, indicators and intervention areas.		
	TOTAL	**45 Hrs**

TEXT BOOKS :

1.	Rajagopalan, R, "Environmental Studies-From Crisis to Cure", Oxford University Press (2015)
2.	Benny Joseph, "Environmental Science and Engineering", Tata McGraw-Hill, New Delhi, 2017.
3.	Dr.A.Ravikrishnan, "Environmental Science and Engineering" , Sri Krishna Hi-tech Publishing Company Pvt. Ltd. Chennai, 2014.
4.	Allen, D. T. and Shonnard, D. R., Sustainability Engineering: Concepts, Design and Case Studies, Prentice Hall.

REFERENCES

1.	R.K. Trivedi, "Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards", Vol. I and II, Enviro Media.
2.	Gilbert M.Masters, "Introduction to Environmental Engineering and Science", 3rd Edition, Pearson Education, 2023.
3.	Dharmendra S. Sengar, "Environmental law", Prentice hall of India PVT LTD, New Delhi, 2007.

S.No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C01	2	-	-	-	-	1	2	2	-	-	-	1	-	-	-
C02	2	-	-	-	-	1	2	-	-	-	-	1	-	-	-
C03	3	-	-	-	-	2	3	-	-	-	-	1	-	-	-
C04	3	-	-	-	-	2	3	-	-	-	-	1	-	-	-
C05	3	-	-	-	-	2	3	-	-	-	-	1	-	-	-
Avg.	2.6	-	-	-	-	1.6	2.6	2	-	-	-	1	-	-	-

1) P Dhana 12/4/24

2) M.G 12/04/24

MEMBERS
1. Dr.P.Dhanakodi
2 Dr.M.Gunasekaran

SUBJECT EXPERT
Dr.V.Thangaraj M.Sc., Ph.D.
Assistant Professor (Sr.Gr)/Chemistry
Anna University BIT campus
Trichy

MAHENDRA ENGINEERING COLLEGE
Autonomous | Accredited by NAAC with 'A++' Grade (Cycle-2)
Accredited by NBA Tier-I (WA) UG : CSE, ECE, EEE
Mahendhirapuri, Mallasamudram (W), Namakkal (Dt) - 637 503, Tamil Nadu
04288-288 500 / 521 / 522 | www.mahendra.info

DEPARTMENT OF ENGLISH

REGULATION 2024 (CBCS)

SEMESTER - I & II

PRACTICAL

S. No.	Course Code	Course Title	L	T	P	C
01	24HS21001	**PERSONALITY DEVELOPMENT PRACTICE** (Common to all B.E ./ B.Tech. Programmes) SEMESTER- I (FOR NON - CIRCUIT BRANCHES) SEMESTER- II (FOR CIRCUIT BRANCHES)	0	0	2	1

MAHENDRA ENGINEERING COLLEGE

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04288-288 500 / 521 / 522 | www.mahendra.info

Syllabus - Regulation 2024

Department	**English**

Semester I – Non-Circuit Branches
Semester II – Circuit Branches
(Common to all B.E./ B.Tech. Programmes)

Course code	**Course Name**	**Hours/week**			**Credit**	**Maximum marks**
		L	**T**	**P**	**C**	
24HS21001	**Personality Development Practice**	0	0	2	1	**100**

Objectives	• To develop listening and speaking skills of students for a variety of purposes like making presentations, attending interviews and participating in discussions • To enhance the non-verbal and social interaction skills of students for becoming effective communicators • To enable learners to hone their linguistic (LSRW) skills with the help of Technology
Outcomes	**At the end of the course, the students will be able to** • Understand the language proficiency and its techniques • Prepare the resume with organized details • Develop soft skills to excel in their career

LIST OF EXERCISES

1.	Importance of Communication Skills
2.	Building Vocabulary (Basic level)
3.	Stage Dynamics (Group PPT Presentation)
4.	Predicting the Content of a Given Article (Newspaper, Magazine, etc.,)
5.	Common Errors in English
6.	Interview Skills
7.	Presentation skills
8.	Group Discussion
9.	Soft Skills (Self-Confidence, Team Work, Time Management, Adaptability, Openness to Criticism)
10.	Creative Writing – Any Essay type (Descriptive, Narrative etc.)

Total Hrs : 15

REFERENCE BOOKS:

1. Joshi, Manmohan, ***Soft Skills***, 1st Edition. Bookboon, 2017
2. Raman, Meenakshi & Sangeeta Sharma. ***Technical Communication: Principles and Practice***, Ed.III, Oxford University Press, New Delhi. 2015

Online Websites:

https:// www.ted.com/talks
https://quizziz.com
www.pdfdrive.com
https://www.calameo.com/read/00072308558ed20d410e7/

Activity:
Worksheets for relevant topics

MAHENDRA ENGINEERING COLLEGE
(Autonomous)

Syllabus

Department	**Mechanical Engineering**	**Programme Code**	**1081**

I Semester

Course code	**Course Name**	**Hours/week**			**Credit**	**Maximum marks**
		L	T	P	C	
24GE23101	**COMPUTER AIDED DESIGN AND DRAFTING LABORATORY**	0	0	3	1.5	**100**

Objective(s)	• Develop skill to use software to create 2D and 3D models. • Understanding the basic principles in drafting techniques • To get the knowledge and practicing the advanced drafting software.

LIST OF EXPERIMENTS

1. INTRODUCTION to CAD
2. AutoCAD – Basics
   - Starting with AutoCAD
   - Layout and sketching
   - Drawing environment
   - Elements of drawing
   - Draw commands
   - 3D Functions
3. 2D – FIGURES for practice using Design Software
4. ISOMETRIC DRAWING for practice using Design Software
5. 3-D Solid Figures Using Design Software
   - Learning Different Operations like Threading, Sweep, Swept blend. Modeling

LIST OF EQUIPMENTS (for a batch of 30 students)

1. Better hardware, with suitable graphics facility - 30 No.
2. Licensed software for Drafting and Modeling. - 30 Licenses
3. Laser Printer or Plotter to print / plot drawings - 1 No

TOTAL HOURS: 45

Outcome(s)	• Ability to use the software packers for drafting and modeling • Ability to create 2D and 3D models of Engineering Components • Ability to understand the dimensioning and different fits and tolerance techniques.

COs Vs POs and PSOs Mapping

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	2	-	-	-	-	-	-	2	-	-	-	-	2	-	-
CO2	3	-	-	-	-	-	-	2	-	-	-	-	2	1	-
CO3	2	-	-	-	-	-	-	2	-	-	-	-	2	-	-

I – B.E / B.TECH. DEGREE

ENGINEERING MATHEMATICS - II

SYLLABUS FOR

CHOICE BASED CREDIT SYSTEM

(2024 – 2026)

DEPARTMENT OF MATHEMATICS

MAHENDRAENGINEERINGCOLLEGE

(AUTONOMOUS)

MALLASAMUDRAM WEST, TAMIL NADU 637503

MAHENDRA ENGINEERING COLLEGE
(AUTONOMOUS)

MALLASAMUDRAM WEST, NAMAKKAL - 637503

DEPARTMENT OF MATHEMATICS

Department : Common to all Branches

Programme : B.E. / B.Tech.(Regular)

SEMESTER – II

COURSE CODE	COURSE NAME	HOURS/WEEK			CREDIT	MAXIMUM MARKS
		L	T	P	C	
24MA12201	ENGINEERING MATHEMATICS - II (Common to all Branches)	3	1	0	4	100

MAHENDRA ENGINEERING COLLEGE(Autonomous)							
Syllabus						Regulations 2024	
Department	MATHEMATICS		Programme Code				
SEMESTER – II							
Course code	Course Name	Hours/week				Credit	Maximum marks
		L	T	P		C	
24MA12201	ENGINEERING MATHEMATICS - II (Common to all Branches)	3	1	0		4	100

Objectives	To enable the students to: • Define vector function, operators and working procedure to evaluate line, surface and volume integrals. • Explain different types of higher order ordinary differential equations with variable coefficients and various methods to solve the equations. • Learn Laplace transform, inverse Laplace transform and its properties to solve differential equations. • Know about functions of complex variables, properties and problems involving conformal mapping. • Learn about Taylor's and Laurent's series expansion of complex functions and the process of evaluating complex integrals.
Outcomes	At the end of the course the students will be able to • Solve problems related to vector differentiation, line, surface and volume integrals and theorems involving them. • Solve higher order differential equations with variable coefficients. • Describe Laplace transform and its properties inverse Laplace transform and the solution of linear differential equation using Laplace transform techniques. • Solve Analytic functions, harmonic functions, conformal mapping and its applications. • Expand the functions as Taylor's and Laurent's series and evaluate the complex integrals.

UNIT-I	**VECTOR CALCULUS**	**9+3**

Gradient Divergence and Curl – Directional derivative – Irrotational and solenoidal vector fields – Vector integration – Green's theorem in a plane, Gauss divergence theorem and Stokes' theorem (excluding proofs).Verification and application in evaluating line, surface and volume integrals.

UNIT -II	**ORDINARY DIFFERENTIAL EQUATIONS OF HIGHER ORDERS**	**9+3**

Second and Higher order linear differential equations with constant coefficients– Method of variation of parameters – Cauchy Euler equation, Legendre's type differential equations – System of simultaneous linear differential equations with constant coefficients.

UNIT-III	**LAPLACE TRANSFORM**	**9+3**

Transform, Properties of Laplace Transform, Laplace transform of periodic functions. Finding inverse Laplace transform by different methods, convolution theorem, solving Initial value problems by Laplace Transform method.

UNIT-IV	ANALYTIC FUNCTIONS	9+3
Functions of a complex variable, Cauchy-Riemann equations – Analytic functions – Harmonic and orthogonal properties of analytic function – Harmonic conjugate – Construction of analytic functions – Conformal mapping: w= z+c, cz, 1/z, and Bilinear transformation.		
UNIT -V	**COMPLEX INTEGRATION**	**9+3**
Complex integration – Statement and applications of Cauchy's integral theorem and Cauchy's integral formula(without proof) – Taylor and Laurent expansions –Types of Singularities-Singular points – Residues – Residue theorem(without proof) – Application of residue theorem to evaluate real integrals – Contour integration.		
	Total	**(L:45+T:15): 60 Periods**

TEXT BOOK :	
1	B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 2017.
2	Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 2018.
REFERENCES:	
1	Michael D. Greenberg, Advanced Engineering Mathematics, Pearson 2013.
2	Lokenath Debnath and Dambaru Bhatta,"Integral Transforms and Their Applications, CRC Press 2015.
3	Dennis G. Zill and Warren S. Wright "Advanced Engineering Mathematics", Jones and Bartlett 2014.

MAHENDRA ENGINEERING COLLEGE (Autonomous)-Syllabus			R 2024
DEPARTMENT:	SCIENCE & HUMANITIES	Programme Code & Name	ENGINEERING PHYSICS

SEMESTER-I&II

COURSE CODE	COURSE NAME	HOURS/WEEK			CREDIT	MAXIMUM MARKS
		L	T	P	C	
24PY12001	ENGINEERING PHYSICS (FOR ALL BRANCHES)	3	0	0	3	100

Objective(s)

- To provide fundamental knowledge about lasers, Ultrasonic's, Properties of Matter, Quantum Physics and different kinds of Engineering Materials.
- To correlate the principles with application oriented Engineering studies.

Out come(s)

After completing the course the students

- Understand the basics of Laser, Fiber Optics and its types with its applications in various fields.
- Gain knowledge about Ultrasonic's their applications in various engineering fields.
- Have the necessary understanding on Properties of materials and their uses.
- Get Knowledge on basics concepts of Quantum Physics with their Applications.
- Understand the properties of SMA, metallic glasses, bio materials and their applications.

UNIT I	LASER AND FIBER OPTICS	9 (Hrs)

Introduction – Principle of spontaneous emission, stimulated absorption and emission – Einstein's coefficient (derivation) – Types of lasers - CO_2, Nd: YAG – Fiber optics: principle, numerical aperture and acceptance angle - types of optical fibers (material, refractive index and mode) – losses associated with optical fibers - fiber optic sensors: pressure and displacement.

UNIT II	ULTRASONICS	(9 Hrs)

Introduction – Production – magnetostriction effect - magnetostriction generator – piezoelectric and inverse piezoelectric effect- piezoelectric generator – properties – Cavitations - Velocity measurement – acoustic grating – SONAR - Non Destructive Testing – pulse echo system through transmission and reflection modes - A,B and C –scan displays-Industrial Applications and medical applications-medical endoscope.

UNIT-III	PROPERTIES OF MATTER	(9 Hrs)

Elasticity – Stress-strain diagram and its uses - factors affecting elastic modulus and tensile strength – torsional stress and deformations – twisting couple - torsion pendulum: theory and experiment - bending of beams - bending moment – cantilever: theory and experiment – uniform and non-uniform bending: theory and experiment - I-shaped girders - stress due to bending in beams.

UNIT-IV	QUANTUM PHYSICS	(9 Hrs)
Black body radiation – Planck's theory (derivation) –wave particle duality – electron diffraction – concept of wave function and its physical significance – Schrödinger's wave equation – time independent and time dependent equations – particle in a one-dimensional rigid box– scanning tunneling microscope- electron tunneling microscope.		

UNIT-V	ADVANCED ENGINEERING MATERIALS	(9 Hrs)
Smart materials: Shape-memory alloys: Martensite, Austenite, Two way shape memory, characteristics and applications –Metallic glasses – Origin – Preparation – Structure, mechanical and electrical properties. **Biomaterials:** First, second and third generation biomaterials – Classification – Metals and alloys – Polymers – Hydrogels – Applications in medicine: Skin and Blood interfacing implants.		

Total hours to be taught	(45 Hrs)

Text book :	
1.	Dr. G. Senthil kumar - Engineering Physics-VRB Publication & Co, Chennai- Latest edition 2022.
2.	Dr. P.K. Palanisamy , "Engineering Physics", Sci tech Publications, Chennai, 2022.
3.	Biomaterial Science and Engineering- JB Park- Plenum Press, NewYork(2014).
4.	M N Avadhanulu, A Textbook of Engineering Physics (2008), S. Chand Publishing, New Delhi.
5.	Bhattacharya, D.K. & Poonam, T. —Engineering Physics. Oxford University Press, 2015.
REFERENCES:	
1.	Pillai S O, "Engineering Physics" (2014), New Age International Publishers, New Delhi.
2.	Karl F Renk, Basics of Laser Physics (2017)-Springer International Publishing, Switzerland.
3.	Introduction to Quantum Mechanics- J Griffiths-2nd edition(2016).
4.	Halliday.D, Resnick.R. & Walker.J, Principles of Physics (2020), Wiley.
5.	Serway, R.A. & Jewett, J.W. —Physics for Scientists and Engineers. Cengage Learning, 2010.
6.	William T. Silfvast, Laser Fundamentals (2014), Cambridge University Press.

Dr. T. Shanmugavel
HOD/Physics

Subject Expert: **Dr. A. CHANDRABOSE**
Professor
National Institute of Technology, Trichy.

MAHENDRA ENGINEERING COLLEGE
(Autonomous)

Syllabus

Department	Computer Science and Engineering	Programme Code	1041

I Semester

Course code	Course Name	Hours/week			Credit	Maximum marks
		L	T	P	C	
24CS13001	PROBLEM SOLVING TECHNIQUES USING C	3	0	0	3	100

Objective(s)	The student should be made to: ● Understand the basics of computer and algorithm ● Learn the basic concepts of C Programming. ● Know the arrays and functions in C ● Be familiar with pointers and structures in C ● Learn the file handling techniques and preprocessors in C
Outcome(s)	Upon completion of this course , students will be able to ● Illustrate algorithms for real time problems through various problem solving techniques ● Explain the syntax of C Programming ● Summarize the concept of arrays and functions in C ● Apply the concepts of pointers and structure ● Develop the concepts of files and preprocessors in C

UNIT-I	**PROBLEM SOLVING ASPECTS**	**9**
Computers: Hardware – Software – Processor – Memory – I/O devices – Interface – Programming Languages Problem Solving Aspects: Algorithms Pseudo code, Flowchart-Steps in Problem Solving – simple strategies for developing algorithms (iteration, recursion) – Steps for Creating and Running programs -Illustrative problems: Exchanging The Values – Find minimum in a list - Factorial Computation - Fibonacci Sequence		
UNIT-II	**C PROGRAMMING BASICS**	**9**
Introduction to C programming – Header files – Structure of a C program – compilation and linking processes – Constants, Variables – Data Types – Expressions-, Expression Evaluation, Type conversion Statements – operators – Input and Output operations – Decision Making and Branching – Looping statements- Programming Examples		
UNIT-III	**ARRAYS AND FUNCTION**	**9**
Arrays: Introduction – One-Dimensional Arrays – Two and multi-Dimensional Arrays - Strings: Operations of Strings. Function – definition of function – Declaration of function – Function prototype – Types of functions- user defined functions – Pass by value – Pass by reference – Recursion - Programming Examples		
UNIT-IV	**POINTERS AND STRUCTURES**	**9**

Pointers - Definition – Initialization - Pointer variables, Pointer arithmetic, Pointers to Pointers, Pointers with Arrays, Pointers with Functions- Introduction to Structure – structure definition – Structure declaration – Structure within a structure-Structures fusion with Arrays- Unions – Storage classes

UNIT-V	**FILE PROCESSING**	**9**
Files: File modes – File functions – Types of file processing: Sequential access, Random access – Text and binary files - Command line arguments – C Preprocessor directives: Macros – Definition – Types of Macros - Creating and implementing user defined header files		
	Total hours	**45**

TEXT BOOK :	
1	Anita Goeland Ajay Mittal, “Computer Fundamentals and Programming in C”, Dorling Kindersley (India)Pvt. Ltd. Pearson Education, 2016.
REFERENCES:	
1	Dromey R.G, “How to Solve it by Computer” Prentice Hall of India, Delhi., 2010.
2	E Balagurusamy, “Computer Programming”, First Edition, Tata McGraw Hill Education (India) Private Ltd, New Delhi., 2013.
3	Pradip Dey, Manas Ghosh, “ Computer Fundamentals and Programming in C”, 2nd Edition, Oxford University Press.,2013.
4	M.Rajaram and P.Uma Maheshwari “ Computer Programming with C”, Pearson Education., 2013.
5	NPTEL course, Problem Solving Through Programming in C, https://nptel.ac.in/courses/106105171
6	NPTEL course, Introduction to Programming in C, https://nptel.ac.in/courses/106104128

MAHENDRA ENGINEERING COLLEGE

(Autonomous)

Syllabus

Department	**Computer Science and Engineering**	**Programme Code**	**1041**

I Semester

Course Code	**Course Name**	**Hours/Week**			**Credit**	**Maximum marks**
		L	**T**	**P**	**C**	
24CS23001	**PROBLEM SOLVING TECHNIQUES USING C LAB (Common to All Branches)**	**0**	**0**	**3**	**1.5**	**100**

Objective(s)	The student should be made to: ● Understand developing applications using Office package. ● Formulate problems and implement algorithms using Scratch and Raptor tool ● Make use of arrays and functions in C. ● Learn how to use pointer concepts. ● Know the concepts of structures, unions and files
Outcome(s)	Upon completion of this course , students will be able to ● Demonstrate the applications of Office Packages ● Solve the real world problems using Scratch and Raptor Tool ● Develop programs using arrays and functions in C. ● Illustrate the working of pointers in C ● Develop the concepts using structures, unions and files in C

LIST OF EXPERIMENTS

1	Prepare A bio-data Using MS Word With Appropriate Page ,Text And Table Formatting Options And Send The Same To Recipients Using Mail Merge
2	Create budget planning of your family with cell referencing, formulae, conditional formatting using Excel
3	Create a Program flow to illustrate the use of Variables and Constants using Scratch Tool
4	Construct flowchart to find the Factorial for a given number Using Raptor
5	Students mark generation using decision statements
6	Calculator using switch statement

7	Prime number generation and to check whether the given number is armstrong or not using looping	
8	Greatest number using array (one dimensional)	
9	Matrix multiplication using array (two dimensional)	
10	Check the given string is palindrome or not.	
11	Write a C Program to swap two numbers using two functions one using pointer and other one without using pointer	
12	Factorial calculation and Fibonacci series using function	
13	Student mark sheet using structures	
14	Copy text from one file to other File	
	Total hours	**30**

MAHENDRA ENGINEERING COLLEGE
(Autonomous)

Regulations 2024

Department	**Electrical and Electronics Engineering**	**Programme Code**	**1051**

I Semester

Course Code	**Course name**	**Hours/week**			**Credit**	**Maximum Marks**
		L	**T**	**P**	**C**	
24EE13001	**BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING**	**3**	**0**	**0**	**3**	**100**

Objective(s)	• To study the basic concepts of electrical circuits and measuring instruments • To understand the operation of magnetic circuits and electrical machines • To study the concepts of semiconductor devices • To acquire knowledge on the concepts of integrated circuits • To impart knowledge on the basic concepts of communication systems
Outcome(s)	At the end of the course, students will be able to: 1. Summarize the concepts of electrical circuits and measuring instruments 2. Illustrate the constructional features and working principle of Electrical machines 3. Explain the operation of semiconductor devices 4. Interpret the concepts of integrated circuits 5. Discuss the basic concepts of Communications systems

UNIT I	**ELECTRICAL CIRCUITS AND MEASUREMENTS**	**(9)**

-Ohm's Law – Kirchhoff's Law- Voltage and Current Sources - Basics of Resistance, Inductance, and Capacitance- Series and Parallel circuits- Average value and RMS value – Power and Power Factor- Classification of Instruments – Moving coil and Moving Iron Instruments – Energy Meter-Residential wiring - Earthing.

UNIT II	**ELECTRICAL MACHINES**	**(9)**

Introduction to Magnetic circuits, Faraday's law, Lenz's Law, Fleming's Left-Hand and Right-Hand Rule- Construction and Working Principle: DC Machines -Single phase Transformer – Three phase Squirrel Cage Induction motor- Single phase Induction motor (Qualitative treatment only).

UNIT III	**SEMICONDUCTOR DEVICES**	**(9)**

PN Junction Diode –Characteristics – Half wave and Full wave Rectifiers –Zener diode- Characteristics- Voltage Regulator-Bipolar Junction Transistor, FET, JFET-Characteristics.

UNIT IV	**DIGITAL ICs and MICROCONTROLLER**	**(9)**

Boolean Algebra - Logic gates - Demorgan's Theorem - Combinational circuits: Adder, Subtractor, Multiplexer, Demultiplexer - Pin Details and Architecture of Microprocessor (8086) and Microcontroller (8051).

UNIT V	**COMMUNICATION SYSTEMS**	**(9)**

Types of Signals: Analog and Digital Signals – Modulation and Demodulation: Principles of Amplitude and Frequency Modulations (Qualitative Treatment). Communication Systems: TV, Modem, Microwave, Satellite and Mobile communication (Block Diagram Approach only)

	Total	**45 Hours**

TEXT BOOKS

1.	V.K Mehta and Rohit Mehta, "Principle of Electrical Engineering and Electronics" S Chand & Company, Third Edition, 2016.
2.	S. Salivahanan, N. Suresh kumar and A. Vallavanraj, "Electronic Devices and Circuits", Tata McGraw Hill, Second Edition, 2011.
3.	Edward Hughes, "Hughes Electrical and Electronic Technology", Pearson Education, tenth Edition 2008.
4.	David A. Bell, "Electronic Devices and Circuits", Oxford University Press, Fifth Edition, 2008.

REFERENCES

1.	Robert T. Paynter, "Introducing Electronics Devices and Circuits", Pearson Education, Seventh Education, 2006.
2.	William H. Hayt, J.V. Jack, E. Kemmebly and steven M. Durbin, "Engineering Circuit Analysis", Tata McGraw Hill, Sixth, Edition, 2002.
3.	J. Millman &Halkins, Satyebranta Jit, "Electronic Devices & Circuits", Tata McGraw Hill, Second Edition, 2008.
4.	**NPTEL :** **Prof. L. Umanand, Basic Electrical Technology, IISc Bangalore** https://nptel.ac.in/courses/108108076 **Prof. M.B. Patil Basic Electronics IIT Bombay** https://onlinecourses.nptel.ac.in/noc21_ee55/preview

COURSE ARTICULATION MATRIX:

POs / COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	1	-	-	-	1	-	1	1	-	-
CO2	3	-	-	-	-	1	-	-	-	1	-	1	1	-	-
CO3	2	-	-	-	-	1	-	-	-	1	-	1	1	-	-
CO4	3	-	-	-	-	1	-	-	-	1	-	1	1	-	-
CO5	2	-	-	-	-	1	-	-	-	1	-	1	1	-	-
CO	**2.4**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**1**	**-**	**1**	**1**	**-**	**-**

Correlation levels:1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

MAHENDRA ENGINEERING COLLEGE (Autonomous)						
Regulations 2024						
Department	**Electrical and Electronics Engineering**				**Programme Code**	**1051**
I Semester						
COURSE CODE	**COURSE NAME**	**Hours/week**			**Credit**	**Maximum Marks**
		L	**T**	**P**	**C**	
24GE23001	**ENGINEERING PRACTICES LABORATORY**	**0**	**0**	**3**	**1.5**	**100**
Objectives	• To learn the concepts of electrical wiring and power measurements. • To study the concepts of electronic devices					
Outcomes	At the end of the course, students will be able to: 1. Demonstrate the domestic wiring and power measurements. 2. Demonstrate the operation of Electric Circuits and PN Junction Diode					

LIST OF EXPERIMENTS	
1	Residential House Wiring using Switches, Fuse, Indicator, Lamp and Energy meter
2	Two way, CFL and LED Lamp Wiring
3	Measurement of Voltage, Current and Power
4	Measurement of Energy using Single Phase Energy Meter
5	Soldering Practice –Assembly of Electronic Components
6	Verification of Logic Gates
7	V-I Characteristics of PN Junction and Zener Diode
8	Half Wave and Full Wave Rectifiers
Total	**45 Hours**

COURSE ARTICULATION MATRIX:

POs / COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	1	-	-	-	1	1	-	1	-	-	-
CO2	3	-	-	-	1	-	-	-	1	1	-	1	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO	**3**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**1**	**1**	**-**	**1**	**-**	**-**	**-**
Correlation levels:1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)															

MAHENDRA ENGINEERING COLLEGE
(Autonomous)

Syllabus

Department	Mechanical Engineering	Programme Code	1081

II Semester

Course code	Course Name	Hours/week			Credit	Maximum marks
		L	T	P	C	
22GE13201	Engineering Mechanics (Common to Non Circuit Branches)	3	0	0	3	100

Objective(s)

- To understand the basic concepts required for analyzing static structures model problems using free-body diagrams and accurate equilibrium equations.
- To calculate the reactive forces on the structural members.
- To know the geometric properties of the different cross sections on the structural members.
- To get the exposure on laws of mechanics, work energy and momentum methods for finding the motion parameters.

UNIT-I	Statics of Particle	9

Introduction to Mechanics – Fundamental Principles – Laws of Mechanics, Lame's theorem, Parallelogram and triangular Law of forces- Vectorial representation of forces and moments, Coplanar forces– Resolution and Composition of forces – Equilibrium of particles - Forces in space - Equilibrium of a particle in space - Equivalent systems of forces - Principle of transmissibility - Single equivalent force.

UNIT-II	Statics of Rigid Body	9

Free body diagram – Types of supports and their reactions-requirements of stable equilibrium – Moments and Couples – Moment of a force about a point and about an axis– Vectorial representation of moments and couples – Scalar components of a moment – Varignon's theorem – Single equivalent force -Equilibrium of Rigid bodies in two dimensions.

UNIT-III	Properties of Sections	9

Centroid – Rectangular, circular, triangular areas by integration – T section, I section, - Angle section, Hollow section by using standard formula – Theorems of Pappus and Guldinus – Second moment of area — Rectangular, circular, triangular areas by integration – T section, I section, Angle section, Hollow section by using standard formula –Parallel axis theorem and perpendicular axis theorem – Product of inertia of plane areas – Polar moment of inertia – Principal axes.

UNIT-IV	Dynamics of Particles	9

Displacements, Velocity and acceleration, their relationship – Relative motion – Curvilinear motion – Newton's law – Work Energy Equation of particles – Impulse and Momentum – Impact of elastic bodies- Impact - direct and central impact – coefficient of restitution. D'Alembert's principle.

UNIT-V	Friction	9

Friction force – Laws of sliding friction – equilibrium analysis of simple systems with sliding friction –wedge friction - Rolling resistance. Applications of screw jacks and belts.

	Total hours	45

Outcome(s)

At the end of this course, Student will be able to

- Analysis the engineering problems in case of equilibrium conditions.
- Calculate the reaction forces of various supports on the structural members.
- Evaluate various geometrical properties like centroid, centre of gravity, Moment of Inertia of various surfaces and solids.
- Solve the problems involving dynamics of particles and rigid bodies.
- Realize about the friction using simple mechanisms.

TEXT BOOK :	
1	R.C. Hibbeller, "Engineering Mechanics – Statics and Dynamics", 11th ed., Pearson Education Asia Pvt. Ltd., 2009.
2	Ferdinand P. Beer, E. Russell Johnston, Vector Mechanics for Engineers: Statics and Dynamics (9th Edition), Tata McGraw-Hill International Edition, 2010.
3	Dr.N.Koteeswaran, "Engineering Mechanics Statics and Dynamics", Sri Balaji Publications 9th Rv.Ed., S.Chand & Co Ltd, 2013.
4	Vela Murali, "Engineering Mechanics", Oxford University Press 2010.
REFERENCES:	
1	M.S. Palanichamy and S. Nagam, "Engineering Mechanics – Statics & Dynamics", 3rd ed., Tata McGraw-Hill, 2004.
2	S. Rajasekaran, G. Sankarasubramanian, "Fundamentals of Engineering Mechanics", 3rd ed., Vikas Publishing House Pvt. Ltd, 2009.
3	Kumar, K.L., "Engineering Mechanics", 3rd Revised Edition, Tata McGraw-Hill Publishing company, New Delhi 2008.
4	Irving H. Shames, "Engineering Mechanics – Statics and Dynamics", 4th ed., – Pearson Education Asia Pvt. Ltd., 2005.

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DEPARTMENT OF HUMANITIES AND SCIENCES

REGULATION 2024 (CBCS)

SEMESTER - II

THEORY

S. No.	Course Code	Course Title	L	T	P	C
01	24HS11003	தமிழரும் தொழில்நுட்பமும் / TAMILS AND TECHNOLOGY (Common to all B.E./ B.Tech Programmes)	1	0	0	1

Dr. J. KAVITHA, M.A., M.Phil., Ph.D.,
Professor and Head,
Department of English,
Mahendra Engineering College
(Autonomous),
NAMAKKAL - 637 503.

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Regulations 2024

Semester - II
(Common to all B.E./B.Tech. Programmes)

Course Code	Course Name	Periods/Week			Credit	Maximum Marks
		L	T	P	C	
24HS11003	தமிழரும் தொழில்நுட்பமும்	1	0	0	1	100

அலகு 1	நெசவுமற்றும் பானைத் தொழில்நுட்பம்	3

சங்ககாலத்தில்நெசவுத் தொழில்–பானைத் தொழில்நுட்பம் – கருப்புசிவப்புபாண்டங்கள்–பாண்டங்களில்கீறல்குறியீடுகள்

அலகு 2	வடிவமைப்புமற்றும் கட்டிடத் தொழில்நுட்பம்	3

சங்ககாலத்தில்வடிவமைப்புமற்றும் கட்டுமானங்கள்&சங்ககாலத்தில் வீட்டுப் பொருட்களில்வடிவமைப்பு–சங்ககாலத்தில்கட்டுமானபொருட்களும் நடுகல்லும் – சிலப்பதிகாரத்தில்மேடைஅமைப்பு பற்றிய விவரங்கள்–மாமல்லபுரச் சிற்பங்களும்,கோவில்களும் – சோழர் காலத்துப் பெருங்கோயில்கள்மற்றும் பிறவழிபாட்டுத் தலங்கள்–நாயக்கர் காலக் கோயில்கள்–மாதிரிகட்டமைப்புகள் பற்றி அறிதல், மதுரைமீனாட்சிஅம்மன் ஆலயம் மற்றும் திருமலைநாயக்கர் மஹால்–செட்டிநாட்டுவீடுகள்–பிரிட்டிஷ்காலத்தில்சென்னையில்இந்தோ–சாரோசெனிக் கட்டிடக் கலை.

அலகு 3	உற்பத்தித் தொழில்நுட்பம்	3

கப்பல்கட்டும் கலை–உலோகவியல்–இரும்புத் தொழிற்சாலை–இரும்பைஉருக்குதல், எஃகு–வரலாற்றுச் சான்றுகளாகசெம்புமற்றும் தங்கநாணயங்கள்–நாணயங்கள்அச்சடித்தல்–மணிஉருவாக்கும் தொழிற்சாலைகள்–கல்மணிகள், கண்ணாடிமணிகள்–சுடுமண் மணிகள்–சங்குமணிகள்–எலும்புத் துண்டுகள்–தொல்லியல்சான்றுகள்–சிலப்பதிகாரத்தில்மணிகளின் வகைகள்.

அலகு 4	வேளாண்மைமற்றும் நீர்ப்பாசனத் தொழில்நுட்பம்	3

அணை, ஏரி, குளங்கள், மதகு–சோழர்காலக் குமிழித் தூம்பின் முக்கியத்துவம் – கால்நடைபராமரிப்பு–கால்நடைகளுக்காகவடிவமைக்கப்பட்ட கிணறுகள்–வேளாண்மைமற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள்–கடல்சார் அறிவு–மீன்வளம் – முத்து மற்றும் முத்துக்குளித்தல்–பெருங்கடல் குறித்த பண்டையஅறிவு–அறிவுசார் சமூகம்.

அலகு 5	அறிவியல்தமிழ்மற்றும் கணித்தமிழ்	3

அறிவியல்தமிழின் வளர்ச்சி –கணித்தமிழ்வளர்ச்சி –தமிழ்நூல்களைமின்பதிப்புசெய்தல்–தமிழ்மென்பொருட்கள்உருவாக்கம் – தமிழ்இணையக் கல்விக்கழகம் – தமிழ் மின் நூலகம் – இணையத்தில்தமிழ்அகராதிகள்–சொற்குவைத் திட்டம்,

TOTAL – 15 PERIODS

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Regulations 2024

Semester - II

(Common to all B.E./ B.Tech. Programmes)

Course code	Course Name	Periods/week			Credit	Maximum marks
		L	T	P	C	
24HS11003	TAMILS AND TECHNOLOGY	1	0	0	1	100

UNIT-I **WEAVING AND CERAMIC TECHNOLOGY** 3

Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.

UNIT-II **HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE** 3

Designing and Structural construction House & Designs in household materials during Sangam Age - Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple)- ThirumalaiNayakarMahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period.

UNIT-III **MANUFACTURING TECHNOLOGY** 3

Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting, steel -Copper and gold-Coins as source of history - Minting of Coins – Beads making-industries Stone beads - Glass beads - Terracotta beads -Shell beads/ bone beats - Archeological evidences - Gem stone types described in Silappathikaram.

UNIT-IV **AGRICULTURE AND IRRIGATION TECHNOLOGY** 3

Dam, Tank, ponds, Sluice, Significance of KumizhiThoompu of Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries – Pearl - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society.

UNIT-V **SCIENTIFIC TAMIL & TAMIL COMPUTING** 3

Development of Scientific Tamil - Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project.

TOTAL HOURS 15

TEXT BOOK ANDREFERENCE BOOKS	
1.	தமிழகவரலாறு–மக்களும் பண்பாடும் – கே.கே. பிள்ளை (வெளியீடுதமிழ்நாடுபாடநூல்மற்றும் கல்வியியல்பணிகள்கழகம்)
2.	கணினித் தமிழ்–முனைவர் இல. சுந்தரம் (விகடன் பிரசுரம்)
3.	கீழடி –வைகைநதிக்கரையில்சங்ககாலநகரநாகரிகம் (தொல்லியல்துறைவெளியீடு)
4.	பொருநை–ஆற்றங்கரைநாகரிகம் (தொல்லியல்துறைவெளியீடு)
5.	Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6.	Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7.	Historical Heritage of the Tamils (Dr.S.V.Subaramanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8.	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9.	Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Publishedby: The Author)
11.	Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Bookand Educational Services Corporation, Tamil Nadu)
12.	Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

Dr. J. KAVITHA, M.A., M.Phil., Ph.D.,
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NAMAKKAL - 637 503.

MAHENDRA ENGINEERING COLLEGE (Autonomous)-Syllabus						R 2024
DEPARTMENT:	SCIENCE & HUMANITIES		Programme Code & Name			PHYSICS LABORATORY
SEMESTER – I & II						
COURSE CODE	**COURSE NAME**	**HOURS/WEEK**			**CREDIT**	**MAXIMUM MARKS**
24PY22001	**PHYSICS LABORATORY (FOR ALL BRANCHES)**	**L**	**T**	**P**	**C**	**100**
		0	0	3	1.5	
Objective(s)	To provide exposure to the students with hands on experience on various basic Physics practices for all branches.					
OUTCOMES	• The hands on exercises undergone by the students will help them to apply physics principles • Principles of optics and Liquid to evaluate engineering properties of materials.					

1. (a) Determination of Wavelength, and particle size using Laser
   (b) Determination of acceptance angle in an optical fiber.
2. Determination of velocity of sound and compressibility of liquid – Ultrasonic interferometer.
3. Determination of Thickness of a thin wire-Air Wedge
4. Determination of wavelength of mercury spectrum – spectrometer grating
5. Determination of Young's modulus by Non uniform bending method
6. Determination of viscosity of liquid – Poiseuille' s method
7. Determination of Rigidity modulus -Torsional Pendulum
8. Determination of Band gap of a semiconductor-PN Diode
9. Determination of Young's modulus by Uniform bending method

(Choose Any 7 Experiments)

REFERENCES	
1.	Physics Laboratory Manual (2023), Department of Physics, Mahendra Engineering College, Namakkal.
2	Geeta Sanon, B.Sc Practical Physics, 5th Edn. (2015), R. Chand & Co.
3	C. L. **Arora** B.Sc. Practical Physics (2001), S. Chand and Company Limited, New Delhi.
4	Indu Prakash and Ramakrishna, A. K. Jha (2012), A Text Book of Practical Physics, Kitab Mahal, New Delhi.
5	D. P. Khandelwal, A Laboratory Manual of Physics: For Undergraduate Classes (1985), Vani Educational books, New Delhi.

Dr. T. Shanmugavel
HOD/Physics

Subject Expert: **Dr. A. CHANDRABOSE**
Professor
National Institute of Technology, Trichy.

MAHENDRA ENGINEERING COLLEGE
(Autonomous)

Syllabus

Department	Computer Science and Engineering	Programme Code	1041

I Semester

Course code	Course Name	Hours/week			Credit	Maximum marks
		L	T	P	C	
24CS13001	PROBLEM SOLVING TECHNIQUES USING C	3	0	0	3	100

Objective(s)	The student should be made to: ● Understand the basics of computer and algorithm ● Learn the basic concepts of C Programming. ● Know the arrays and functions in C ● Be familiar with pointers and structures in C ● Learn the file handling techniques and preprocessors in C
Outcome(s)	Upon completion of this course , students will be able to ● Illustrate algorithms for real time problems through various problem solving techniques ● Explain the syntax of C Programming ● Summarize the concept of arrays and functions in C ● Apply the concepts of pointers and structure ● Develop the concepts of files and preprocessors in C

UNIT-I	**PROBLEM SOLVING ASPECTS**	**9**
Computers: Hardware – Software – Processor – Memory – I/O devices – Interface – Programming Languages Problem Solving Aspects: Algorithms Pseudo code, Flowchart-Steps in Problem Solving – simple strategies for developing algorithms (iteration, recursion) – Steps for Creating and Running programs -Illustrative problems: Exchanging The Values – Find minimum in a list - Factorial Computation - Fibonacci Sequence		
UNIT-II	**C PROGRAMMING BASICS**	**9**
Introduction to C programming – Header files – Structure of a C program – compilation and linking processes – Constants, Variables – Data Types – Expressions-, Expression Evaluation, Type conversion Statements – operators – Input and Output operations – Decision Making and Branching – Looping statements- Programming Examples		
UNIT-III	**ARRAYS AND FUNCTION**	**9**
Arrays: Introduction – One-Dimensional Arrays – Two and multi-Dimensional Arrays - Strings: Operations of Strings. Function – definition of function – Declaration of function – Function prototype – Types of functions- user defined functions – Pass by value – Pass by reference – Recursion - Programming Examples		
UNIT-IV	**POINTERS AND STRUCTURES**	**9**

Pointers - Definition – Initialization - Pointer variables, Pointer arithmetic, Pointers to Pointers, Pointers with Arrays, Pointers with Functions- Introduction to Structure – structure definition – Structure declaration – Structure within a structure-Structures fusion with Arrays- Unions – Storage classes

UNIT-V	**FILE PROCESSING**	**9**
Files: File modes – File functions – Types of file processing: Sequential access, Random access – Text and binary files - Command line arguments – C Preprocessor directives: Macros – Definition – Types of Macros - Creating and implementing user defined header files		
	Total hours	**45**

TEXT BOOK :	
1	Anita Goeland Ajay Mittal, “Computer Fundamentals and Programming in C”, Dorling Kindersley (India)Pvt. Ltd. Pearson Education, 2016.
REFERENCES:	
1	Dromey R.G, “How to Solve it by Computer” Prentice Hall of India, Delhi., 2010.
2	E Balagurusamy, “Computer Programming”, First Edition, Tata McGraw Hill Education (India) Private Ltd, New Delhi., 2013.
3	Pradip Dey, Manas Ghosh, “ Computer Fundamentals and Programming in C”, 2nd Edition, Oxford University Press.,2013.
4	M.Rajaram and P.Uma Maheshwari “ Computer Programming with C”, Pearson Education., 2013.
5	NPTEL course, Problem Solving Through Programming in C, https://nptel.ac.in/courses/106105171
6	NPTEL course, Introduction to Programming in C, https://nptel.ac.in/courses/106104128

MAHENDRA ENGINEERING COLLEGE

(Autonomous)

Syllabus

Department	**Computer Science and Engineering**	**Programme Code**	**1041**

I Semester

Course Code	**Course Name**	**Hours/Week**			**Credit**	**Maximum marks**
		L	**T**	**P**	**C**	
24CS23001	**PROBLEM SOLVING TECHNIQUES USING C LAB (Common to All Branches)**	**0**	**0**	**3**	**1.5**	**100**

Objective(s)	The student should be made to: ● Understand developing applications using Office package. ● Formulate problems and implement algorithms using Scratch and Raptor tool ● Make use of arrays and functions in C. ● Learn how to use pointer concepts. ● Know the concepts of structures, unions and files
Outcome(s)	Upon completion of this course , students will be able to ● Demonstrate the applications of Office Packages ● Solve the real world problems using Scratch and Raptor Tool ● Develop programs using arrays and functions in C. ● Illustrate the working of pointers in C ● Develop the concepts using structures, unions and files in C

LIST OF EXPERIMENTS

1	Prepare A bio-data Using MS Word With Appropriate Page ,Text And Table Formatting Options And Send The Same To Recipients Using Mail Merge
2	Create budget planning of your family with cell referencing, formulae, conditional formatting using Excel
3	Create a Program flow to illustrate the use of Variables and Constants using Scratch Tool
4	Construct flowchart to find the Factorial for a given number Using Raptor
5	Students mark generation using decision statements
6	Calculator using switch statement

7	Prime number generation and to check whether the given number is armstrong or not using looping	
8	Greatest number using array (one dimensional)	
9	Matrix multiplication using array (two dimensional)	
10	Check the given string is palindrome or not.	
11	Write a C Program to swap two numbers using two functions one using pointer and other one without using pointer	
12	Factorial calculation and Fibonacci series using function	
13	Student mark sheet using structures	
14	Copy text from one file to other File	
	Total hours	**30**

MAHENDRAENGINEERINGCOLLEGE
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Syllabus

Department	CIVIL ENGINEERING	Programme Code	1081

I/ IISemester

Coursecode	CourseName	Hours/week			Credit	Maximummarks
		L	T	P	C	
24GE23001	Engineering Practices Laboratory (Civil & Mechanical)	0	0	3	1.5	100

Objective(s)

- To understand the fundamentals of various carpentry and plumbing tools
- To fabricate various carpentry joints.
- To introduce the students to the concepts of basic manufacturing processes
- To identify the hand tools and instruments
- To teach students how to perform simple welding, sheet metal and moulding operation
- To help students perform some simple exercises on facing, turning, step turning and drilling

LISTOFEXPERIMENTS

1. Study of carpentry tools.
2. Making of carpentry joints T-joint, Lap-joint, Dovetail Joint
3. Study of Tools used in Plumbing
4. Pipe connections with different joining components.
5. Connections of Two Galvanized Iron Pipes
6. Preparation of arc welding of butt joints, lap joints and tee joints
7. Fabrication of sheet metal tray and funnel
8. Facing, plain turning and step turning using lathe Drilling operations
9. Basic Study :Gas cutting and gas welding

LIST OF EQUIPMENTS(for a batch of 30 students)

1. Centre Lathe with accessories-5 Nos
2. Arc welding machine -4Nos
3. Gas welding machine-2Nos
4. Sheet Metal Work facility- 3Nos
5. Hand Shear 300mm-2 Nos
6. Bench vicesetup-2 Nos
7. Standard tool sand calipers for sheet metal work setup-2 Nos
8. Rip Saw- 15 nos
9. Jack Plane-10 nos
10. Hack Saw-15 nos
11. Chisel- 10 nos
12. Die Set Too- 2 nos

TOTALHOURS:45

Outcome(s)

At the end of the course, students will be able to:

- Acquire the knowledge about Plumbing & Carpentry components.
- Understand the exposure of hands on training on Joining the two woods and pipes
- Fabricatethemodelsofsheetmetalandweldingjoints
- Performfacing,plainturning, stepturninganddrilling.

MAHENDRA ENGINEERING COLLEGE
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Mahendhirapuri, Mallasamudram (W), Namakkal (Dt) - 637 503, Tamil Nadu
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DEPARTMENT OF CIVIL ENGINEERING

Regulation-2024-Curriculum(CBCS)

III Semester

Sl. No.	Course Code	Course Title	Category	L	T	P	C
THEORY							
1	24MA12301	Transforms And Partial Differential Equations	BS	3	1	0	4
2	24CE13301	Engineering Geology	ES	3	0	0	3
3	24CE14301	Mechanics of Solids	PC	3	0	0	3
4	24CE14302	Construction Materials, Techniques and Practices	PC	3	0	0	3
5	24CE14303	Surveying	PC	3	0	0	3
6	-	Open Elective–1	OE	3	0	0	3
7	24CY11001	Environmental Science and Sustainability	MC	2	-	-	-
PRACTICAL							
8	24CE24301	Strength of Materials Laboratory	PC	0	0	3	1.5
9	24CE24302	Surveying Laboratory	PC	0	0	2	1.0
10	24CE24303	Computer Aided Building Drawing	PC	0	0	2	1.0
			TOTAL	**20**	**1**	**7**	**22.5**

MAHENDRA ENGINEERING COLLEGE
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Syllabus

Department	**Civil Engineering**	**Programme Code**	**1021**

SEMESTER-III

COURSE CODE	**COURSE NAME**	**HOURS/WEEK**			**CREDIT**	**MAXIMUM MARKS**
		L	**T**	**P**	**C**	
24CE13301	**ENGINEERING GEOLOGY**	3	0	0	3	**100**

Objective(s)	• To understand the importance of geological knowledge such as earth, earthquake, volcanism • To acquire knowledge on properties of minerals • To study about the various features of rocks • To know the geological structures and methods of geophysical. • To learn the application of geological investigations in projects such as dams, tunnels, bridges, roads, airport and harbor as well as to choose types of foundations.

UNIT-I	**PHYSICAL GEOLOGY**	**9**

Geology in civil engineering – branches of geology – structure of earth and its composition – weathering of rocks – scale of weathering – soils - landforms and processes associated with river, wind, groundwater and sea – relevance to civil engineering. Plate tectonics – Earth quakes – Seismic zones in India.

UNIT-II	**MINEROLOGY**	**9**

Elementary Knowledge on Symmetry elements of crystallography system-Physical properties of minerals – Quartz group, Feldspar group, Pyroxene - hypersthene and augite, Amphibole – hornblende, Mica – muscovite and biotite, Calcite, Gypsum and Clay minerals.

UNIT-III	**PETROLOGY**	**9**

Classification of rocks, distinction between Igneous, Sedimentary and Metamorphic rocks. Engineering properties of rocks. Description, occurrence, engineering properties, distribution and uses of Granite, Dolerite, Basalt, Sandstone, Limestone, Shale, Quartzite, Marble, Slate, Gneiss and Schist.

UNIT-IV	**STRUCTURAL GEOLOGY AND GEOPHYSICAL METHODS**	**9**

Geological maps – attitude of beds, study of structures – folds, faults and joints – relevance to civil engineering. Geophysical methods – Seismic and electrical methods for subsurface investigations.		
UNIT-V	**APPLICATION OF GEOLOGICAL INVESTIGATIONS**	**9**
Introduction of Remote sensing and GIS for civil engineering applications; Geological conditions necessary for design and construction of Dams, Reservoirs, Tunnels, and Road cuttings - Hydrogeological investigations and mining - Coastal protection structures. Investigation of Landslides, causes and mitigation.		
Total hours to be taught		**(45 Hrs)**
Outcome(s)	• Explain the importance of geological knowledge such as earth, earthquake, volcanism and the action of various geological agencies. • Discuss the properties of minerals. • Classify the types of rocks, their distribution and uses. • Explain the methods of study on geological structure. • Describe the application of geological investigation in projects such as dams, tunnels, bridges, roads, airport and harbor	

Text book :

- Varghese, P.C., Engineering Geology for Civil Engineering Prentice Hall of India Learning Private Limited, New Delhi, 2012.
- Venkat Reddy. D. Engineering Geology, Vikas Publishing House Pvt. Lt, 2010.
- Gokhale KVGK, "Principles of Engineering Geology", B.S. Publications, Hyderabad 2011.
- Chenna Kesavulu N. "Textbook of Engineering Geology", Macmillan India Ltd., 2009.
- Parbin Singh. A " Text book of Engineering and General Geology", Katson publishing house, Ludhiana 2009.

REFERENCES

- Garg. S.K. (2004), Physical and Engineering Geology, Khanna Publishers. –Delhi
- Blyth F.G.H. and de Freitas M.H., Geology for Engineers, Edward Arnold, London, 2010.
- Bell.F.G.. "Fundamentals of Engineering Geology", B.S. Publications. Hyderabad 2011.
- Dobrin, M.B "An introduction to geophysical prospecting", McGraw Hill, New Delhi, 1988.

POs / COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	-	-	-	-	1	1	1	1	1	-	1	2	-
CO2	2	-	-	-	-	1	1	1	1	1	-	1	2	-
CO3	2	-	-	-	-	1	1	1	1	1	-	1	2	-
CO4	2	-	-	-	-	1	1	1	1	1	-	1	2	-
CO5	2	-	-	-	1	1	1	1	1	1	-	1	2	-

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MAHENDRA ENGINEERING COLLEGE

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Syllabus

Department	**Civil Engineering**	**Programme Code**	**1021**

SEMESTER-III

COURSE CODE	**COURSE NAME**	**HOURS/WEEK**			**CREDIT**	**MAXIMUM MARKS**
		L	**T**	**P**	**C**	
24CE14301	**MECHANICS OF SOLIDS**	3	0	0	3	**100**

Objective(s)	• To learn the fundamental concepts and behavior of solids objects. • To acquire knowledge on shear force and bending moment in beam. • To know the deflection behaviors of beam subjected to different loading conditions. • To gain knowledge on effect of torsion on shafts and springs. • To know the mechanism of load acting in truss.

UNIT-I	**STRESS AND STRAIN**	9

Concepts of Stress and Strain- Types of Stresses and strains- Stress Strain Diagram for ductile and brittle material- Elastic limit–Hooke's Law – Types of modulus –Relationship among elastic constants –Factor of Safety –Bar of varying crosssection -Compound Bars -Thermal Stresses.

UNIT-III	**SHEAR FORCE AND BENDING MOMENT IN BEAMS**	9

Types of Beams - Types of loads and supports – Shear Force and Bending Moment Diagrams for statically determinate beam with concentrated load and UDL .Theory of simple bending- Assumptions of simple bending equation- Bending and shear stress distribution diagram: Rectangle-Circle-Symmetric I section.

UNIT-IV	**DEFLECTION**	9

Relationship between moment, slope and deflection-Macaulay's methods –Moment Area Method -conjugate beam method (Concepts of Theorem only) –Use of these methods to calculate slope and deflection for determinant beam.

UNIT-V	**TORSION**	9

Theory of simple torsion- assumption - Torsion rigidity - Polar modulus - Torsion in solid and hollow circular shafts –Power transmitted by a shaft- Closed and Open Coiled helical springs

UNIT-II	**PLANE TRUSS**	9

Analysis of Plane truss by using method of joints and method of sections .

Total hours to be taught	**(L:45)**

Outcome(s)	At the end of this course, the student will be able to, • Apply the linear laws of elasticity as related to stress and strain in solid objects like bar, beams, cylinder and column. • Analyze the determinate and indeterminate beams for shear stress and flexure is acting and draw the shear force and bending moment diagram of beams. • Solve the stresses and deflection of the beams under various loading. • Design the shafts to transmit required power and also springs for its maximum energy. • Determine the internal forces acted in plane trusses.

Text book :

- Rajput R.K, “Strength of materials” (Mechanics of Solids), S. Chand (2015).
- Bansal R.K. “Strength of Materials”, Laxmi publications, New Delhi, 2017.
- Subramanian R.,“Strength of Materials”, Oxford University Press, New Delhi (2013)
- Bhavikatti. S., “Solid Mechanics”, Vikas publishing house Pvt. Ltd, New Delhi, 2010.

REFERENCES

- Gambhir. M.L., "Fundamentals of Solid Mechanics", PHI Learning Private Limited., New Delhi, 2009.
- Timoshenko.S.B. and Gere.J.M, “Mechanics of Materials”, Van Nos Reinbhold, New Delhi 1995.
- Vazirani.V.N and Ratwani.M.M, “Analysis of Structures”, Vol I Khanna Publishers, New Delhi,1995.
- Junnarkar.S.B. and Shah.H.J, “Mechanics of Structures”, Vol I, Charotar Publishing House, New Delhi 1997.

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CO1	3	-	-	-	-	1	-	-	1	-	-	-	2	-
CO2	3	-	-	-	-	1	1	-	1	1	-	1	2	-
CO3	1	2	3	-	-	1	1	-	1	1	-	1	2	1
CO4	2	2	3	-	-	1	-	-	1	-	-	-	2	1
CO5	2	3		-	-	1	-	-	1	-	-	-	2	-

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MAHENDRA ENGINEERING COLLEGE

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Department	**Civil Engineering**	**Programme Code**	**1021**

SEMESTER-II

COURSE CODE	**COURSE NAME**	**HOURS/ WEEK**			**CREDIT**	**MAXIMUM MARKS**
		L	**T**	**P**	**C**	
24CE14302	**CONSTRUCTION MATERIALS,TECHNIQUES AND PRACTICES**	3	0	0	3	**100**

Objective(s)	• To enable the students to acquire fundamental knowledge in Construction materials. • To learn about the different components of building construction. • To familiarize the construction in masonry and practices. • To provide the knowledge about technique involved in the sub &super structures • To impart the various equipment used in construction.

UNIT-I	**CONSTRUCTION MATERIALS**	**9**
Properties and applications of Bricks – stones – sand – cement – concrete – steel sections –Plastic – Timber – Composite.		
UNIT-II	**CONSTRUCTION PRACTICES**	**9**
Specifications, details and sequence of activities and construction co-ordination – SiteClearance – Marking – Earthwork - Brick masonry and Stone masonry - damp proof courses.		
UNIT-III	**COMPONENTS AND STRUCTURES**	**9**
Door and windows - roofing and flooring – plastering –Lintel, Stairs– Basics of Interior Design and Landscaping.		
UNIT-IV	**SUB AND SUPER STRUCTURE CONSTRUCTION**	**9**
Techniques of Box jacking – Pipe Jacking - diaphragm walls-Tunneling techniques – well and caisson – sinking cofferdam –Dewatering – Techniques of Launching girders, bridge decks, offshore platforms – shells – heavy decks		
UNIT-V	**CONSTRUCTION EQUIPMENT**	**9**
Selection of equipment for earth work - types of earthwork equipment - tractors, motor graders, scrapers, earth movers – Equipment for foundation- Equipment for material handling and erection of structures - Equipment for dredging, trenching, tunneling-		

Total hours to be taught	45

Outcome(s)	At the end of this course, the student will be able to, • Explain the different materials using in the construction fields. • Elaborate about the various components in the building structure. • Apply the various techniques and practices on masonry construction. • Describe the methods and techniques involved in the construction ofvarious types of sub and super structures. • Select the equipment used in the construction sites.
Text book :	
•	Shanmugam G and Palanichamy M S, "Basic Civil and Mechanical Engineering", Tata McGraw Hill Publishing Co., New Delhi, 2005.
•	P.C Punima. "Building construction", Prentice Hall of India Pvt. Ltd, New Delhi,2016.
•	Arora S.P. and Bindra S.P., "Building Construction, Planning Techniques and Methodof Construction", Dhanpat Rai and Sons, 2010.
•	Varghese, P.C. "Building construction", Prentice Hall of India Pvt. Ltd, New Delhi,2011.
REFERENCES	
•	http://nptel.ac.in/syllabus/105102088/
•	http://nptel.ac.in/courses/105103093/21.
•	S.Ramamrutham,"Basic Civil Engineering", Jain book agency, 3rd Edition, 2013.
•	Deodhar, S.V. "Construction Equipment and Job Planning", Khanna Publishers, NewDelhi, 2012.
•	Gambhir, M.L, "Concrete Technology", Tata McGraw Hill Publishing CompanyLtd, New Delhi, 2013

MAHENDRA ENGINEERING COLLEGE
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Syllabus

Department	**Civil Engineering**	**Programme Code**	**1021**

SEMESTER-III

COURSE CODE	**COURSE NAME**	**HOURS/WEEK**			**CREDIT**	**MAXIMUM MARKS**
		L	**T**	**P**	**C**	
24CE14303	**SURVEYING**	3	0	0	3	**100**

Objective(s)	The objectives of this course is, • To know the fundamentals and methods of surveying. • To gain knowledge about the procedure of leveling and contour surveying • To study about leveling applications. • To locate the curve in highway road alignment • To acquire the knowledge about the theodolite surveying

UNIT-I	**FUNDAMENTALS OF SURVEYING**	9

Definition - Classifications - Basic principles -Field work and office work -Instruments For measuring distance - Equipment and accessories for ranging and chaining – Methods of ranging - uses of cross - staff and optical square- Errors in linear measurement and their corrections. Compass – Basic principles - Types - Bearing - Local attraction - Traversing

UNIT-II	**LEVELLING**	9

Levels- Benchmarks - Temporary and permanent adjustments –Types of leveling Staff- Balancing back sight and foresight distance-Fly, check and reciprocal levelling -Longitudinal and cross section leveling- Reducing levels by rise and fall and height of collimation methods and check- Effect of curvature and refraction

UNIT-III	**LEVELLING APPLICATIONS AND VOLUME MEASUREMENTS**	9

Definition –Contouring- Contour interval and horizontal equivalent-characteristics- interpolation contouring by grid and radial methods - Drawing contour lines - uses of contour maps - drawing of contours using computers– Calculation of areas and volumes

UNIT-IV	**THEODOLITE SURVEYING**	9

Theodolite - types-features and fundamental axes – adjustments- temporary and permanent - methods of measurement of horizontal angles - taking vertical angles - Heights and distances of inaccessible points - Triangulation Survey- methods of traversing - Problems on omitted measurements.

UNIT-V	**CURVES**	9

Methods - Determination of constants of the tacheometer - use of anallactic lens - distance and elevation formulae for inclined sights with vertical and normal holding staff - movable hair method - principles of tangential tacheometry-problems in tacheometry –subtense bar method Basic concept - Total Station - Electronic Theodolite - Laser alignment instrument – Global Positioning System

Total hours to be taught	**(L:45)**

Outcome(s)	At the end of the course the student should be able to, • Apply and calculate the area by using chain and compass surveying. • Determine the reduced level on the ground surface by using various leveling techniques. • Prepare longitudinal and cross sectional contour maps for various land profiles. • Compute height difference of land using theodolite and tacheometry. • Draw the outline of curve alignment in land for road work

Text book :

- Dr. B.C. Punmia, Ashok Kumar Jain, Ashok Kr. Jain, Arun Kr. Jain"Surveying (Volume –I)", Lakshmi Publications,17thedition, 2016.
- Dr. B.C. Punmia, Ashok Kumar Jain, Ashok Kr. Jain, Arun Kr. Jain"Surveying (Volume –II)", Lakshmi Publications,16thedition, 2016
- Surveying and Leveling-38th edition.2014, N.N. Basak Tata McGraw Hill
- S.K.Duggal, "Surveying (Volume-I,II) "Tata Mcgraw-Hill Publishing company Ltd. NewDelhi,2007

REFERENCES

- SatheeshGopi, R.Sathikumar, N.Madhu, " Advanced Surveying -Total station, GIS and Remote sensing", Pearson Education India(2012).
- Arora K.R.,"Surveying Vol I, II & III", Standard Book house, 10th Edition 2008
- S. S. Bhavikatti, "Surveying and Levelling (Volume-1& II)"I. K. International Pvt Ltd,2009.
- A.M Chandra , "Higher Surveying", New age International, New Delhi.2004.
- Leudr.D.R., *Aerial Photographic Interpretation*, McGrawHill, 1959.
- A.M Chandra , "Higher Surveying", New age International, New Delhi.2004.

POs / COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	-	-	-	1	-	-	1	-	-	1	1	3
CO2	1	2	-	-	-	1	-	-	1	-	-	1	1	3
CO3	2	3	-	-	1	1	-	-	1	1	-	2	1	3
CO4	1	1	-	-	2	-	-	-	-	-	-	1	3	1
CO5	1	1	-	-	2	-	-	-	-	-	-	1	3	1

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<table>
<tr><td colspan="5">MAHENDRA ENGINEERING COLLEGE (Autonomous)-Syllabus</td><td>R 2024</td></tr>
<tr><td>DEPARTMENT:</td><td colspan="2">SCIENCE & HUMANITIES</td><td colspan="2">Programme Code & Name</td><td>CY& CHEMISTRY</td></tr>
<tr><td colspan="6">SEMESTER-III (For Non Circuit Branches) & SEMESTER- IV (For Circuit Branches)</td></tr>
<tr><td>COURSE CODE</td><td>COURSE NAME</td><td colspan="3">HOURS/WEEK</td><td>CREDIT</td><td>MAXIMUM MARKS</td></tr>
<tr><td rowspan="2">24CY11001</td><td rowspan="2">ENVIRONMENTAL SCIENCE AND SUSTAINABILITY</td><td>L</td><td>T</td><td>P</td><td>C</td><td rowspan="2">100</td></tr>
<tr><td>2</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Objectives</td><td colspan="5">To make the students familiar with :
1. The importance of Environment, Ecosystem and Biodiversity.
2. The causes, effects and prevention measures of environmental pollution.
3. The social issues of the environment and National laws for environment protection.
4. The green environment and associated issues.
5. The concept of sustainable development goals and appreciate the interdependence of economic and social aspects of sustainability, recognize and analyze.</td></tr>
<tr><td>Outcomes</td><td colspan="5">At the end of the course the student will be able to
1. Explain the importance of Environment, Ecosystem and various types of Biodiversity.
2. Identify the different types of Pollution and be familiar with control measures.
3. List out the environmental issues and essential legislation on environmental laws.
4. Develop the concept of green synthesis method in environment and related problems.
5. Recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.</td></tr>
<tr><td>UNIT-I</td><td colspan="4">ENVIRONMENT, ECOSYSTEM & BIODIVERSITY</td><td>12 Hrs</td></tr>
<tr><td colspan="6">Definition, Scope and Importance of Environment – Need for public awareness – Ecosystem: concept of an ecosystem – structure and function of an ecosystem – energy flow in the ecosystem – Biodiversity: Introduction – definition - genetic, species and ecosystem diversity – value of biodiversity – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity – Field visit to local area.</td></tr>
<tr><td>UNIT-II</td><td colspan="4">ENVIRONMENTAL POLLUTION & DISASTER MANAGEMENT</td><td>9 Hrs</td></tr>
<tr><td colspan="6">Definition – causes, effects and control measures of: (a) Air, (b) Water, (c) Soil, (d) Noise, (e) Thermal pollution– solid waste management: causes, effects and control methods of municipal solid wastes – disaster management: floods, earthquake and landslides– E-waste and plastic waste: recycling and reuse - role of an individual in prevention of pollution – pollution case studies (vizag gas leakage) – Field visit to local polluted area.</td></tr>
<tr><td>UNIT-III</td><td colspan="4">SOCIAL ISSUES & ENVIRONMENTAL IMPACT ASSESMENT</td><td>9 Hrs</td></tr>
<tr><td colspan="6">Social issues – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case</td></tr>
</table>

studies (Global warming). – EPA: Environment protection act - EIA: EIA structure- methods of baseline data acquisition. Planning and management of impact studies - operational aspects of EIA - methods for impact identification- Role of NGOs in creating awareness among people regarding environmental issues.		
UNIT-IV	**GREEN ENVIRONMENTAL ISSUES**	9 Hrs
Introduction – Clean development mechanism – carbon emission-carbon foot printing - carbon credits - carbon sequestration and Polluter pay principle – Sustainable green building practices – Carbon Neutrality in India - Geneva Conventions and their Additional Protocols.		
UNIT-V	**SUSTAINABILITY AND MANAGEMENT**	6 Hrs
Development , GDP ,Sustainability- concept, needs and challenges - economic, social and aspects of sustainability - from unsustainability to sustainability - millennium development goals, and protocols- Sustainable Development Goals - targets, indicators and intervention areas.		
	TOTAL	**45 Hrs**

TEXT BOOKS :	
1.	Rajagopalan, R, "Environmental Studies-From Crisis to Cure", Oxford University Press (2015)
2.	Benny Joseph, "Environmental Science and Engineering", Tata McGraw-Hill, New Delhi, 2017.
3.	Dr.A.Ravikrishnan, "Environmental Science and Engineering" , Sri Krishna Hi-tech Publishing Company Pvt. Ltd. Chennai, 2014.
4.	Allen, D. T. and Shonnard, D. R., Sustainability Engineering: Concepts, Design and Case Studies, Prentice Hall.
REFERENCES	
1.	R.K. Trivedi, "Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards", Vol. I and II, Enviro Media.
2.	Gilbert M.Masters, "Introduction to Environmental Engineering and Science", 3nd Edition, Pearson Education, 2023.
3.	Dharmendra S. Sengar, "Environmental law", Prentice hall of India PVT LTD, New Delhi, 2007.

S.No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C01	2	-	-	-	-	1	2	2	-	-	-	1	-	-	-
C02	2	-	-	-	-	1	2	-	-	-	-	1	-	-	-
C03	3	-	-	-	-	2	3	-	-	-	-	1	-	-	-
C04	3	-	-	-	-	2	3	-	-	-	-	1	-	-	-
C05	3	-	-	-	-	2	3	-	-	-	-	1	-	-	-
Avg.	**2.6**	**-**	**-**	**-**	**-**	**1.6**	**2.6**	**2**	**-**	**-**	**-**	**1**	**-**	**-**	**-**

MAHENDRA ENGINEERING COLLEGE
(Autonomous)

Syllabus

Department	**Civil Engineering**	**Programme Code**	**1021**

SEMESTER-IV

COURSE CODE	**COURSE NAME**	**HOURS/WEEK**			**CREDIT**	**MAXIMUM MARKS**
		L	**T**	**P**	**C**	
24CE24301	**STRENGTH OF MATERIALS LABORATORY**	**0**	**0**	**3**	**1.5**	**100**

Objective(s)	• To understand the concept of compression, torsion and tension in various materials • To study the impact and hardness of metals. • To impart knowledge about the testing of springs and beams .

LIST OF EXPERIMENTS

1.	Tension test on mild steel rod
2	Double shear test on metal
3.	Torsion test on mild steel rod
4.	Impact test on metal specimen (Izod and Charpy)
5.	Hardness test on metals (Rockwell and Brinell Hardness Tests)
6.	Deflection test on beam
7.	Compression test on helical spring
8	Tension test on helical spring

Total hours to be taught	**45 Hrs**
Outcome(s)	**At the end of this course, the student will be able to,** • Evaluate the young modulus and torsional strength of given material. • Calculate the impact strength and hardness of given metal specimens. • Determine the rigidity modulus and deflection of given beams & springs.

POs / COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	3			1		1	1					
CO2	1	2	3			1		1	1					
CO3	1	2	3			1		1	1					

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MAHENDRA ENGINEERING COLLEGE
(Autonomous)

Syllabus

Department	**Civil Engineering**	**Programme Code**	**1021**

SEMESTER-III

COURSE CODE	**COURSE NAME**	**HOURS/WEEK**			**CREDIT**	**MAXIMUM MARKS**
		L	**T**	**P**	**C**	
24CE24302	**SURVEYING LABORATORY**	**0**	**0**	**2**	**1.0**	**100**

Objective(s)	The objectives of this course is, • To learn concept of chaining and compass surveying to find given area • To acquire knowledge about leveling and Elevation of building • To study about the total station, EDM and GPS and instruments

LIST OF EXPERIMENTS

1.	Chaining and Ranging of a Line
2	Compass Traversing
3.	Simple Leveling
4.	Fly leveling and Check leveling
5.	Theodolite Surveying
6.	Trigonometrically Leveling
7	Tachometric Surveying
8	Demonstration of Total Station
9	Demonstration of GPS

Total hours to be taught	**45 Hrs**

Outcome(s)	At the end of the course the student should be able to, • Explain the measuring procedure by using chaining, • Compute the distance and angle using compass and leveling. • Calculate the angles using the theodolite and tachometric surveying.

POs / COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	-	-	-	-	-	-	1	-	-	3	1	3
CO2	2	3	-	-	-	-	-	-	1	-	-	2	1	3
CO3	2	3	-	-	2	-	-	-	1	1	-	1	1	3

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MAHENDRA ENGINEERING COLLEGE
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Syllabus

Department	Civil Engineering	Programme Code	1021

SEMESTER-III

COURSE CODE	COURSE NAME	HOURS/WEEK			CREDIT	MAXIMUM MARKS
		L	T	P	C	
24CE24303	COMPUTER AIDED BUILDING DRAWING	0	0	2	1	100

Objective:

- To know the usage of software.
- To learn basic drawing fundamentals in various building drawing.
- To draw the different views of the buildings.

LIST OF EXPERIMENTS

1.	INTRODUCTION: Introduction to computer aided drawing, co–ordinate systems, reference planes. Commands: Initial settings, drawing aids, drawing basic entities, modify commands, layers, texts and dimensioning, blocks.
2	Building drawing: Terms, elements of planning building drawing, methods of making line drawing and detailed drawings. Site plan floor plan, elevation and section drawing of small residential buildings, foundation plan.
3.	Buildings with load bearing walls.
4.	Buildings with sloped roof.
5.	Perspective view for residential buildings.
6.	R.C.C Framed Structure
7.	Frame the 3-D View for G+1 Residential Building

Total hours to be taught	**45 Hrs**

Outcome:

- Use the Software commands for drawing 2D & 3D building drawings required for different civil engineering applications.
- Plan and draw Civil Engineering Buildings as per aspect and orientation.
- Presenting drawings as per user requirements and preparation of technical report.

POs / COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	3			1		1	1					
CO2	1	2	3			1		1	1					
CO3	1	2	3			1		1	1					

DEPARTMENT OF CIVIL ENGINEERING

Regulation-2024-Curriculum(CBCS)

IV Semester

Sl. No.	Course Code	Course Title	Category	L	T	P	C
THEORY							
1	24MA12404	Numerical Methods	BS	3	1	0	4
2	24CE14401	Strength of Materials	PC	3	0	0	3
3	24CE14402	Fluid Mechanics and Machinery	PC	3	0	0	3
4	24CE14403	Water Supply Engineering	PC	3	0	0	3
5	24CE14404	Computer Aided Modelling and Design of Structures	PC	2	0	2	3
6		Open Elective –2	OE	3	0	0	3
7	24HS11006	Universal Human Values	HS	3	0	0	3
PRACTICAL							
8	24CE24401	Hydraulics Engineering Laboratory	PC	0	0	2	1
9	24CE34401	Advanced Surveying and Camp	PC	1	0	2	2
10	24HS21002	Professional Communication Skills	HS	0	1	2	2
			TOTAL	**21**	**2**	**8**	**27**

MAHENDRA ENGINEERING COLLEGE

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Syllabus

Department	**Civil Engineering**	**Programme Code**	**1021**

SEMESTER-IV

COURSE CODE	**COURSE NAME**	**HOURS/WEEK**			**CREDIT**	**MAXIMUM MARKS**
		L	**T**	**P**	**C**	
24CE14401	**STRENGTH OF MATERIALS**	3	0	0	3	**100**

Objective(s)	➢ To learn the structural deflection of beams and trusses using energy theorems. ➢ To know the concept of analyzing indeterminate beam ➢ To calculate the load carrying capacity of columns with different end conditions. ➢ To understand the various theories of failures under applied load. ➢ To gain complete knowledge about the stresses in symmetrical and unsymmetrical beam sections.

UNIT-I	**ENERGY PRINCIPLES**	9

Strain energy and strain energy density –Stress due to different types of loads- strain energy due to axial load, shear, flexure and torsion – Castigliano's theorems –Maxwell's reciprocal theorem (concept only)- Principle of virtual work.

UNIT-II	**INDETERMINATE BEAMS**	9

Concept of Analysis – Concentrated load , UDL and moments of Propped cantilever, fixed beams-fixed end moments and reactions –Clapeyron's Theorem of three moments (Supports at same level, Flexural rigidity for span is same and continuous beam has fixed)

UNIT-III	**COLUMNS AND CYLINDERS**	9

Euler's theory of long columns – critical loads for prismatic columns with different end conditions; Effective length –Limitation-Rankine-Gordon formula for eccentrically loaded columns — middle third rule – core section – Thick cylinder and Compound cylinder(Definition only).

UNIT-IV	**THREE DIMENSION STATE OF STRESS**	9

Principle Stresses and Principle planes-Maximum shear stress-State of stress in three dimension-Determination of principal stresses and principal planes.Theories of failure– Principal stress - Principal strain – shear stress – Total Strain energy theory-application in analysis of stress, load carrying capacity.

UNIT-V	**ADVANCED TOPICS IN BENDING OF BEAMS**	9

Bending of beams of symmetrical and unsymmetrical sections – Shear Centre –Principle of Winkler Bach formula.	
Total hours to be taught	**(L:45)**
Outcome(s)	At the end of this course, the student will be able to, • Apply the principle of virtual work. • Analyze indeterminate beams like propped cantilever, continuous beams and fixed beams. • Analyze the long and short columns and compute the design loads. • Determine the state of stress in three dimensions. • Analyze the unsymmetrical bending in structural members.

Text book :

Rajput R.K. "Strength of Materials (Mechanics of Solids)", S.Chand & company Ltd., New Delhi, 2017.

Egor P Popov, "Engineering Mechanics of Solids", 2nd edition, PHI Learning Pvt. Ltd., New Delhi, 2012

REFERENCES

Kazimi S.M.A, "Solid Mechanics", Tata McGraw-Hill Publishing Co., New Delhi, 2006

William A .Nash, "Theory and Problems of Strength of Materials", Schaum"s Outline Series, Tata McGraw Hill Publishing company, 2007.

Punmia B.C."Theory of Structures" (SMTS) Vol 1&II, Laxmi Publishing Pvt Ltd, New Delhi 2017.

Rattan.S.S., "Strength of Materials", Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2017.

POs / COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	-	-	-	-	-	-	1	-	-	1	1	-
CO2	2	3	-	-	-	-	-	-	1	-	-	1	1	-
CO3	-	3	-	-	-	1	-	-	1	-	-	1	1	-
CO4	1	2	3	-	-	-	-	-	1	-	-	1	1	-
CO5	1	2	3	-	-	1	-	-	1	-	-	1	1	-

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MAHENDRA ENGINEERING COLLEGE

(Autonomous)

Syllabus

Department	**Civil Engineering**	**Programme Code**	**1021**

SEMESTER-IV

COURSE CODE	**COURSE NAME**	**HOURS/WEEK**			**CREDIT**	**MAXIMUM MARKS**
		L	**T**	**P**	**C**	
24CE14402	**FLUID MEHANICS AND MACHINERY**	3	0	0	3	**100**

Objective(s)	The main objective of this course is, • To study the fundamentals of fluid properties & characteristics. • To get knowledge on dimensional analysis and model laws. • To understand the types and characteristics of open channel flow. • To know about applications of Bernoulli's Equation. • To learn about the types of turbines and pumps

UNIT-I	**FLUID PROPERTIES AND FLUID STATICS**	**9**

Units and Dimensions – Fluid properties – Density, Specific gravity, Viscosity, Surface tension, Capillarity, Compressibility and Bulk modulus – Pascal's Law – pressure measurements – manometers - Fluid statics - Total pressure and centre of pressure on submerged surfaces

UNIT-II	**DIMENSIONAL ANALYSIS AND MODEL STUDIES**	**9**

Fundamentals – derived units - Dimensional homogeneity and similarity – Rayleigh method and Buckingham-pi theorem method –Model,type and their applications in model testing – Model laws and scale effects- Dimensionless numbers

UNIT-III	**OPEN CHANNEL FLOW**	**9**

Open channel flow - Definition- Types – Properties - Velocity distribution in open channel – Uniform flow - Chezy's and Manning's uniform flow equations- Determination of depth – Best hydraulic sections for uniform flow- Draw down and back water curves- Hydraulic jump

UNIT-IV	**FLOW THROUGH PIPES**	**9**

Euler's &Bernouli's equation – Applications of Bernoulli's equation - Venturimeter, Orifice meter Major and Minor losses – Flow through pipes in series and parallel – Equivalent pipe and pipe network

UNIT-V	**HYDRAULIC MACHINES**	**9**

Introduction - Classification of turbines –Working principles and efficiency of Pelton wheel, Francis turbine and Kaplan turbines - Specific speed Classification of pumps – Working principles and efficiency of Roto dynamic pumps and positive displacement pumps - Air vessels.

Total hours to be taught	**(L:45+T:15)**

Outcome(s)	At the end of this course, the student will be able to, • Apply mathematical knowledge to predict the properties and characteristics of a fluid. • Analyze the fluid flows with proper use of Dimensional Modeling. • Apply the knowledge in addressing problem of open channel flow • Determine the losses in pipe channel. • Summarize the performance of pumps and turbines.

Text book :

- Jain.A.K., "Fluid Mechanics",KhannaPublishers,Delhi,2011.
- R.K. Bansal, “Fluid mechanics and hydraulic machines,” Laxmi Publications (P) Ltd, 2015.
- Rajput R.K., “Fluid Mechanics and Hydraulic Machines”, S. Chand Publishing Ltd, New Delhi, 2013.
- P.N. Modi& S.M. Seth, Hydraulics and Fluid Mechanics including Hydraulic Machines, Twentieth Edition 2015, Standard Book House, New Delhi.
- White, F.M., “Fluid Mechanics”, Tata McGraw Hill, 5th Edition, New Delhi, 2003

REFERENCES

- Streeter, V.L., and Wylie, E.B., “Fluid Mechanics”, McGraw Hill, 2000.
- Fox W.R. and McDonald A.T., Introduction to Fluid Mechanics John-Wiley and Sons, Singapore, 1995.
- RajeshSrivastava,"Flowthroughopenchannels",OxfordUniversityPress,NewDelhi, 2008.
- Streeter, V.L., and Wylie, E.B., “Fluid Mechanics”, McGraw Hill, 2000.

POs / COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	1	1	1	-	-	-	-	3	-
CO2	2	3	-	-	-	1	1	1	-	-	-	-	2	1
CO3	3	-	-	-	-	1	1	1	1	-	-	-	3	-
CO4	2	3	-	-	-	1	1	1	-	-	-	-	2	-
CO5	2	-	-	-	-	1	1	1	-	-	-	1	3	-

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MAHENDRA ENGINEERING COLLEGE
(Autonomous)
Syllabus

Department	**Civil Engineering**	**Programme Code**	**1021**

SEMESTER-IV

COURSE CODE	**COURSE NAME**	**HOURS/WEEK**			**CREDIT**	**MAXIMUM MARKS**
		L	**T**	**P**	**C**	
24CE14403	**WATER SUPPLY ENGINEERING**	3	0	0	3	**100**

Objective(s)	The objectives of this course is, • To know the planning and standards for water supply engineering. • To learn functions and mechanism of intake structures. • To know the concept of primary treatment units. • To get knowledge about process of advance water treatment. • To acquire the knowledge about concept of water distribution layout.

UNIT-I	**PLANNING FOR WATERSUPPLY SYSTEM**	9

Public water supply system -Planning -Objectives -Design period -Population forecasting -Water demand -Sources of water and their characteristics -Development and selection of source - Water quality - Characterization and standards

UNIT-II	**INTAKE WORKS AND TRANSPORTATION**	9

Water supply -intake structures -Functions and drawings -Pipes and conduits for water- Pipe materials-Laying, jointing and testing of pipes - Corrosion – mechanism and prevention. Drawings appurtenances- Types and capacity of pumps -Selection of pumps and pipe materials.

UNIT-III	**WATER TREATMENT**	9

Treatment flow charts -Principles, functions design and drawing of screens ,Flash mixers, flocculators, sedimentation tanks and sand filters -Disinfection- Residue Management

UNIT-IV	**ADVANCED WATER TREATMENT**	9

Principle and function of Aeration, taste and odour control - Iron and manganese removal, Defluoridation and demineralization -Water softening – Membrane system, Desalination - Construction and Operation & Maintenance aspects of Water Treatment Plant-Reverse Osmosis.

UNIT-V	**WATER DISTRIBUTION AND SUPPLY**	9

Requirements of water distribution - Components - service reservoirs – methods and layout of distribution system- Analysis by Hardy Cross method and Equivalent Pipe method - operation and maintenance - Principles of design of water supply in buildings.

Total hours to be taught	**(L:45)**

Outcome(s)	At the end of the course the student should be able to
•	• llustrate the various water supply systems. • Differentiate various intake structures and select suitable pipe material for water conveyance. • Explain the various water treatment processes. • Select suitable treatment units for special. • Design various water distribution network.
•	Draw the layout of water distribution systems.

Text book :	
•	Garg, S.K., "Environmental Engineering", Vol.1 Khanna Publishers, New Delhi, 2005.
•	Modi, P.N. "Water Supply Engineering", Standard Book House, New Delhi, 2010
•	Punmia, B.C., Ashok K Jain and Arun K Jain, "Water Supply Engineering", Laxmi Publications Pvt. Ltd., New Delhi, 2017
•	Mark J. Hammer, Mark J. Hammer Jr, “Water and Waste Water Technology”, Prentice hall of India 2012
•	Environmental Engg. - A design Approach by Arcadio P. Sincero and Gregoria P. Sincero, Prentice Hall of India, New Delhi.
REFERENCES.	
•	Birdie.G.S., “Water Supply and Sanitary Engineering”, Dhanpat Rai and sons, 2017
•	Fair. G. M.., Geyer. J. C., “Water Supply and Waste Water disposal”, John Wiley & Sons, 2010.
•	Babbit. H. E., and Donald. J. J., “Water Supply Engineering”, McGraw Hill book Co, 1984
•	Steel E. W. et.al, “Water Supply Engineering”, McGraw Hill International Book Co,1984.
•	Duggal. K.N., “ Elememts of public Health Engineering”, S.Chand and Co,1995. Jain Publishers, CPHEECO MANUAL

POs / COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	-	-	-	1	1	1	1	1	-	-	2	-
CO2	2	-	-	-	-	1	1	1	1	1	-	-	1	1
CO3	2	3	-	-	-	1	1	1	1	1	-	-	2	2
CO4	3	-	-	-	-	1	1	1	1	1	-	1	3	1
CO5	3	2	1	-	-	1	1	1	1	1	-	-	2	1

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MAHENDRA ENGINEERING COLLEGE

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Syllabus

Department	**Civil Engineering**	**Programme Code**	

SEMESTER-IV

COURSE CODE	**COURSE NAME**	**HOURS/WEEK**			**CREDIT**	**MAXIMUM MARKS**
		L	**T**	**P**	**C**	**100**
24CE14404	**COMPUTER AIDED MODELLING AND DESIGN OF STRUCTURES**	3	0	0	3	

Objective(s)	➢ To understand the fundamental principles of structural analysis ➢ To study the theoretical concepts involved in computer-based structural modelling. ➢ To acquire knowledge of computational methods and matrix-based analysis techniques ➢ To learn structural performance with respect to strength and stability. ➢ To gain knowledge about fundamentals of BIM.

UNIT-I	**FUNDAMENTALS OF COMPUTER-AIDED STRUCTURAL ENGINEERING**	9

Evolution of computer applications in structural engineering - Concepts of modelling, discretization, idealization of structures -Types of structural systems and load transfer mechanisms -Role and importance of computer-aided design (CAD) and computer-aided engineering (CAE) -Mathematical models vs physical structures -Introduction to matrix analysis of structures-Overview of modelling assumptions, limitations, and sources of error.

UNIT-II	**STRUCTURAL MODELLING CONCEPTS**	9

Principles of structural modelling - Types of elements: line, surface, solid and their theoretical basis- Degrees of freedom and compatibility- Representation of loads and boundary conditions - Meshing theory: mesh refinement, convergence, element shapes -Stiffness formulation of basic elements -Modelling idealizations for beams, frames, slabs, shells and trusses -Influence of geometry, material properties, and boundary conditions on model behavior.

UNIT-III	**THEORY OF STRUCTURAL ANALYSIS USING COMPUTER MODELS**	9

Linear static analysis: assumptions and limitations -Theory of matrix methods: stiffness matrices, assembly, and solution techniques -Structural stability and eigenvalue problems -Dynamic analysis theory: Natural frequencies and mode shapes -Response spectrum analysis -Time-history analysis (introductory) -Load combinations and theoretical basis -Interpretation of analytical results: displacements, internal forces, reactions -Verification and validation of computer-based analysis.

UNIT-IV	**THEORETICAL BASIS FOR DESIGN OF STRUCTURAL COMPONENTS**	9

Design philosophies: Working Stress, Ultimate Strength, Limit State theories -Behaviour of RC and steel

members under various loads -Theoretical background of: Flexure, shear and axial behavior-Buckling of compression members -Slabs and plate action-Shear walls and lateral load-resisting systems-Concept of capacity design for seismic loads-Code-based theoretical considerations (IS/ACI/AISC/Eurocode – general concepts)-Theoretical approach to detailing principles (ductility, anchorage, development length).		
UNIT-V	**ADVANCED CONCEPTS IN COMPUTER AIDED MODELLING & DESIGN**	9
Fundamentals of Building Information Modelling (BIM) -Conceptual framework of parametric modelling-Theoretical overview of digital representation of structural information-Model coordination and interdisciplinary integration-Theory of clash detection and conflict resolution-Introduction to optimisation and automated design algorithms-Role of AI, machine learning, and digital twins in structural engineering-Ethical and practical limitations of computer-aided design tools.		
Total hours to be taught		**(L:45)**

Outcome(s)

At the end of the course the student should be able to:

- Explain the fundamental concepts of computer-aided structural modelling
- Interpret the matrix methods and their application in computer-based structural analysis.
- Analyze linear static and basic dynamic behaviour of structures using computer models.
- Apply BIM concepts, and interdisciplinary coordination in structural engineering.
- Evaluate the limitations and ethical considerations involved in computer-aided modelling.

REFERENCES

- Chandrasekaran, Srinivasan. *Computer-Aided Structural Analysis: Integration Techniques*.3st ed., CRC Press, 2025.
- Nawari, Nawari O., and Michael Kuenstle. *Building Information Modeling: Framework for Structural Design*. 2nd ed., CRC Press, 2024.
- Molina Villegas, Juan Camilo. *Advanced Structural Analysis: From Theory to Computer Implementation*. Woodhead Publishing, 2025.

Regulations 2024

Course Code	Course Name	Hours/Week			Credit
		L	T	P	C
24HS11006	UNIVERSAL HUMAN VALUES	3	0	0	3

(Mandatory Credit Course to All UG Programmes to be offered in III Semester)

Pre-requisites: Universal Human Values 1 (Induction Programme) (desirable)

The foundation course "H-102 Universal Human Values: "Understanding Harmony" maybe covered in III or IV semester. This course discusses the role of human beings in their family. It also touches issues related to their role in the society and the nature. During the Induction Program, students would get an initial exposure to human values through Universal Human Values 1. This exposure is to be augmented by this compulsory full semester foundation course. The Course has 5 Modules (5 Units): 30 Lectures and 15 Practice sessions (Tutorials).

1. COURSE OBJECTIVES:

The objectives of the course are:

(i). Development of a holistic perspective based on self-exploration about themselves(human being), family, society and nature/existence.

(ii). Understanding (or developing clarity) the harmony in the human being, family, societyand nature/existence

(iii). Strengthening of self-reflection for harmonious relationship in family, society

(iv). Development of commitment and courage to act as human being in ensuring harmony innature for co-existence.

(v). Development of holistic principles of harmony and professional ethics for naturalacceptance of human values and observe ethical human conduct.

2. COURSE OUTCOMES:

Upon completion of the Course the Learner will be able to:

- Distinguish between values and skills, and highlight the need for Universal HumanValues.
- Describe the need for Harmony and distinguish between happiness and accumulation ofphysical facilities, etc.
- Relate the value of harmonious relationship in family, society based on trust andrespect for happiness and prosperity in their life and profession.
- Outline the role of a human being in ensuring harmony in nature for co-existence.
- Apply the holistic principles of Harmony and Professional Ethics for natural acceptanceof human values and observe Ethical Human Conduct.

Module 1: Course Introduction - Need, Basic Guidelines, Content and Process for ValueEducation

L 1. Purpose and motivation for the course, recapitulation from Universal Human

Values-I(Induction Programme).

L 2. Self-Exploration–what is it? Its content and process; 'Natural Acceptance' andExperiential Validation-as the process for self-exploration.

L 3. Continuous Happiness and Prosperity - A look at basic Human Aspirations.

L 4. Right understanding, Relationship and Physical Facility - the basic requirements forfulfillment of aspirations of every human being with their correct priority.

L 5. Understanding Happiness and Prosperity correctly - A critical appraisal of the currentscenario.

L 6. Method to fulfill the above human aspirations: understanding and living in harmony atvarious levels.

3 Practice sessions *(T1 to T3) - To discuss natural acceptance in human being as the innateacceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking.*

Module 2: Understanding Harmony in the Human Being - Harmony in Myself!

L 7. Understanding human being as a co-existence of the sentient 'I' and the material 'Body'L 8. Understanding the needs of Self ('I') and 'Body'- happiness and physical facility

L 9. Understanding the Body as an instrument of 'I'(I being the doer, seer and enjoyer)L 10.Understanding the characteristics and activities of 'I' and harmony in 'I'

L 11.Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal ofPhysical needs, meaning of Prosperity in detail.

L 12.Programs to ensure Sanyam and Health.

3 Practice sessions *(T4 to T6) - To discuss the role others have played in making material goods available to me. Identifying from one's own life. Differentiate between prosperity andaccumulation. Discuss program for ensuring health vs dealing with disease.*

Module 3: Understanding Harmony in the Family and Society - Harmony in Human-Human Relationship

L 13. Understanding values in human-human relationship; meaning of Justice (Nine universalvalues in relationships) and program for its fulfillment to ensure mutual happiness; Trust and Respect as the foundational values of relationship.

L 14. Understanding the meaning of Trust; Difference between intention and competence.

L 15. Understanding the meaning of Respect, Difference between respect and differentiation;the other salient values in relationship.

L 16. Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive HumanGoals.

L 17. Visualizing a universal harmonious order in Society-Undivided Society, UniversalOrder-from family to world family.

3 Practice sessions *(T7 to T9): Include practice sessions to reflect on relationships infamily, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education, etc. Discuss Gratitude as a universal value in relationships, scenarios. Elicit examples from students' lives.*

Module4: Understanding Harmony in the Nature and Existence - Whole existence as Coexistence

L 18. Understanding the harmony in the Nature.

L 19. Interconnectedness and mutual fulfillment among the four orders of nature -recyclability and self-regulation in nature.
L 20. Understanding Existence as Co-existence of mutually interacting units in all - pervasivespace.
L 21. Holistic perception of harmony at all levels of existence.
2 Practice sessions *(T10 to T11): Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and roleof technology, etc.*

Module 5: Implications of the above Holistic Understanding of Harmony on Professional Ethics

L 22. Natural acceptance of human values.
L 23. Definitiveness of Ethical Human Conduct.
L 24. Basis for Humanistic Education, Humanistic Constitution and Humanistic UniversalOrder.
L 25. Competence in professional ethics: (a). Ability to utilize the professional competencefor augmenting universal human order (b). Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems, (c). Ability toidentify and develop appropriate technologies and management patterns for above production systems.
L 26. Case studies of typical holistic technologies, management models and productionsystems.
L 27. Strategy for transition from the present state to Universal Human Order: (a). At thelevel of individual: as socially and ecologically responsible engineers, technologistsand managers (b). At the level of society: as mutually enriching institutions and organizations.
L 28. Definition of Morals, Values and Ethics – Integrity – Work ethic – Service learning –Civic virtue – Respect for others – Living peacefully.
L 29. Importance of Caring – Sharing – Honesty – Courage – Valuing time – Cooperation –Commitment – Empathy – Self-confidence – Character – Spirituality.
L 30. Introduction to Yoga and meditation for professional excellence and stressmanagement.
Sum up.
4 Practice sessions *(T12 to T15) - Include Practice Exercises and Case Studies which will betaken up in Practice (Tutorial) Sessions.*
eg. To discuss the conduct as an Engineer or Scientist, etc.

TOTAL = 45 Hours

3. READINGS:

Textbook

1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, ExcelBooks, New Delhi, 2010.

Reference Books

1. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of My Experiments with Truth -by Mohandas Karamchand Gandhi
4. Small is Beautiful - E. F Schumacher.
5. Slow is Beautiful - Cecile Andrews.
6. Economy of Permanence - J C Kumarappa.

7. Bharat Mein Angreji Raj - Pandit Sunderlal.
8. Rediscovering India by Dharampal.
9. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi.
10. India Wins Freedom - Maulana Abdul Kalam Azad.
11. Vivekananda - Romain Rolland (English).
12. Mika Martin and Roland Scinger, 'Ethics in Engineering', Pearson Education/PrenticeHall, New York 1996.

MAHENDRA ENGINEERING COLLEGE
(Autonomous)

Syllabus

Department	**Civil Engineering**	**Programme Code**	

SEMESTER-IV

COURSE CODE	**COURSE NAME**	**HOURS/WEEK**			**CREDIT**	**MAXIMUM MARKS**
		L	**T**	**P**	**C**	
24CE24401	**HYDRAULIC ENGINEERING LABORATORY**	**0**	**0**	**2**	**1**	**100**

Objective(s)	The objectives of this course is, • To understand the flow measurement in a pipe flow • To get knowledge in the energy loss in pipe flow • To study the characteristics of pumps • To learn about the characteristics of turbines.

LIST OF EXPERIMENTS

a	**Flow Measurement** 1. Calibration of Rotometer 2. Flow through Venturimeter, Orificemeter 3. Flow through variable duct area - Bernoulli"s Experiment 4. Flow through Orifice, Mouthpiece and Notches
b	**Losses in Pipes** 5.Determination of friction coefficient in pipes 6.Determination of loss coefficients for pipe fittings
c.	**Pumps** 7. Characteristic curve of Centrifugal pumps (Constant speed / variable speed) 8. Gear pump 9. Submersible pump
d	**Turbines** 10. Pelton wheel turbine 11. Francis turbine

Total hours to be taught	**45 Hrs**
Outcome(s)	At the end of this course students will able to, • Calculate the discharge of fluid in pipes. • Determine the energy loss in conduits. • Sketch the characteristics curves of pumps and turbines.

POs / COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	-	-	-	1	1	1	1	-	-	-	3	1
CO2	2	3	-	-	-	1	1	1	1	-	-	-	3	1
CO3	3	-	-	-	-	1	1	1	1	-	-	-	3	2

"-" - No correlation , "1" - Lower correlation , "2" - Moderate correlation , "3" – Higher correlation

MAHENDRA ENGINEERING COLLEGE

(Autonomous)

Syllabus

Department	**Civil Engineering**	**Programme Code**	**1021**

SEMESTER-IV

COURSE CODE	**COURSE NAME**	**HOURS/WEEK**			**CREDIT**	**MAXIMUM MARKS**
		L	**T**	**P**	**C**	
24CE34401	**ADVANCED SURVEYING AND CAMP**	1	0	2	2	**100**

Objective(s)	The objectives of this course is, • To gain knowledge about hydrographic, photogrammetric and astronomical surveying. • To get the knowledge about modern surveying methods. • To measure the area and Volume in totalstation • To learn about the measuring L/S and C/S by totalstation • To study about the GPS

UNIT-I	**ADVANCED SURVEYING METHODS**	9

Introduction & object of Geodetic Surveying-Hydrographic surveying – Tides - MSL - Sounding methods. Determination of azimuth , Latitude and longitude & Examples of azimuth , Latitude and longitude - Basic concepts. Photogrammetry Surveying - Introduction, principle, uses Aerial camera terrestrial and aerial Photogrammetry – Drone Surveying.

UNIT-II	**MODERN SURVEYING**	9

Electromagnetic distance measurement -Measuring Principle, Working Principle, Sources of error. Total station-Measuring and working principle-Sources of error. Global positioning system,Types, Applications of GPS,Method of operation,– Types of segments- System Segmentation Integration of remote sensing and GIS, applications in civil engineering. – Observation principle-– Remote sensing – platforms and sensors – Digital image processing.

LABORATORY

LIST OF EXPERIMENTS	27

1. Study of Total Station and GPS
2. Determine the area of large surface using Total station.
3. Determine the Volume of earthwork using Total Station.
4. Layout of Contouring in Grid method using theodolite.
5. Determination of L.S & C.S using Dumpy level.
6. Determination of L.S & C.S using Theodolite
7. Layout of radial Contouring using theodolite.
8. Building marking using theodolite.

Outcome(s)	At the end of the course the student should be able to, • Explain hydrographic, photogrammetric and astronomical surveying. • Apply modern surveying in the field. • Calculate the angular measurement by using theodolite and tacheometric surveying • Compute the area, volume and L/S, C/S of land using total station. • Describe concept about GPS

Text book :

•	Dr. B.C. Punmia, Ashok Kumar Jain, Ashok Kr. Jain, Arun Kr. Jain"Surveying (Volume –I)", Lakshmi Publications,17thedition, 2016.
•	Dr. B.C. Punmia, Ashok Kumar Jain, Ashok Kr. Jain, Arun Kr. Jain"Surveying (Volume –II)", Lakshmi Publications,16thedition, 2016
•	Surveying and Leveling-38th edition.2014, N.N. Basak Tata McGraw Hill
•	S.K.Duggal, "Surveying (Volume-I,II) "Tata Mcgraw-Hill Publishing company Ltd. Newdelhi,2007.

REFERENCES

•	SatheeshGopi, R.Sathikumar, N.Madhu, " Advanced Surveying -Total station, GIS and Remote sensing", Pearson Education India(2012).
•	Arora K.R.,"Surveying Vol I, II & III", Standard Book house, 10th Edition 2008
•	S. S. Bhavikatti, "Surveying and Levelling (Volume-1& II)"I. K. International Pvt Ltd, 2009.
•	A.M Chandra , "Higher Surveying", New age International, New Delhi.2004.
•	Leudr.D.R., *Aerial Photographic Interpretation*, McGrawHill, 1959.
•	A.M Chandra , "Higher Surveying", New age International, New Delhi.2004.

S.NO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	-	1	-	-	-	-	-	-	-	2	1	3
CO2	1	2	-	-	-	-	-	-	-	-	-	1	1	3
CO3	2	3	-	-	1	-	-	-	2	-	-	2	3	1
CO4	2	3	-	-	2	-	-	-	2	-	-	2	3	1
CO5	1	2	-	-	2	-	-	-	1	-	-	2	1	3

"-" - No correlation , "1" - Lower correlation , "2" - Moderate correlation , "3" – Higher correlation

Syllabus - Regulation 2024

Department	**English**

Semester – IV
(Common to all B.E./B.Tech. Programmes)

Course code	Course Name	Hours/week			Credit	Maximum marks
		L	T	P	C	
24HS21002	**PROFESSIONAL COMMUNICATION SKILLS** (Common to all B.E./B.Tech. Degree Programmes)	0	1	2	2	100

Objectives	➢ To familiarize students with the stage dynamics ➢ To help the learners to improve their creative skills ➢ To make them acquire the ability to speak effectively in real life situations
Outcomes	**At the end of the course, the learners will be able to :** ➢ Apply suitable vocabulary in academic and workplace contexts ➢ Demonstrate communication skills effectively in both oral and written formats ➢ Create documents professionally and make presentations effectively

LIST OF EXERCISES

1.	Introduction to Professional Communication and SWOT Analysis
2.	Soft Skills (Goal Setting, Empathy, Stress Management, Emotional Intelligence, Conflict Resolution)
3.	Building Vocabulary (Intermediate Level)
4.	Welcome Address and Vote of Thanks
5.	Stage Dynamics (Body Language and Paralanguage – Individual Presentation for 3 minutes)
6.	Framing Questions (WH Questions & 'Yes' or 'No' Questions)
7.	Narrative Techniques - Narrating the Experience
8.	Master of Ceremony Skills
9.	Picture Description
10.	Impromptu Speech (Just a Minute)

Total Hrs : 30

Textbook:	
1	Joshi, Manmohan, *Soft Skills*, 1st Edition. Bookboon, 2017
Reference Books:	
1	Muralikrishna, & Sunita Mishra, *Communication Skills for Engineers*. Pearson, New Delhi, 2011.
2	Barun K. Mitra, Personality Development and Soft Skills, Oxford University Press, New Delhi, 2011
Online Websites:	
1	https:// www.ted.com/talks
2	https://joshtalks.com
3	https://quizziz.com
4	www.pdfdrive.com
5	www.talking books.com