



**Mahatma Education Society's
Pillai HOC College of Engineering and
Technology, Rasayani**

1.3 Curriculum Enrichment

1.3.1 Institution integrates crosscutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability into the Curriculum

Programme Name: Information Technology
Course name: Software engineering and project management

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Pillai HOC College of
Engineering and Technology,
Pillai's HOC Educational Campus
Rasayani, Tal. Khetapur
Dist. Raigad, Pin-410 207**

Course Code	Course/Subject Name	Credits
MEC802	Industrial Engineering and Management	04

Objectives

1. To familiarise with concept of integration of various resources and the significance of optimizing them in manufacturing and allied Industries
2. To acquaint with various productivity enhancement techniques

Outcomes: Learner will be able to...

1. Illustrate the need for optimization of resources and its significance
2. Develop ability in integrating knowledge of design along with other aspects of value addition in the conceptualization and manufacturing stage of various products.
3. Demonstrate the concept of value analysis and its relevance.
4. Manage and implement different concepts involved in method study and understanding of work content in different situations.
5. Describe different aspects of work system design and facilities design pertinent to manufacturing industries.
6. Illustrate concepts of Agile manufacturing, Lean manufacturing and Flexible manufacturing

Modules	Detailed contents	Hrs.
01	Introduction to Industrial Engineering History and contribution, Industrial engineering approach, techniques of industrial engineering, objectives of industrial engineering, system approach to industrial engineering, definition and concept of productivity, productivity measurements, factors influencing productivity and productivity improvement techniques.	06
	Value Engineering and Value Analysis: Distinction between value engineering & value analysis and their Significance. Steps in value engineering & analysis and Check lists.	05
03	Work study: Method study, micro-motion-study and principles of motion economy, Work measurement: time study, work sampling, standard data, PMTS; MOST	10
04	Work system design: Introduction to ergonomics and its scope in relation to work. Outline of discipline of anatomy, physiology and psychology, with respect to ergonomics building blocks such as anthropometry and biomechanics Job evaluation, merit rating, incentive schemes, wage administration and business process reengineering	08
05	Facility Design: Facility location factors and evaluation of alternate locations; types of plant layout and their evaluation; computer aided layout design techniques; assembly line balancing; materials handling systems Concepts of Group Technology and cellular manufacturing	09
06	Agile manufacturing: Introduction, Developing agile manufacturing, Integration of Product/Process Development, Application of IT/IS concepts, Agile supply chain management, Design of skill and knowledge and Computer control of Agile manufacturing. Flexible manufacturing, Lean Manufacturing, Value Stream Mapping	10

Assessment:

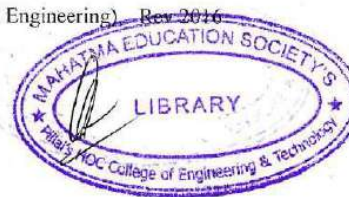
Internal Assessment for 20 marks:

Consisting **Two Compulsory Class Tests**

First test based on approximately 40% of contents and second test based on remaining contents (approximately 40% but excluding contents covered in Test I)

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End Semester Examination:

Weightage of each module in end semester examination will be proportional to number of respective lecture hours mentioned in the curriculum.

1. Question paper will comprise of total six questions, each carrying 20 marks
2. Question 1 will be compulsory and should cover maximum contents of the curriculum
3. Remaining questions will be mixed in nature (for example if Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3)
4. Only Four questions need to be solved.

References

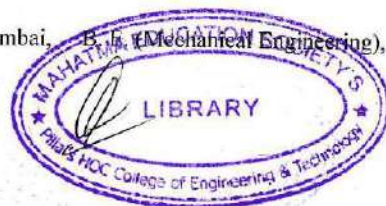
1. Introduction to Work study, ILO, Geneva, and Oxford & IBH Pub Co. Pvt. Ltd.
2. Ergonomics at Work, Murrell
3. Plant Layout and Material Handling, James M. Apple, John Wiley & Sons
4. Facility Layout and Location – An Analytical Approach, Richard L. Francis & John A. White, Prentice Hall
5. Production Planning and Control, Samuel Elion
6. Production and Operations Management, Joseph G. Monks
7. Quality planning and analysis, J M Juran, FM Gryana, TMH
8. Total Quality Management, D. H. Bester Field et al. prentice hall
9. TQM in new product manufacturing, HG Menon; TMH
10. Industrial Engineering and Management by Dr Ravi Shankar



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Course name:Infrastructure Security

Course Code	Course Name	Theory	Practical	Tutorial	Theory	Practical/Oral	Tutorial	Total
ITC702	Infrastructure Security	04	--	-	04	--	-	04

Course Code	Course Name	Examination Scheme							
		Theory Marks				End Sem. Exam	Term Work	Oral & Practical	Total
		Internal assessment							
		Test1	Test2	Avg. of two Tests					
ITC702	Infrastructure Security	20	20	20	80	--	--	100	

Course Objectives: Students will try :

1. To understand underlying principles of infrastructure security
2. To explore software vulnerabilities, attacks and protection mechanisms
To learn security aspects of wireless network infrastructure and protocols
3. To investigate web server vulnerabilities and their countermeasures
4. To develop policies for security management and mitigate security related risks in the organization
5. To Learn the different attacks on Open Web Applications and Web services.
6. To Learn the different security policies.

Course Outcomes: Students will be able to:

1. Understand the concept of vulnerabilities, attacks and protection mechanisms
2. Analyze and evaluate software vulnerabilities and attacks on databases and operating systems
3. Explain the need for security protocols in the context of wireless communication
4. Understand and explain various security solutions for Web and Cloud infrastructure
5. Understand, and evaluate different attacks on Open Web Applications and Web services
6. Design appropriate security policies to protect infrastructure components

Prerequisite: Computer Networks, Cryptography and Network Security

Detail Syllabus:

Sr. No.	Module	Detailed Content	Hours	CO Mapping
1	Introduction	Cyber-attacks, Vulnerabilities, Defense Strategies and Techniques, Authentication Methods- Password, Token and Biometric, Access Control Policies and Models (DAC,MAC, RBAC, ABAC, BIBA, Bell La Padula), Authentication and Access Control Services- RADIUS, TACACS, and TACACS+	6	CO1

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II	Software Security	<p>Software Vulnerabilities:</p> <p>Buffer overflow, Format String, Cross-Site Scripting, SQL Injection, Malware: Viruses, Worms, Trojans, Logic Bomb, Bots, Rootkits</p> <p>Operating System Security:</p> <p>Memory and Address Protection, File Protection Mechanism, User Authentication.</p> <p>Linux and Windows: Vulnerabilities, File System Security</p> <p>Database Security:</p> <p>Database Security Requirements, Reliability and Integrity, Sensitive Data, Inference Attacks, Multilevel Database Security</p>	12	CO2
III	Wireless Security	Mobile Device Security- Security Threats, Device Security, GSM, UMTS and 4G Security, IEEE 802.11x Wireless LAN Security, VPN Security, Wireless Intrusion Detection System (WIDS)	9	CO3
IV	Cloud Security	Cloud Security Risks and Countermeasures, Data Protection in Cloud, Cloud Application Security, Cloud Identity and Access Management, Cloud Security as a Service, SAML, OAuth	8	CO4
V	Web Security	Web Security Considerations, User Authentication and Session Management, Cookies, SSL, HTTPS, SSH, Privacy on Web, Web Browser Attacks, Account Harvesting, Web Bugs, Clickjacking, Cross-Site Request Forgery, Session Hijacking and Management, Phishing and Pharming Techniques, DNS Attacks, Web Service Security, Secure Electronic Transaction, Email Attacks, Web Server Security as per OWASP, Firewalls, Penetration Testing	12	CO4, CO5
VI	Information Security and Risk Management	Security Policies, Business Continuity Plan, Risk Analysis, Incident Management, Legal System and Cybercrime, Ethical Issues in Security Management.	5	CO6

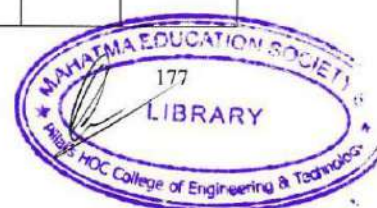
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Text Books:

1. Computer Security Principles and Practice, William Stallings, Sixth Edition, Pearson Education
2. Security in Computing, Charles P. Pfleeger, Fifth Edition, Pearson Education
3. Network Security and Cryptography, Bernard Menezes, Cengage Learning
4. Network Security Bible, Eric Cole, Second Edition, Wiley

Reference Books:

1. Web Application Hackers Handbook by Wiley.
2. Computer Security, Dieter Gollman, Third Edition, Wiley
3. CCNA Security Study Guide, Tim Boyle, Wiley
4. Introduction to Computer Security, Matt Bishop, Pearson.
5. Cloud Security and Privacy, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Riely

Assessment:

Internal Assessment for 20 marks:

Consisting of **Two Compulsory Class Tests**

Approximately 40% to 50% of syllabus content must be covered in First test and remaining 40% to 50% of syllabus contents must be covered in second test.

End Semester Examination: Some guidelines for setting the question papers are as:

- Weightage of each module in end semester examination is expected to be/will be proportional to number of respective lecture hours mentioned in the syllabus.
- Question paper will comprise of total **six questions, each carrying 20 marks.**
- **Q.1 will be compulsory** and should cover **maximum contents of the syllabus.**
- **Remaining question will be mixed in nature** (for example if Q.2 has part (a) from module 3 then part (b) will be from any other module. (Randomly selected from all the modules.)
- **Total four questions** need to be solved.

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Course: Principles of Communication

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical /Oral	Tutorial	Total
ITC304	Principle of Communication	03	--	--	03	--	--	03

Course Code	Course Name	Examination Scheme						
		Theory Marks				Term Work	Pract. /Oral	Total
		Internal assessment			End Sem. Exam			
Test1	Test 2	Avg.	End Sem. Exam					
ITC304	Principle of Communication	20	20	20	80	--	--	100

Course Objectives:

Sr. No.	Course Objectives
	The course aims:
1	Study the basic of Analog and Digital Communication Systems.
2	Describe the concept of Noise and Fourier Transform for analyzing communication systems.
3	Acquire the knowledge of different modulation techniques such as AM, FM and study the block diagram of transmitter and receiver.
4	Study the Sampling theorem and Pulse Analog and digital modulation techniques
5	Learn the concept of multiplexing and digital band pass modulation techniques
6	Gain the core idea of electromagnetic radiation and propagation of waves.

Course Outcomes:

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
	On successful completion, of course, learner/student will be able to:	
1	Describe analog and digital communication systems	L1,L2
2	Differentiate types of noise, analyses the Fourier transform of time and frequency domain.	L1, L2, L3, L4
3	Design transmitter and receiver of AM, DSB, SSB and FM.	L1,L2,L3,L4
4	Describe Sampling theorem and pulse modulation systems.	L1,L2,L3
5	Explain multiplexing and digital band pass modulation techniques.	L1, L2
6	Describe electromagnetic radiation and propagation of waves.	L1,L2

Prerequisite: Basic of electrical engineering



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DETAILED SYLLABUS:

Sr. No.	Module	Detailed Content	Hours	CO Mapping
0	Prerequisite	Terminologies in communication systems, analog and digital electronics	02	
I	Introduction	Basics of analog communication and digital communication systems (Block diagram), Electromagnetic Spectrum and application, Types of Communication channels. Self-learning Topics: Applications areas of analog and digital communication.	03	CO1
II	Noise and Fourier Representation of Signal and System	Basics of signal representation and analyses, Introduction to Fourier Transform, its properties (time and frequency shifting, Fourier transform of unit step, delta and gate function. Types of Noise, Noise parameters –Signal to noise ratio, Noise factor, Noise figure, Friss formula and Equivalent noise temperature. Self-learning Topics: Practice Numerical on above topic.	06	CO2
III	Amplitude and Angle modulation Techniques.	Need for modulation, Amplitude Modulation Techniques: DSBFC AM,DSBSC-AM, SSB SC AM- block diagram spectrum, waveforms, bandwidth, Power calculations. Generation of AM using Diode, generation of DSB using Balanced modulator, Generation of SSB using Phase Shift Method. AM Transmitter (Block Diagram) AM Receivers – Block diagram of TRF receivers and Super heterodyne receiver and its characteristics- Sensitivity, Selectivity, Fidelity, Image frequency and its rejection and double spotting Angle Modulation FM: Principle of FM- waveforms, spectrum, bandwidth. Pre- emphasis and de-emphasis in FM, FM generation: Direct method –Varactor diode Modulator, Indirect method (Armstrong method) block diagram and waveforms. FM demodulator: Foster Seeley discriminator, Ratio detector. Self-learning Topics: Use of AM and FM in Modern Communication Technology. Challenges faced by radio business.	12	CO1, CO2, CO3
IV	Pulse Analog Modulation and Digital Modulation	Sampling theorem for low pass and band pass signals with proof, Anti- aliasing filter, PAM, PWM and PPM generation and Degeneration. Quantization process, Pulse code modulation, Delta modulation, adaptive delta modulation. Introduction to Line Codes and ISI.	08	CO1, CO2, CO4



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		Self-learning Topics: Implementation of Pulse code modulation and demodulation.		
V	Multiplexing and Digital Band Pass Modulation Techniques	Principle of Time Division Multiplexing, Frequency Division Multiplexing, Orthogonal Frequency Division Multiplexing and its applications .ASK, FSK, PSK QPSK Generation and detection. Self-learning Topics: Implement TDM, FDM, OFDM.	04	CO1, CO2, CO5
VI	Radiation and Propagation of Waves	Electromagnetic radiation, fundamentals, types of propagation, ground wave, sky wave, space wave tropospheric scatter propagation Self-learning Topics: List the real time examples for different types of propagation waves.	04	CO6

Text Books:

- [1]. George Kennedy, Bernard Davis, SRM Prasanna, Electronic Communication Systems, Tata McGraw Hill, 5th Ed
 [2]. Simon Haykin, Michael Moher, Introduction to Analog & Digital Communications, Wiley India Pvt. Ltd., 2nd Ed.
 [3]. Wireless Communication and Networking, Vijay Garg

References:

- [1]. Wayne Tomasi, Electronic Communications Systems, Pearson Publication, 5th Ed.
 [2]. B P Lathi, Zhi Ding, Modern Digital and Analog Communication Systems, Oxford University
 [3]. Herbert Taub, Donald L Schilling, Goutam Saha, Principles of Communication Systems, Tata McGraw Hill, 3rdEd.
 [4]. K Sam Shanmugam, Digital and Analog Communication Systems, Wiley India Pvt. Ltd, 1st Ed.

Online References:

Sr. No.	Website Name
1.	https://www.nptel.ac.in
2.	https://www.classcentral.com
3.	http://www.vlab.co.in/

Assessment:

Internal Assessment (IA) for 20 marks:

- IA will consist of Two Compulsory Internal Assessment Tests. Approximately 40% to 50% of syllabus content must be covered in First IA Test and remaining 40% to 50% of syllabus content must be covered in Second IA Test

➤ **Question paper format**

- Question Paper will comprise of a total of six questions each carrying 20 marks Q.1 will be compulsory and should cover maximum contents of the syllabus
- Remaining questions will be mixed in nature (part (a) and part (b) of each question must be from different modules. For example, if Q.2 has part (a) from Module 3 then part (b) must be from any other Module randomly selected from all the modules)
- A total of four questions need to be answered



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Programme Name: Electrical Engineering

Course Name: Project Management

ELECTRICAL ENGINEERING - SEMESTER-VIII						
Course Code	Course Name	Teaching scheme (Contact Hours)		Credits Assigned		
EEIO8021	Project Management	Theory	Pract./Tut.	Theory	Pract./Tut.	Total
		3	--	3	--	3

Course code	Course Name	Examination Scheme							
		Theory					Term Work	Oral	Total
		Internal Assessment			End Sem. Exam	Exam Duration (in Hrs)			
		Test 1	Test 2	Avg					
EEIO8021	Project Management	20	20	20	80	3	--	--	100

Course Objectives	<ol style="list-style-type: none"> 1. To familiarize the students with the use of a structured methodology/approach for each and every unique project undertaken, including utilizing project management concepts, tools and techniques. 2. To appraise the students with the project management life cycle and make them knowledgeable about the various phases from project initiation through closure.
Course Outcomes	<p>Upon successful completion of this course, the learner will be able to:</p> <ol style="list-style-type: none"> 1. Apply selection criteria and select an appropriate project from different options. 2. Write work break down structure for a project and develop a schedule based on it. 3. Identify opportunities and threats to the project and decide an approach to deal with them strategically. 4. Use Earned value technique and determine & predict status of the project. 5. Capture lessons learned during project phases and document them for future reference



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Module	Contents	Hours
1	Project Management Foundation: Definition of a project, Project Vs Operations, Necessity of project management, Triple constraints, Project life cycles (typical & atypical) Project phases and stage gate process. Role of project manager, Negotiations and resolving conflicts, Project management in various organization structures, PM knowledge areas as per Project Management Institute (PMI)	05
2	Initiating Projects: How to get a project started, selecting project strategically, Project selection models (Numeric /Scoring Models and Non-numeric models), Project portfolio process, Project sponsor and creating charter; Project proposal. Effective project team, Stages of team development & growth (forming, storming, norming & performing), team dynamics.	06
3	Project Planning and Scheduling: Work Breakdown structure (WBS) and linear responsibility chart, Interface; Co-ordination and concurrent engineering, Project cost estimation and budgeting, Top down and bottoms up budgeting, Networking and Scheduling techniques. PERT, CPM, GANTT chart, Introduction to Project Management Information System (PMIS).	08
4	Planning Projects: Crashing project time, Resource loading and levelling, Goldratt's critical chain, Project Stakeholders and Communication plan Risk Management in projects: Risk management planning, Risk identification and risk register, Qualitative and quantitative risk assessment, Probability and impact matrix. Risk response strategies for positive and negative risks	06

University of Mumbai, Electrical Engineering, Rev. 2019 'C' Scheme



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5	<p>5.1 Executing Projects: Planning monitoring and controlling cycle, Information needs and reporting, engaging with all stakeholders of the projects, Team management, communication and project meetings</p> <p>5.2 Monitoring and Controlling Projects: Earned Value Management techniques for measuring value of work completed; Using milestones for measurement; change requests and scope creep, Project audit</p> <p>5.3 Project Contracting Project procurement management, contracting and outsourcing,</p>	08
6	<p>6.1 Project Leadership and Ethics: Introduction to project leadership, ethics in projects, Multicultural and virtual projects</p> <p>6.2 Closing the Project: Customer acceptance; Reasons of project termination, Various types of project terminations (Extinction, Addition, Integration, Starvation), Process of project termination, completing a final report; doing a lessons learned analysis; acknowledging successes and failures; Project management templates and other resources; Managing without authority; Areas of further study.</p>	06

References:

1. Project Management: A managerial approach, Jack Meredith & Samuel Mantel, 7th Edition, Wiley India
2. A Guide to the Project Management Body of Knowledge (PMBOK® Guide), 5th Ed, Project Management Institute PA, USA
3. Project Management, Gido Clements, Cengage Learning
4. Project Management, Gopalan, Wiley India
5. Project Management, Dennis Lock, 9th Edition, Gower Publishing England

Assessment:

Internal Assessment for 20 marks:

Consisting **Two Compulsory Class Tests**

First test based on approximately 40% of contents and second test based on remaining contents (approximately 40% but excluding contents covered in Test I)

End Semester Examination:

Weightage of each module in end semester examination will be proportional to number of respective lecture hours mentioned in the curriculum.

1. Question paper will comprise of total **six questions, each carrying 20 marks**
2. **Question 1** will be **compulsory** and should **cover maximum contents of the curriculum**
3. **Remaining questions will be mixed in nature** (for example if Q.2 has part (a) from module 3 then, part (b) will be from any module other than module 3)
4. Only **Four questions need to be solved**



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Course Name:Renewable Energy Sources

ELECTRICAL ENGINEERING - SEMESTER-V						
Course Code	Course Name	Teaching scheme (Contact Hours)			Credits Assigned	
EEDO5011	Renewable Energy Sources	Theory	Pract./Tut.	Theory	Pract./Tut.	Total
		3	–	3		3

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract/ Oral	Total
		Internal Assessment			End Sem. Exam	Exam Duration (in Hrs)			
		Test 1	Test 2	Avg					
EEDO5011	Renewable Energy Sources	20	20	20	80	3	-	-	100

Course Objectives	<ol style="list-style-type: none"> 1. To review of conventional and non-conventional energy sources. 2. To give the students basic knowledge of solar thermal energy applications 3. To give the students basic knowledge solar photovoltaic system 4. To give the students basic knowledge of wind energy system 5. To give the students basic knowledge of fuel cell system operation 6. To give the students basic knowledge about other renewable energy sources.
Course outcomes	<p>Upon successful completion of this course, the learner will be able to:</p> <ol style="list-style-type: none"> 1. Understand different types conventional energy sources and their reserves 2. Identify and analyse the process of power generation through solar thermal energy utilization 3. Identify and analyse the process of power generation through solar photovoltaic energy utilization 4. Identify and describe the various components and types of Wind Energy system 5. Identify and describe the basic operation and types of Fuel cell system 6. Understand different types of other non-conventional energy sources

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Module	Contents	Hours
1.	Introduction:- World's and India's production and reserves of commercial energy sources, energy alternatives, review of conventional and non-conventional energy sources. Statistic of net potential and current generation status of different energy alternatives.	04
2.	Solar Energy (Thermal Energy applications) : Solar thermal energy storage, Liquid flat plate collector, Solar air heater, concentrating collectors, thermal energy storage, solar pond	04
3.	Solar Energy (Direct Electricity Applications): Solar Photovoltaic- solar cell: characteristics, losses, model of a solar cell, emerging solar cell technologies; Solar PV modules, mismatch in module, hot spots, bypass diode; PV module: I-V and power curve, effect of variation in temperature and solar radiations; MPPT, types, different algorithms for electrical MPPT. Distributed MPPT, MPPT converters. Types of PV systems: standalone, grid connected systems; BOS of PV system, Battery charge controllers, Power Conditioning Unit, Solar PV Micro-inverters Solar Plant design: mounting of PV panels supporting structures, Calculation and Design methodology of standalone PV system and grid connected system.	12
4.	Wind Energy: Review of wind energy system and its components, types of wind turbines, characteristics; general concepts of aerofoils and aerodynamics, Wind data, Energy content of the wind, Power generation and control in wind energy systems, performance calculations of wind energy systems. Topologies of WES, WES with rectifier / inverter system, Power Converters for Doubly Fed Induction Generators (DFIG) in Wind Turbines.	08

5.	Fuel Cell: Review of fuel cells and their principle of operation, Review of types of fuel cell and their performance comparison. Topologies of fuel cell power systems, applications.	05
6.	Other Sources: Review of other nonconventional sources, their features and applications; Biomass, Tidal, Ocean, Thermal Electric Conversion, geothermal, Micro-hydro, Wave energy	06

Text / Reference Books:

1. Ali Keyhani, Mohammad N. Marwali, Min Dai "Integration of Green and Renewable Energy in Electric Power Systems", Wiley
2. Green M.A " Solar Cells": Operating Principles, Technology and System Applications, Prentice Hall Inc, Englewood Cliffs N.J, U.S.A, 1982
3. James Larminie, Andrew Dicles "Fuel Cell Systems Explained," Wiley publication
4. Chetan Singh Solanki , Solar Photo Voltaics , PHI Learning Pvt Ltd., New Delhi,2009
5. Hashem Nehrir and Caisheng Wang, Modeling and control of Fuel Cells: Distributed Generation Applications, IEEE Press, 2009
6. J.F. Manwell and J.G. McGowan, Wind Energy Explained, Theory Design and Applications, Wiley publication
7. Leo J.M.J. Blomen and Michael N. Mugerwa, "Fuel Cell System", New York, Plenum Press, 1993.
8. D. D. Hall and R. P. Grover, Biomass Regenerable Energy, John Wiley, New York, 1987.
9. Felix A. Farret and M. Godoy Simoes, Integration of Alternative Sources of Energy, 2006, John Wiley and Sons.
10. S. Chakraborty, M. G. Simões and W. E. Kramer, Power Electronics for Renewable and Distributed Energy System, Springer 2013
11. N. Femia • G. Petrone, G. Spagnuolo and M. Vitelli, Power Electronics and Control Techniques for Maximum Energy Harvesting in Photovoltaic Systems, CRC Press, 2013.

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Course Name : Professional Communication and Ethics-II

ELECTRICAL ENGINEERING - SEMESTER-V								
Course Code	Course Name	Teaching scheme			Credit assigned			
EEL504	Professional Communication & Ethics-II	Theory	Pract.	Tut.	Theory	Pract.	Tut.	Total
		--	2* + 2 Hours (Batch-wise)	--	--	2	--	02

*Theory class to be conducted for full class.

Course Code	Course Name	Examination Scheme									
		Theory					Term work	Pract	Oral	Internal Oral	Total
		Internal Assessment			End sem	Duration (hrs)					
		Test 1	Test 2	Avg.							
EEL504	Professional Communication & Ethics-II	--	--	--	--	--	25	--	--	25	50

Course Rationale	This curriculum is designed to build up a professional and ethical approach, effective oral and written communication with enhanced soft skills. Through practical sessions, it augments student's interactive competence and confidence to respond appropriately and creatively to the implied challenges of the global Industrial and Corporate requirements. It further inculcates the social responsibility of engineers as technical citizens.
Course Objectives	<ul style="list-style-type: none"> To discern and develop an effective style of writing important technical/business documents. To investigate possible resources and plan a successful job campaign. To understand the dynamics of professional communication in the form of group discussions, meetings, etc. required for career enhancement. To develop creative and impactful presentation skills. To analyze personal traits, interests, values, aptitudes and skills. To understand the importance of integrity and develop a personal code of ethics.



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Course Outcomes	<p>Upon successful completion of this course, the learner will be able to:</p> <ol style="list-style-type: none"> 1. Plan and prepare effective business/technical documents which will in turn provide solid foundation for their future managerial roles. 2. Strategize their personal and professional skills to build a professional image and meet the demands of the industry. 3. Emerge successful in group discussions, meetings and result-oriented agreeable solutions in group communication situations. 4. Deliver persuasive and professional presentations. 5. Develop creative thinking and interpersonal skills required for effective professional communication. 6. Apply codes of ethical conduct, personal integrity and norms of organizational behaviour.
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Module	Contents	Hours
1	<p>ADVANCED TECHNICAL WRITING :PROJECT/PROBLEM BASED LEARNING (PBL)</p> <p>1.1 Purpose and Classification of Reports: Classification on the basis of:</p> <ul style="list-style-type: none"> • Subject Matter (Technology, Accounting, Finance, Marketing, etc.) • Time Interval (Periodic, One-time, Special) • Function (Informational, Analytical, etc.) • Physical Factors (Memorandum, Letter, Short & Long) 	06

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	<p>1.2. Parts of a Long Formal Report:</p> <ul style="list-style-type: none"> • Prefatory Parts (Front Matter) • Report Proper (Main Body) • Appended Parts (Back Matter) <p>1.3. Language and Style of Reports</p> <ul style="list-style-type: none"> • Tense, Person & Voice of Reports • Numbering Style of Chapters, Sections, Figures, Tables and Equations • Referencing Styles in APA & MLA Format • Proofreading through Plagiarism Checkers <p>1.4. Definition, Purpose & Types of Proposals</p> <ul style="list-style-type: none"> • Solicited (in conformance with RFP) & Unsolicited Proposals • Types (Short and Long proposals) <p>1.5. Parts of a Proposal</p> <ul style="list-style-type: none"> • Elements • Scope and Limitations • Conclusion <p>1.6. Technical Paper Writing</p> <ul style="list-style-type: none"> • Parts of a Technical Paper (Abstract, Introduction, Research Methods, Findings and Analysis, Discussion, Limitations, Future Scope and References) • Language and Formatting • Referencing in IEEE Format 	
2	<p>EMPLOYMENT SKILLS</p> <p>2.1. Cover Letter & Resume</p> <ul style="list-style-type: none"> • Parts and Content of a Cover Letter • Difference between Bio-data, Resume & CV • Essential Parts of a Resume • Types of Resume (Chronological, Functional & Combination) <p>2.2 Statement of Purpose</p> <ul style="list-style-type: none"> • Importance of SOP • Tips for Writing an Effective SOP <p>2.3 Verbal Aptitude Test</p> <ul style="list-style-type: none"> • Modelled on CAT, GRE, GMAT exams <p>2.4. Group Discussions</p> <ul style="list-style-type: none"> • Purpose of a GD • Parameters of Evaluating a GD • Types of GDs (Normal, Case-based & Role Plays) • GD Etiquettes <p>2.5. Personal Interviews</p> <ul style="list-style-type: none"> • Planning and Preparation • Types of Questions • Types of Interviews (Structured, Stress, Behavioural, Problem Solving & Case-based) • Modes of Interviews: Face-to-face (One-to one and Panel) Telephonic, Virtual 	06

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3	BUSINESS MEETINGS 3.1 Conducting Business Meetings <ul style="list-style-type: none"> • Types of Meetings • Roles and Responsibilities of Chairperson, Secretary and Members • Meeting Etiquette 3.2. Documentation <ul style="list-style-type: none"> • Notice • Agenda • Minutes 	02
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4	TECHNICAL/ BUSINESS PRESENTATIONS 4.1 Effective Presentation Strategies <ul style="list-style-type: none"> • Defining Purpose • Analyzing Audience, Location and Event • Gathering, Selecting & Arranging Material • Structuring a Presentation • Making Effective Slides • Types of Presentations Aids • Closing a Presentation • Platform skills 4.2 Group Presentations <ul style="list-style-type: none"> • Sharing Responsibility in a Team • Building the contents and visuals together • Transition Phases 	02
5	INTERPERSONAL SKILLS 5.1 Interpersonal Skills <ul style="list-style-type: none"> • Emotional Intelligence • Leadership & Motivation • Conflict Management & Negotiation • Time Management • Assertiveness • Decision Making 5.2 Start-up Skills <ul style="list-style-type: none"> • Financial Literacy • Risk Assessment • Data Analysis (e.g. Consumer Behaviour, Market Trends, etc.) 	08

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6	<p>CORPORATE ETHICS</p> <p>6.1 Intellectual Property Rights</p> <ul style="list-style-type: none"> • Copyrights • Trademarks • Patents • Industrial Designs • Geographical Indications • Integrated Circuits • Trade Secrets (Undisclosed Information) <p>6.2 Case Studies</p> <ul style="list-style-type: none"> • Cases related to Business/ Corporate Ethics 	02
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List of assignments:

(In the form of Short Notes, Questionnaire/ MCQ Test, Role Play, Case Study, Quiz, etc.)

1. Cover Letter and Resume
2. Short Proposal
3. Meeting Documentation
4. Writing a Technical Paper/ Analyzing a Published Technical Paper
5. Writing a SOP
6. IPR
7. Interpersonal Skills
8. Aptitude test (Verbal Ability)

Note:

1. The Main Body of the project/book report should contain minimum 25 pages (excluding Front and Back matter).
2. The group size for the final report presentation should not be less than 5 students or exceed 7 students.

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Course Name: Internet of Thing

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ELECTRICAL ENGINEERING - SEMESTER-VII						
Course Code	Course Name	Teaching scheme (Contact Hours)		Credits Assigned		
EEDO7013	Internet of Things	Theory	Pract./Tut.	Theory	Pract./Tut.	Total
		3	--	3		3

Course Code	Course Name	Examination Scheme							
		Theory			End Sem. Exam	Exam Duration (in Hrs)	Term Work	Pract/ Oral	Total
		Internal Assessment							
		Test 1	Test 2	Avg					
EEDO7013	Internet of Things	20	20	20	80	3	-	-	100

Course Objectives	To provide overview of internet-of-things technologies, hardware, operating systems, networking, security and databases aspects.
Course outcomes	<p>Upon successful completion of this course, the learner will be able to:</p> <ol style="list-style-type: none"> 1. Understand the concept of IOT 2. Illustrate IOT architecture and applications in various fields 3. Demonstrate use Devices, Gateways and Data Management in IoT. 4. Describe the security and privacy issues in IOT. 5. Understand emerging technological options, platforms and case studies of IoT implementation in home & city automation.

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Module	Contents	Hours
1	Introduction to IoT: Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Sources of IoT; Sensing, Actuation, Basics of Networking; Software Architectures and Software Interoperability, Privacy and Security	06
2	IoT Architecture: Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views. Real-World Design Constraints- Introduction, Technical Design constraints, Data representation and visualization, Interaction and remote control.	06
3	Hardware Platforms: Operating Systems, Time Synchronization, Positioning and Localization, Medium Access Control, Topology and Coverage Control, Routing: Transport Protocols, Network Security, Middleware, Databases. IOT Physical Devices & Endpoints:	06
4	Networking and Communication Protocols: Cloud based IoT platforms, Zigbee and Zwave, advantage of low power mesh networking. Long distance Zigbee; Bluetooth/BLE: Low power vs high power, speed of detection, class of BLE. Wireless protocols such as Piconet and packet structure for BLE and Zigbee. Web Communication Protocols for connected devices, Web connectivity using Gateway, SOAP, REST, HTTP, RESTful and WebSockets (Publish –Subscribe),MQTT, AMQP, CoAP Protocols	10
5	Introduction to Mobile App platform for IoT: Protocol stack of Mobile app for IoT, Mobile to server integration.	04
6	IoT Applications: Fog Computing, eHealth, Smart Cities and Smart Homes, Connected Vehicles, Smart Grid; Industrial IoT: Case Study: Agriculture, Healthcare, Activity Monitoring.	07

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	Introduction to Programming and Integration of Sensors / Actuators with IoT platform using Arduino, Raspberry Pi.	
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Text /Reference Books:-

1. Vijay Madiseti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014.
2. S. Misra, A. Mukherjee, and A. Roy, Introduction to IoT. Cambridge University Press, 2020.
3. S. Misra, C. Roy, and A. Mukherjee, Introduction to Industrial Internet of Things and Industry 4.0. CRC Press. 2020.
4. Adrian McEwen, Hakim Cassimally Designing the Internet of Things , John Wiley, 2014
5. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013.
6. CunoPfister, "Getting Started with the Internet of Things", OReilly Media, 2011
7. A. McEwen, H. Cassimally, "Designing the Internet of Things", Wiley, 2013.
8. Samuel Greenguard, "Internet of Things", MIT Press, 2015.
9. Mandler, B., Barja, J., Mitre Campista, M.E., Cagáová, D., Chaouchi, H., Zeadally, S., Badra, M., Giordano, S., Fazio, M., Somov, A., Vieriu, R.-L., Internet of Things. IoT Infrastructures, Springer International Publishing
10. Olivier Hersent, David Boswarthick, Omar Elloumi, The Internet of Things: Key Applications and Protocols, Wiley-Blackwell.
11. Internet of things (IoT): Technologies, Applications, Challenges, and Solutions Edited by B.K. Tripathy J. Anuradha, CRC Press, 2018

Web Reference /Video Courses

1. **NPTEL Course:** Introduction to Internet of Things By Prof. Sudip Misra, IIT Kharagpur

Assessment:

Internal Assessment consists of two tests out of which; one should be compulsory class test (on minimum 02 Modules) and the other is either a class test or assignment on live problems or course project.

Theory Examination:

1. Question paper will comprise of 6 questions, each carrying 20 marks.
2. Total four questions need to be solved.
3. Q.1 will be compulsory, based on entire syllabus wherein sub questions of 2 to 5 marks will be asked.
4. Remaining questions will be randomly selected from all the modules

Course name: Electric and Electric hybrid vehicle



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Semester IV								
Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract.	Tut.	Theory	TW/Pract.	Tut.	Total
EEC405	Electric and Hybrid Electric Vehicle	03	-	-	03	-	-	03

Examination Scheme								
Theory			Term Work/Practical/Oral			Total		
Internal Assessment			End Sem Exam	Duration of End Sem. Exam	Term Work		Pract.	Oral
Test-I	Test-II	Average						
20	20	20	80	03 Hrs	-	-	-	100

Course Objectives	<p>The course is aimed:</p> <ol style="list-style-type: none"> To learn the history of electric hybrid electric vehicles (EV & HEV) and emphasize the need and importance of EV-HEV for sustainable future. To study the fundamental concepts and principles of electric and hybrid electric vehicles drive train topologies To develop a thorough understanding of the key elements of EV/HEV: Electric Machines for Propulsion Applications and Energy Sources To model, analyze and design electric and hybrid electric vehicles drive train and to understand energy management strategies
Course outcomes	<p>Upon successful completion of this course, the learner will be able to:</p> <ol style="list-style-type: none"> Identify and describe the history and evolution of electric & hybrid electric vehicles. Identify and describe the principles of various EV/HEVs drive train topologies. Select electric propulsion system components for EV/HEV drives for the desirable performance and control. Compare and evaluate various energy sources and energy storage components for EV/HEV. Model, analyze and design EV/HEV drive train with energy management strategies. Recognize the need to adapt and engage in operations EV/HEV for sustainable transportation system.

Module	Detailed Contents	Hours
1	<p>Introduction:</p> <p>Basics of vehicles mechanisms, history of electric vehicles (EV) and hybrid electric vehicles (HEV), need and importance of EV and HEV, Power/Energy supplies requirements for EV/HEV applications. State of the art and Indian and global scenario in EV/HEV</p>	04
2	<p>Drive-train Topologies:</p> <p>Various electric drive-train topologies, basics of hybrid traction system, various hybrid drive-train topologies, power flow control in drive-train topologies, fuel efficiency analysis.</p>	07
3	<p>DC and AC Machines for Propulsion Applications:</p> <p>Electric system components for EV/HEV, suitability of DC and AC machines for EV/HEV applications, AC and DC Motor drives.</p>	05
4	<p>Energy Sources for EV/HEV:</p> <p>Requirements of energy storage in EV/HEV: batteries, fuel cells, flywheels and ultra-capacitors as energy sources for EV/HEV, characteristics and comparison of</p>	10

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	energy sources for EV/HEV, hybridization of different energy sources. EV battery chargers: AC and DC, Fast chargers and related standards	
5	Drive-train Modelling and Design Considerations : Modeling and analysis of EV/HEV drive train: Total tractive force calculation, sizing of motor, and design considerations for power electronics drive.	08
6	Energy Management Strategies and Energy Efficiency: EV/HEV energy management strategies, classification and comparison of various energy management strategies. Basic EV AC and DC Chargers, G2V and V2G concept.	05

Self-study: Testing and Evaluation Standards for EV & HEV available on Automotive Research Association of India (ARAI) website: <https://emobility.araiindia.com/standards/>

Assessment:

Internal Assessment Test:

Assessment consists of two class tests of 20 marks each. The first-class test (Internal Assessment I) is to be conducted when approx. 40% syllabus is completed and second class test (Internal Assessment II) when additional 40% (approx.) syllabus is completed. Duration of each test shall be one hour.

End Semester Theory Examination:

1. Question paper will comprise of total 06 questions, each carrying 20 marks.
2. Total 04 questions need to be solved.
3. Question No: 01 will be compulsory and based on entire syllabus wherein 4 sub-questions of 5 marks each will be asked.
4. Remaining questions will be randomly selected from all the modules.
5. Weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.

Books Recommended:

Text Books:

1. I. Hussein, *Electric and Hybrid Vehicles: Design Fundamentals*, CRC Press, 2003.
2. M. Ehsani, Y. Gao, S.E. Gay and Ali Emadi, *Modern Electric, Hybrid Electric and Fuel Cell Vehicles: Fundamentals, Theory and Design*, CRC Press, 2005
3. Sheldon Williamsom, *Energy Management Strategies for Electric and Plug-in Hybrid Vehicles*, Springer 2013
4. J. Larminie and J. Lowry, *Electric Vehicle Technology Explained*, Wiley, 2003
5. C. MI, M. Abul and D. W. Gao, *Hybrid Electrical Vehicle Principles and Application with Practical Perspectives*, Wiley 2011

Reference Books:

1. N.Mohan, T.M.Undeland, and W.P Robbins, *Power Electronics, Converters, Applications & Design*, Wiley India Pvt. Ltd., 2003
2. B. K Bose, *Modern Power Electronics and AC Drives*, Pearson Education 2002
3. Robert A. Huggins, *Energy Storage*, Springer 2010

NPTEL/ Swayam Course:

1. Course: **Intro. to Hybrid and Electric Vehicles - Prof. Praveen Kumar & Prof. S. Majhi (IIT Guwahati):** <https://nptel.ac.in/courses/108/103/108103009/>
2. Course: **Electric Vehicles - Part 1 By Prof. Amit Kumar Jain (IIT Delhi)** <https://nptel.ac.in/courses/108/102/108102121/>

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Civil Department

AY 2022-23 : Professional Communication and Ethics - II

Semester-V		
Course Code	Course Name	Credits
CEL505	Professional Communication and Ethics-II	02

Contact Hours			Credits Assigned			
Theory	Practical	Tutorial	Theory	Practical	Tutorial	Total
—	02+02	-	-	02	-	02

Theory					Term Work/Practical/Oral			Total
Internal Assessment			End Sem Exam	Duration of End Sem Exam	Term Work	Pract.	Oral	
Test-I	Test-II	Average						
-	-	-	-	-	25	-	25	50

Course Rationale

This curriculum is designed to build up a professional and ethical approach, effective oral and written communication with enhanced soft skills. Through practical sessions, it augments student's interactive competence and confidence to respond appropriately and creatively to the implied challenges of the global Industrial and Corporate requirements. It further inculcates the social responsibility of engineers as technical citizens.

Course Objectives

1. Discern and develop an effective style of writing important technical/business documents.
2. Investigate possible resources and plan a successful job campaign.
3. Understand the dynamics of professional communication in the form of group discussions, meetings, etc. required for career enhancement.
4. Develop creative and impactful presentation skills.
5. Analyze personal traits, interests, values, aptitudes and skills.
6. Understand the importance of integrity and develop a personal code of ethics.

Course Outcomes

Learner will be able to

1. Plan and prepare effective business/ technical documents which will in turn provide solid foundation for their future managerial roles.
2. Strategize their personal and professional skills to build a professional image and meet the demands of the industry.
3. Emerge successful in group discussions, meetings and problem-solving situations in group communication situations.




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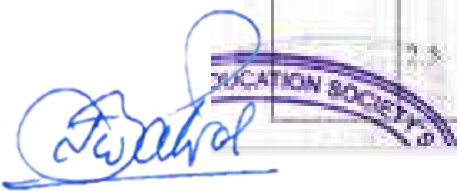
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4. Deliver persuasive and professional presentations.
5. Develop creative thinking and interpersonal skills required for effective professional communication.
6. Apply codes of ethical conduct, personal integrity and norms of organizational behaviour.

Detailed Syllabus

Module	Course Module / Contents	Periods
1	Advanced Technical Writing: Project/ Problem Based Learning (PBL)	06
	1.1 Purpose and Classification of Reports, Classification on the basis of: Subject Matter (Technology, Accounting, Finance, Marketing etc.); Time Interval (Periodic, One-time, Special); Function (Informational, Analytical, etc.); Physical Factors (Memorandum, Letter, Short & Long)	
	1.2 Parts of a Long Formal Report Prefatory Parts (Front Matter), Report Proper (Main Body), Appended Parts (Back Matter)	
	1.3 Language and Style of Reports: Tense, Person & Voice of Reports, Numbering Style of Chapters, Sections, Figures, Tables and Equations, Referencing Styles in APA & MLA Format, Proofreading through Plagiarism Checkers	
	1.4 Definition, Purpose & Types of Proposals: Solicited (in conformance with RFP) & Unsolicited Proposals, Types (Short and Long proposals)	
	1.5 Parts of a Proposal Elements: Scope and Limitations, Conclusion	
	1.6 Technical Paper Writing: Parts of a Technical Paper (Abstract, Introduction, Research Methods, Findings and Analysis, Discussion, Limitations, Future Scope and References), Language and Formatting, Referencing in IEEE Format	
2	Employment Skills	06
	2.1 Cover Letter & Resume: Parts and Content of a Cover Letter, Difference between Bio-data, Resume & CV, Essential Parts of a Resume, Types of Resume (Chronological, Functional & Combination)	
	2.2 Statement of Purpose: Importance of SOP, Tips for Writing an Effective SOP	
	2.3 Verbal Aptitude Test: Modelled on CAT, GRE, GMAT exams	
	2.4 Group Discussions: Purpose of a GD, Parameters of Evaluating a GD, Types of GDs (Normal, Case-based & Role Plays), GD Etiquettes.	
2.5 Personal Interviews: Planning and Preparation, Types of Questions, Types of Interviews (Structured, Stress, Behavioral, Problem Solving & Case-based), Modes of Interviews: Face-to-face (One-to-one and Panel), Telephonic, Virtual		



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3	Business Meetings		02
	3.1	Conducting Business Meetings: Types of Meetings, Roles and Responsibilities of Chairperson, Secretary and Members, Meeting Etiquette	
	3.2	Documentation: Notice, Agenda, Minutes	
4	Technical/ Business Presentations		02
	4.1	Effective Presentation Strategies: Defining Purpose, Analysing Audience, Location and Event, Gathering, Selecting & Arranging Material, structuring a Presentation, Making Effective Slides, Types of Presentations Aids, Closing a Presentation, Platform Skills	
	4.2	Group Presentations: Sharing Responsibility in a Team, Building the contents and visuals together, Transition Phases	
5	Interpersonal Skills		08
	5.1	Interpersonal Skills: Emotional Intelligence, Leadership & Motivation, Conflict Management & Negotiation, Time Management, Assertiveness, Decision Making	
	5.2	Start-up Skills: Financial Literacy, Risk Assessment, Data Analysis (e.g., Consumer Behaviour, Market Trends, etc.)	
6	Corporate Ethics		02
	6.1	Intellectual Property Rights: Copyrights, Trademarks, Patents, Industrial Designs, Geographical Indications, Integrated Circuits, Trade Secrets (Undisclosed Information)	
	6.2	Case Studies: Cases related to Business/ Corporate Ethics	
Total			26

List of Assignments for Term Work

In the form of Short Notes, Questionnaire/ MCQ Test, Role Play, Case Study, Quiz, etc.

- 1 Cover Letter and Resume
- 2 Short Proposal
- 3 Meeting Documentation
- 4 Writing a Technical Paper/ Analysing a Published Technical Paper
- 5 Writing a SOP
- 6 IPR
- 7 Interpersonal Skills
- 8 Aptitude test (Verbal Ability)

Note:

- The Main Body of the project/book report should contain minimum 25 pages (excluding Front and Back matter).
- The group size for the final report presentation should not be less than 5 students and not to exceed more than 7 students.
- There will be an end-semester presentation based on the



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AY 2021-22 : Environmental Engineering

Semester-VI

Course Code	Course Name	Credits
CEC604	Environmental Engineering	04

Contact Hours			Credits Assigned			
Theory	Practical	Tutorial	Theory	Practical	Tutorial	Total
04	-	-	04	-	-	04

Theory					Term Work/Practical/Oral			Total
Internal Assessment			End Sem Exam	Duration of End Sem Exam	Term Work	Pract.	Oral	
Test-I	Test-II	Average						
20	20	20	80	3 Hours	-	-	-	

Rationale

Every civil engineer must be acquainted with the principles of public health engineering, purification of water, sewage collection, design of water and sewage treatment and development of rational approaches towards sustainable waste management via appropriate treatment and reuse. The course deals with the overall features and study of treatment of water, building drainage, rain water harvesting, sewage treatment processes and solid waste management. The course also lays emphasis on the knowledge of Air and Noise pollution.

Objectives

1. To demonstrate the necessary knowledge and concepts in the fields of water supply and quality of water.
2. To impart necessary skill for the design and operation of various units of water treatment facilities.
3. To recognize the necessary knowledge of good plumbing system, building drainage and rainwater harvesting.
4. To demonstrate the necessary knowledge on domestic sewage and Sewerage system.
5. To develop a flow Chart for sewage treatment and design its units.
6. To impart the basic understanding of Air pollution, noise pollution and solid waste so as to control its adversity on ambient environment.

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Detailed Syllabus		
Module	Course Module / Contents	Periods
1	Water Supply and Quality Of Water	04
	1.1 Water supply: Water supply systems, water resources, types of intake structures, distribution systems of water and distribution layouts.	
1.2	Quality of water: Introduction to pure water: potable, wholesome, palatable, distilled, polluted and contaminated water, drinking water standards and characteristics of water, water borne diseases.	
2	Water Treatment	15
	2.1 WTP: Typical layout of WTP, Aeration, Types of Aeration systems, sedimentation, types of settling, tube settlers, design of sedimentation tank.	
	2.2 Coagulation and flocculation: Principle of coagulation, flocculation, Clari flocculator, coagulants aids.	
	2.3 Filtration: rapid sand filters, operation, cleaning and back-washing, Entire design of rapid gravity filter with under drainage system. Pressure filter: Construction and operation.	
	2.4 Disinfection: Different methods of disinfection, chlorination and chemistry of chlorination, chlorine demand, free and combined chlorine, various forms of chlorine, types of chlorination. Numerical to calculate quantity of required chlorine doses.	
2.5	Advanced and Miscellaneous Treatments: Water softening by lime soda process and by base exchange method, Reverse Osmosis, Activated carbon, Membrane filtration, Removal of Iron and Manganese.	
3	Building Water Supply, Drainage and Rainwater Harvesting	04
	3.1 Building water supply: Water demands, Per capita Supply, Service connection from main, Water meter.	
	3.2 Building drainage: basic principles, traps-types, location and function, Systems of Plumbing, anti siphonic and vent pipes.	
3.3	Rainwater harvesting: Need for rainwater harvesting, Annual potential, Roof-top rain water harvesting, Numerical on annual rainwater harvesting potential.	




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4	Domestic Sewage and Sewerage System:		08
	4.1	Sewage: Introduction to domestic sewage, and storm water; System of sanitation, Physical and chemical characteristics, decomposition of sewage, BOD, COD, numerical on BOD, MPCB norms for disposal of sewage effluent.	
4.2	Sewerage system: Systems of sewerage and their layout: Separate, Combined and partially combined systems, merits and demerits, self-cleaning velocity and non-scouring velocity, Sewer- Shape, hydraulic design of sewers, Laying and testing of sewers, manhole-location, necessity, types and drop manhole, ventilation.		
5	Sewage Treatment		15
	5.1	Treatment processes: Objective, methods of treatment, flow sheets showing Preliminary, Primary, Secondary and Tertiary treatment. Primary treatment: Screening, Gril removal, Oil and Grease removal, settling tank.	
		Secondary Treatment Methods: Trickling filter- Principle, Process description and Design of trickling filter. Activated sludge process (ASP) - Principle, Process description, Recirculation of sludge, (numerical), Sludge volume index.	
	5.2	Introduction to Biological Treatment: Aerated lagoons, Oxidation ponds, oxidation ditches.	
		Self-purification of natural waterbodies; Oxygen economy, Disposal of treated effluent: Disposal of Raw and treated sewage on land and water, DO sag curve.	
5.3	Rural and Low-cost sanitation: Septic Tank and Soak Pit – Operation, suitability and Design.		
6	Air Pollution, Noise Pollution and Municipal Solid Waste Management		06
	6.1	Air pollution: Composition of air, Quantification of air pollutants, Air quality standards, Effect of air pollution on Environment, Introduction to Air pollution control devices.	
	6.2	Noise pollution: Basic concept and measurement, Effects of noise, and control methods, and numerical on sound level.	
6.3	Municipal Solid Waste Management: Sources, storage, treatment, disposal,SR Principles.		
Total			51



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Contribution to Outcome

On completion of this course, the students will be able to:

1. Analyse the quality of water and make outline of water Supply scheme.
2. Design the various units of water treatment plant and apply the advanced, miscellaneous treatments whenever necessary.
3. Build service connection of water supply from main and building drainage system at construction site along with rain water harvesting layout.
4. Analyse and plan sewerage system along with test for sewer line.
5. Design the units of sewage treatment plant. Also, able to apply the knowledge of low-cost treatment and stream sanitation.
6. Understand air pollution, noise pollution and functional elements of solid waste management.

Internal Assessment

20 Marks

Consisting of two Compulsory Class Tests –

First test based on approximately 40% of contents and second test based on remaining contents (approximately 40% but excluding contents covered in first test).

Average of marks will be considered for IAE.

End Semester Examination

80 Marks

Weightage of each module in end semester examination will be proportional to number of respective lecture hours mentioned in the curriculum.

1. Question paper will comprise of total six questions, each carrying 20 marks.
2. Question 1 will be compulsory and should cover maximum contents of the curriculum.
3. Remaining questions will be mixed in nature (for example if Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3).
4. Only Four questions need to be solved.

Site Visit:

The students will visit to sewage treatment plant/ water treatment plant in the nearby vicinity or in the city and prepare detailed report thereof. This report will form a part of the term work.

Recommended Books:

1. Water Supply Engineering: S. K. Garg, Khanna Publication.
2. Water Supply Engineering: P.N. Modi, Rajsons Publication.
3. Water Supply and Sanitary Engineering: S.K. Hussain, Oxford & IBH Publication, New Delhi.
4. Environmental Engineering: B. C. Ponnur, Laxmi Publications, New Delhi.
5. Solid waste management in developing countries: A.D. Bhide and B.B. Sundaresan.
6. Environmental Engineering Vol II- Sewage Disposal and Air Pollution Engineering: S. K. Garg, Khanna Publishers New Delhi.
7. Wastewater Treatment- Concepts and Design Approach: G. L. Karla and R. A. Christian.
8. Integrated solid waste management, Tchobanoglous, Theissen and Vigil, McGraw Hill Publication.



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AY 2020-21 : Water Resource Engineering- II



Semester VII		
Subject Code	Subject Name	Credits
CE-C 703	Water Resources Engineering - II	05

Teaching Scheme						
Contact Hours			Credits Assigned			
Theory	Practical	Tutorial	Theory	Practical	Tutorials	Total
03	-	02	03	-	02	05

Evaluation Scheme								
Theory					Term Work/ Practical/Oral			Total
Internal Assessment			End Sem Exam	Duration of End Sem Exam	TW	PR	OR	
Test I	Test 2	Average						
20	20	20	80	04 Hrs.	25	-	25	150

Rationale

This subject provides necessary knowledge about design of gravity dams, earthen dams, energy dissipaters, canal headwork's, and canal structures. This subject is also useful with respect to facts, concepts, principles and procedures related to canal design, canal lining, cross drainage works and water logging. Further students will be able to plan and execute the construction of these structures.

Objectives

1. To understand different types of dams and its suitability to a particular region.
2. To study design consideration of earthen dams.
3. To study various types of Spillways.
4. To understand the importance of all theories for design of irrigation channels.
5. To study the classification of canals and design of canal system.

Detailed Syllabus

Module	Topics	Periods
I	Gravity dams Definition, typical cross section, forces acting on gravity dam, modes of failure and structural stability analysis, profile of dam- elementary and practical profile, low and high gravity dam, design consideration and fixing of section of dam, methods of design, construction of galleries in dams, types of joints, temperature control in concrete dams, foundation treatment, Arch dams, types of arch dams.	08
II	Earth and rock fill dams: Types of earth dams, method of construction, causes and failures of earth dams, design criteria, selecting suitable preliminary section, seepage line for different conditions and its location, seepage control through embankment and through foundations, Swedish circle method with pore pressure, details of construction and maintenance, types of rock fill dams, stability analysis, advantages.	06
III	Spillways and flood control works: Introduction, location of spillway, design consideration of main spillway.	06

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	controlled and uncontrolled spillway, types of spillways, design principles of ogee spillway, Chute spillway, Siphon spillway and shaft spillway, energy dissipation below overflow and other types of spillways, design of bucket type energy dissipater and stilling basin, flood mitigation reservoirs, Crest gates, types, advantages, design of radial gate, outlet works through dams, intake structures.	
IV	Irrigation Channels (Silt Theories) Kennedy's theory, Kennedy's methods of channel designs silt supporting capacity according to Kennedy's theory, Drawbacks in Kenned' % theory Lacey's regime theory, Lacey's theory applied to channel design, Comparison of Kennedy's and Lacey's theory defects in Lacey's theory, Introduction to Sediment transport in channels.	07
V	Canal Head works and Distribution System Canals Classification, canal alignment, canal losses, estimation of discharge, cross sections of irrigation canals, maintenance of irrigation canal, canal lining, economics of canal lining, water logging, effect of water logging, remedial measures.	06
VI	Canal structures Canal falls, types of canal falls, canal escapes, types, canal head regulators, cross regulators, canal outlets and its types cross drainage works and types of cross drainage works.	06

Course Outcomes

On completion of this course the student will be able to:

1. Design the section of gravity dams, earth and rockfill dams, arch dams and buttress dams.
2. Design spillways and energy dissipaters.
3. Apply silt theories to design irrigation canals.
4. Explain various types of canals and its maintenance.
5. Explain different cross drainage works of a canal system.

Theory examination:

1. The question paper will comprise of six questions; each carrying 20 marks.
2. The first question will be compulsory and will have short questions having weightage of 4-5 marks covering the entire syllabus.
3. The remaining five questions will be based on all the modules of the entire syllabus. For this, the modules shall be divided proportionately and further, the weightage of the marks shall be judiciously awarded in proportion to the importance of the sub-module and contents thereof.
4. The students will have to attempt any three questions out of remaining five questions.
5. Total four questions need to be attempted.

Oral Examination:

The oral Examination shall be based upon the entire syllabus and the term work consisting of the assignments.

Term Work:

The term work shall comprise of the neatly written report based on assignments. The assignments shall be given covering the entire syllabus in such a way that the students would attempt four problems on each sub-modules and contents thereof further.

Distribution of the Term Work Marks:

The marks of the term work shall be judiciously awarded depending upon the quality of the term work. The final certification and acceptance of term work warrants the satisfactory and appropriate completion of the assignments.

The following weightage of marks shall be given for different components of the term work,

- Assignments : 20 Marks
- Attendance: 05 Marks

Further, while giving weightage of marks on the attendance, following guidelines shall be resorted to.

- 75%- 80% : 03 Marks; 81%- 90%: 04 Marks 91% onwards: 05 Marks

Recommended Books:

1. Irrigation and Water Power Engineering: *B.C. Purohit, Purohit B.L.Lal, A.K. Jain*, Laxmi Publications Pvt. Ltd, New Delhi.
2. Irrigation Engineering and Hydraulic Structures: *S.K. Ukarande*, Ane Books Pvt. Ltd, ISBN, 9789383656899.
3. Irrigation Water Resources and Water Power Engineering: *P.N. Modi*, Standard Book House, Delhi, ISBN 978-81-87401-29-0.
4. Irrigation Engineering and Hydraulics Structures: *S. K. Garg*, Khanna Publishers, Delhi.
5. Design of Irrigation Structures: *S. K. Sharma*, S. Chand and Co.
6. Theory and Design of Irrigation Structures: *R. S. Fardawy and R. C. Gupta*, Nem Chand
7. Engineering for Dams, Vol. I to III: *Craiger, Justin and Hinds*, John Wiley
8. Design of Small Dams: USDR.
9. Hydro Power Structures: *R. S. Fardawy*, Nem Chand and Bross.
10. Concrete Dams: *R. S. Fardawy*, Oxford and IBH Publishing Co.



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AY 2019-20 : Solid Waste Management

Semester-VII		
Subject Code	Subject Name	Credits
CE-DLO 7042	Solid Waste Management	5

Teaching Scheme			Credits Assigned			
Contact Hours			Theory	Practical	TW/Tutorials	Total
3	-	2	3	-	2	5

Evaluation Scheme								Total
Theory			Teamwork/Practical/Oral/Tutorial					
Internal Assessments			ESE	Duration of ESE	TW/TU	PR	OR	
IAE-I	IAE-II	Average	80	3Hr	25	-	25	150

Rationale

This course will be of interest to those wishing to understand the principles and techniques of solid waste management, including the legislative, environmental, economic and social drivers. Students will be introduced to the selection and design of appropriate methods of storage, collection, transfer, treatment and disposal in both industrialized and developing countries. The course also provides the opportunity to visit recycling facilities and disposal sites to better understand links between theory and practice.

Objectives

- To make the students conversant with different aspects of the types, sources, generation, storage, collection, transport, processing and disposal of municipal solid waste.
- To provide knowledge of different types of sources, sampling and characteristics of solid waste.
- To impart knowledge and skills in the collection, storage, transport and recycling options for solid wastes including the related engineering principles, design criteria, methods and equipments.
- To fully appreciate the current practices available and implement the systems available in solid waste management.
- To be aware of the significance of recycling, reduce, reuse of solid wastes and also to impart students with the skill of design and operation of disposal system based on latest technology.
- To provide students prerequisite knowledge necessary for higher studies and research in the field of Solid waste management.

Module	Sub Modules/Contents	Periods
1.	Introducing Municipal Solid Waste Management Overview; problems and issues of solid waste management - Need for solid waste management-Functional elements such as waste generation, storage, collection, transfer and transport, processing, recovery and disposal in the management of solid waste.	03
2.	Generation and characteristics of waste Sources, Types, composition, quantity, sampling and characteristics of waste, factors affecting generation of solid wastes	03



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3.	Waste collection, storage and transport Collection and storage of municipal solid waste; Methods of collection - House to House collection -collection routes; on site storage methods-materials used for containers -Recycling and Reuse of waste -Need for transfer and transport; transfer station-selection of location, operation and maintenance; transportation Methods-manual, Mechanical methods with or without compaction, economy in transportation of waste optimization of transportation routes.	10
4.	Waste processing techniques Processing techniques-biological and chemical conversion technologies – composting and its methods, Vermi-composting, mechanical composting, In vessel composting, Incineration, pyrolysis, gasification.	04
5.	Disposal of Solid Waste Segregation, Volume reduction at source; recovery and recycle; dumping of solid waste-sanitary waste- sanitary landfills-site selection-design and operation of sanitary landfill - leachate and landfill gas management-landfill closure and environmental monitoring-landfill remediation; Municipal solid waste in Indian conditions, legal aspects of solid waste disposal, Plastic waste disposal.	10
6.	Types of Solid Waste Industrial Waste products during manufacturing and packing, operation of pollution control facilities, generation, and minimization at source, recycling, disposal. Hazardous waste Definition, sources, hazardous characteristics, management, treatment and disposal Electronic waste Waste characteristics, generation, collection, transport and disposal Biomedical waste Definition, sources, classification, collection, segregation- Color coding, treatment and disposal.	09

Contribution to outcomes

On completion of this course, the students will be able to understand the various methods of disposal of solid waste. They will have better understanding of the nature and characteristics of solid waste and regulatory requirements regarding solid waste management and further they will have an ability to plan waste-minimization. Besides, they will be prepared to contribute practical solutions to environmental problems in our society.

After the completion of the course the student should be able to

- Explain generation, storage, collection, transfer and transport, processing, recovery and disposal in the management of solid waste.
- Understand the characteristics of different types of solid waste and the factors affecting variation.
- Identify the methods of collection, storage and transportation of solid waste.
- Suggest suitable technical solutions for processing of wastes.
- Ability to plan waste minimization and disposal of municipal solid waste.
- Ensure the safe handling and treatment of Hazardous, Electronic and Biomedical waste.

Theory Examination:-

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1. Question paper will comprise of six questions; each carrying 20 marks.
2. The first question will be compulsory which will have the short questions having weightage of 4-5 marks covering the entire syllabus.
3. The remaining five questions will be based on all the modules of entire syllabus. For this, the module shall be divided proportionately further, the weightage of the marks shall be judiciously awarded in proportion to the importance of the sub-module contents thereof.
4. The students will have to attempt any three questions out of remaining five questions.
5. Total four questions need to be attempted.

Site Visit: The students will visit landfilling /composting site in the nearby vicinity and prepare detailed report thereof. This report will form a part of the term work.

Oral Examination:-

The oral Examination shall be based upon the entire syllabus and the term work consisting of the Assignments, Tutorials including the site visit report.

Distribution of Term Work Marks:

The marks of the term work shall be judiciously awarded for the various components depending upon the quality of the term work. The final certification and acceptance of term work warrants the satisfactory and appropriate completion of the assignments. Each student shall prepare a report on any industrial/hazardous/municipal solid waste comprising source, characterization, transportation, recycle, treatment and disposal.

The following weightage of marks shall be given for different components of the term work.

1. Report (on any industrial/hazardous/municipal solid waste/site visit) : 05 Marks
2. Seminar : 05Marks
3. Attendance : 05 Marks
4. Assignments and Tutorials :10 Marks

Further, while giving weightage of marks on the attendance, following guidelines shall be resorted to

75%- 80%: 03 Marks; 81%- 90%: 04 Marks; 91% onwards: 05 Marks.

Recommended Books:-

1. Integrated Solid Waste Management; Tchobanoglous, Thisen and Vigil, McGraw Hill International.
2. Hazardous Waste Management; Lagrega, Buckingham and Evans, McGraw Hill International.
3. Solid Waste Management in Developing Countries: A.D. Bhide, Nagpur publications.
4. Environmental Pollution Control Engineering; C.S. Rao, Wiley Eastern, Manual of solid waste of management, CPHEEO.
5. E-Waste: Implications, Regulations, and Management in India and Current Global Best Practices, Rakesh Johri, The Energy and Resources Institute.
6. Biomedical Waste Management in India; Jugal Kishore and G. K. Ingole, Century Publications.



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AY 2018-19 : Industrial Waste Treatment

Semester VIII		
Subject Code	Subject Name	Credits
CE-C DL08032	Industrial Waste Treatment	5

Teaching Scheme						
Contact Hours			Credits Assigned			
Theory	Practical	Tutorial	Theory	Practical	Tutorials	Total
04	02	--	04	01	--	05

Evaluation Scheme								
Theory					Term Work/ Practical/Oral			Total
Internal Assessment			End Sem Exam	Duration of End Sem Exam	TW	PR	OR	
Test 1	Test 2	Average						
20	20	20	80	04 Hrs.	25	-	25	150

Rationale

Industrial waste waters are generally much more polluted than the domestic or even commercial wastewaters. Such industrial wastewaters cannot always be treated easily by the normal methods of treating domestic wastewaters, and certain specially designed methods. In order to achieve this aim, it is generally always necessary, and advantageous to isolate and remove the troubling pollutants from the wastewaters, before subjecting them to usual treatment processes. Thus Wastewater treatment is closely related to the standards and/or expectations set for the effluent quality. Wastewater treatment processes are designed to achieve improvements in the quality of the wastewater.

Objectives

- To provide knowledge of different types and characteristics of industrial wastes. Also to make the students conversant with effluent and stream standards.
- To study the problems faced by many industrial plants with new effluent limits to be met with their existing treatment plant.
- To understand in-depth yet practical review of wastewater treatment technologies and how to optimize their operation.
- To develop rational approaches towards sustainable waste water management via sludge recovery and treatments.
- To provide an understanding of the mechanisms and processes used to treat waters that have been contaminated in some way by various industrial activities prior to its release into the environment or its re-use.
- To study the sources of contaminants, legislative framework for their remediation as well as the technical aspects of the unit operations involved. To Utilize IIA documents for policy development, project planning or for legal or political action planning.



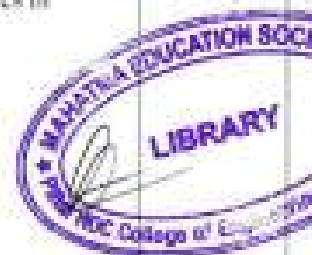
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Detailed Syllabus		
Module	Sub Modules/Contents	Periods
1	General: Liquid wastes from industries – their volumes and characteristics, Effect of disposal into natural water courses, Municipal sewers and on land, stream standards and effluent standards.	04
2	Sampling and analysis of industrial wastes, Treatability study, good housekeeping, bioassay test, population equivalence.	04
3	Stream sanitation: Effects of industrial wastes on self-purification of streams and fish life, Statement and significance of the parameters of Streeter and Phelps' equation and BOD equations, Deoxygenating and reoxygenation, Oxygen sag and numerical based on this.	06
4	General treatment of industrial wastes: Neutralization, Equalization, segregation, Modification of conventional aerobic and anaerobic biological treatment methods, Dewatering and disposal of sludges, unit operation- floatation, Vacuum filtration, Centrifugation, Filter press and membrane filters, Advanced treatment.	12
5	Detailed consideration of wastes produced from following industries: Manufacturing processes normally followed, Volume and effects of raw and treated effluent on streams, Sewers, Characteristics of effluents and land Treatment methods, reuse-recovery. 1) Sugar-sugarcane 2) Distilleries 3) Pulp & paper: Sulphate process 4) Textiles: Cotton 5) Dairy 6) Tanneries 7) Electroplating	16
6	Provision of various acts pertaining to industrial wastes / effluents, Introduction to environmental impact assessment and environmental audit, Common Effluent Treatment Plants (CETPs): Location, Need, Design, Operation & Maintenance Problems and Economical aspects.	10



Contribution to outcomes

On completion of this course, the students will have an ability to understand the industrial waste sources, effects and its treatment. The students will understand the various methods of disposal of industrial waste. They will have an understanding of the nature and characteristic of industrial waste and regulatory requirements regarding industrial waste treatment and further, they will have an ability to plan industrial waste minimization.

Students should able to

1. Understand the characteristics of industrial wastewater.
2. Identify sampling method and analyze industrial waste.
3. Design facilities for the processing and regulation of industrial waste water.

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4. Explain on-site treatment methods and solve Analyze and design wastewater treatment systems. (floatation, vacuum filtration, centrifugation, filter press and membrane filters)
5. Detailed on-site manufacturing processes and treatments of industrial waste water.
6. Analyze proposed development project plans for possible environmental effects and to improve treated effluent quality to confirm standard prescribed by regulatory agencies.

Theory Examination:-

1. Question paper will comprise of six questions, each carrying 20 marks.
2. The first question will be compulsory which will have the short questions having weightage of 4-5 marks covering the entire syllabus.
3. The remaining five questions will be based on all the modules of entire syllabus. For this, the module shall be divided proportionately further, the weightage of the marks shall be judiciously awarded in proportion to the importance of the sub-module contents thereof.
4. The students will have to attempt any three questions out of remaining five questions.
5. Total four questions need to be attempted.

Oral Examination:-

The oral Examination shall be based upon the entire syllabus and the term work consisting of the assignments and Tutorial including the site visit report.

Distribution of Term Work Marks:-

The marks of the term work shall be judiciously awarded for the various components depending upon the quality of the term work. The final certification and acceptance of term work warrants the satisfactory and appropriate completion of the assignments. Each student shall prepare a report comprising design criteria and flow sheet of the proposed treatment scheme including laboratory analysis for any one industrial waste. Demonstration of available software for design of effluent treatment plant is to be considered.

The following weightage of marks shall be given for different components of the term work.

7. Report (on any industry/site visit) : 05 Marks
8. Seminar : 05 Marks
9. Attendance : 05 Marks
10. Assignments and Tutorials : 10 Marks

Further, while giving weightage of marks on the attendance, following guidelines shall be resorted to
 75%- 80%: 03 Marks; 81%- 90%: 04 Marks; 91% onwards: 05 Marks

Recommended Books:-

1. Waste Water Treatment: Rao & Datta, Oxford & IBH Publishing Co.
2. Environmental Pollution and control in chemical process industries: S.C. Bhatia, Khanna Publication.
3. Industrial Water Pollution Control: W W Eckenfelder Jr, Mc Graw Hill.
4. Industrial Water Pollution Management: E F Gurnham, John Wiley.
5. Biological Waste Treatment: Eckenfelder & Connor Pergamon Press.
6. Theories and Practices of Industrial Waste Treatment: Addison Wesley.
7. Pollution Control in Process Industries: S P Mahajan , Tata megraw Hill.

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Mechanical Engineering
Course name Business communication and Ethics :2018-19



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Subject Code	Subject Name	Credits
MEL506	Business Communication & Ethics	02

Objectives:

1. To inculcate professional and ethical attitude at the workplace
2. To enhance effective communication and interpersonal skills
3. To build multidisciplinary approach towards all life tasks
4. To hone analytical and logical skills for problem-solving

Outcomes: Learner will be able to...

1. Design a technical document using precise language, suitable vocabulary and apt style.
2. Develop the life skills/ interpersonal skills to progress professionally by building stronger relationships.
3. Demonstrate awareness of contemporary issues knowledge of professional and ethical responsibilities.
4. Apply the traits of a suitable candidate for a job/higher education, upon being trained in the techniques of holding a group discussion, facing interviews and writing resume/SOP.
5. Deliver formal presentations effectively implementing the verbal and non-verbal skills

Module	Detailed Contents	Hrs.
01	Report Writing	05
1.1	Objectives of Report Writing	
1.2	Language and Style in a report	
1.3	Types : Informative and Interpretative (Analytical, Survey and Feasibility) and Formats of reports (Memo, Letter, Short and Long Report)	
02	Technical Writing	03
2.1	Technical Paper Writing (IEEE Format)	
2.2	Proposal Writing	
03	Introduction to Interpersonal Skills	09
3.1	Emotional Intelligence	
3.2	Leadership and Motivation	
3.3	Team Building	
3.4	Assertiveness	
3.5	Conflict Resolution and Negotiation Skills	
3.6	Time Management	
3.7	Decision Making	
04	Meetings and Documentation	02
4.1	Strategies for conducting effective meetings	
4.2	Notice, Agenda and Minutes of a meeting	
4.3	Business meeting etiquettes	
05	Introduction to Corporate Ethics	02
5.1	Professional and work ethics (responsible use of social media - Facebook, WA, Twitter etc.	
5.2	Introduction to Intellectual Property Rights	
5.4	Ethical codes of conduct in business and corporate activities (Personal ethics, conflicting values, choosing a moral response and making ethical decisions)	
06	Employment Skills	07
6.1	Group Discussion	

University of Mumbai, B. E. (Mechanical Engineering), Rev 2016

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6.2	Resume Writing	
6.3	Interview Skills	
6.4	Presentation Skills	
6.5	Statement of Purpose	
		28

Assessment:

List of Assignments

1. Report Writing (Theory)
2. Technical Proposal
3. Technical Paper Writing (Paraphrasing a published IEEE Technical Paper)
4. Interpersonal Skills (Group activities and Role plays)
5. Interpersonal Skills (Documentation in the form of soft copy or hard copy)
6. Meetings and Documentation (Notice, Agenda, Minutes of Mock Meetings)
7. Corporate ethics (Case studies, Role plays)
8. Writing Resume and Statement of Purpose

Term Work

Term work shall consist of all assignments from the list.

The distribution of marks for term work shall be as follows:

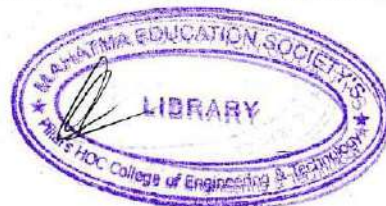
Book Report	10 marks
Assignments:	10 marks
Project Report Presentation:	15 marks
Group Discussion:	10 marks
Attendance:	05 marks

References:

1. Fred Luthans, "Organizational Behavior", Mc Graw Hill,
2. Lesiker and Petit, "Report Writing for Business", Mc Graw Hill
3. R.Subramaniam, "Professional Ethics" Oxford University Press
4. Huckin and Olsen, "Technical Writing and Professional Communication", McGraw
5. Raman and Sharma, Fundamentals of Technical Communication, Oxford University Press
6. Hill Wallace and Masters, "Personal Development for Life and Work", Thomson Learning, 12th Edition
7. Heta Murphy, "Effective Business Communication", Mc Graw Hill, edition
8. R.C Sharma and Krishna Mohan, "Business Correspondence and Report Writing",
9. Raman Sharma, *Communication Skills*, Oxford University Press
10. B N Ghosh, "Managing Soft Skills for Personality Development", Tata McGraw Hill Lehman,
11. Dufrene, Sinha, "BCOM", Cengage Learning, 2nd edition
12. Bell . Smith, "Management Communication" Wiley India Edition, 3rd edition.
13. Dr. K. Alex, "Soft Skills", S Chand and Company
14. Robbins Stephens P., "Organizational Behavior", Pearson Education
15. <https://grad.ucla.edu/asis/agep/advsoptem.pdf>

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Mechanical Engineering Course name: Industrial Engineering and Management



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Course Code	Course/Subject Name	Credits
MEC802	Industrial Engineering and Management	04

Objectives

1. To familiarise with concept of integration of various resources and the significance of optimizing them in manufacturing and allied Industries
2. To acquaint with various productivity enhancement techniques

Outcomes: Learner will be able to...

1. Illustrate the need for optimization of resources and its significance
2. Develop ability in integrating knowledge of design along with other aspects of value addition in the conceptualization and manufacturing stage of various products.
3. Demonstrate the concept of value analysis and its relevance.
4. Manage and implement different concepts involved in method study and understanding of work content in different situations.
5. Describe different aspects of work system design and facilities design pertinent to manufacturing industries.
6. Illustrate concepts of Agile manufacturing, Lean manufacturing and Flexible manufacturing

Modules	Detailed contents	Hrs.
01	Introduction to Industrial Engineering History and contribution, Industrial engineering approach, techniques of industrial engineering, objectives of industrial engineering, system approach to industrial engineering, definition and concept of productivity, productivity measurements, factors influencing productivity and productivity improvement techniques.	06
	Value Engineering and Value Analysis: Distinction between value engineering & value analysis and their Significance. Steps in value engineering & analysis and Check lists.	05
03	Work study: Method study, micro-motion-study and principles of motion economy, Work measurement: time study, work sampling, standard data, PMTS; MOST	10
04	Work system design: Introduction to ergonomics and its scope in relation to work. Outline of discipline of anatomy, physiology and psychology, with respect to ergonomics building blocks such as anthropometry and biomechanics Job evaluation, merit rating, incentive schemes, wage administration and business process reengineering	08
05	Facility Design: Facility location factors and evaluation of alternate locations; types of plant layout and their evaluation; computer aided layout design techniques; assembly line balancing; materials handling systems Concepts of Group Technology and cellular manufacturing	09
06	Agile manufacturing: Introduction, Developing agile manufacturing, Integration of Product/Process Development, Application of IT/IS concepts, Agile supply chain management, Design of skill and knowledge and Computer control of Agile manufacturing. Flexible manufacturing, Lean Manufacturing, Value Stream Mapping	10

Assessment:

Internal Assessment for 20 marks:

Consisting Two Compulsory Class Tests

First test based on approximately 40% of contents and second test based on remaining contents (approximately 40% but excluding contents covered in Test I)

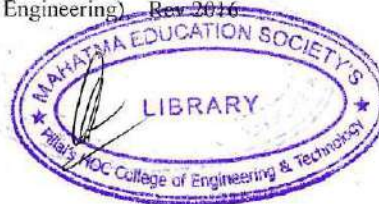
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End Semester Examination:

Weightage of each module in end semester examination will be proportional to number of respective lecture hours mentioned in the curriculum.

1. Question paper will comprise of total six questions, each carrying 20 marks
2. Question 1 will be compulsory and should cover maximum contents of the curriculum
3. Remaining questions will be mixed in nature (for example if Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3)
4. Only Four questions need to be solved.

References

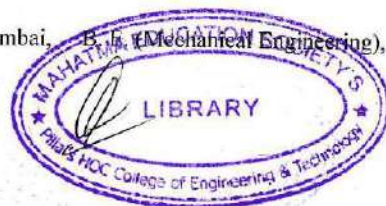
1. Introduction to Work study, ILO, Geneva, and Oxford & IBH Pub Co. Pvt. Ltd.
2. Ergonomics at Work, Murrell
3. Plant Layout and Material Handling, James M. Apple, John Wiley & Sons
4. Facility Layout and Location – An Analytical Approach, Richard L. Francis & John A. White, Prentice Hall
5. Production Planning and Control, Samuel Elion
6. Production and Operations Management, Joseph G. Monks
7. Quality planning and analysis, J M Juran, FM Gryana, TMH
8. Total Quality Management, D. H. Bester Field et al. prentice hall
9. TQM in new product manufacturing, HG Menon; TMH
10. Industrial Engineering and Management by Dr Ravi Shankar



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Course Code	Course Name	Credits
ILO7018	Energy Audit and Management	03

Objectives:

1. To understand the importance energy security for sustainable development and the fundamentals of energy conservation.
2. To introduce performance evaluation criteria of various electrical and thermal installations to facilitate the energy management
3. To relate the data collected during performance evaluation of systems for identification of energy saving opportunities.

Outcomes: Learner will be able to...

1. To identify and describe present state of energy security and its importance.
2. To identify and describe the basic principles and methodologies adopted in energy audit of an utility.
3. To describe the energy performance evaluation of some common electrical installations and identify the energy saving opportunities.
4. To describe the energy performance evaluation of some common thermal installations and identify the energy saving opportunities
5. To analyze the data collected during performance evaluation and recommend energy saving measures

Sr. No	Detailed Contents	Hrs
01	Energy Scenario: Present Energy Scenario, Energy Pricing, Energy Sector Reforms, Energy Security, Energy Conservation and its Importance, Energy Conservation Act-2001 and its Features. Basics of Energy and its various forms, Material and Energy balance	04
02	Energy Audit Principles: Definition, Energy audit- need, Types of energy audit, Energy management (audit) approach-understanding energy costs, Bench marking, Energy performance, Matching energy use to requirement, Maximizing system efficiencies, Optimizing the input energy requirements, Fuel and energy substitution. Elements of monitoring& targeting; Energy audit Instruments; Data and information-analysis. Financial analysis techniques: Simple payback period, NPV, Return on investment (ROI), Internal rate of return (IRR)	08
03	Energy Management and Energy Conservation in Electrical System: Electricity billing, Electrical load management and maximum demand Control; Power factor improvement, Energy efficient equipments and appliances, star ratings. Energy efficiency measures in lighting system, Lighting control: Occupancy sensors, daylight integration, and use of intelligent controllers.	10

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	Energy conservation opportunities in: water pumps, industrial drives, induction motors, motor retrofiting, soft starters, variable speed drives.	
04	Energy Management and Energy Conservation in Thermal Systems: Review of different thermal loads; Energy conservation opportunities in: Steam distribution system, Assessment of steam distribution losses, Steam leakages, Steam trapping, Condensate and flash steam recovery system. General fuel economy measures in Boilers and furnaces, Waste heat recovery, use of insulation- types and application. HVAC system: Coefficient of performance, Capacity, factors affecting Refrigeration and Air Conditioning system performance and savings opportunities.	10
05	Energy Performance Assessment: On site Performance evaluation techniques, Case studies based on: Motors and variable speed drive, pumps, HVAC system calculations; Lighting System: Installed Load Efficacy Ratio (ILER) method, Financial Analysis.	04
06	Energy conservation in Buildings: Energy Conservation Building Codes (ECBC): Green Building, LEED rating, Application of Non-Conventional and Renewable Energy Sources	03

Assessment:

Internal Assessment for 20 marks:

Consisting Two Compulsory Class Tests

First test based on approximately 40% of contents and second test based on remaining contents (approximately 40% but excluding contents covered in Test I)

End Semester Examination:

Weightage of each module in end semester examination will be proportional to number of respective lecture hours mentioned in the curriculum.

1. Question paper will comprise of total six questions, each carrying 20 marks
2. Question 1 will be compulsory and should cover maximum contents of the curriculum
3. Remaining questions will be mixed in nature (for example if Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3)
4. Only Four questions need to be solved.

REFERENCES:

1. Handbook of Electrical Installation Practice, Geofry Stokes, Blackwell Science
2. Designing with light: Lighting Handbook, By Anil Valia, Lighting System
3. Energy Management Handbook, By W.C. Turner, John Wiley and Sons
4. Handbook on Energy Audits and Management, edited by A. K. Tyagi, Tata Energy Research Institute (TERI).
5. Energy Management Principles, C.B.Smith, Pergamon Press
6. Energy Conservation Guidebook, Dale R. Patrick, S. Fardo, Ray E. Richardson, Fairmont Press
7. Handbook of Energy Audits, Albert Thumann, W. J. Younger, T. Niehus, CRC Press
8. www.energymanagertraining.com
9. www.bcc-india.nic.in

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B. E. (Mechanical Engineering) IV - 2019

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ASH

2019-20

Course Name: Professional Communication and Ethics I



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AC: Item No. 4.40
Date: 26TH July, 2019

UNIVERSITY OF MUMBAI



Bachelor of Engineering

First Year Engineering (Semester I & II), Revised course

(REV- 2019 'C' Scheme) from Academic Year 2019 – 20

(Common for All Branches of Engineering)

Under

FACULTY OF SCIENCE & TECHNOLOGY

(As per AICTE guidelines with effect from the academic year
2019–2020)

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Program Structure for First Year Engineering
Semester I & II
UNIVERSITY OF MUMBAI
(With Effect from 2019-2020)

Semester I

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract.	Tut.	Theory	Pract.	Tut.	Total
FEC101	Engineering Mathematics-I	3	--	1*	3	--	1	4
FEC102	Engineering Physics-I	2	--	--	2	--	--	2
FEC103	Engineering Chemistry-I	2	--	--	2	--	--	2
FEC104	Engineering Mechanics	3	--	--	3	--	--	3
FEC105	Basic Electrical Engineering	3	--	--	3	--	--	3
FEL101	Engineering Physics-I	--	1	--	--	0.5	--	0.5
FEL102	Engineering Chemistry-I	--	1	--	--	0.5	--	0.5
FEL103	Engineering Mechanics	--	2	--	--	1	--	1
FEL104	Basic Electrical Engineering	--	2	--	--	1	--	1
FEL105	Basic Workshop practice-I	--	2	--	--	1	--	1
Total		13	08	01	13	04	01	18

Course Code	Course Name	Examination Scheme							
		Theory			End Sem. Exam.	Exam. Duration (in Hrs)	Term Work	Pract. /oral	Total
		Internal Assessment							
		Test1	Test 2	Avg.					
FEC101	Engineering Mathematics-I	20	20	20	80	3	25	--	125
FEC102	Engineering Physics-I	15	15	15	60	2	--	--	75
FEC103	Engineering Chemistry-I	15	15	15	60	2	--	--	75
FEC104	Engineering Mechanics	20	20	20	80	3	--	--	100
FEC105	Basic Electrical Engineering	20	20	20	80	3	--	--	100
FEL101	Engineering Physics-I	--	--	--	--	--	25	--	25
FEL102	Engineering Chemistry-I	--	--	--	--	--	25	--	25
FEL103	Engineering Mechanics	--	--	--	--	--	25	25	50
FEL104	Basic Electrical Engineering	--	--	--	--	--	25	25	50
FEL105	Basic Workshop practice-I	--	--	--	--	--	50	--	50
Total		--	--	90	360	--	175	50	675

* Shall be conducted batch-wise



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Semester II

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract.	Tut.	Theory	Pract.	Tut.	Total
FEC201	Engineering Mathematics-II	3	--	1*	3	--	1	4
FEC202	Engineering Physics-II	2	--	--	2	--	--	2
FEC203	Engineering Chemistry-II	2	--	--	2	--	--	2
FEC204	Engineering Graphics	2	--	--	2	--	--	2
FEC205	C programming	2	--	--	2	--	--	2
FEC206	Professional Communication and Ethics- I	2	--	--	2	--	--	2
FEL201	Engineering Physics-II	--	1	--	--	0.5	--	0.5
FEL202	Engineering Chemistry-II	--	1	--	--	0.5	--	0.5
FEL203	Engineering Graphics	--	4	--	--	2	--	2
FEL204	C programming	--	2	--	--	1	--	1
FEL205	Professional Communication and Ethics- I	--	2	--	--	1	--	1
FEL206	Basic Workshop practice-II	--	2	--	--	1	--	1
Total		13	12	01	13	06	01	20

Course Code	Course Name	Examination Scheme							
		Theory			End Sem. Exam.	Exam. Duration (in Hrs)	Term Work	Pract. /oral	Total
		Internal Assessment							
		Test I	Test 2	Avg.					
FEC201	Engineering Mathematics-II	20	20	20	80	3	25	--	125
FEC202	Engineering Physics-II	15	15	15	60	2	--	--	75
FEC203	Engineering Chemistry-II	15	15	15	60	2	--	--	75
FEC204	Engineering Graphics	15	15	15	60	3	--	--	75
FEC205	C programming	15	15	15	60	2	--	--	75
FEC206	Professional Communication and Ethics- I	10	10	10	40	2	--	--	50
FEL201	Engineering Physics-II	--	--	--	--	--	25	--	25
FEL202	Engineering Chemistry-II	--	--	--	--	--	25	--	25
FEL203	Engineering Graphics	--	--	--	--	--	25	50	75
FEL204	C programming	--	--	--	--	--	25	25	50
FEL205	Professional Communication and Ethics- I	--	--	--	--	--	25	--	25
FEL206	Basic Workshop practice-II	--	--	--	--	--	50	--	50
Total		--	--	90	360	--	200	75	725

* Shall be conducted batch-wise

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Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned				
		Theory	Pract.	Tut.	Theory	Tut.	Pract.	Total	
FEL205	Professional Communication and Ethics- I	--	2	--	--	--	1	1	
Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract. /oral	Total
		Internal Assessment			End Sem. Exam.	Exam. Duration (in Hrs)			
		Test1	Test 2	Avg.					
FEL205	Professional Communication and Ethics- I	--	--	--	--	--	25	--	25

Objectives

To provide practice in ...

1. Active listening with focus on content, purpose, main idea, tone and pronunciation.
2. Fluent speaking and presentation skills in social, academic and professional situations.
3. Faster reading skills for effective comprehension in a variety of texts.
4. Drafting effective written discourse in academics, business and technology.
5. Grooming and projecting impressive persona in all interactions.

Outcomes: Learner will be able to...

1. Listen and comprehend all types of spoken discourse successfully.
2. Speak fluently and make effective professional presentations.
3. Read large quantities of text in a short time to comprehend, summarise and evaluate content.
Draft precise business letters, academic essays and technical guidelines.
Dress finely and conduct themselves with panache in social, academic and professional situations.



List of Assignments & Activities	Details of Assignments	Details of Activities	Hrs.
1.	Written record of listening activities	Listening practice tasks of 3 types (through audio recordings of (1) Monologues (2) Dialogues (3) Formal/Expert Talk or Lecture)	02
2.	Transcription of the public speech along with a plagiarism report	Practice public speech	02
3.	Transcription of the public speech along with a plagiarism report	Public speech (Internal Assessment - I)	02
4.	Written assignment on barriers and non-verbal communication	Role plays / case studies	02
5.	Summarization through graphic organisers (1. Text to graphic	NA	02

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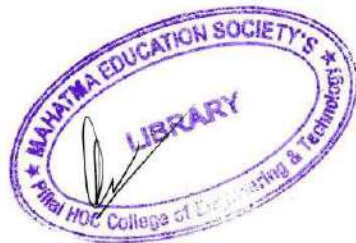
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	organizer 2. Graphic organizer to text)		
6.	Written record of reading activities	Advanced level reading comprehension with MCQs (similar in level and format to CAT, GRE and GMAT verbal sections)	02
7.	Aptitude test on vocabulary and grammar	Aptitude test on vocabulary and grammar (similar in level and format to CAT, GRE and GMAT verbal sections)	02
8.	2 types of letters in complete block format	NA	02
9.	Written assignment on technical writing (Exercises based on framing Definitions, Describing Technical Objects, Framing User Instructions and Describing Technical Processes)	NA	02
10.	Documentation on case studies / role plays on Module 6	Case studies / role plays	02

Assessment:

The distribution of marks for term work shall be as follows:

- Assignments : 20 marks
- Attendance (Theory and Practical) : 05 marks



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2018-19

Course Name: 1. Environmental Studies
2. Communication Skills



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AC 14/7/2016, Item No. 4.64

UNIVERSITY OF MUMBAI



Bachelor of Engineering

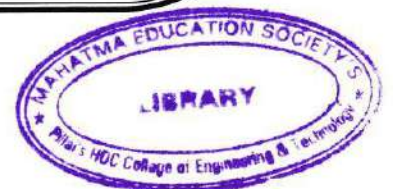
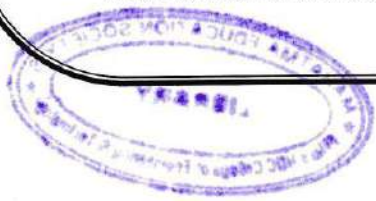
**First Year Engineering (Semester I & II), Revised course
(REV- 2016) from Academic Year 2016 – 17,
(Common for All Branches of Engineering)**

**(As per Choice Based Credit and Grading System
with effect from the academic year 2016–2017)**

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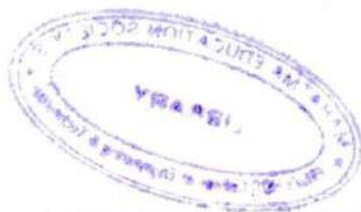
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**Program Structure for
First Year Engineering (Semester I & II)
Mumbai University
(With Effect from 2016-2017)**

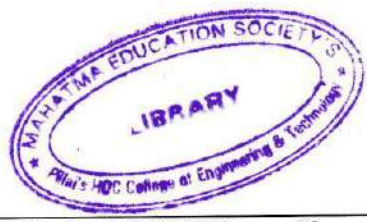
Semester I

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned					
		Theory	Pract.	Tut.	Theory	TW/Pract	Tut.	Total		
FEC101	Applied Mathematics-I	04	-	01	04	-	01	05		
FEC102	Applied Physics-I	03	01	-	03	0.5	-	3.5		
FEC103	Applied Chemistry -I	03	01	-	03	0.5	-	3.5		
FEC104	Engineering Mechanics	05	02	-	05	01	-	06		
FEC105	Basic Electrical Engineering	04	02	-	04	01	-	05		
FEC106	Environmental studies	02	-	-	02	-	-	02		
FEL101	Basic Workshop Practice-I	-	04	-	-	02	-	02		
Total		21	10	01	21	05	01	27		
Course Code	Course Name	Examination Scheme								
		Theory					Term Work	Pract	Oral	Total
		Internal Assessment			End Sem Exam					
		Test1	Test2	Avg						
FEC101	Applied Mathematics-I	20	20	20	80	25	-	-	125	
FEC102	Applied Physics-I	15	15	15	60	25	-	-	100	
FEC103	Applied Chemistry -I	15	15	15	60	25	-	-	100	
FEC104	Engineering Mechanics	20	20	20	80	25	-	25	150	
FEC105	Basic Electrical Engineering	20	20	20	80	25	-	25	150	
FEC106	Environmental studies	15	15	15	60	-	-	-	75	
FEL101	Basic Workshop Practice-I	-	-	-	-	50	-	-	50	
Total				105	420	175		50	750	



Semester II

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned						
		Theory	Pract.	Tut.	Theory	TW/Pract	Tut.	Total			
FEC201	Applied Mathematics-II	04	-	01	04	-	01	05			
FEC202	Applied Physics-II	03	01	-	03	0.5	-	3.5			
FEC203	Applied Chemistry -II	03	01	-	03	0.5	-	3.5			
FEC204	Engineering Drawing	03	04	-	03	02	-	05			
FEC205	Structured Programming Approach	04	02	-	04	01	-	05			
FEC206	Communication Skills	02	02	-	02	01	-	03			
FEL201	Basic Workshop Practice-II	-	04	-	-	02	-	02			
Total		19	14	01	19	07	01	27			
Course Code		Course Name		Examination Scheme							
				Theory			End Sem Exam	Term Work	Pract	Oral	Total
				Internal Assessment							
Test1	Test2	Avg									
FEC201	Applied Mathematics-II	20	20	20	80	25	-	-	125		
FEC202	Applied Physics-II	15	15	15	60	25	-	-	100		
FEC203	Applied Chemistry -II	15	15	15	60	25	-	-	100		
FEC204	Engineering Drawing	15	15	15	60	25	50	-	150		
FEC205	Structured Programming Approach	20	20	20	80	25	25	-	150		
FEC206	Communication Skills	10	10	10	40	25	-	-	75		
FEL201	Basic Workshop Practice-II	-	-	-	-	50	-	-	50		
Total				95	380	200	75	-	750		

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract.	Tut.	Theory	TW/Pract	Tut.	Total
FEC106	Environmental Studies	02	--	--	02	--	--	02

Course Code	Course Name	Examination Scheme							
		Theory			End Sem Exam	Term Work	Pract	Oral	Total
		Internal Assessment							
Test1	Test2	Av of Test 1 & 2							
FEC106	Environmental Studies	15	15	15	60	--	--	--	75

Objectives


1. Creating the awareness about environmental problems among students.
2. Imparting basic knowledge about the environment and its allied problems.
3. Developing an attitude of concern for the environment.
4. Motivating students to participate in environment protection and environment improvement.
5. Acquiring skills to help the concerned individuals in identifying and solving environmental problems.

Outcomes: Learner will be able to...

1. Illustrate Depleting Nature of Environmental Resources, Global Environmental Crisis, Ecosystem concept.
2. Adapt to 3R (Reuse, Recovery, Recycle).
3. Study different control measures related to Environmental Pollution.
4. Illustrate and analyse various Case Studies related to Environmental Legislation.
5. Demonstrate the working of Renewable energy sources & Equipments.
6. Illustrate the Techniques of Disaster Management and Green Building.

Module	Detailed Contents	Hrs.
01	<p>Overview of Environmental Aspects:</p> <ul style="list-style-type: none"> • Definition, Scope and Importance of Environmental Study • Need for Public awareness of environmental education • Introduction to depletion of natural resources: Soil, Water, Minerals and Forests. • Global crisis related to – Population, water, sanitation & Land. <p>Ecosystem:</p> <ul style="list-style-type: none"> • Study of ecosystems : Forest, desert and aquatic (in brief). • Energy flow in Ecosystem, overview of Food Chain, Food Web and Ecological Pyramid. • Concept of ecological succession and its impact on human beings (in brief). <p>Case Study on Chipko Movement (Uttarakhand, India), (began in 1973).</p>	4
02	<p>Aspects of Sustainable Development:</p> <ul style="list-style-type: none"> • Concept and Definition of Sustainable Development. • Social, Economical and Environmental aspects of sustainable development. • Control measures: 3R (Reuse, Recovery, Recycle), • Resource utilization as per the carrying capacity (in brief). <p>Case Study on Narmada BachaoAndolan (Gujarat, India, in the mid and late 1980s).</p>	2

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03	<p>Types of Pollution:</p> <ul style="list-style-type: none"> Water pollution: Sources of water pollution and Treatment of Domestic and industrial waste water (with flow-diagram of the treatment), Land Pollution: Solid waste, Solid waste management by land filling, composting and incineration Air pollution: Sources of air pollution, Consequences of air pollution :- Greenhouse effect (Explanation with schematic diagram), Photochemical Smog (Explanation with chemical reaction). Cleaning of gaseous effluents to reduce air contaminants namely dust particle or particulate matters by using:- (i) Electrostatic precipitators (ii) Venturi scrubber (Schematic diagram and working). Noise pollution: Sources, effects, threshold limit for different areas and control methods. E-Pollution: Definition, Sources and effects. Nuclear pollution: Sources and effects. <p>Case study on Water Pollution of Ganga River. Case study on London smog (U. K.)(December, 1952). Case Study of Fukushima Disaster (March, 2011).</p>	8
04	<p>Pollution Control Legislation:</p> <ul style="list-style-type: none"> Functions and powers of Central and State Pollution Control Board. Environmental Clearance, Consent and Authorization Mechanism. <p>Case Study of Dombivali MIDC- Boiler Blast Tragedy (Thane, Maharashtra, India), (May, 2016).</p>	3
05	<p>Renewable Sources of Energy:</p> <ul style="list-style-type: none"> Importance of renewable sources of energy. Principle and working with schematic diagram of :- (i) Solar Energy: (a) Flat plate collector and (b) Photovoltaic cell. (ii) Wind Energy: Wind Turbines. (iii) Hydropower: Hydropower generation from water reservoir of the dam. (iv) Geothermal Energy: Utilisation of underground sources of steam for power generation. 	4
06	<p>Technological Advances to overcome Environmental problems:</p> <ul style="list-style-type: none"> Concept of Green Buildings, Various indoor air pollutants and their effects on health. Carbon Credit: Introduction and general concept. Disaster Management: Techniques of Disaster Management to cope up with (i) Earthquake and (ii) Flood. <p>Case Study on Earthquake in Latur (Maharashtra, India), (September,1993). Case Study on Cloudburst and Landslides at Kedarnath (Uttarakhand, India), (June, 2013).</p>	5

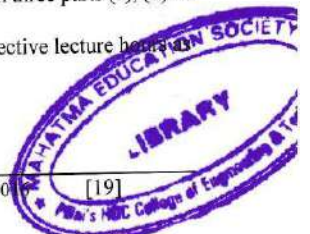
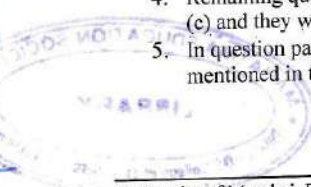
Assessment:

Internal Assessment Test:

- Each test will be of 15 marks.
- At least one question will be based on case study. Candidate is expected to explain the salient features of the incident and suggest preventive measures.

End Semester Theory Examination:

- Question paper will comprise of total six question, each carrying 15 marks.
- Total four questions need to be solved.
- Question Number One will be compulsory and it will be based on entire syllabus wherein sub-questions of 2 to 3 marks will be asked.
- Remaining questions i.e. Q.2 to Q.6 will be mixed in nature and will be divided in three parts (a), (b) & (c) and they will belong to different modules.
- In question paper, weight of each module will be proportional to number of respective lecture hours mentioned in the syllabus.

References:

1. Environmental Studies by Benny Joseph, TataMcGraw Hill.
2. Environmental Studies by R.Rajagopalan, Oxford University Press.
3. Environmental Studies by. AnanditaBasak, Pearson Education.
4. Essentials of Environmental Studies by Kurian Joseph & Nagendran, Pearson Education.
5. Fundamentals of Environmental Studies by Varadbal G. Mhatre, Himalaya Publication House.
6. Perspective of Environmental Studies, by Kaushik and Kaushik, New Age International.
7. Renewable Energy by Godfrey Boyle, Oxford Publications.
8. Textbook of Environmental Studies by Dave and Katewa, Cengage Learning.
9. Textbook of Environmental studies by ErachBharucha, University Press.
10. Environmental pollution control engineering by C.S. Rao, New Age International (P) Limited Publishers.



A handwritten signature in blue ink, appearing to read "S. S. S.", written over a faint circular stamp.

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Pillai's HOC Educational Campus
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Dist. Raigad, Pin-410 207

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract.	Tut.	Theory	TW/Pract	Tut.	Total
FEC206	Communication Skills	02	02	--	02	01	--	03

Course Code	Course Name	Examination Scheme							
		Theory			End Sem Exam	Term Work	Pract	Oral	Total
		Internal Assessment							
		Test1	Test2	Av of Test 1 & 2					
FEC206	Communication Skills	10	10	10	40	25	--	--	75

Objectives

1. To acquaint the students with appropriate language skills with the purpose of improving the existing ones – LSRW
2. To make the learners understand the importance and effective use of non-verbal communication
3. To make the learner proficient in public speaking and presentation skills
4. To guide and teach the students to utilize the principles of professional business and technical writing for effective communication in the global world
5. To make the learner capable of creating official content digitally for further communication in the corporate environment

Outcomes: Learner will be able to...

1. Understand and evaluate information they listen to and express their ideas with greater clarity
2. Speak and respond effectively along the various channels of communication in a business organization
3. Speak convincingly before an audience with the help of an expanded vocabulary and enhanced digital content
4. Read and summarize effectively
5. Communicate through result oriented writing both within and outside the organization.
6. Write a set of effective and easy to understand technical description, instructions and convey the same using global information technology

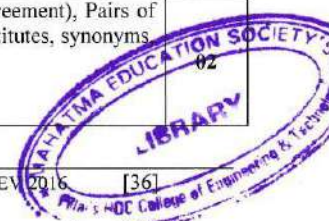
Module	Detailed Contents	Hrs.
01	Communication Theory: Concept and Meaning, Communication cycle, Objectives, Barriers to communication (linguistic and semantic, psychological, physical, mechanical, cultural), Methods of communication (verbal and non-verbal), Networks of communication (formal and informal), Language skills (listening, speaking, reading, writing), Corporate communication: Digital Content Creation.	13
02	Business Correspondence: Principles of Business Correspondence, Parts of a business letter, Formats (Complete block and Modified block), Types of letters: Enquiry, Reply to enquiry, Claim, Adjustment and Sales letter.	05
03	Grammar and Vocabulary: Common errors, Concord (subject- verb agreement), Pairs of confused words, Lexicon (Enriching vocabulary through one-word substitutes, synonyms, antonyms, etc.)	02



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04	Summarization and Comprehension: Passages to test the analytical skills and expression	02
05	Technical writing : Techniques to define an object, writing instructions, language exercises based on types of expositions (description of an object, explanation of a process)	02
06	Information Communication Technology (ICT) enabled communication media: E-mail, Blog and Website.	02

The distribution of Term Work marks will be as follows -

Attendance : 05 marks
Assignments : 20 marks

List of assignments:

1. Communication theory: 02
2. Business Correspondence: 02
3. Grammar and vocabulary: 01
4. Summarization & Comprehension: 01
5. Technical writing: 01
6. ICT enabled communication media: 01

Assessment:

Internal Assessment Test:

Assessment consists of two class tests of 10 marks each. The first test should be conducted in the form of a three-minute public speech. The second test should be based on theory and application exercises as mentioned in the syllabus.

End Semester Theory Examination:

1. Question paper will comprise of total 06 questions, each carrying 10 marks.
2. Total 04 questions need to be solved.
3. Question No: 01 will be compulsory and based on entire syllabus wherein sub-questions of 3 to 5 marks will be asked.
4. Remaining questions will be mixed in nature.(e.g. Suppose Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3)
5. In question paper weightage of each module will be proportional to number of respective lecture hrs as mentioned in the syllabus.
6. The first module (Communication Theory) will carry 40 % weightage.

References:

1. Communication in Organizations by Dalmar Fisher, Jaico Publishing House
2. Communication Skills by Meenakshi Raman & Sangeeta Sharma,
3. Oxford University Press.
4. Business Correspondence & Report-writing by R.C. Sharma & Krishna Mohan, Tata McGraw-Hill Education.
5. Effective Technical Communication by Ashraf Rizvi, Tata McGraw-Hill.
6. Technical Writing & Professional Communication for non-native speakers of English by Thomas N. Huckin & Leslie A. Olsen, McGraw-Hill.
7. Mastering Communication by Nicky Stanton, Palgrave Master Series
8. www.businesscommunicationskills.com
9. www.kcitraing.com
10. www.mindtools.com
11. Journal of Business Communication



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