

## Syllabus for B.Tech(Mechanical Engineering) up to Third Year

Revised Syllabus of B.Tech in ME for the students who were admitted in Academic Session 2010-2011)




### Second Year – Third Semester

A. THEORY							
Sl.No.	Paper Code	Subjects	Contact Hours / Week				Cr.Points
			L	T	P	Total	
1.	HU-301	Values & Ethics in Profession	3	0	0	3	3
2.	PH-301	Physics-2	3	1	0	4	4
3.	CH301	Basic Environmental Engineering & Elementary Biology	3	0	0	3	3
4.	ME 301	Applied Thermodynamics	4	0	0	4	4
5.	ME 302	Strength of Materials	3	0	0	3	3
6.	ME 303	Engineering Materials	3	0	0	3	3
<b>Total Theory</b>			19	1	0	20	20
B. PRACTICAL							
Sl.No.	Field	Subjects	Contact Hours / Week				Cr.Points
			L	T	P	Total	
7.	HU-381	Technical Report Writing & Language Lab Practice	0	0	3	3	2
	PH391	Physics Lab-2	0	0	3	3	2
8.	ME 391	Machine Drawing –I	0	0	3	3	2
9.	ME 392	Workshop Practice-II	0	0	3	3	2
10.	ME 393	Applied Mechanics Lab	0	0	3	3	2
<b>Total Practical</b>			0	0	15	15	10
<b>Total Semester</b>			19	1	15	35	30

### Second Year – Fourth Semester

A. THEORY							
Sl.No.	Field	Subjects	Contact Hours / Week				Cr.Points
			L	T	P	Total	
1.	M(CS)401	Numerical Methods	2	1	0	3	2
2.	M-402	Mathematics-3	3	1	0	4	4
3.	ME 401	Fluid Mechanics & Hydraulic Machines	4	0	0	4	4
4.	ME 402	Mechanisms	3	0	0	3	3
5.	ME 403	Primary Manufacturing Processes	4	0	0	4	4
<b>Total Theory</b>			16	2	0	18	17
B. PRACTICAL							
Sl.No.	Field	Subjects	Contact Hours / Week				Cr.Points
			L	T	P	Total	
6.	M(CS)491	Numerical Methods Lab	0	0	2	2	1
7.	ME491	Fluid Mechanics & Hydraulics Lab	0	0	3	3	2
8.	ME 492	Manufacturing Technology Lab	0	0	3	3	2
9.	ME493	Material Testing Lab	0	0	3	3	2
10.	ME 494	Machine Drawing-II	0	0	3	3	2
<b>Total Practical</b>			0	0	14	14	9
<b>Total Semester</b>			16	2	12	32	26

  
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Revised Syllabus of B.Tech CE (for the students who were admitted in Academic Session 2010-2011)



**VALUES & ETHICS IN PROFESSION**

HU-301

Credits:3L

*Credits- 3*

Science, Technology and Engineering as knowledge and as Social and Professional Activities

***Effects of Technological Growth:***

Rapid Technological growth and depletion of resources, Reports of the Club of Rome. Limits of growth: sustainable development  
Energy Crisis: Renewable Energy Resources  
Environmental degradation and pollution. Eco-friendly Technologies. Environmental Regulations, Environmental Ethics  
Appropriate Technology Movement of Schumacher; later developments  
Technology and developing nations. Problems of Technology transfer. Technology assessment impact analysis.  
Human Operator in Engineering projects and industries. Problems of man, machine, interaction, impact of assembly line and automation.  
Human centered Technology.

***Ethics of Profession:***

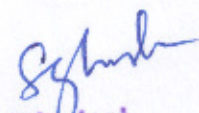
Engineering profession: Ethical issues in Engineering practice. Conflicts between business demands and professional ideals. Social and ethical responsibilities of Technologists. Codes of professional ethics. Whistle blowing and beyond. Case studies.

***Profession and Human Values:***

Values Crisis in contemporary society  
Nature of values: Value Spectrum of a good life  
Psychological values: Integrated personality; mental health  
Societal values: The modern search for a good society, justice, democracy, secularism, rule of law, values in Indian Constitution.  
Aesthetic values: Perception and enjoyment of beauty, simplicity, clarity  
Moral and ethical values: Nature of moral judgements; canons of ethics; ethics of virtue; ethics of duty; ethics of responsibility.

**Books:**

1. Stephen H Unger, Controlling Technology: Ethics and the Responsible Engineers, John Wiley & Sons, New York 1994 (2<sup>nd</sup> Ed)
2. Deborah Johnson, Ethical Issues in Engineering, Prentice Hall, Englewood Cliffs, New Jersey 1991.
3. A N Tripathi, Human values in the Engineering Profession, Monograph published by IIM, Calcutta 1996.

  
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## Syllabus for B.Tech(Mechanical Engineering) up to Third Year

Revised Syllabus of B.Tech in ME for the students who were admitted in Academic Session 2010-2011)



### Third Year- Fifth Semester

A. THEORY							
Sl.No.	Field	Subjects	Contact Hours / Week				Credit Points
			L	T	P	Total	
1.	HU511	Principles & Practices of Management	2	0	0	2	2
2.	ME 501	Dynamics of Machines	3	0	0	3	3
3.	ME 502	Heat Transfer	4	0	0	4	4
4.	ME 503	Design of Machine Elements	4	0	0	4	4
5.	ME504	Metrology & Measurement	3	0	0	3	3
6.	ME 505	* Professional Elective-I	3	0	0	3	3
<b>Total Theory</b>			19	0	0	19	19
B. PRACTICAL							
Sl.No.	Field	Subjects	Contact Hours / Week				Credit Points
			L	T	P	Total	
7.	ME 581 (Sessional)	Seminar-I	0	0	3	3	2
8.	ME 592	Applied Thermodynamics & Heat Transfer Lab	0	0	3	3	2
9.	ME 593	Design Practice-I	0	0	3	3	2
10.	ME594	Metrology & Measurement Lab	0	0	2	2	1
11.	ME 595	Professional Elective Lab-I	0	0	3	3	2
<b>Total Practical</b>			0	0	14	14	9
<b>Total Semester</b>			19	0	14	33	28

\* List of Professional Elective I:

1. ME505A-Electrical Machines
2. ME505B-Applied Fluid Mechanics

### Third Year – Sixth Semester

A. THEORY							
Sl.No.	Field	Subjects	Contact Hours / Week				Credit Points
			L	T	P	Total	
1.	HU 611	Production & Operations Management	2	0	0	2	2
2.	ME 601	IC Engines and Gas Turbines	3	0	0	3	3
3.	ME 602	Machining Principles & Machine Tools	3	0	0	3	3
4.	ME 603	Machine Design	3	0	0	3	3
5.	ME 604	@ Professional Elective-II	3	0	0	3	3
6.	ME 605	@@ Professional Elective-III	3	0	0	3	3
<b>Total Theory</b>			17	0	0	17	17
B. PRACTICAL							
Sl.No.	Field	Subjects	Contact Hours / Week				Credit Points
			L	T	P	Total	
7.	ME 691	Machining & Machine Tools Lab	0	0	3	3	2
8.	ME 692	IC Engine Lab	0	0	3	3	2
9.	ME 693	Design Practice-II	0	0	3	3	2
10.	ME 694	Dynamics of Machines Lab	0	0	3	3	2
11.	ME 695	Professional Elective-II Lab	0	0	3	3	2
<b>Total Practical</b>			0	0	15	15	10
<b>Total Semester</b>			17	0	15	32	27

@ List of Prof. Elective-II:

1. ME604A- Air Conditioning & Refrigeration
2. ME604B- Mechatronics
3. ME604C- Fluid Power Control

@@List of Prof. Elective-III:

1. ME605A- Materials Handling
2. ME605B- Finite Element Method
3. ME605C- Turbo Machinery

**Note:** Vacational Training to be conducted after sixth semester and to be evaluated in seventh semester

**Syllabus for B.Tech(Civil Engineering) Up to Third Year**  
Revised Syllabus of B.Tech CE (for the students who were admitted in Academic Session 2010-2011)



**Principles & Practices of Management**

HU-511

Contacts: 21

Credits- 2

**Module I: Management**

(4 hours)

Definition, nature, importance, evolution of management thoughts – pre & post scientific era, contributions made by Taylor, Fayol, Gilbreth, Elton Mayo, McGregor, Maslow –covering Time & Motion Study, Hawthorne Experiments; Is management a science or art? Functions of manager, ethics in managing and social responsibility of managers.

**Module II: Planning & Control**

(4 hours)

Why Management process starts with planning, steps in planning, planning premises, types of planning, barriers to effective planning, operational plan, strategic planning, McKinsey's 7's

Approach, SWOT analysis, Controlling- concept, Planning- control relationship, process of control, human response to control, dimensions of control, MBO.

**Module III: Decision Making & Organizing**

(4 hours)

Nature, process of decision making, decision making under Certainty and Uncertainty, decision-tree, group-aided decision, brain-storming.

Organizing – concept, nature and process of organizing, authority and responsibility, delegation and empowerment, centralization and decentralization, concept of departmentation.

**Module IV: Staffing & Motivation**

(3 hours)

Concept, Manpower planning, Job design, recruitment & selection, training and development, performance appraisal, motivation, motivators and satisfaction, motivating towards organizing objectives, morale building.

**Module V: Leadership & Communication**

(3 hours)

Defining leadership and its role, should managers lead, leadership style, leadership development, Leadership behavior. Communication- Process, Bridging gap-using tools of communication, electronic media in Communication.

**Module VI: Financial Management**

(3 hours)

Financial functions of management, Financial Planning, Management of Working Capital, Sources of Finance.

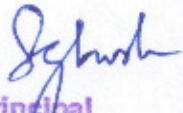
**Module VII: Marketing Management**

(3 hours)

Functions of Marketing, Product Planning & Development, Marketing Organization, Sales Organization, Sales Promotion, Consumer Behaviour, Marketing Research and Information.

**Suggested Text Books & References:**

1. Robbins & Coulter, Management, Prentice Hall of India.
2. John R. Schermerhorn, Introduction to Management, Wiley-India Edition.
3. Koontz, Principles of Management, Tata-McGraw Hill.
4. Richard L. Daft, New Era of Management, Cengage Learning.
5. Stoner, Freeman and Gilbert, Jr., Management, Prentice Hall of India.
6. Koontz, Wehrlich, Essentials of Management, Tata-McGraw Hill.
7. D.C. Bose, Principles of Management and Administration, Prentice Hall of India.
8. Karan Nerkar, Vilas Chopde & Kogent Learning Inc, Principles and Practices of Management, Dreamtech Press.
9. Parag Diwan, Management Principles and Practices, Excel Books, New Delhi.
10. Joseph M Putty, Management of Principles and Practices.
11. Richard. L.Daft, Principles of Management, Cengage Learning.

  
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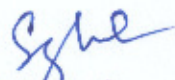
**Syllabus for B. Tech in Electronics & Communication Engineering**  
(Applicable from the academic session 2018-2019)

4th Year: 7<sup>th</sup> Semester

D. Theory								
Sl No	Field	Theory	Contact Hours/week				Credit Points	
			L	T	P	Total		
1.	PE-EC701	Program Elective -3	3	0	0	3	3	
2.	PE-EC702	Program Elective -4	3	0	0	3	3	
3.	PE-EC703	Program Elective -5	3	0	0	3	3	
4.	OE-EC704	Open Elective - 3	3	0	0	3	3	
5.	HS-HU701	Principles of Management	2	0	0	2	2	
Total Theory						14	14	
E. Practical								
6	EC781	Industrial Training	During Semester Break(6 <sup>th</sup> & 7 <sup>th</sup> )				1	
7.	EC782	Project Stage – I	0	0	8	8	4	
Total Practical						8	5	
Total Credits						22	19	

4<sup>th</sup> Year: 8<sup>th</sup> Semester

E. Theory								
Sl No	Field	Theory	Contact Hours/week				Credit Points	
			L	T	P	Total		
1.	PE-EC801	Program Elective – 6	3	0	0	3	3	
2.	PE-EC802	Program Elective - 7	3	0	0	3	3	
3.	OE-EC803	Open Elective - 4	3	0	0	3	3	
4.	OE-EC804	Open Elective - 5	3	0	0	3	3	
Total Theory						12	12	
F. Practical								
5.	EC881	Project Stage – II	0	0	15	15	7.5	
6.	EC882	Grand Viva					1.5	
Total Practical						15	9	
Total Contact /Credits						27	21	

  
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**Syllabus for B. Tech in Electronics & Communication Engineering**  
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**Semester-VII**

HS-HU701	Principles of Management	2L:0T:0P	2 credits
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**Module-I**

1. Basic concepts of management: Definition - Essence, Functions, Roles, Level.
2. Functions of Management: Planning - Concept, Nature, Types, Analysis, Management by objectives; Organisation Structure -Concept, Structure, Principles, Centralization, Decentralization, Span of Management; Organisational Effectiveness.

**Module-II**

3. Management and Society - Concept, External Environment, CSR, Corporate Governance, Ethical Standards.
4. People Management - Overview, Job design, Recruitment & Selection, Training & Development, Stress Management.
5. Managerial Competencies - Communication, Motivation, Team Effectiveness, Conflict Management, Creativity, Entrepreneurship.

**Module-III**


6. Leadership: Concept, Nature, Styles.
7. Decision making: Concept, Nature, Process, Tools & techniques.
8. Economic, Financial & Quantitative Analysis - Production, Markets, National Income Accounting, Financial Function & Goals, Financial Statement & Ratio Analysis, Quantitative Methods - Statistical Interference, Forecasting, Regression Analysis, Statistical Quality Control.

**Module-IV**

9. Customer Management - Market Planning & Research, Marketing Mix, Advertising & Brand Management.
10. Operations & Technology Management - Production & Operations Management, Logistics & Supply Chain Management, TQM, Kaizen & Six Sigma, MIS.

**References:**

1. Management: Principles, Processes & Practices - Bhat, A & Kumar, A (OUP).

  
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List of Open Elective

Sl No.	Course Code	Course Title	Hours/week			Credits	Semester
			L	T	P		
1	OE-EC506A	Soft Skill and Interpersonal Communication	3	0	0	3	
2	OE-EC506B	Cyber Law & Intellectual Property Rights	3	0	0	3	V
3	OE-EC506C	Human Resource Management	3	0	0	3	
4	OE-EC604A	Electronic Measurements and Measuring Instruments	3	0	0	3	
5	OE-EC604B	Operating System	3	0	0	3	VI
6	OE-EC604C	Object Oriented Programming	3	0	0	3	
7	OE-EC704A	Web Technology	3	0	0	3	
8	OE-EC704B	Optimisation Technique	3	0	0	3	VII
9	OE-EC704C	Entrepreneurship	3	0	0	3	
10	OE-EC803A	Internet of Things(IoT)	3	0	0	3	
11	OE-EC803B	Big Data Analysis	3	0	0	3	
12	OE-EC803C	Cyber Security	3	0	0	3	VIII
13	OE-EC804A	Artificial Intelligence	3	0	0	3	
14	OE-EC804B	Microwave Integrated Circuits	3	0	0	3	
15	OE-EC804C	Organisational Behaviour	3	0	0	3	



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<b>OE-EC804C</b>	<b>Organizational Behavior</b>	<b>3L:0T:0P</b>	<b>3 credits</b>
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**UNIT-1-Introduction to Organization and Organizational Behaviour :**

Meaning and definition of organization, features and principles of organization, Organizational structures and nature of organizational behavior.

**UNIT-2-Personality :**

Meaning of Personality, Personality Development, Determinants of personality, Application of personality in the organizational level. Motivation-concept of motivation, motivation and behavior, Theories of motivation, Need theory, Hygiene theory, Theory X and Theory Y, Elements of sound motivational system, Motivation in Indian organization.

**UNIT-3-Leadership :**

Meaning, Theory of leadership, Trait theory, Behavioural theory, Leadership styles, Leadership in Indian Organisation. Group Dynamics-Concept of Group Dynamic, Types of Group, Group Behaviour, Group Decisions, Techniques to improve group decision, merits and de-merits of group decision.

**UNIT-4- Organizational Change :**

Meaning and Nature of organizational change, Factors of organizational change, Resistance to change, Factors in resistance, Overcoming resistance to change, Organizational Development-Concept, Objectives and process of organization development.

**Text Book**


1. ORGB, An innovative Approach to Learning and Teaching ,Organizational Behaviour, Nelson, Quick, Khandelwal, Cengage Learning, 2012.

**Reference Book**

1. Organizational Behaviour Dr S.S.Khanka, S.Chand, 2014.
2. Organisational Behaviour. Arun Kumar and N.Meenaskshi .Vikas Publishing House, 2009.
3. Managing Organisational Behaviour, Moorhead & Griffin. CENGAGE Learning, 2014.
4. Human Behaviour at Work. Keith Davies, 2002.

**Course Outcome :** At the end of the course the students will be able to:

1. know about organisational structure, organisational behaviour and personality development.
2. learn about motivational techniques and skill required to work in a group and the process of group decision making.
3. know various leadership styles and the role of leader in achievement of organisational objective.

  
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## Syllabus for B.Tech(Electronics & Communication Engineering) Up to Fourth Year

Revised Syllabus of B.Tech ECE (for the students who were admitted in Academic Session 2010-2011)



### ECE SECOND YEAR: THIRD SEMESTER

A. THEORY							
Sl.No.	Field	Theory	Contact Hours/Week				Cr. Points
			L	T	P	Total	
1	M(CS)301	Numerical Methods	2	1	0	3	2
2	M302	Mathematics-III	3	1	0	4	4
3	EC301	1. Circuit Theory & Networks	3	1	0	4	4
4	EC302	2. Solid State Device	3	0	0	3	3
5	EC303	1. Signals & Systems	3	0	0	3	3
	EC304	2. Analog Electronic Circuits	3	1	0	4	4
6							
<b>Total of Theory</b>						<b>21</b>	<b>20</b>
B. PRACTICAL							
7	M(CS)391	Numerical Lab	0	0	2	2	1
8	EC391	Circuit Theory & Network Lab	0	0	3	3	2
9	EC392	Solid State Devices	0	0	3	3	2
10	EC393	1. Signal System Lab	0	0	3	3	2
11	EC394	2. Analog Electronic Circuits Lab	0	0	3	3	2
<b>Total of Practical</b>						<b>14</b>	<b>9</b>
<b>Total of Semester</b>						<b>35</b>	<b>29</b>

### ECE SECOND YEAR: FOURTH SEMESTER

A. THEORY							
Sl.No.	Field	Theory	Contact Hours/Week				Cr. Points
			L	T	P	Total	
1	HU401	Values & Ethics in Profession	3	0	0	3	3
2	PH401	Physics-II	3	1	0	4	4
3	CH401	Basic Environmental Engineering & Elementary Biology	2+1	0	0	3	3
4	EC401	1. EM Theory & Transmission Lines	3	1	0	4	4
5	EC402	2. Digital Electronic & Integrated Circuits	3	1	0	4	4
<b>Total of Theory</b>						<b>18</b>	<b>18</b>
B. PRACTICAL							
6	HU481	Technical Report Writing & Language Lab Practice	0	0	3	3	2
7	PH491	Physics-II Lab	0	0	3	3	2
8	EC491	1. EM Theory & Tx Lines Lab	0	0	3	3	2
9	EC492	2. Digital Electronic & Integrated Circuits Lab	0	0	3	3	2
<b>Total of Practical</b>						<b>12</b>	<b>8</b>
<b>Total of Semester</b>						<b>30</b>	<b>26</b>

*Syharsh*

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Revised Syllabus of B.Tech CE (for the students who were admitted in Academic Session 2010-2011)



**VALUES & ETHICS IN PROFESSION**

**HU-401**

**Contracts:3L**

**Credits-3**

Science, Technology and Engineering as knowledge and as Social and Professional Activities

**Effects of Technological Growth:**

Rapid Technological growth and depletion of resources. Reports of the Club of Rome. Limits of growth: sustainable development  
Energy Crisis: Renewable Energy Resources  
Environmental degradation and pollution. Eco-friendly Technologies. Environmental Regulations, Environmental Ethics  
Appropriate Technology Movement of Schumacher: later developments  
Technology and developing nations. Problems of Technology transfer, Technology assessment impact analysis.  
Human Operator in Engineering projects and industries. Problems of man, machine, interaction, Impact of assembly line and automation. Human centered Technology.

**Ethics of Profession:**

Engineering profession: Ethical issues in Engineering practice. Conflicts between business demands and professional ideals. Social and ethical responsibilities of Technologists. Codes of professional ethics. Whistle blowing and beyond, Case studies.

**Profession and Human Values:**

Values Crisis in contemporary society  
Nature of values: Value Spectrum of a good life  
Psychological values: Integrated personality; mental health  
Societal values: The modern search for a good society, justice, democracy, secularism, rule of law, values in Indian Constitution.  
Aesthetic values: Perception and enjoyment of beauty, simplicity, clarity  
Moral and ethical values: Nature of moral judgements; canons of ethics; ethics of virtue; ethics of duty; ethics of responsibility.

**Books:**

1. Stephen H Unger, Controlling Technology: Ethics and the Responsible Engineers, John Wiley & Sons, New York 1994 (2<sup>nd</sup> Ed)
2. Deborah Johnson, Ethical Issues in Engineering, Prentice Hall, Englewood Cliffs, New Jersey 1991.
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# Syllabus for B.Tech(Electronics & Communication Engineering) Up to Fourth Year

Revised Syllabus of B.Tech ECE (for the students who were admitted in Academic Session 2010-2011)



## Third Year - Fifth Semester

A. THEORY							
Sl.No	Paper Code	Theory	Contact Hours/Week				Cr. Pts
			L	T	P	Total	
1	HU-501	Economics for Engineers	3	0	0	3	3
2	EC-501	Analog Communication	3	1	0	4	4
3	EC-502	Microprocessors & Microcontrollers	3	1	0	4	4
4	EC-503	Control System	3	0	0	3	3
5	F. E.- EC-504A EC-504B	Computer Architecture Data structure & C	3	1	0	4	3/4
Total of Theory						18	18
B. PRACTICAL							
6	EC-591	Analog Communication*	0	0	3	3	2
7	EC-592	Microprocessors & Microcontrollers*	0	0	3	3	2
8	EC-593	Control System*	0	0	3	3	2
9	F.E. EC-594A EC-594B	Computer Architecture Data structure & C	0	0	3	3	2
Total of Practical						12	8
Total of Semester						30	26

Laboratories to have both physical experiments and simulation. Only virtual laboratory is not accepted

## Third Year - Sixth Semester

A. THEORY							
Sl.No.	Field	Theory	Contact Hours/Week				Cr. Pts
			L	T	P	Total	
1	HU-601	Principles of Management	2	0	0	2	2
2	EC601	Digital Communications	3	0	0	3	3
3	EC602	Digital Signal Processing	3	0	0	3	3
4	EC-603	Telecommunication System	3	0	0	3	3
5	(No Lab) EC-604A EC-604B	Antenna Theory & Propagation Information Theory & Coding	3	0	0	3	3
6	(With Lab) EC-605A EC-605B EC-605C	Object Oriented Programming (IT) Programming Language (CSE) Electronic Measurement & Instrumentation(EI)	3	0	0	3	3
Total of Theory						17	17
B. PRACTICAL							
8	EC691	Digital Communications	0	0	3	3	2
9	EC-692	Digital Signal Processing	0	0	3	3	2
10	F.E. EC-695A EC-695B EC-695C	Object Oriented Programming (IT) Programming Language (CSE) Electronic Measurement & Instrumentation	0	0	3	3	2
11	EC-681	Seminar	0	0	3	3	2
Total of Practical						12	8
Total of Semester						29	25

**Syllabus for B.Tech(Civil Engineering) Up to Third Year**  
Revised Syllabus of B.Tech CE (for the students who were admitted in Academic Session 2010-2011)



**SEMESTER - VI**

**Theory**

**Principles of Management**

**HU-601**

**Contracts: 2L**

**Credits- 2**

**Module-I**

1. Basic concepts of management: Definition – Essence, Functions, Roles, Level
2. Functions of Management: Planning – Concept, Nature, Types, Analysis, Management by objectives; Organisation Structure – Concept, Structure, Principles, Centralization, Decentralization, Span of Management; Organisational Effectiveness.

**Module-II**

3. Management and Society – Concept, External Environment, CSR, Corporate Governance, Ethical Standards.
4. People Management – Overview, Job design, Recruitment & Selection, Training & Development, Stress Management.
5. Managerial Competencies – Communication, Motivation, Team Effectiveness, Conflict Management, Creativity, Entrepreneurship.

**Module-III**

6. Leadership: Concept, Nature, Styles.
7. Decision making: Concept, Nature, Process, Tools & techniques.
8. Economic, Financial & Quantitative Analysis – Production, Markets, National Income Accounting, Financial Function & Goals, Financial Statement & Ratio Analysis, Quantitative Methods – Statistical Interference, Forecasting, Regression Analysis, Statistical Quality Control.

**Module-IV**

9. Customer Management – Market Planning & Research, Marketing Mix, Advertising & Brand Management.
10. Operations & Technology Management – Production & Operations Management, Logistics & Supply Chain Management, TQM, Kaizen & Six Sigma, MIS.

**Readings:**

1. Management: Principles, Processes & Practices – Bhat, A & Kumar, A (OUP).
2. Essentials for Management – Koontz, Revised edition, Tata McGraw Hill (TMH)
3. Management – Stoner, James A. F. (Pearson)
4. Management - Ghuman, Tata McGraw Hill(TMh)

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Proposed  
Fourth Year - Seventh Semester

A. THEORY								
Sl. No.	Field	Theory Name of Paper	Contact Hours/Week				Cr. Pts	
			L	T	P	Total		
1	EC701	Wireless Communication & N/W	3	0	0	3	3	
2	EC702	Microelectronics & VLSI Designs	3	0	0	3	3	
3	EC703	A. RF & Microwave Engg. (With Lab) B. Optical Communication & N/W C. Computer Networks D. FPGA & Reconfigurable Computing	3	0	0	3	3	
4	EC704	A. Radar Engg (No Lab) B. Embedded Systems C. Biomedical Instrumentation	3	0	0	3	3	
5	F. E. EC705	A. Artificial Intelligence (CSE) B. Robotics (CSE ) C. Data Base Management System D. Power Electronics	3	0	0	3	3	
<b>Total of Theory</b>						<b>15</b>	<b>15</b>	
B. PRACTICAL								
Name of Paper								
6	HU 781	Group Discussion	0	0	3	3	2	
7	EC792	VLSI Design Lab	0	0	3	3	2	
8	EC793	A. RF & Microwave Engg. Lab B. Optical Communication & N/W Lab C. Computer Networks Lab D. FPGA & Reconfigurable Computing lab	0	0	3	3	2	
9	F.E EC795	A. Artificial Intelligence Lab(CSE) B. Robotics lab(CSE) C. Data Base Management System Lab (CSE) D. Power Electronics Lab(BE)	0	0	3	3	2	
10	EC781	Industrial training	4 wks during 6 <sup>th</sup> -7 <sup>th</sup> Sem-break				2	
11	EC782	Project part I					3	2
<b>Total of Practical</b>						<b>15</b>	<b>12</b>	
<b>Total of Semester</b>						<b>30</b>	<b>27</b>	

Fourth Year - Eighth Semester

A. THEORY							
Sl. No.	Field	Theory Paper Name	Contact Hours/Week				Cr. Pts
			L	T	P	Total	
1	HU801A	Organisational Behaviour	2	0	0	2	2
3	EC801	A. Smart Antenna (No Lab) B. Digital Image Processing C. Satellite Communication & Remote Sensing	3	0	0	3	3
	EC802	A. Neural N/W & Applications (CSE) (No Lab) B. Material Sc. & Engg (Mat. Sc) C. Renewable Energy (EE) D. Audio & Speech Processing (CSE)	3	0	0	3	3
<b>Total of Theory</b>						<b>8</b>	<b>8</b>
B. PRACTICAL							
	EC881	Design Lab / Industrial problem related practical training	0	0	6	6	4
	EC882	Project part-2	0	0	12	12	6
	EC893	Grand viva					3
<b>Total of Practical</b>						<b>18</b>	<b>13</b>
<b>Total of Semester</b>						<b>26</b>	<b>21</b>

**Syllabus for B.Tech(Civil Engineering) Up to Third Year**  
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**Organisational Behaviour**

**HU801A**

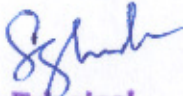
**Contracts: 2L**

**Credits- 2**

1. Organizational Behaviour: Definition, Importance, Historical Background, Fundamental Concepts of OB, Challenges and Opportunities for OB. [2]
2. Personality and Attitudes: Meaning of personality, Personality Determinants and Traits, Development of Personality, Types of Attitudes, Job Satisfaction. [2]
3. Perception: Definition, Nature and Importance, Factors influencing Perception, Perceptual Selectivity, Link between Perception and Decision Making. [2]
4. Motivation: Definition, Theories of Motivation - Maslow's Hierarchy of Needs Theory, McGregor's Theory X & Y, Herzberg's Motivation-Hygiene Theory, Alderfer's ERG Theory, McClelland's Theory of Needs, Vroom's Expectancy Theory. [4]
5. Group Behaviour: Characteristics of Group, Types of Groups, Stages of Group Development, Group Decision Making. [2]
6. Communication: Communication Process, Direction of Communication, Barriers to Effective Communication. [2]
7. Leadership: Definition, Importance, Theories of Leadership Styles. [2]
8. Organizational Politics: Definition, Factors contributing to Political Behaviour. [2]
9. Conflict Management: Traditional vis-a-vis Modern View of Conflict, Functional and Dysfunctional Conflict, Conflict Process, Negotiation - Bargaining Strategies, Negotiation Process. [2]
10. Organizational Design: Various Organizational Structures and their Effects on Human Behaviour, Concepts of Organizational Climate and Organizational Culture. [4]

**References:**

1. Robbins, S. P. & Judge, T.A.: Organizational Behavior, Pearson Education, 15<sup>th</sup> Edn.
2. Luthans, Fred: Organizational Behavior, McGraw Hill, 12<sup>th</sup> Edn.
3. Shukla, Madhukar: Understanding Organizations - Organizational Theory & Practice in India, PHI
4. Fincham, R. & Rhodes, P.: Principles of Organizational Behaviour, OUP, 4<sup>th</sup> Edn.
5. Hersey, P., Blanchard, K.H., Johnson, D.E.- Management of Organizational Behavior Leading Human Resources, PHI, 10<sup>th</sup> Edn.

  
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## Syllabus for B.Tech(Electrical & Electronics Engineering) Up to Fourth Year

Revised Syllabus of B.Tech EEE (for the students who were admitted in Academic Session 2010-2011)



### 3rd Semester

#### Theory:

Sl. No.	CODE	Paper	Contacts periods Per weeks			Total Contact Hrs	Credits
			L	T	P		
1	M (CS) 301	Numerical Methods	2	1	0	3	2
2	M302	Mathematics-III	3	1	0	4	4
3	EC(EE)301	Analog Electronic circuits	3	0	0	3	3
4	EC(EE)302	Digital Electronic circuit	3	0	0	3	3
5	EE-301	Electric Circuit theory	3	1	0	4	4
6	EE-302	Field theory	3	1	0	4	4
						20	20

#### Practical / Sessional:

Sl. No.	CODE	Paper	Contacts periods Per weeks			Total Contact Hrs	Credits
			L	T	P		
1	EC(EE)391	Analog & Digital Electronic circuit	0	0	3	3	2
2	M (CS) 391	Numerical Methods	0	0	2	2	1
3	EE-391	Electric Circuit Theory	0	0	3	3	2
4	HU-391	Technical report writing and language practice	0	0	3	3	2
Total of Practical / Sessional						11	7
TOTAL OF SEMESTER:						32	27

### 4<sup>th</sup> Semester

#### Theory:

Sl. No.	CODE	Paper	Contacts periods Per weeks			Total Contact Hrs	Credits
			L	T	P		
1	HU-401	Values and Ethics in Profession	3	0	0	3	3
2	PH (EE)-401	Physics-II	3	1	0	4	4
3	EI(EEE)-401	Transducers & sensors	3	0	0	3	3
4	CH-401	Basic Environmental Engineering & Elementary Biology	3	0	0	3	3
5	EE-401	Electric Machine-I	3	1	0	4	4
6	EE-402	Electrical & Electronic measurement	3	1	0	4	3
						21	20

#### Practical / Sessional:

Sl. No.	CODE	Paper	Contacts periods Per weeks			Total Contact Hrs	Credits
			L	T	P		
1	PH(EE)-491	Physics-II Lab	0	0	3	3	2
2	EI(EEE)-491	Transducers & sensors Lab	0	0	3	3	2
3	EE-491	Electric Machine Lab-I	0	0	3	3	2
4	EE-492	Electrical & Electronic measurement Lab	0	0	3	3	2
Total of Practical / Sessional						12	8
TOTAL OF SEMESTER:						33	28

**Syllabus for B.Tech(Civil Engineering) Up to Third Year**  
Revised Syllabus of B.Tech CE (for the students who were admitted in Academic Session 2010-2011)



**VALUES & ETHICS IN PROFESSION**

**HU-401**

**Contracts: 3L**

**Credits- 3**

Science, Technology and Engineering as knowledge and as Social and Professional Activities

***Effects of Technological Growth:***

Rapid Technological growth and depletion of resources, Reports of the Club of Rome. Limits of growth: sustainable development

Energy Crisis: Renewable Energy Resources

Environmental degradation and pollution. Eco-friendly Technologies, Environmental Regulations, Environmental Ethics

Appropriate Technology Movement of Schumacher; later developments

Technology and developing notions. Problems of Technology transfer, Technology assessment impact analysis.

Human Operator in Engineering projects and industries. Problems of man, machine, interaction, Impact of assembly line and automation. Human centered Technology.

***Ethics of Profession:***

Engineering profession: Ethical issues in Engineering practice, Conflicts between business demands and professional ideals. Social and ethical responsibilities of Technologists. Codes of professional ethics. Whistle blowing and beyond, Case studies.

***Profession and Human Values:***

Values Crisis in contemporary society

Nature of values: Value Spectrum of a good life

Psychological values: Integrated personality; mental health

Societal values: The modern search for a good society, justice, democracy, secularism, rule of law, values in Indian Constitution.

Aesthetic values: Perception and enjoyment of beauty, simplicity, clarity

Moral and ethical values: Nature of moral judgements; canons of ethics; ethics of virtue; ethics of duty; ethics of responsibility.

**Books:**

1. Stephen H Unger, Controlling Technology: Ethics and the Responsible Engineers, John Wiley & Sons, New York 1994 (2<sup>nd</sup> Ed)
2. Deborah Johnson, Ethical Issues in Engineering, Prentice Hall, Englewood Cliffs, New Jersey 1991.
3. A N Tripathi, Human values in the Engineering Profession, Monograph published by IIM, Calcutta 1996.

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## Syllabus for B.Tech(Electrical & Electronics Engineering) Up to Fourth Year

Revised Syllabus of B.Tech EEE (for the students who were admitted in Academic Session 2010-2011)



### 5<sup>th</sup> Semester

Theory:

Sl. No.	CODE	Paper	Contacts periods Per weeks			Total Contact Hrs	Credits
			L	T	P		
1	HU-501	Economics for Engineers	3	0	0	3	3
2	EEE-501	Electric machine-II	3	1	0	4	4
3	EEE-502	Power system-I	3	1	0	4	4
5	EEE-503	Digital Signal Processing	3	1	0	4	4
6	EEE-504	A. Data structure & algorithm B. Computer Organization C. Microprocessor & Microcontroller	3	0	0	3	3
<b>Total of theory</b>						<b>18</b>	<b>18</b>

Practical / Sessional:

Sl. No.	CODE	Paper	Contacts periods Per weeks			Total Contact Hrs	Credits
			L	T	P		
1	EEE-591	Electric machine-II	0	0	3	3	2
3	EEE-593	Digital Signal Processing	0	0	3	3	2
4	EEE-594	A. Data structure & algorithm B. Computer Organization C. Microprocessor & Microcontroller	0	0	3	3	2
5	EEE-581	Seminar	0	0	3	3	2
<b>Total of Practical / Sessional</b>						<b>12</b>	<b>8</b>
<b>TOTAL OF SEMESTER:</b>						<b>30</b>	<b>26</b>

### EEE 6<sup>th</sup> Semester

Theory:

Sl. No.	CODE	Paper	Contact periods Per week			Total Contact Hrs	Credits
			L	T	P		
1	HU-601	Principle of Management	2	0	0	2	2
2	EEE-601	Power System-II	3	1	0	4	4
3	EEE-602	Control System	3	1	0	4	4
4	EEE-603	Power Electronics	3	1	0	4	4
5	EEE-604	a. Operating System b. Object Oriented Programming & JAVA c. Embedded Systems.	3	0	0	3	3
6	EEE-605	a. Power Plant Engineering b. Communication Engineering.	3	0	0	3	3
						<b>20</b>	<b>20</b>

Practical / Sessional:

Sl. No.	CODE	Paper	Contact periods Per week			Total Contact Hrs	Credits
			L	T	P		
1	EEE-691	Power System	0	0	3	3	2
2	EEE-692	Control System	0	0	3	3	2
3	EEE-693	Power Electronics	0	0	3	3	2
4	EEE-694	a. Operating System b. Object Oriented Programming & JAVA c. Embedded Systems	0	0	3	3	2
<b>Total of Practical / Sessional</b>						<b>12</b>	<b>8</b>
<b>TOTAL OF SEMESTER:</b>						<b>32</b>	<b>28</b>

Industrial training conducted after 6<sup>th</sup> Semester.

**Syllabus for B.Tech(Civil Engineering) Up to Third Year**  
Revised Syllabus of B. Tech CE (for the students who were admitted in Academic Session 2010-2011)




**PRINCIPLE OF MANAGEMENT**  
**HU-601**

**Credit: 2**

**Contact: 21.**

Module	Content	Hour
1	<b>Basic concepts of management:</b> Definition – Essence, Functions, Roles, Level. <b>Functions of Management:</b> Planning – Concept, Nature, Types, Analysis, Management by objectives; Organization Structure – Concept, Structure, Principles, Centralization, Decentralization, Span of Management; Organizational Effectiveness.	05
2	<b>Management and Society</b> – Concept, External Environment, CSR, Corporate Governance, Ethical Standards. <b>People Management</b> – Overview, Job design, Recruitment & Selection, Training & Development, Stress Management. <b>Managerial Competencies</b> – Communication, Motivation, Team Effectiveness, Conflict Management, Creativity, Entrepreneurship	05
3	<b>Leadership:</b> Concept, Nature, Styles. <b>Decision making:</b> Concept, Nature, Process, Tools & techniques. <b>Economic, Financial &amp; Quantitative Analysis</b> – Production, Markets, National Income Accounting, Financial Function & Goals, Financial Statement & Ratio Analysis, Quantitative Methods – Statistical Interference, Forecasting, Regression Analysis, Statistical Quality Control.	05
4	<b>Customer Management</b> – Market Planning & Research, Marketing Mix, Advertising & Brand Management. <b>Operations &amp; Technology Management</b> – Production & Operations Management, Logistics & Supply Chain Management, TQM, Kaizen & Six Sigma, MIS.	05

  
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**Syllabus for B. Tech in Electrical & Electronics Engineering (EEE)**

(Applicable from the academic session 2018-2019)

**Curriculum Structure**

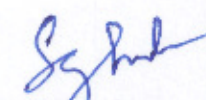
**3<sup>rd</sup> Semester**

**Theory:**

Sl. No.	CODE	Paper	Contact periods Per week			Total Contact Hrs	Credits
			L	T	P		
1	PC-EEE-301	Electric Circuit Theory	3	1	0	4	4
2	PC-EEE-302	Analog Electronics	3	0	0	3	3
3	PC-EEE-303	Electromagnetic field theory	3	0	0	3	3
4	ES-ME-301	Engineering Mechanics	3	0	0	3	3
5	BS-M-301	Mathematics-III	3	0	0	3	3
6	BS-EEE-301	Biology for Engineers	3	0	0	3	3
7	MC-EEE-301	Indian Constitution	3	0	0	3	0
		TOTAL OF SEMESTER:				22	19

**Practical / Sessional:**

Sl. No.	CODE	Paper	Contact periods Per week			Total Contact Hrs	Credits
			L	T	P		
1	PC-EEE-391	Electric Circuit Theory Laboratory	0	0	2	2	1
2	PC-EEE-392	Analog Electronics laboratory	0	0	2	2	1
3	PC-CS-391	Numerical Methods laboratory	0	0	2	2	1
		Total of Practical / Sessional				06	3
		TOTAL OF SEMESTER:				28	22

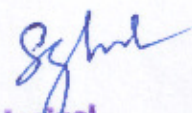
  
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**Syllabus for B.Tech(Civil Engineering) Up to Third Year**  
Revised Syllabus of B.Tech CE (for the students who were admitted in Academic Session 2010-2011)



<b>Name of the course</b>	<b>INDIAN CONSTITUTION</b>
<b>Course Code: MC-EEE 301</b>	<b>Semester: 3<sup>rd</sup></b>
<b>Duration: 6 months</b>	<b>Maximum Marks: 100</b>
<b>Teaching Scheme</b>	<b>Examination Scheme</b>
Theory: 3 hrs/week	Mid Semester Exam: 15 Marks
Tutorial: 0 hr/week	Assignment & Quiz: 10 Marks
Practical: 0 hrs/week	Attendance: 05 Marks
Credit Points: 0	End Semester Exam: 70 Marks
<b>Objective:</b>	
1.	To have basic knowledge about Indian Constitution.
2.	To understand the structure and functioning of union, state and local self-government.
3.	To understand the structure, jurisdiction and function of Indian judiciary.
<b>Pre-Requisite</b>	
1.	NIL

1	<b>Indian Constitution:</b> Sources and constitutional history, Features: Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy	5	
2	<b>Union government and its administration:</b> Structure of the Indian Union: Federalism, Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha. <b>State government and its administration:</b> Governor: Role and Position, CM and Council of ministers, State Secretariat: Organisation, Structure and Functions	10	
3	<b>Supreme court:</b> Organization of supreme court, procedure of the court, independence of the court, jurisdiction and power of supreme court. <b>High court:</b> Organization of high court, procedure of the court, independence of the court, jurisdiction and power of supreme court. <b>Subordinate courts:</b> constitutional provision, structure and jurisdiction. National legal services authority, Lok adalats, family courts, gram nyayalays. Public interest litigation (PIL): meaning of PIL, features of PIL, scope of PIL, principle of PIL, guidelines for admitting PIL	10	

  
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4	<b>Local Administration:</b> District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation, Pachayati raj: Introduction, PRI: Zila Pachayat, Elected officials and their roles, CEO Zila Pachayat: Position and role, Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy.	10	
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**Text books:**

1. Indian polity, M. Laxmikanth, MC Graw Hill education, 5<sup>th</sup> Edition.

**Reference books**

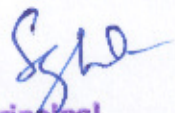
1. DD Basu, " Introduction to the constitution of India", 21<sup>st</sup> Edition, Lexis Nexis Books Publication Ltd, India

**Course Outcome: After completion of this course, the learners will be able to**

1. describe
  - different features of Indian constitution..
  - power and functioning of Union, state and local self-government.
  - structure, jurisdiction and function of Indian Judiciary.
  - basics of PIL and guideline for admission of PIL.
  - Functioning of local administration starting from block to Municipal Corporation.
2. identify authority to redress a problem in the profession and in the society.

**Special Remarks:**

The above mentioned outcomes are not limited. Institute may redefine outcomes based their program educational objective.

  
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**Syllabus for B. Tech in Electrical & Electronics Engineering (EEE)**  
 (Applicable from the academic session 2018-2019)

**4<sup>th</sup> Semester**

**Theory:**

Sl. No.	CODE	Paper	Contact periods Per week			Total Contact Hrs	Credits
			L	T	P		
1	PC-EEE-401	Electric machine-I	3	0	0	3	3
2	PC-EEE-402	Digital Electronics	3	0	0	3	3
3	PC-EEE-403	Electrical and Electronic Measurement	3	0	0	3	3
4	ES-EEE-401	Thermal Power Engineering	3	0	0	3	3
5	HM-EEE-401	Values and Ethics in profession	3	0	0	3	3
6	MC-EEE-401	Environmental Science	3	0	0	3	0
		<b>TOTAL OF SEMESTER:</b>				18	15

**Practical / Sessional:**

Sl. No.	CODE	Paper	Contact periods Per week			Total Contact Hrs	Credits
			L	T	P		
1	PC-EEE-491	Electric Machine-I laboratory	0	0	2	2	1
2	PC-EEE-492	Digital Electronics laboratory	0	0	2	2	1
3	PC-EEE-493	Electrical and Electronic measurement laboratory	0	0	2	2	1
4	ES-ME-491	Thermal Power Engineering laboratory	0		2	2	1
		Total of Practical / Sessional				08	4
		<b>TOTAL OF SEMESTER:</b>				26	19

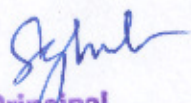
  
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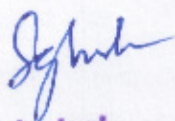
<b>Name of the course</b>		<b>VALUES AND ETHICS IN PROFESSION</b>	
<b>Course Code: HM-EEE-401/HM-EE-401</b>		<b>Semester: 4th</b>	
<b>Duration: 6 months</b>		<b>Maximum Marks: 100</b>	
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Theory: 3 hrs/week		Mid Semester Exam: 15 Marks	
Tutorial: 0 hr/week		Assignment & Quiz: 10 Marks	
Practical: 0 hrs/week		Attendance: 05 Marks	
Credit Points: 3		End Semester Exam: 70 Marks	
<b>Objective:</b>			
1.	To inculcate Human values to grow as a responsible human beings with a proper personality.		
2.	To instill Professional Ethics to maintain ethical conduct and discharge professional duties.		
<b>Pre-Requisite</b>			
1.	Not applicable		
<b>Unit</b>	<b>Content</b>	<b>Hrs</b>	<b>Marks</b>
1	<b>Human values:</b> Morals, Values, and Ethics – Integrity –Trustworthiness – Work Ethics – Service-Learning – Civic Virtue – Respect for others – Living Peacefully – Caring – Sharing – Honesty –Courage – Value Time – Co-operation – Commitment – Empathy – Self-confidence – Spirituality- Character.	5	
2	<b>Principles for harmony:</b> Truthfulness – Customs and Traditions -Value Education – Human Dignity – Human Rights – Fundamental Duties – Aspirations and Harmony (I, We & Nature) – Gender Bias – Emotional Intelligence – Salovey – Mayer Model – Emotional Competencies – Conscientiousness	5	

  
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**Syllabus for B.Tech(Civil Engineering) Up to Third Year**  
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3	<p><b>Engineering ethics and social experimentation:</b>                  History of Ethics – Need of Engineering Ethics – Senses of Engineering Ethics- Profession and Professionalism – Self Interest – Moral Autonomy – Utilitarianism – Virtue Theory – Uses of Ethical Theories – Deontology- Types of Inquiry –Kohlberg’s Theory – Gilligan’s Argument – Heinz’s Dilemma – Comparison with Standard Experiments – Learning from the Past – Engineers as Managers – Consultants and Leaders – Balanced Outlook on Law – Role of Codes – Codes and Experimental Nature of Engineering.</p>	8	
4	<p><b>Engineers’ responsibility towards safety and risk for sustainable development:</b>                  The concept of Safety – Safety and Risk – Types of Risks – Voluntary v/s Involuntary Risk – Consequences – Risk Assessment –Accountability – Liability – Reversible Effects – Threshold Levels of Risk – Delayed v/s Immediate Risk – Safety and the Engineer – Designing for Safety – Risk-Benefit Analysis-Accidents.</p>	5	
5	<p><b>Engineers’ duties and rights:</b>                  Concept of Duty – Professional Duties – Collegiality – Techniques</p>		
	<p>for Achieving Collegiality – Senses of Loyalty – Consensus and Controversy – Professional and Individual Rights – Confidential and Proprietary Information – Conflict of Interest-Ethical egoism – Collective Bargaining – Confidentiality – Gifts and Bribes – Problem solving-Occupational Crimes- Industrial Espionage- Price Fixing-Whistle Blowing.</p>	7	
6	<p><b>Global issues:</b>                  Globalization and MNCs –Cross Culture Issues – Business Ethics – Media Ethics – Environmental Ethics – Endangering Lives – Bio Ethics – Computer Ethics – War Ethics – Research Ethics – Intellectual Property Rights.</p>	5	

  
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**Text books:**

1. Professional Ethics & Human Values, Premvir Kapoor, Khanna Publishing House, Delhi (AICTE Recommended Textbook).
2. A text book on professional Ethics & Human values, R.S. Naagarazan, New Age international Publishing.
3. Engineering Ethics, M. Govindarajan, S. Natarajan, V.S. Senthilkumar, Prentice Hall India.
4. Human value and professional Ethics, Jayshree Suresh, B.S. Raghvan, S. Chand Publishing

**Reference books:**

1. Ethics in Science and Engineering, James G. Speight & Russel Foote, Wiley.

**Course Outcome:**

After completion of this course, the learners will be able to

1. illustrate different aspects of human values, ethics, engineers' responsibility and duties
2. explain different principles, different theories and laws of engineering ethics and social experimentation
3. identify different factors in the light of Engineers' responsibility towards safety and risk
4. correlate between ethics of different work environment.
5. explain the need for intellectual property rights.

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*(Formerly West Bengal University of Technology)*  
**Syllabus for B. Tech in Electrical & Electronics Engineering (EEE)**  
 (Applicable from the academic session 2018-2019)

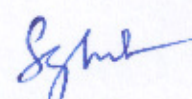
**7<sup>th</sup> Semester**

**Theory:**

Sl. No.	CODE	Paper	Contact periods Per week			Total Contact Hrs	Credits
			L	T	P		
1	PC-EEE-701	Analog and digital communication	3	0	0	3	3
2	PE-EEE-701	A. Electric Drive B. Digital Control system C. HVDC transmission System	3	0	0	3	3
3	OE-EEE-701	A. Embedded system B. Computer network C. Introduction to Machine learning	3	0	0	3	3
4	OE-EEE-702	A. Internet of Things B. Computer Graphics C. Soft computing Techniques	3		0	3	3
5	HM-EEE-701	Principle of Management	3	0	0	3	3
TOTAL OF SEMESTER:						15	15

**Practical / Sessional:**

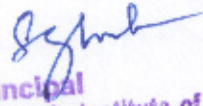
Sl. No.	CODE	Paper	Contact periods Per week			Total Contact Hrs	Credits
			L	T	P		
1	PC-EEE 791	Analog and digital Communication laboratory	0	0	2	2	1
2	PW-EEE 781	Project stage-I	0	0	4	4	2
3	PW-EEE782	Seminar	0	0	0	0	1
		Total of Practical / Sessional				06	04
TOTAL OF SEMESTER:						21	19

  
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**Syllabus for B.Tech(Civil Engineering) Up to Third Year**  
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<b>Name of the course</b>		<b>PRINCIPLE OF MANAGEEMENT</b>	
<b>Course Code: HM-EEE 701</b>		<b>Semester: 7<sup>th</sup></b>	
<b>Duration: 6 months</b>		<b>Maximum Marks: 100</b>	
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Theory: 3 hrs/week		Mid Semester Exam: 15 Marks	
Tutorial: 0 hr/week		Assignment & Quiz: 10 Marks	
Practical: 0 hrs/week		Attendance: 05 Marks	
Credit Points: 3		End Semester Exam: 70 Marks	
<b>Objective:</b>			
1.	To understand basic concept and approaches to management.		
2.	To understand planning and decision making processes.		
3.	To understand organizational design and structure.		
4.	To understand various aspects of leadership.		
<b>Pre-Requisite</b>			
1.	English (HM- HU 201)		
Unit	Content	Hrs	Marks
1	<b>Concept &amp; approaches to management:</b> Meaning & Definition of the term Management, Management as a Science or an Art, Management as a Profession, Management as a Process, Difference between Management & Administration; Levels of Management, Roles of a Manager, Quality of a good Manager, Significance of Management, Limitations of Management, Business Environment and its interaction with Management.	8	

  
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### Syllabus for B.Tech(Civil Engineering) Up to Third Year

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	Approaches to Management – Classical, Neo-classical and Modern Contributors to Management Thought – Taylor and Scientific Theory, Fayol's and Administrative Theory, Peter Drucker and Management Thought. Various Approaches to Management (i.e. Schools of Management Thought) Indian Management Thought		
2	<p><b>Planning &amp; decision making:</b> Planning: Meaning, Definition, Process, Types, Principles, Significance &amp; Limitations of Planning; Strategic Planning – Meaning &amp; Process, MBO – Meaning, Process and Requirements for Implementation, Planning Premises – Meaning &amp; Types, Forecasting – Meaning &amp; Techniques.</p> <p>Decision Making – Meaning, Types, Process, Significance &amp; Limitations</p>	8	
3	<p><b>Organization design &amp; Structure:</b> Organization – Meaning, Process, Principles, Organization Structure – Determinants and Forms: Line, Functional, Line &amp; Staff, Project, Matrix and Committees; Formal and Informal Organization; Departmentation – Meaning and Bases; Span of Control – Meaning and Factors Influencing, Authority.</p> <p>Responsibility and Accountability; Delegation – Meaning, Process; Principles; Centralization and Decentralization – Meaning; Degree of Decentralization; Difference between Delegation and Decentralization.</p>	8	
4	<p><b>Directing:</b> Motivation – Meaning , Definition, Significance &amp; Limitations; Financial and non-financial incentives of Motivation</p> <p>Leadership - Meaning, Definition, Significance of Leadership, Leadership styles Type, Process and Barriers of Communication, Strategies to overcome the Barriers.</p>	8	
5	<p><b>Customer Management</b> – Market Planning &amp; Research, Marketing Mix, Advertising &amp; Brand Management.</p> <p><b>Operations &amp; Technology Management</b> – Production &amp; Operations Management, Logistics &amp; Supply Chain Management, TQM, Kaizen &amp; Six Sigma, MIS.</p>	8	

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**Syllabus for B.Tech(Civil Engineering) Up to Third Year**  
Revised Syllabus of B.Tech CE (for the students who were admitted in Academic Session 2010-2011)



**Text books:**

1. Essentials of Management. H. Koontz and H. Weihrich , 7<sup>th</sup> Edition, Tata McGraw Hill
2. Principles of Management, Premvir Kapoor, Khanna Publishing House, 2019
3. Principles of Management - Text and Cases, Dipak Kumar Bhattacharyya. Pearson Education India, 2011.

**Reference books:**

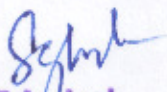
4. Management-Text & Cases, V.S.P Rao & Hari V. Krishna, Excel Books, 2005
1. Principles of Management, T. Ramaswami, Himalaya Publishing House, 2014
2. Management of Technology and Operations, R. Ray Gehani, Wiley, 1998

**Course Outcome:** After completion of this course, the learners will be able to

1. explain the concepts and approaches of management.
2. demonstrate the roles, skills and functions of management.
3. diagnose and solve organizational problems.
4. identify the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities.
5. apply different methods of Customer. Operation and Technology management.
6. acquire skills of good leader in an organization.

**Special Remarks (if any)**

The above mentioned outcomes are not limited. Institute may redefine outcomes based their program educational objective.

  
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Revised Syllabus of B.Tech CE (for the students who were admitted in Academic Session 2010-2011)

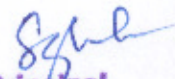


**Civil Engineering**  
**Second Year – Third Semester**

A. THEORY							
Sl. No	Field	Theory	Contact hours per week				Cr. Points
			L	T	P	Total	
1	HU301	Values & Ethics in Profession	3	0	0	3	3
2	PH301	Physics - 2	3	1	0	4	4
3	CH301	Basic Environmental Engineering & Elementary Biology	(2+1)	0	0	3	3
4	CE301	Solid Mechanics	3	0	0	3	3
5	CE302	Surveying	3	1	0	4	4
6	CE303	Building Material & Construction	3	1	0	4	4
Total Theory						21	21
B. PRACTICAL							
7	PH391	Physics - 2	0	0	3	3	2
8	CE391	Solid Mechanics	0	0	3	3	2
9	CE392	Surveying Practice I	0	0	3	3	2
10	CE393	Building Design & Drawing	0	0	3	3	2
Total Practical						12	8
Total of Semester						33	29

**Second Year – Fourth Semester**

A. THEORY							
Sl. No	Field	Theory	Contact hours per week				Cr. Points
			L	T	P	Total	
1	M(CS)401	Numerical Methods	2	1	0	3	2
2	M402	Mathematics - 3	3	1	0	4	4
3	CE401	Fluid Mechanics	3	0	0	3	3
4	CE402	Structural Analysis	3	1	0	4	4
5	CE403	Soil Mechanics	3	1	0	4	4
Total Theory						18	17
B. PRACTICAL							
6	HU481	Technical Report Writing & Language Lab Practice	0	0	3	3	2
7	M(CS)491	Numerical Methods	0	0	2	2	1
8	CE491	Fluid Mechanics	0	0	3	3	2
9	CE492	Surveying Practice -II	0	0	3	3	2
10	CE493	Soil Mechanics Lab - I	0	0	3	3	2
Total Practical						14	9
Total of Semester						32	26

  
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Revised Syllabus of B.Tech CE (for the students who were admitted in Academic Session 2010-2011)



**VALUES & ETHICS IN PROFESSION**

**HU-301**

**Contracts:3L**

**Credits- 3**

Science, Technology and Engineering as knowledge and as Social and Professional Activities

**Effects of Technological Growth:**

Rapid Technological growth and depletion of resources. Reports of the Club of Rome. Limits of growth: sustainable development

Energy Crises: Renewable Energy Resources

Environmental degradation and pollution. Eco-friendly Technologies. Environmental Regulations. Environmental Ethics

Appropriate Technology Movement of Schumacher; later developments

Technology and developing notions. Problems of Technology transfer. Technology assessment impact analysis.

Human Operator in Engineering projects and industries. Problems of man, machine, interaction. Impact of assembly line and automation. Human centered Technology.

**Ethics of Profession:**

Engineering profession: Ethical issues in Engineering practice, Conflicts between business demands and professional ideals. Social and ethical responsibilities of Technologists. Codes of professional ethics. Whistle blowing and beyond, Case studies.

**Profession and Human Values:**

Values Crisis in contemporary society

Nature of values: Value Spectrum of a good life

Psychological values: Integrated personality; mental health

Societal values: The modern search for a good society, justice, democracy, secularism, rule of law, values in Indian Constitution.

Aesthetic values: Perception and enjoyment of beauty, simplicity, clarity

Moral and ethical values: Nature of moral judgements; canons of ethics; ethics of virtue; ethics of duty; ethics of responsibility.

**Books:**

1. Stephen H Unger, Controlling Technology: Ethics and the Responsible Engineers, John Wiley & Sons, New York 1994 (2<sup>nd</sup> Ed)
2. Deborah Johnson, Ethical Issues in Engineering, Prentice Hall, Englewood Cliffs, New Jersey 1991.
3. A N Tripathi, Human values in the Engineering Profession, Monograph published by IIM, Calcutta 1996.

  
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## Syllabus for B.Tech(Civil Engineering) Up to Third Year

Revised Syllabus of B.Tech CE (for the students who were admitted in Academic Session 2010-2011)



Third Year – Fifth Semester

<b>A. THEORY</b>							
Sl. No	Field	Theory	Contact hours per week				Cr. Points
			L	T	P	Total	
1	HU501	Economics for Engineers	3	0	0	3	3
2	CE501	Foundation Engineering	3	1	0	4	4
3	CE502	Design of RC Structures	3	1	0	4	4
4	CE503	Concrete Technology	3	0	0	3	3
5	CE504	Engineering Geology	3	0	0	3	3
Total Theory						17	17
<b>B. PRACTICAL</b>							
6	CE591	Soil Mechanics Lab – II	0	0	3	3	2
7	CE592	Concrete Laboratory	0	0	3	3	2
8	CE593	Quantity Surveying, Specifications and Valuation	0	0	3	3	2
9	CE594	Engineering Geology Laboratory	0	0	3	3	2
Total Practical						12	8
Total of Semester						29	25

Third Year – Sixth Semester

<b>A. THEORY</b>							
Sl. No	Field	Theory	Contact hours per week				Cr. Points
			L	T	P	Total	
1	HU601	Principles of Management	2	0	0	2	2
2	CE601	Highway & Transportation Engineering	3	0	0	3	3
3	CE602	Design of Steel Structure	3	0	0	3	3
4	CE603	Construction Planning and Management	3	0	0	3	3
5	CE604	Professional Elective – I	3	0	0	3	3
6	CE605	Free Elective – I	3	0	0	3	3
Total Theory						17	17
<b>B. PRACTICAL</b>							
7	CE691	Highway & Transportation Engineering Lab	0	0	3	3	2
8	CE692	Detailing of RC and Steel Structures	0	0	3	3	2
9	CE693	CAD Laboratory	0	0	3	3	2
10	CE681	Seminar	0	0	3	3	2
Total Practical						12	8
Total of Semester						29	25

Professional Elective – I

1. CE604A : Bridge Engineering
2. CE604B : Prestressed Concrete
3. CE604C : Structural Dynamics and Earthquake Engineering

Free Elective – I

1. CE605A : Operations Research(M)
2. CE605B : Human Resource Management
3. CE605C : Materials Handling(ME)

  
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**Syllabus for B.Tech(Civil Engineering) Up to Third Year**  
Revised Syllabus of B.Tech CE (for the students who were admitted in Academic Session 2010-2011)



**Theory**

**Principles of Management**

**Code: HU/601**

**Contact: 2L**

**Credits: 2**

**Module-I**

1. Basic concepts of management: Definition – Essence, Functions, Roles, Level
2. Functions of Management: Planning – Concept, Nature, Types, Analysis, Management by objectives, Organisation Structure – Concept, Structure, Principles, Centralization, Decentralization, Span of Management; Organisational Effectiveness.

**Module-II**

3. Management and Society – Concept, External Environment, CSR, Corporate Governance, Ethical Standards.
4. People Management – Overview, Job design, Recruitment & Selection, Training & Development, Stress Management.
5. Managerial Competencies – Communication, Motivation, Team Effectiveness, Conflict Management, Creativity, Entrepreneurship.

**Module-III**

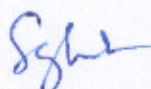
6. Leadership: Concept, Nature, Styles.
7. Decision making: Concept, Nature, Process, Tools & techniques.
8. Economic, Financial & Quantitative Analysis – Production, Markets, National Income Accounting, Financial Function & Goals, Financial Statement & Ratio Analysis, Quantitative Methods – Statistical Interference, Forecasting, Regression Analysis, Statistical Quality Control.

**Module-IV**

9. Customer Management – Market Planning & Research, Marketing Mix, Advertising & Brand Management.
10. Operations & Technology Management – Production & Operations Management, Logistics & Supply Chain Management, TQM, Kaizen & Six Sigma, MIS.

**Readings:**

1. Management: Principles, Processes & Practices – Bhat, A & Kumar, A (OUP).
2. Essentials for Management – Koontz, Revised edition, Tata McGraw Hill (TMH)
3. Management – Stoner, James A. F. (Pearson)
4. Management - Ghuman, Tata McGraw Hill(TMh)

  
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**Maulana Abul Kalam Azad University of Technology, West Bengal**  
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**Syllabus for B. Tech in Civil Engineering**  
 (Applicable from the academic session 2018-2019)

**Curriculum Structure**  
**Semester III (Second year)**

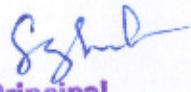
Sl. No.	Category	Code	Course Title	Hours per week			Credits
				L	T	P	
<b>Theory</b>							
1	Basic Science courses	CE(BS)301	Biology for Engineers	2	1	0	3
2	Engineering Science Courses	CE(ES)301	Engineering Mechanics	3	1	0	4
3	Engineering Science Courses	CE(ES)302	Energy Science & Engineering	1	1	0	2
4	Basic Science courses	CE(BS)301	Mathematics-III (Transform & Discrete Mathematics)	2	0	0	2
5	Humanities and Social Sciences including Management courses	CE(HS)301	Humanities-I (Effective Technical Communication)	3	0	0	3
6	Humanities and Social Sciences including Management courses	CE(HS)302	Introduction to Civil Engineering	1	1	0	2
<b>Theory credits</b>							<b>16</b>
<b>Practical/ Sessional</b>							
1	Engineering Science Courses	CE(ES)391	Basic Electronics	1	0	2	2
2	Engineering Science Courses	CE(ES)392	Computer-aided Civil Engineering Drawing	1	0	2	2
3	Engineering Science Courses	CE(ES)393	Life Science	1	0	2	2
<b>Practical credits</b>							<b>6</b>
<b>Total credits</b>							<b>22</b>

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**Syllabus for B.Tech(Civil Engineering) Up to Third Year**  
 Revised Syllabus of B.Tech CE (for the students who were admitted in Academic Session 2010-2011)



CE(HS)301	<b>Humanities-I (Effective Technical Communication)</b>	3L + 0T	3 Credits
<b>Module 1</b>	Information Design and Development- Different kinds of technical documents, Information development life cycle, Organization structures, factors affecting information and document design, Strategies for organization, Information design and writing for print and for online media.		4L
<b>Module 2</b>	Technical Writing, Grammar and Editing- Technical writing process, forms of discourse, Writing drafts and revising, Collaborative writing, creating indexes, technical writing style and language. Basics of grammar, study of advanced grammar, editing strategies to achieve appropriate technical style. Introduction to advanced technical communication, Usability, Human factors, Managing technical communication projects, time estimation, Single sourcing, Localization.		8L
<b>Module 3</b>	Self Development and Assessment- Self assessment, Awareness, Perception and Attitudes, Values and belief, Personal goal setting, career planning, Self-esteem. Managing Time; Personal memory, Rapid reading, Taking notes; Complex problem solving; Creativity		8L
<b>Module 4</b>	Communication and Technical Writing- Public speaking, Group discussion, Oral presentation, Interviews, Graphic presentation, Presentation aids, Personality Development. Writing reports, project proposals, brochures, newsletters, technical articles, manuals, official notes, business letters, memos, progress reports, minutes of meetings, event report.		8L
<b>Module 5</b>	Ethics- Business ethics, Etiquettes in social and office settings, Email etiquettes, Telephone etiquettes, Engineering ethics, Managing time, Role and responsibility of engineer, Work culture in jobs, Personal memory, Rapid reading, Taking notes, Complex problem solving, Creativity		8L
<b>Reference</b>	1. David F. Beer and David McMurrey, Guide to writing as an Engineer, John Wiley, New York, 2004 2. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN 0312406843) 3. Kulbhushan Kumar, Effective Communication Skills, Khanna Publishing House 4. Shiv Khera, You Can Win, Macmillan Books, New York, 2003. 5. Raman Sharma, Technical Communications, Oxford Publication, London, 2004. 6. Dale Jungk, Applied Writing for Technicians, McGraw Hill, New York, 2004. (ISBN: 07828357-4) 7. Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi 2002. 8. Xebec, Presentation Book, TMH New Delhi, 2000. (ISBN 0402213)		

  
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**Syllabus for B. Tech in Civil Engineering**  
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**Semester IV (Second year)**

Sl. No.	Category	Code	Course Title	Hours per week			Credits
				L	T	P	
<b>Theory</b>							
1	Engineering Science Courses	CE(ES)401	Introduction to Fluid Mechanics	2	0	0	2
2	Engineering Science Courses	CE(ES)402	Introduction to Solid Mechanics	2	0	0	2
3	Professional Core courses	CE(PC)401	Soil Mechanics – I	2	1	0	3
4	Professional Core courses	CE(PC)402	Environmental Engineering -I	2	1	0	3
5	Professional Core courses	CE(PC)403	Surveying & Geomatics	2	1	0	3
6	Professional Core courses	CE(PC)404	Concrete Technology	2	1	0	3
7	Humanities and Social Sciences including Management courses	CE(HS)401	Civil Engineering - Societal & Global Impact	2	0	0	2
8	Mandatory Courses (non-credit)	CE(MC)401	Management I (Organizational Behavior)	2	0	0	0
<b>Theory credits</b>							<b>18</b>
<b>Practical/ Sessional</b>							
1	Professional Core courses	CE(ES)491	Fluid Mechanics Laboratory	0	0	2	1
2	Professional Core courses	CE(ES)492	Solid Mechanics Laboratory	0	0	2	1
3	Professional Core courses	CE(ES)493	Engineering Geology Laboratory	0	0	2	1
4	Professional Core courses	CE(PC)493	Surveying & Geomatics	0	0	2	1
5	Professional Core courses	CE(PC)494	Concrete Technology Laboratory	0	0	2	1
<b>Practical credits</b>							<b>5</b>
<b>Total credits</b>							<b>23</b>

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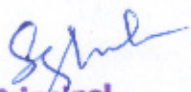
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**Syllabus for B.Tech(Civil Engineering) Up to Third Year**  
 Revised Syllabus of B.Tech.CE (for the students who were admitted in Academic Session 2010-2011)



<b>CE(MC)401</b>	<b>Management – I (Organizational Behaviour)</b>	<b>2L + 0T</b>	<b>2 Credits</b>
<b>Module 1</b>	Introduction to Organizational Behaviour-Concept, Importance, Challenges and Opportunities Personality-Meaning of Personality, Personality Determinants and Traits, Psychoanalytic Theory, Argyris Immaturity to Maturity Continuum Impact on organization. Attitude-Concept, Components, Cognitive Dissonance Theory, Attitude Surveys.		<b>5L.</b>
<b>Module 2</b>	Perception- Concept, Nature and Importance, Process of Perception, Factors influencing perception, Perceptual Selectivity, Shortcuts to Judge Others: Halo		<b>6L.</b>

	Effect, Stereotyping, Projection and Contrast Effects, Impact on Organization. Motivation-Definition, Theories of Motivation-Maslow's Hierarchy of Needs Theory, McGregor's Theory X&Y, Herzberg's Motivation-Hygiene Theory, Alderfer's ERG Theory, McClelland's Theory of Needs, Vroom's Expectancy Theory.																	
<b>Module 3:</b>	Leadership-Concept, Leadership Styles, Theories-Behavioural Theory: Ohio Studies, Michigan Studies, Blake & Mouton Managerial Grid; Contingency Theory; Fielder Theory. Group Behaviour: Definition, Characteristics of Group, Types of Groups: Formal & Informal; Stages of Group Development, Group Decision making, Group Decision Making Vs Individual Decision Making		<b>8L.</b>															
<b>Module 4:</b>	Organizational Design-Variou organizational structures and their pros and cons, Concepts of organizational climate and culture, Organizational Politics-Concept, Factors influencing degree of Politics Conflict management- Concept, Sources of conflict, Stages of conflict process, Conflict resolution techniques, Tools-Johari Window to analyse and reduce interpersonal conflict, Impact on organization.		<b>5L.</b>															
<b>Reference</b>	<table border="1"> <thead> <tr> <th>Sl.</th> <th>Book Name</th> <th>Author</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Organization Behaviour</td> <td>Stephen Robbins</td> </tr> <tr> <td>2</td> <td>Organization Behaviour</td> <td>Luthans</td> </tr> <tr> <td>3</td> <td>Organization Behaviour</td> <td>L.M. Prasad</td> </tr> <tr> <td>4</td> <td>Organization Behaviour : Text, Cases &amp;Games</td> <td>K. Aswathappa</td> </tr> </tbody> </table>	Sl.	Book Name	Author	1	Organization Behaviour	Stephen Robbins	2	Organization Behaviour	Luthans	3	Organization Behaviour	L.M. Prasad	4	Organization Behaviour : Text, Cases &Games	K. Aswathappa		
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**Semester VI (Third year]**

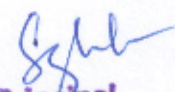
Sl. No.	Category	Code	Course Title	Hours per week			Credits
				L	T	P	
<b>Theory</b>							
1	Professional Core courses	CE(PC)601	Construction Engineering & Management	2	0	0	2
2	Professional Core courses	CE(PC)602	Engineering Economics, Estimation & Costing	2	0	0	2
3	Professional Core courses	CE(PC)603	Water Resources Engineering	2	0	0	2
4	Professional Core courses	CE(PC)604	Design of Steel Structures	2	0	0	2
5	Professional Elective courses	CE(PE)601	Elective-I	2	0	0	2
6	Professional Elective courses	CE(PE)602	Elective-II	2	0	0	2
7	Open Elective courses	CE(OE)601	Open Elective-I (Humanities)	2	0	0	2
<b>Theory credits</b>							<b>14</b>
<b>Practical/ Sessional</b>							
1	Professional Core courses	CE(PC)693	Water Resource Engineering Laboratory	0	0	2	1
2	Professional Core courses	CE(PC)694	Steel Structure Design Sessional	0	0	2	1
3	Professional Core courses	CE(PC)695	Quantity Survey Estimation and Valuation Sessional	0	1	2	2
<b>Practical credits</b>							<b>4</b>
<b>Total credits</b>							<b>18</b>

CE(PE)601 (Elective-I)	CE(PE)602 (Elective-II)
601A: Stability of Slopes 601B: <b>Foundation Engineering</b> 601C: Ground Improvement Technique	602A : Building Construction Practice 602B : <b>Structural Analysis-II</b> 602C : Industrial Structures
CE(OE)601 (Open Elective-I)	
601A: Soft Skills and Interpersonal Communication – I 601B: Introduction to Philosophical Thoughts	

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<b>CE(OE)601A</b>	<b>Soft Skills and Interpersonal Communication - I</b>	<b>2L + 0T</b>	<b>2 Credits</b>	
<b>Course Outcome</b>	<ol style="list-style-type: none"> <li>1. Analyse the dynamics of business communication and communicate accordingly.</li> <li>2. Write business letters and reports</li> <li>3. Learn to articulate opinions and views with clarity</li> <li>4. Appreciate the use of language to create beautiful expressions</li> <li>5. Analyse and appreciate literature.</li> <li>6. Communicate in an official and formal environment.</li> </ol>			
<b>Module 1</b>	Communication Skill Definition, nature & attributes of Communication Process of Communication Models or Theories of Communication Types of Communication Levels or Channels of Communication Barriers to Communication	3L		
<b>Module 2</b>	Business Communication- Scope & Importance Writing Formal Business Letters Writing Reports Organizational Communication: Agenda & minutes of a meeting, notice, memo, circular Project Proposal Technical Report Writing Organizing e-mail messages E-mail etiquette Tips for e-mail effectiveness	8L		
<b>Module 3</b>	Language through Literature Modes of literary & non-literary expression Introduction to Fiction, (An Astrologer's Day by R.K. Narayan and Monkey's Paw by W.W. Jacobs), Drama (The Two Executioners by Fernando Arrabal) or (Lithuania by Rupert Brooke) & Poetry (Night of the Scorpion by Nissim Ezekiel and Palanquin Bearers by Sarojini Naidu)	8L		
<b>Module 4</b>	Grammar in usage (nouns, verbs, adjectives, adverbs, tense, prepositions, voice change) - to be dealt with the help of the given texts.	10L		
<b>Reference</b>	<b>Sl.</b>	<b>Book Name</b>	<b>Author</b>	<b>Publishing House</b>
	1	Theories of Communication: A Short Introduction	Armand Matterlart and Michele Matterlart	Sage Publications Ltd
	2	Professional Writing Skills	Chan, Janis Fisher, and Diane Lutovich	San Anselmo, CA: Advanced Communication Designs, 1997.
	3	Writing and Speaking at Work: A Practical Guide for Business Communication	Edward P. Bailey	Prentice-Hall

  
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4	Professional Core Courses	PCC-CS404	Design & Analysis of Algorithms	3	0	0	3
5	Basic Science courses	BSC 401	Biology	2	1	0	3
6	Mandatory Courses	MC401	Environmental Sciences	1	-	-	1
<b>Practical</b>							
7	Engineering Science Course	PCC-CS 492	Computer Architecture	0	0	4	2
8	Professional Core Courses	PCC-CS494	Design & Analysis of Algorithms	0	0	4	2
<b>Total credits</b>							<b>21</b>

**Semester V (Third year)**

Sl. No.	Type of course	Code	Course Title	Hours per week			Credits
				L	T	P	
1	Engineering Science Course	ESC501	Software Engineering	3	0	0	3
2	Professional Core Courses	PCC-CS501	Compiler Design	3	0	0	3
3	Professional Core Courses	PCC-CS502	Operating Systems	3	0	0	3
4	Professional Core Courses	PCC-CS503	Object Oriented Programming	3	0	0	3
5	Humanities & Social Sciences including Management courses	HSMC-501	Introduction to Industrial Management (Humanities III)	3	0	0	3
6	Professional Elective	PEC-IT 501A/B/C/D	(Elective-I) Theory of	3	0	0	3



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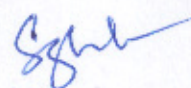
**Introduction to Industrial Management (Humanities III)**

Code: HSMC-501

Contacts: 3L

Name of the Course:	<b>Introduction to Industrial Management (Humanities III)</b>	
Course Code: HSMC-501	Semester: V	
Duration: 6 months	Maximum Marks: 100	
<b>Teaching Scheme</b>	<b>Examination Scheme</b>	
Theory: 3 hrs./week	Mid Semester exam: 15	
Tutorial: NIL	Assignment and Quiz : 10 marks	
Practical: NIL	Attendance: 5 marks	
Credit Points:	End Semester Exam: 70 Marks	
	3	

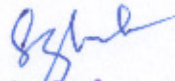
Unit	Content	Hrs/Unit	Marks/Unit
1	<p><b>Introduction</b> System- concept, definition, types, parameters, variables and behavior. Management – definition and functions. Organization structure: i. Definition. ii. Goals. iii. Factors considered in formulating structure. iv. Types. v. Advantages and disadvantages. vi. Applications. Concept, meaning and importance of division of labor, scalar &amp; functional processes, span of control, delegation of authority, centralization and decentralization in industrial management. Organizational culture and climate – meaning, differences and factors affecting them. Moral-factors affecting moral. Relationship between moral and productivity. Job satisfaction- factors influencing job satisfaction. Important provisions of factory act and labor laws.</p>	6	

  
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2	<p><b>Critical Path Method (CPM) and Programme Evaluation Review Technique (PERT):</b></p> <p>2.1 CPM &amp; PERT-meaning, features, difference, applications. 2.2 Understand different terms used in network diagram.                  Draw network diagram for a real life project containing 10-15 activities, computation of LPO and EPO.(Take minimum three examples).                  Determination of critical path on network.                  Floats, its types and determination of floats.                  Crashing of network, updating and its applications.</p>	8	
3	<p><b>Materials Management:</b></p> <p>Material management-definition, functions, importance, relationship with other departments.                  Purchase - objectives, purchasing systems, purchase procedure, terms and forms used in purchase department.                  Storekeeping- functions, classification of stores as centralized and decentralized with their advantages, disadvantages and application in actual practice.                  Functions of store, types of records maintained by store, various types and applications of storage equipment, need and general methods for codification of stores.                  Inventory control:                  i. Definition.                  ii. Objectives.                  iii. Derivation for expression for Economic Order Quantity (EOQ) and numeric examples. iv. ABC analysis and</p>	6	

  
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	<p>Economic Order Quantity (EOQ) and numeric examples. iv. ABC analysis and other modern methods of analysis. v. Various types of inventory models such as Wilson's inventory model, replenishment model and two bin model. (Only sketch and understanding, no derivation.).</p> <p>3.6 Material Requirement Planning (MRP)- concept, applications and brief details about software packages available in market.</p>		
4	<p><b>Production planning and Control (PPC):</b></p> <p>Types and examples of production. PPC : i. Need and importance. ii. Functions. iii. Forms used and their importance. iv. General approach for each type of production.</p> <p>Scheduling- meaning and need for productivity and utilisation.</p> <p>Gantt chart- Format and method to prepare.</p> <p>Critical ratio scheduling-method and numeric examples.</p> <p>Scheduling using Gantt Chart (for at least 5-7 components having 5-6</p>	8	

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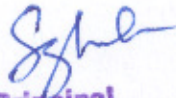
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	machining operations, with processes, setting and operation time for each component and process. resources available, quantity and other necessary data). At least two examples. 4.7 Bottlenecking- meaning, effect and ways to reduce.		
5	<b>Value Analysis (VA) and Cost Control:</b> 5.1 VA-definition, terms used, process and importance. 5.2 VA flow diagram. DARSIRI method of VA. Case study of VA-at least two. Waste-types, sources and ways to reduce them. Cost control-methods and important guide lines.	4	
6	<b>Recent Trends in IM:</b> ERP (Enterprise resource planning) - concept, features and applications. Important features of MS Project. Logistics- concept, need and benefits. Just in Time (JIT)-concept and benefits. Supply chain management-concept and benefits.	4	

**Text book and Reference books:**

1. L.S. Srinath- "CPM & PERT principles and Applications".
2. Buffa - "Modern Production Management".
3. N. Nair - "Materials Management".
4. O. P. Khanna - "Industrial Engineering & Management".
5. Mikes - "Value Analysis".
6. S.C. Sharma, "Engineering Management - Industrial Engineering & Management", Khanna Book Publishing Company, New Delhi

  
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5	Open Elective courses	OEC-IT601A/B	(Open Elective-) Numerical Methods/ Human Resource Development and Organizational Behavior	3	0	0	3
6	Project	PROJ-CS601	Research Methodology	3	0	0	3
<b>Practical</b>							
7	Professional Core Courses	PCC-CS691	Database Management Systems	0	0	4	2
8	Professional Core Courses	PCC-CS692	Computer Networks	0	0	4	2
<b>Total credits</b>							<b>22</b>

**Semester VII (Fourth year)**

Sl. No.	Type of course	Code	Course Title	Hours per week			Credits
				L	T	P	
1	Professional Elective courses	PEC-CS701A/B/C/D/E	(Elective-IV) Quantum Computing/ Cloud Computing/ Digital Signal Processing/Multi-agent Intelligent Systems/Machine learning	3	0	0	3
2	Professional Elective courses	PEC-CS702A/B/C/D/E	(Elective-V) Neural Networks and Deep Learning/ Soft Computing/ Ad-Hoc and Sensor Networks/Information Theory and Coding/Cyber Security	3	0	0	3
3	Open Elective courses	OEC-CS701A/B/C	(Open Elective-II) Operations Research/Multimedia Systems/Introduction to Philosophical Thoughts	3	0	0	3
4	Humanities & Social	HSM	Project Management and	2	1	0	3

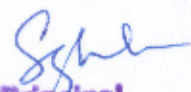
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**Human Resource Development and Organizational Behavior**  
**Code: OEC-IT601 B**  
**Contact: 3L**

Name of the Course:	<b>Human Resource Development and Organizational Behavior</b>	
Course Code: <b>OEC-IT601 B</b>	Semester: VI	
Duration 6 months	Maximum Marks: 100	
<b>Teaching Scheme</b>	<b>Examination Scheme</b>	
Theory 3 hrs /week	Mid Semester exam: 15	
Tutorial NIL	Assignment and Quiz: 10 marks	
	Attendance: 5 marks	
Practical: NIL	End Semester Exam: 70 Marks	
Credit Points:	3	

Unit	Content	Hrs/Unit	Marks/Unit
1	Organizational Behaviour: Definition, Importance, Historical Background, Fundamental Concepts of OB, Challenges and Opportunities for OB [2] Personality and Attitudes. Meaning of personality, Personality Determinants and Traits, Development of Personality, Types of Attitudes, Job Satisfaction.	4	
2	Perception: Definition, Nature and Importance, Factors influencing Perception, Perceptual Selectivity, Link between Perception and Decision Making [2] 4. Motivation: Definition, Theories of Motivation - Maslow's Hierarchy of Needs Theory, McGregor's Theory X & Y, Herzberg's Motivation-Hygiene Theory, Alderfer's ERG Theory, McClelland's Theory of Needs, Vroom's Expectancy Theory.	8	

  
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3	Group Behaviour: Characteristics of Group, Types of Groups, Stages of Group Development, Group Decision Making [2] Communication: Communication Process, Direction of Communication, Barriers to Effective Communication. [2] Leadership: Definition, Importance, Theories of Leadership Styles.	4	
4	Organizational Politics: Definition, Factors contributing to Political Behaviour. [2] Conflict Management: Traditional vis-a-vis Modern View of Conflict, Functional and Dysfunctional Conflict, Conflict Process, Negotiation – Bargaining Strategies, Negotiation Process. [2] Organizational Design: Various Organizational Structures and their Effects on Human Behaviour, Concepts of Organizational Climate and Organizational Culture.	8	

**Text book and Reference books:**

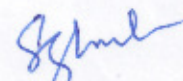
1. Robbins, S. P. & Judge, T.A.: Organizational Behavior, Pearson Education, 15th Edn.
2. Luthans, Fred: Organizational Behavior, McGraw Hill, 12th Edn.
3. Shukla, Madhukar: Understanding Organizations – Organizational Theory & Practice in India, PHI
4. Fincham, R. & Rhodes, P.: Principles of Organizational Behaviour, OUP, 4th Edn.
5. Hersey, P., Blanchard, K.H., Johnson, D.E.- Management of Organizational Behavior Leading Human Resources, PHI, 10th Edn.

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**Semester V (Third year)**

Sl. No.	Category	Code	Course Title	Hours per week			Credits
				L	T	P	
<b>Theory</b>							
1	Professional Core courses	CE(PC)501	Design of RC Structures	2	1	0	3
2	Professional Core courses	CE(PC)502	Engineering Hydrology	2	1	0	3
3	Professional Core courses	CE(PC)503	Structural Analysis – I	2	1	0	3
4	Professional Core courses	CE(PC)504	Soil Mechanics – II	2	1	0	3
5	Professional Core courses	CE(PC)505	Environmental Engineering – II	2	1	0	3
6	Professional Core courses	CE(PC)506	Transportation Engineering	2	1	0	3
7	Mandatory courses (non-credit)	CE(MC)501	Constitution of India/ Essence of Indian Knowledge Tradition	-	-	-	0
<b>Theory credits</b>							<b>18</b>
<b>Practical/ Sessional</b>							
1	Professional core courses	CE(PC)591	RC Design Sessional	0	0	2	1
2	Professional core courses	CE(PC)594	Soil Mechanics Laboratory	0	0	2	1
3	Professional core courses	CE(PC)595	Environmental Engineering Laboratory	0	0	2	1
4	Professional core courses	CE(PC)596	Transportation Engineering Laboratory	0	0	2	1
5	Professional core courses	CE(PC)597	Computer Application in CE	0	0	2	1
<b>Practical credits</b>							<b>5</b>
<b>Total credits</b>							<b>23</b>



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CE(PC)502	Engineering Hydrology	3L + 0T	3 Credits	
<b>Course Outcome</b>	On completion of the course, the students will be able to: 10. study the source, occurrence, movement and distribution of water which is a prime resource for development of a nation. 11. learn about the functioning of reservoirs and estimation of storage capacities. 12. learn about flood hazards, estimation of design floods for various structures and methods of estimating effects of passage of floods through rivers and reservoirs. 13. know the basic principles of measurement of flow in rivers.			
<b>Prerequisite</b>	Introduction to Civil Engineering CE(HS)302, CE(ES)401, Fluid Mechanics, Chemistry BS-CH101, Physics BS-PH101.			
<b>Module 1</b>	Hydrology: Hydrologic Cycle, Global Water Budget, India's Water Budget.		1L	
<b>Module 2</b>	Catchment: Definition & Descriptions, Various Types of Catchment, Factors Characterizing a Catchment, Delineation of Catchment Boundary.		2L	
<b>Module 3:</b>	Measurement of Precipitation: Precipitation, Description and Functioning of Various Types of Rain gauges, Rain gauge Network- Codal Provisions, Optimum Number of Rain gauge Stations.		2L	
<b>Module 4:</b>	Processing of Rainfall Data: Normal Rainfall, Estimation of Missing Rainfall Data, Test for Consistency of Record; Mass Curve of Rainfall, Hyetograph, Point Rainfall; Mean Precipitation over an Area- Arithmetic Mean, Thiessen Polygon and Isohyetal Method.		4L	
<b>Module 5:</b>	Losses from Precipitation: Evaporation - Evaporation Process, Factors affecting Evaporation, Measurement of Evaporation- Description and Functioning of Pan Evaporimeter, Pan Coefficient, Evapotranspiration: AET, PET, Measurement of ET, Estimation of ET-Blaney Criddle Formulae; Infiltration- Process, Factors Affecting Infiltration, Infiltration Rate and Infiltration Capacity, Measurement of Infiltration, Infiltration Equations, Infiltration Indices.		6L	
<b>Module 6</b>	Streamflow Measurement: Importance, Direct and Indirect Methods, Measurement of Stage- Various Gauges and Recorders, Measurement of Velocity-Current Meters, their Functioning and Calibration; Velocity Distribution, Floats; Streamflow Computation- Area-Velocity Method, Moving Boat Method, Dilution Technique, Electromagnetic Method, Ultrasonic Method; Indirect Methods- Flow Measuring Structures, Slope Area Method; Stage-Discharge Relation, Permanent Control, Stage for Zero Discharge, Shifting Control- Backwater Effect, Unsteady Flow Effect, Extension of the Rating Curve.		12L	
<b>Module 7</b>	Runoff: Description of the Process, Components of Runoff, Factors Affecting Runoff, Characteristics of Streams, Rainfall Runoff Relationships, Hydrographs: Types, Base Flow Separation, Effective Rainfall.		2L	
<b>Module 8</b>	Unit Hydrograph- Definition, Assumptions, Applications- Derivation of Unit Hydrograph, Distribution Graph, Unit Hydrograph of Different Durations- Method of Superposition and S-Curve.		4L	
<b>Module 9</b>	Floods: Concept of flood as a natural hazard; Estimation of flood discharge in a river - rational method, empirical formulae, unit hydrograph method; flood frequency studies - return period.		2L	
<b>Module 10</b>	Flood Routing: Concept of flood routing in channels and through a reservoir, basic routing equations; reservoir routing - Modified Pul's method; channel routing - Muskingum method.		5L	
<b>Reference</b>	<b>Sl.</b>	<b>Book Name</b>	<b>Author</b>	<b>Publishing House</b>
	1	Engineering Hydrology (4th Ed.	K. Subramanya	McGraw Hill Education (India) Private Limited, New Delhi, 2013.
	2	Engineering Hydrology	R. Srivastava and A. Jain	McGraw Hill Education (India) Private Limited, New Delhi, 2017.
	3	Applied Hydrology	V. T. Chow, D. Maidment, L. Mays	Tata McGraw Hill Edition, New Delhi, 2010.

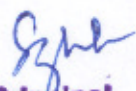
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<b>CE(PC)595</b>	<b>Environmental Engineering Laboratory</b>	<b>2P</b>	<b>1 Credits</b>
<b>Course Outcome</b>	On completion of the course the students will be able to: 1. Experiment various physical characteristics for a given sample of water and wastewater 2. Determine various chemical characteristics for a given sample of water and wastewater 3. Examine the bacteriological characteristics for a given sample of water and wastewater 4. Examine the suitability of a few treatment options for a given sample of water and wastewater 5. Compare the determined quality parameters with standards to decide on the suitability of use for the tested water and disposal of tested wastewater		
<b>Prerequisite</b>	Class-XII level knowledge of Physics, Chemistry, Mathematics, Biology and Environmental Science; Undergraduate level knowledge of Environmental Engineering, Biology for Engineers, Chemistry Laboratory, Physics Laboratory		
<b>Experiment 1</b>	Determination of turbidity for a given sample of water		
<b>Experiment 2</b>	Determination of electrical conductivity for a given sample of water		
<b>Experiment 3</b>	Determination of Total Solids, Suspended Solids, Dissolved Solids and Volatile Solids in a given sample of water		
<b>Experiment 4</b>	Determination of pH for a given sample of water		
<b>Experiment 5</b>	Determination of carbonate, bi-carbonate and hydroxide alkalinity for a given sample of water		
<b>Experiment 6</b>	Determination of acidity for a given sample of water		
<b>Experiment 7</b>	Determination of hardness for a given sample of water		
<b>Experiment 8</b>	Determination of concentration of Iron in a given sample of water		
<b>Experiment 9</b>	Determination of concentration of Chlorides in a given sample of water		
<b>Experiment 10</b>	Determination of the Optimum Alum Dose for a given sample of water through Jar Test		
<b>Experiment 11</b>	Determination of the Chlorine Demand and Break-Point Chlorination for a given sample of water		
<b>Experiment 12</b>	Determination of amount of Dissolved Oxygen (DO) in a given sample of water		
<b>Experiment 13</b>	Determination of the Biochemical Oxygen Demand (BOD) for a given sample of wastewater		
<b>Experiment 14</b>	Determination of the Chemical Oxygen Demand (COD) for a given sample of wastewater		
<b>Experiment 15</b>	Determination of Coliform Bacteria: presumptive test, Confirmative test and Determination of MPN		
<b>Reference</b>	1. Garg, S.K. <i>Environmental Engineering</i> , Volume-1 and Volume-2. Khanna Publishers 2. Peavy, H.S., Rowe, D.R., Tchobanoglous, G. <i>Environmental Engineering</i> . McGraw Hill International Edition / Tata McGraw Hill Indian Edition 3. Sawyer, C.N., McCarty, P.L., Parkin, G.F. <i>Chemistry for Environmental Engineering and Science</i> . McGraw Hill International Edition / Tata McGraw Hill Indian Edition 4. IS: 3025 (Different Parts). "METHODS OF SAMPLING AND TEST (PHYSICAL AND CHEMICAL) FOR WATER AND WASTE WATER". 5. APHA Standard Methods for the Examination of Water and Wastewater. 6. IS: 10500 – 2012, "DRINKING WATER SPECIFICATION (SECOND REVISION)".		

  
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## Syllabus for B.Tech(Mechanical Engineering) up to Third Year

Revised Syllabus of B.Tech in ME for the students who were admitted in Academic Session 2010-2011)



### Second Year – Third Semester

A. THEORY							
Sl.No.	Paper Code	Subjects	Contact Hours / Week				Cr.Points
			L	T	P	Total	
1.	HU-301	Values & Ethics in Profession	3	0	0	3	3
2.	PH-301	Physics-2	3	1	0	4	4
3.	CH301	Basic Environmental Engineering & Elementary Biology	3	0	0	3	3
4.	ME 301	Applied Thermodynamics	4	0	0	4	4
5.	ME 302	Strength of Materials	3	0	0	3	3
6.	ME 303	Engineering Materials	3	0	0	3	3
<b>Total Theory</b>			19	1	0	20	20
B. PRACTICAL							
Sl.No.	Field	Subjects	Contact Hours / Week				Cr.Points
			L	T	P	Total	
7.	HU-381	Technical Report Writing & Language Lab Practice	0	0	3	3	2
	PH391	Physics Lab-2	0	0	3	3	2
8.	ME 391	Machine Drawing –I	0	0	3	3	2
9.	ME 392	Workshop Practice-II	0	0	3	3	2
10.	ME 393	Applied Mechanics Lab	0	0	3	3	2
<b>Total Practical</b>			0	0	15	15	10
<b>Total Semester</b>			19	1	15	35	30

### Second Year – Fourth Semester

A. THEORY							
Sl.No.	Field	Subjects	Contact Hours / Week				Cr.Points
			L	T	P	Total	
1.	M(CS)401	Numerical Methods	2	1	0	3	2
2.	M-402	Mathematics-3	3	1	0	4	4
3.	ME 401	Fluid Mechanics & Hydraulic Machines	4	0	0	4	4
4.	ME 402	Mechanisms	3	0	0	3	3
5.	ME 403	Primary Manufacturing Processes	4	0	0	4	4
<b>Total Theory</b>			16	2	0	18	17
B. PRACTICAL							
Sl.No.	Field	Subjects	Contact Hours / Week				Cr.Points
			L	T	P	Total	
6.	M(CS)491	Numerical Methods Lab	0	0	2	2	1
7.	ME491	Fluid Mechanics & Hydraulics Lab	0	0	3	3	2
8.	ME 492	Manufacturing Technology Lab	0	0	3	3	2
9.	ME493	Material Testing Lab	0	0	3	3	2
10.	ME 494	Machine Drawing-II	0	0	3	3	2
<b>Total Practical</b>			0	0	14	14	9
<b>Total Semester</b>			16	2	12	32	26

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**Syllabus for B.Tech(Civil Engineering) Up to Third Year**  
Revised Syllabus of B.Tech CE (for the students who were admitted in Academic Session 2010-2011)



**Basic Environmental Engineering and Elementary Biology**

**CE 11-301**

**L-T-P = 3-0-0**

At least 30 Hrs Sem

**General**

Basic ideas of environment, basic concepts, man, society & environment, their interrelationship.

1L

Mathematics of population growth and associated problems. Importance of population study in environmental engineering, definition of resource, types of resource, renewable, non-renewable, potentially renewable, effect of excessive use vis-à-vis population growth, Sustainable Development.

2L

Materials balance: Steady state conservation system, steady state system with non conservative pollutants, step function.

1L

Environmental degradation: Natural environmental Hazards like Flood, earthquake, Landslide-causes, effects and control/management; Anthropogenic degradation like Acid rain-cause, effects and control. Nature and scope of Environmental Science and Engineering.

2L

**Ecology**

Elements of ecology: System, open system, closed system, definition of ecology, species, population, community, definition of ecosystem-components types and function. 1L

Structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems, Mangrove ecosystem (special reference to Sundar ban). Food chain [definition and one example of each food chain], Food web.

2L

Biogeochemical Cycle- definition, significance, flow chart of different cycles with only elementary reaction [Oxygen, carbon, Nitrogen, Phosphate, Sulphur]

1L

Biodiversity- types, importance, Endemic species, Biodiversity Hot-spot, Threats to biodiversity,

Conservation of biodiversity.

2L

**Air pollution and control**

Atmospheric Composition: Troposphere, Stratosphere, Mesosphere, Thermosphere, Tropopause and Mesopause.

1L

Energy balance: Conductive and Convective heat transfer, radiation heat transfer, simple global temperature model [Earth as a black body, earth as albedo], Problems.

1L

Green house effects: Definition, impact of greenhouse gases on the global climate and consequently on sea water level, agriculture and marine food Global warming and its consequence, Control of Global warming, Earth's heat budget.

1L

Lapse rate: Ambient lapse rate Adiabatic lapse rate, atmospheric stability, temperature inversion (radiation inversion).

2L

Atmospheric dispersion: Maximum mixing depth, ventilation coefficient, effective stack height, smokestack plumes and Gaussian plume model

2L

Definition of pollutants and contaminants, Primary and secondary pollutants: emission standard, criteria pollutant.

Sources and effect of different air pollutants- Suspended particulate matter, oxides of carbon, oxides of nitrogen, oxides of sulphur, particulate, PAN.

2L

Smog, Photochemical smog and London smog.

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**Syllabus for B.Tech(Civil Engineering) Up to Third Year**  
Revised Syllabus of B.Tech CE (for the students who were admitted in Academic Session 2010-2011)



Depletion Ozone layer: CFC, destruction of ozone layer by CFC, impact of other green house gases, effect of ozone modification.

1L

Standards and control measures: Industrial, commercial and residential air quality standard, control measure (ESP, cyclone separator, bag house, catalytic converter, scrubber (ventury), Statement with brief reference).

1L

**Water Pollution and Control**

Hydrosphere: Hydrological cycle and Natural water.

Pollutants of water, their origin and effects: Oxygen demanding wastes, pathogens, nutrients, Salts, thermal application, heavy metals, pesticides, volatile organic compounds. 2L

River/Lake/ground water pollution: River: DO, 5 day BOD test, Seeded BOD test, BOD reaction rate constants, Effect of oxygen demanding wastes on river[deoxygenation, reaeration], COD, Oil, Greases, pH.

2L

Lake: Eutrophication [Definition, source and effect]. 1L

1L

Ground water: Aquifers, hydraulic gradient, ground water flow (Definition only) 1L

1L

Standard and control: Waste water standard [BOD, COD, Oil, Grease].

Water Treatment system [coagulation and flocculation, sedimentation and filtration, disinfection, hardness and alkalinity, softening]

Waste water treatment system, primary and secondary treatments [Trickling filters, rotating biological contractor, Activated sludge, sludge treatment, oxidation ponds] tertiary treatment definition.

2L

Water pollution due to the toxic elements and their biochemical effects: Lead, Mercury, Cadmium, and Arsenic

**Land Pollution**

Lithosphere: Internal structure of earth, rock and soil 1L

1L

Solid Waste: Municipal, industrial, commercial, agricultural, domestic, pathological and hazardous solid wastes; Recovery and disposal method- Open dumping, Land filling, incineration, composting, recycling.

Solid waste management and control (hazardous and biomedical waste).

2L

**Noise Pollution**

Definition of noise, effect of noise pollution, noise classification [Transport noise, occupational noise, neighbourhood noise]

1L

Definition of noise frequency, noise pressure, noise intensity, noise threshold limit value, equivalent noise level,  $L_{10}$  (18 hr Index),

$L_d$

Noise pollution control.

1L

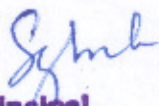
**Environmental Management:**

Environmental impact assessment, Environmental Audit, Environmental laws and protection act of India, Different international environmental treaty/ agreement/ protocol. 2L

2L

**References/Books**

1. Masters, G. M., "Introduction to Environmental Engineering and Science", Prentice-Hall of India Pvt. Ltd., 1991.

  
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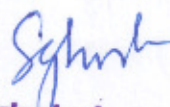
**Syllabus for B.Tech(Civil Engineering) Up to Third Year**  
Revised Syllabus of B.Tech CE (for the students who were admitted in Academic Session 2010-2011)



<b>CE(PC)603</b>	<b>Water Resources Engineering</b>	2L + 0T	2 Credits
<b>Course Outcome</b>	On successful completion of this course, student should be able to: 1. Understand the fundamentals of flow in open channels. 2. Understand the concepts of irrigation. 3. Estimate the quantity of water required by different crops in different seasons, and accordingly the irrigation water requirement. 4. Design channels and other irrigation structures required for irrigation, drainage, soil conservation, flood control and other water-management projects. 5. Learn about groundwater resources, aquifers and wells.		
<b>Prerequisite</b>	Introduction to Civil Engineering, Introduction to Fluid Mechanics CE(ES)-401		

<b>Module 1</b>	<b>Open Channel Flow:</b> Channel Characteristics and parameters, Energy-depth relationships, Specific Energy concept, Critical Flow, Hydraulic Jump, Uniform flow, Efficient sections, Slope profiles, Gradually Varied Flow, Water surface profiles.	8L
<b>Module 2</b>	<b>Irrigation:</b> Definition, Necessity, Scope, Benefits of Irrigation; Types, techniques and sources of irrigation; Development of irrigation in India.	3L
<b>Module 3:</b>	<b>Soil-water-plant Relationship:</b> Types of crops, cropping seasons, water requirement of crops, base period, kor period, Duty, Delta, Commanded area, Net Irrigation Requirement, Field Irrigation Requirement, Gross Irrigation Requirement, Intensity of irrigation, Consumptive use of water, estimation of evapotranspiration, Blaney-Criddle method, Modified Penman's method, Irrigation efficiencies, Frequency of irrigation.	6L
<b>Module 4:</b>	<b>Canal irrigation:</b> Classification of irrigation canals, canals in alluvium; Design of unlined canals: Kennedy's method, Lacey's method; Lined canals: advantages, materials used, typical sections, design of lined canals, economics of canal lining; Canal sections – filling, cutting, partial cutting and partial filling.	6L
<b>Module 5:</b>	<b>Land drainage:</b> Water logging issues in irrigation, provision of drains, design and maintenance of open drains, closed drains, discharge and spacing of closed drains.	4L
<b>Module 6</b>	<b>Groundwater:</b> Occurrence of groundwater– Aquifers, Various Types of Aquifers, Aquifer Parameters: Specific Yield, Specific Retention, Storage Coefficient, Transmissivity.	4L

Reference	Sl.	Book Name	Author	Publishing House
	1	Irrigation and Water Power Engineering	B. C. Punmia, A. K. Jain and P. B. Lal	Laxmi Publications (P) Ltd., New Delhi, 2019.
	2	Irrigation, Water Resources and Water Power Engineering	P. N. Modi	Standard Book House, New Delhi, 2019.
	3	Irrigation Engineering and Hydraulic Structures	S. K. Sharma	S Chand Publishing, New Delhi, 2017.2012.
	4	Irrigation Engineering	N. N. Basak	Tata McGraw Hill Education India Private Limited, 2017.
	5	Irrigation and Water Resources Engineering	G. L. Asawa	New Age Publishers, New Delhi, 2005.

  
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**Syllabus for B.Tech(Civil Engineering) Up to Third Year**  
Revised Syllabus of B.Tech CE (for the students who were admitted in Academic Session 2010-2011)



**Water Resource Engineering**

Contact Hours: 3L.

Credit: 3

Module 1	<b>Fluid Mechanics</b>	
	Review of fluid statics Review of fluid dynamics; dimensional analysis	1 3
Module 2	<b>Closed Conduit Flow</b>	
	Closed conduit flow	2
	Design of water distribution systems, pipe network analysis: Hardy Cross Method Design of Network Reservoir pipeline	3 4
Module 3	<b>Open Channel Flow</b>	
	Continuity, momentum equations	1
	Chezy, Mannings and energy equations Water surface profiles	6 2
Module 4	<b>Surface Water Hydrology</b>	
	Rainfall depth, duration, distribution, determination of average rainfall depth by Arithmetic Mean Method, Thiessen Polygon Method and Isohyetal Method	4
	Rainfall/ runoff equations	2

	Rainfall/ runoff models, unit hydrograph, hydrologic routing models	4
Module 5	<b>Groundwater Hydrology</b>	
	Porosity and water content, Equations of ground water flow (unconfined aquifers/ confined aquifers/ unsaturated flow), Estimation of aquifer parameters using graphical and analytical approach	4
	<b>Total</b>	<b>36</b>

**Text and Reference Books:**

1. S.K. Garg, Hydrology and Water Resources Engineering, Khanna Pub.
2. R.A. Wurbs and W.P. James, Water Resources Engineering, PHI Learning Pvt. Ltd., New Delhi.
3. K. Subramanya, Engineering Hydrology, Tata McGraw-Hill.
4. C.S.P. Ojha, R. Berndtsson and P. Bhunya, Engineering Hydrology, Oxford University Press.
5. M. J. Deodhar, Elementary Engineering Hydrology, Pearson Education.
6. K. Subramanya, Flow in Open Channels, Tata McGraw-Hill.
7. R. Srivastava, Flow through Open Channels, Oxford University Press.
8. Ven Te Chow, Open-Channel Hydraulics, McGraw-Hill.

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**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**BACHELOR OF TECHNOLOGY IN MECHANICAL ENGINEERING**  
(Effective from academic session 2018-19)  
**Curriculum Structure**

**List of Open Electives**

There are three Open Elective Course Papers in Semester VII and VIII as follows:  
(Open Elective-I) OE-ME701, (Open Elective-II) OE-ME801 and (Open Elective-III) OE-ME802

There are two baskets of Open Electives one each of Semester VII and VIII.  
Students are to choose one paper from the basket of Open Electives corresponding to Semester VII, and two papers from the basket of Open Electives corresponding to Semester VIII.

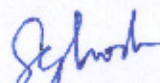
**List of Open Electives (OE-ME701) in Semester VII**

Subject Code	Subject Name
A	Industrial Engineering
B	Project Management
C	Introduction to Product Design and Development
D	Non-conventional Energy Sources
E	Biomechanics and Biomaterials
F	Computational Methods in Engineering
G	Artificial Intelligence (AI)
H	Machine Learning
I	Water Resource Engineering

**List of Open Electives (OE-ME801 and OE-ME802) in Semester VIII**

Subject Code	Subject Name
A	Total Quality Management
B	Entrepreneurship Development
C	Safety and Occupational Health
D	Industrial Pollution and Control
E	Energy Conservation and Management
F	Waste to Energy- An Overview
G	Automation & Control
H	Internet of Things (IoT)
I	Block Chain
J	Cyber Security
K	Quantum Computing
L	Data Sciences
M	Virtual Reality (VR)

Note: If a student chooses the paper, **Industrial Engineering (Code: A)** as an Open Elective-I in Semester VII, its paper code will be **OE-ME701A**.

  
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**Syllabus for B.Tech(Civil Engineering) Up to Third Year**  
Revised Syllabus of B.Tech CE (for the students who were admitted in Academic Session 2010-2011)



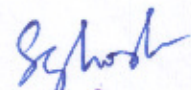
<b>Subject Code : D</b>	<b>Category: Open Elective Courses</b>
<b>Subject Name: Non-Conventional Energy Resources</b>	<b>Semester: Seventh</b>
<b>L-T-P : 3-0-0</b>	<b>Credit: 3</b>
<b>Pre-Requisites: Thermodynamics, Fluid Dynamics and Heat Transfer</b>	

**Course Objective:**

To have an idea about different sources of renewable energy that would be sustainable.  
To have the concept of using solar energy for heating as well as Photovoltaic Generation.

**Course Content:**

Module No.	Description of Topic	Contact Hrs.
1	Principles of Renewable Energy: The history of energy scene, energy of the future: sustainable energy, development and role of renewable energy, Scientific Principles of renewable energy.	4
2	Review of principles of thermodynamics, fluid dynamics and heat transfer.	1
3	Solar Radiation: i) Sun-Earth geometry, ii) Extraterrestrial Solar Radiation, iv) Measurement and estimation of solar radiation.	4
4	Solar Water Heating: i) Flat Plate Collectors: Heat Transfer analysis, Testing ii) Evacuated Tube Collectors	5
5	Other Solar Thermal Applications: i) Air heaters, ii) Water Desalination, iii) Space Cooling, iv) Solar Concentrators, v) Solar ponds	3
6	Photovoltaic Generation: i) Photon absorption at Silicon p-n junction, ii) Solar Cell, iii) Application and Systems.	4
7	Wind Power: i) Turbine types & terms, ii) Mechanical & Electrical Power from Wind Turbines.	3
8	Biomass & Biofuels: i) Use of Biomass, ii) Classification & Use of Biofuels.	3
9	Wave Power & Tidal Power: Basic Concepts	3
10	Ocean Thermal Energy Conversion, Geothermal Energy. Energy Storage	6

  
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**Syllabus for B.Tech(Civil Engineering) Up to Third Year**  
Revised Syllabus of B.Tech CE (for the students who were admitted in Academic Session 2010-2011)




**Course Outcomes:**

After completing this course, the students will

1. know about the energy scenario at present and the need of using renewable energy for sustainability.
2. know specifically the use of solar energy for heating as well as photovoltaic generation.

**Learning Resources:**

1. G. Boyle, Renewable Energy, 2<sup>nd</sup> Edition, Oxford University Press, 2010.
2. J. Twidell and T. Weir, Renewable Energy Resources, 2<sup>nd</sup> Edition, Taylor & Francis, 2006.
3. B.H. Khan, Non Conventional Energy Resources, McGraw Hill, 2010.
4. G.D. Rai, Non Conventional Energy Sources, Khanna Publishers, New Delhi, 2017.
5. Ashish Chandra, Non-Conventional Energy Sources, Khanna Publishers, New Delhi, 2019.

  
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## Syllabus for B.Tech(Electrical & Electronics Engineering) Up to Fourth Year

Revised Syllabus of B.Tech EEE (for the students who were admitted in Academic Session 2010-2011)



### 3rd Semester

Theory:

Sl. No.	CODE	Paper	Contacts periods Per weeks			Total Contact Hrs	Credits
			L	T	P		
1	M (CS) 301	Numerical Methods	2	1	0	3	2
2	M302	Mathematics-III	3	1	0	4	4
3	EC(EE)301	Analog Electronic circuits	3	0	0	3	3
4	EC(EE)302	Digital Electronic circuit	3	0	0	3	3
5	EE-301	Electric Circuit theory	3	1	0	4	4
6	EE-302	Field theory	3	1	0	4	4
						20	20

Practical / Sessional:

Sl. No.	CODE	Paper	Contacts periods Per weeks			Total Contact Hrs	Credits
			L	T	P		
1	EC(EE)391	Analog & Digital Electronic circuit	0	0	3	3	2
2	M (CS) 391	Numerical Methods	0	0	2	2	1
3	EE-391	Electric Circuit Theory	0	0	3	3	2
4	HU-391	Technical report writing and language practice	0	0	3	3	2
Total of Practical / Sessional						11	7
TOTAL OF SEMESTER:						32	27

### 4<sup>th</sup> Semester

Theory:

Sl. No.	CODE	Paper	Contacts periods Per weeks			Total Contact Hrs	Credits
			L	T	P		
1	HU-401	Values and Ethics in Profession	3	0	0	3	3
2	PH (EE)-401	Physics-II	3	1	0	4	4
3	EI(EEE)-401	Transducers & sensors	3	0	0	3	3
4	CH-401	Basic Environmental Engineering & Elementary Biology	3	0	0	3	3
5	EE-401	Electric Machine-I	3	1	0	4	4
6	EE-402	Electrical & Electronic measurement	3	1	0	4	3
						21	20

Practical / Sessional:

Sl. No.	CODE	Paper	Contacts periods Per weeks			Total Contact Hrs	Credits
			L	T	P		
1	PH(EE)-491	Physics-II Lab	0	0	3	3	2
2	EI(EEE)-491	Transducers & sensors Lab	0	0	3	3	2
3	EE-491	Electric Machine Lab-I	0	0	3	3	2
4	EE-492	Electrical & Electronic measurement Lab	0	0	3	3	2
Total of Practical / Sessional						12	8
TOTAL OF SEMESTER:						33	28

**Syllabus for B.Tech(Civil Engineering) Up to Third Year**  
Revised Syllabus of B.Tech CE (for the students who were admitted in Academic Session 2010-2011)



**CH401: Basic Environmental Engineering & Elementary Biology**

**Contacts** : 3L  
**Credits** : 3

**General**

Basic ideas of environment, basic concepts, man, society & environment, their interrelationship.

1L

Mathematics of population growth and associated problems, Importance of population study in environmental engineering, definition of resource, types of resource, renewable, non-renewable, potentially renewable, effect of excessive use vis-à-vis population growth, Sustainable Development.

2L

Materials balance: Steady state conservation system, steady state system with non conservative pollutants, step function.

1L

Environmental degradation: Natural environmental Hazards like Flood, earthquake, Landslide-causes, effects and control/management; Anthropogenic degradation like Acid rain-cause, effects and control.

Nature and scope of Environmental Science and Engineering.

2L

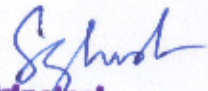
**Ecology**

Elements of ecology: System, open system, closed system, definition of ecology, species, population, community, definition of ecosystem- components types and function. 1L

Structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems, Mangrove ecosystem (special reference to Sundar ban); Food chain [definition and one example of each food chain], Food web. 2L

Biogeochemical Cycle- definition, significance, flow chart of different cycles with only elementary reaction [Oxygen, carbon, Nitrogen, Phosphate, Sulphur]. 1L

Biodiversity- types, importance, Endemic species, Biodiversity Hot-spot, Threats to biodiversity, Conservation of biodiversity. 2L

  
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**Syllabus for B.Tech(Civil Engineering) Up to Third Year**  
Revised Syllabus of B.Tech CE (for the students who were admitted in Academic Session 2010-2011)



**Air pollution and control**

Atmospheric Composition: Troposphere, Stratosphere, Mesosphere, Thermosphere, Tropopause and Mesopause. 1L

Energy balance: Conductive and Convective heat transfer, radiation heat transfer, simple global temperature model [Earth as a black body, earth as albedo]. Problems. 1L

Green house effects: Definition, impact of greenhouse gases on the global climate and consequently on sea water level, agriculture and marine food. Global warming and its consequence. Control of Global warming. Earth's heat budget 1L

Lapse rate: Ambient lapse rate Adiabatic lapse rate, atmospheric stability, temperature inversion (radiation inversion). 2L

Atmospheric dispersion: Maximum mixing depth, ventilation coefficient, effective stack height, smokestack plumes and Gaussian plume model. 2L

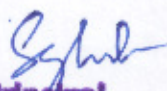
Definition of pollutants and contaminants, Primary and secondary pollutants: emission standard, criteria pollutant.

Sources and effect of different air pollutants- Suspended particulate matter, oxides of carbon, oxides of nitrogen, oxides of sulphur, particulate, PAN. 2L

Smog, Photochemical smog and London smog.

Depletion Ozone layer: CFC, destruction of ozone layer by CFC, impact of other green house gases, effect of ozone modification. 1L

Standards and control measures: Industrial, commercial and residential air quality standard, control measure (ESP, cyclone separator, bag house, catalytic converter, scrubber (ventury). Statement with brief reference). 1L

  
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**Syllabus for B.Tech(Civil Engineering) Up to Third Year**  
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**Water Pollution and Control**

Hydrosphere, Hydrological cycle and Natural water.

Pollutants of water, their origin and effects: Oxygen demanding wastes, pathogens, nutrients, Salts, thermal application, heavy metals, pesticides, volatile organic compounds. 2L

River/Lake/ground water pollution: River: DO, 5 day BOD test, Seeded BOD test, BOD reaction rate constants, Effect of oxygen demanding wastes on river[deoxygenation, reaeration], COD, Oil, Greases, pH.

2L

Lake: Eutrophication [Definition, source and effect]. 1L

Ground water: Aquifers, hydraulic gradient, ground water flow (Definition only) 1L

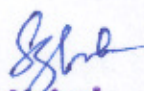
Standard and control: Waste water standard [BOD, COD, Oil, Grease],

Water Treatment system [coagulation and flocculation, sedimentation and filtration, disinfection, hardness and alkalinity, softening]

Waste water treatment system, primary and secondary treatments [Trickling filters, rotating biological contractor, Activated sludge, sludge treatment, oxidation ponds] tertiary treatment definition.

2L

Water pollution due to the toxic elements and their biochemical effects: Lead, Mercury, Cadmium, and Arsenic 1L

  
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**Land Pollution**

- Lithosphere: Internal structure of earth, rock and soil 1L
- Solid Waste: Municipal, industrial, commercial, agricultural, domestic, pathological and hazardous solid wastes: Recovery and disposal method- Open dumping, Land filling, incineration, composting, recycling.
- Solid waste management and control (hazardous and biomedical waste). 2L

**Noise Pollution**

- Definition of noise, effect of noise pollution, noise classification [Transport noise, occupational noise, neighbourhood noise] 1L
- Definition of noise frequency, noise pressure, noise intensity, noise threshold limit value, equivalent noise level,  $L_{10}$  (18 hr Index),  $Ld_n$ .
- Noise pollution control. 1L


**Environmental Management:**

- Environmental impact assessment, Environmental Audit, Environmental laws and protection act of India, Different international environmental treaty/ agreement/ protocol. 2L

**References/Books**

1. Masters, G. M., "Introduction to Environmental Engineering and Science", Prentice-Hall of India Pvt. Ltd., 1991.
2. De, A. K., "Environmental Chemistry", New Age International.

**NON CONVENTIONAL ENERGY**  
EEE-704 (e)

  
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**Semester VI (Third year)**

Sl. No.	Category	Code	Course Title	Hours per week			Credits
				L	T	P	
<b>Theory</b>							
1	Professional Core courses	CE(PC)601	Construction Engineering & Management	2	0	0	2
2	Professional Core courses	CE(PC)602	Engineering Economics, Estimation & Costing	2	0	0	2
3	Professional Core courses	CE(PC)603	Water Resources Engineering	2	0	0	2
4	Professional Core courses	CE(PC)604	Design of Steel Structures	2	0	0	2
5	Professional Elective courses	CE(PE)601	Elective-I	2	0	0	2
6	Professional Elective courses	CE(PE)602	Elective-II	2	0	0	2
7	Open Elective courses	CE(OE)601	Open Elective-I (Humanities)	2	0	0	2
<b>Theory credits</b>							<b>14</b>
<b>Practical/ Sessional</b>							
1	Professional Core courses	CE(PC)693	Water Resource Engineering Laboratory	0	0	2	1
2	Professional Core courses	CE(PC)694	Steel Structure Design Sessional	0	0	2	1
3	Professional Core courses	CE(PC)695	Quantity Survey Estimation and Valuation Sessional	0	1	2	2
<b>Practical credits</b>							<b>4</b>
<b>Total credits</b>							<b>18</b>

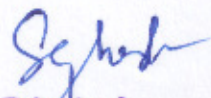
<b>CE(PE)601 (Elective-I)</b>	<b>CE(PE)602 (Elective-II)</b>
601A: Stability of Slopes 601B: <b>Foundation Engineering</b> 601C: Ground Improvement Technique	602A : Building Construction Practice 602B : <b>Structural Analysis-II</b> 602C : Industrial Structures
<b>CE(OE)601 (Open Elective-I)</b>	
601A: Soft Skills and Interpersonal Communication – I 601B: Introduction to Philosophical Thoughts	



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<b>CE(PC)693</b>	<b>Water Resource Engineering Laboratory</b>	<b>2P</b>	<b>1 Credits</b>
<b>Course Outcome</b>	On completion of the course, the students will be able to: <b>14. Delineate the watershed of any reservoir using DEM.</b> <b>15. Determine the average rainfall over a catchment.</b> <b>16. Use the raingauge properly for a specified purpose.</b> <b>17. Measure the rate of infiltration of water through the soil.</b> <b>18. Measure the sunshine hours in a particular day.</b>		
<b>Prerequisite</b>	Engineering Hydrology CE(PC)502 & Water Resources Engineering CE(PC)603		
<b>Experiment 1</b>	Catchment area delineation (Manually and using DEM)		
<b>Experiment 2</b>	Calculation of average rainfall over a catchment area with arithmetic mean method, Thiessen polygon method and Isohyetal Method.		
<b>Experiment 3</b>	Use of different type of Rain gauges.		
<b>Experiment 4</b>	Measurement of infiltration rate using double ring infiltrometer.		
<b>Experiment 5</b>	Measurement of evaporation using evaporimeter.		
<b>Experiment 6</b>	Measurement of bright sunshine hours using sunshine recorder.		

  
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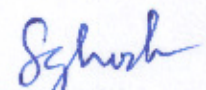
**4<sup>th</sup> Semester**

**Theory:**

Sl. No.	CODE	Paper	Contact periods Per week			Total Contact Hrs	Credits
			L	T	P		
1	PC-EEE-401	Electric machine-I	3	0	0	3	3
2	PC-EEE-402	Digital Electronics	3	0	0	3	3
3	PC-EEE-403	Electrical and Electronic Measurement	3	0	0	3	3
4	ES-EEE-401	Thermal Power Engineering	3	0	0	3	3
5	HM-EEE-401	Values and Ethics in profession	3	0	0	3	3
6	MC- EEE-401	Environmental Science	3	0	0	3	0
		TOTAL OF SEMESTER:				18	15

**Practical / Sessional:**

Sl. No.	CODE	Paper	Contact periods Per week			Total Contact Hrs	Credits
			L	T	P		
1	PC-EEE-491	Electric Machine-I laboratory	0	0	2	2	1
2	PC-EEE-492	Digital Electronics laboratory	0	0	2	2	1
3	PC-EEE-493	Electrical and Electronic measurement laboratory	0	0	2	2	1
4	ES-ME-491	Thermal Power Engineering laboratory	0		2	2	1
		Total of Practical / Sessional				08	4
		TOTAL OF SEMESTER:				26	19

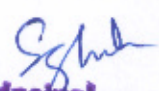
  
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**Syllabus for B.Tech(Civil Engineering) Up to Third Year**  
 Revised Syllabus of B Tech CE (for the students who were admitted in Academic Session 2010-2011)



<b>Name of the course</b>	<b>ENVIRONMENTAL SCIENCE</b>
<b>Course Code: MC-EEE-401/MC-EE-401</b>	<b>Semester: 4th</b>
<b>Duration: 6 months</b>	<b>Maximum Marks: 100</b>
<b>Teaching Scheme</b>	<b>Examination Scheme</b>
Theory: 3 hrs/week	Mid Semester Exam: 15 Marks
Tutorial: 0 hr/week	Assignment & Quiz: 10 Marks
Practical: 0 hrs/week	Attendance: 05 Marks
Credit Points: 0	End Semester Exam: 70 Marks
<b>Objective:</b>	
1.	To understand the environment and its relationships with human activities
2.	To be able to apply the fundamental knowledge of science and engineering to assess environmental and health risk
3.	To understand environmental laws and regulations to develop guidelines and procedures for health and safety issues
4.	To acquire the skill to solve problem related to environment and pollution
<b>Pre-Requisite</b>	
1.	Basic knowledge of science

1	<p>Basic ideas of environment, basic concepts, man, society &amp; environment, their interrelationship (1L)</p> <p>Mathematics of population growth and associated problems, Importance of population study in environmental engineering, definition of resource, types of resource, renewable, non-renewable, potentially renewable, effect of excessive use vis-à-vis population growth, Sustainable Development (2L).</p> <p>Materials balance: Steady state conservation system, steady state system with non-conservative pollutants, step function (1L).</p> <p>Environmental degradation: Natural environmental Hazards like Flood, earthquake, Landslide-causes, effects and control/management; Anthropogenic degradation like Acid rain-cause, effects and control. Nature and scope of Environmental Science and Engineering (2L)</p>	6	
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2	<p>Elements of ecology: System, open system, closed system, definition of ecology, species, population, community, definition of ecosystem- components types and function (1L).</p> <p>Structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems, Mangrove ecosystem (special reference to Sundar ban); Food chain [definition and one example of each food chain], Food web (2L)</p> <p>Biogeochemical Cycle- definition, significance, flow chart of different cycles with only elementary reaction [Oxygen, carbon, Nitrogen, Phosphate, Sulphur] (1L)</p> <p>Biodiversity- types, importance, Endemic species, Biodiversity Hot-spot, Threats to biodiversity, Conservation of biodiversity.( 2L)</p>	6	
	<p>Atmospheric Composition: Troposphere, Stratosphere,</p>		
3	<p>Mesosphere, Thermosphere, Tropopause and Mesopause (1L)</p> <p>Energy balance: Conductive and Convective heat transfer, radiation heat transfer, simple global temperature model [Earth as a black body, earth as albedo], Problems.( 1L)</p> <p>Green house effects: Definition, impact of greenhouse gases on the global climate and consequently on sea water level, agriculture and marine food. Global warming and its consequence, Control of Global warming. Earth's heat budget.(1L)</p> <p>Lapse rate: Ambient lapse rate Adiabatic lapse rate, atmospheric stability, temperature inversion (radiation inversion).(2L)</p> <p>Atmospheric dispersion: Maximum mixing depth, ventilation coefficient, effective stack height, smokestack plumes and Gaussian plume model.(2L)</p> <p>Definition of pollutants and contaminants, Primary and secondary pollutants: emission standard, criteria pollutant. Sources and effect of different air pollutants Suspended particulate matter, oxides of carbon, oxides of nitrogen, oxides of sulphur, particulate, PAN (2L)</p> <p>Smog, Photochemical smog and London smog. Depletion Ozone layer: CFC, destruction of ozone layer by CFC, impact of other green-house gases, effect of ozone modification. (1L)</p> <p>Standards and control measures: Industrial, commercial and residential air quality standard, control measure (ESP. cyclone separator, bag house, catalytic converter, scrubber (ventury), Statement with brief reference). (1L)</p>	11	

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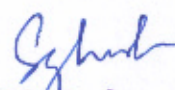
4	<p>Hydrosphere, Hydrological cycle and Natural water. Pollutants of water, their origin and effects: Oxygen demanding wastes, pathogens, nutrients, Salts, thermal application, heavy metals, pesticides, volatile organic compounds. (2L)</p> <p>River/Lake/ground water pollution: River: DO, 5-day BOD test, Seeded BOD test, BOD reaction rate constants, Effect of oxygen demanding wastes on river [deoxygenation, reaeration], COD, Oil, Greases, pH. (2L)</p> <p>Lake: Eutrophication [Definition, source and effect]. (1L)</p> <p>Ground water: Aquifers, hydraulic gradient, ground water flow (Definition only)(1L)</p> <p>Standard and control: Waste water standard [BOD, COD, Oil, Grease], Water Treatment system [coagulation and flocculation, sedimentation and filtration, disinfection, hardness and alkalinity, softening] Waste water treatment system, primary and secondary treatments [Trickling filters, rotating biological contractor, Activated sludge, sludge treatment, oxidation ponds] tertiary treatment definition. (2L)</p> <p>Water pollution due to the toxic elements and their biochemical effects: Lead, Mercury, Cadmium, and Arsenic (1L)</p>	9	
5	<p>Environmental impact assessment, Environmental Audit, Environmental laws and protection act of India, Different international environmental treaty/ agreement/ protocol. (3L)</p>	3	

**Text books:**

1. Environmental Studies, M.P. Poonia & S.C. Sharma, Khanna Publishing House
2. Introduction to Environmental Engineering and Science, G.M. Masters, Prentice-Hall of India Pvt. Ltd., 1991.

**Reference books:**

1. Environmental Chemistry, A. De, New Age International
2. Text Book for Environmental Studies, Erach Bharucha, UGC
3. Elements of Environmental Pollution Control, O.P. Gupta, Khanna Publishing House (AICTE Recommended Book).

  
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**Curriculum Structure**

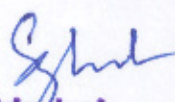
**3<sup>rd</sup> Semester**

**Theory:**

Sl. No.	CODE	Paper	Contact periods Per week			Total Contact Hrs	Credits
			L	T	P		
1	PC-EEE-301	Electric Circuit Theory	3	1	0	4	4
2	PC-EEE-302	Analog Electronics	3	0	0	3	3
3	PC-EEE-303	Electromagnetic field theory	3	0	0	3	3
4	ES-ME-301	Engineering Mechanics	3	0	0	3	3
5	BS-M-301	Mathematics-III	3	0	0	3	3
6	BS-EEE-301	Biology for Engineers	3	0	0	3	3
7	MC-EEE-301	Indian Constitution	3	0	0	3	0
		<b>TOTAL OF SEMESTER:</b>				22	19

**Practical / Sessional:**

Sl. No.	CODE	Paper	Contact periods Per week			Total Contact Hrs	Credits
			L	T	P		
1	PC-EEE-391	Electric Circuit Theory Laboratory	0	0	2	2	1
2	PC-EEE-392	Analog Electronics laboratory	0	0	2	2	1
3	PC-CS-391	Numerical Methods laboratory	0	0	2	2	1
		<b>Total of Practical / Sessional</b>				06	3
		<b>TOTAL OF SEMESTER:</b>				28	22

  
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**Syllabus for B.Tech(Civil Engineering) Up to Third Year**  
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<b>Name of the course</b>	<b>BIOLOGY FOR ENGINEERS</b>
<b>Course Code:BS-EEE-301</b>	<b>Semester: 3<sup>rd</sup></b>
<b>Duration: 6 months</b>	<b>Maximum Marks: 100</b>
<b>Teaching Scheme</b>	<b>Examination Scheme</b>
Theory: 3 hrs/week	Mid Semester Exam: 15 Marks
Tutorial: 0 hr/week	Assignment & Quiz: 10 Marks
Practical: 0 hrs/week	Attendance: 05 Marks
Credit Points: 3	End Semester Exam: 70 Marks
<b>Objective:</b>	
1.	To introduce modern biology with an emphasis on evolution of biology as a multi-disciplinary field.
2.	To make students aware of application of engineering principles in biology and engineering robust solution inspired by biological examples.
<b>Pre-Requisite</b>	
1.	NIL

Unit	Content	Hrs	Marks
1	<b>Introduction</b> Purpose: To convey that Biology is as important a scientific discipline as Mathematics, Physics and Chemistry. Bring out the fundamental differences between science and engineering by drawing a comparison between eye and camera, Bird flying and aircraft. Mention the most exciting aspect of biology as an independent scientific discipline. Why we need to study biology? Discuss how biological observations of 18th Century that lead to major discoveries. Examples from Brownian motion and the origin of thermodynamics by referring to the original observation of Robert Brown and Julius Mayor. These examples will highlight the fundamental importance of observations in any scientific inquiry	2	
2	<b>Classification:</b> Purpose: To convey that classification <i>per se</i> is not what biology is all about. The underlying criterion, such as morphological, biochemical or ecological be highlighted. Hierarchy of life forms at phenomenological level. A common thread weaves this hierarchy Classification. Discuss classification based on (a) cellularity- Unicellular or multicellular (b) ultrastructureprokaryotes or eucaryotes. (c) energy and Carbon utilization -Autotrophs, heterotrophs, lithotropes (d) Ammonia excretion – aminotelic, uricotelic, ureotelic (e) Habitata- aquatic or terrestrial (e) Molecular taxonomy- three major kingdoms of life. A given organism can	3	

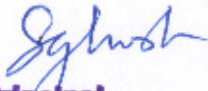
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	come under different category based on classification. Model organisms for the study of biology come from different groups. E.coli, S.cerevisiae, D. Melanogaster, C. elegance, A. Thaliana, M. musculus.		
3	<b>Biomolecules</b> Purpose: To convey that all forms of life has the same building blocks and yet the manifestations are as diverse as one can imagine. Molecules of life. In this context discuss monomeric units and polymeric structures. Discuss about sugars, starch and cellulose. Amino acids and proteins. Nucleotides and DNA/RNA. Two carbon units and lipids.	4	
4	<b>Macromolecular analysis:</b> Purpose: To analyze biological processes at the reductionistic level. Proteins- structure and function. Hierarch in protein structure. Primary secondary, tertiary and quaternary structure. Proteins as enzymes, transporters, receptors and structural elements.	5	
5	<b>Metabolism</b> Purpose: The fundamental principles of energy transactions are the same in physical and biological world. Thermodynamics as applied to biological systems. Exothermic and endothermic versus endergonic and exergonic reactions. Concept of Keq and its relation to standard free energy. Spontaneity. ATP as an energy currency. This should include the breakdown of glucose to CO <sub>2</sub> + H <sub>2</sub> O (Glycolysis and Krebs cycle) and synthesis of glucose from CO <sub>2</sub> and H <sub>2</sub> O (Photosynthesis). Energy yielding and energy consuming reactions. Concept of Energy charge.	4	
6	<b>Microbiology</b> Concept of single celled organisms. Concept of species and strains. Identification and classification of microorganisms. Microscopy. Ecological aspects of single celled organisms. Sterilization and media compositions. Growth kinetics.	3	
7	<b>Immunology</b> Purpose: How does the immune system work? What are the molecular and cellular components and pathways that protect an organism from infectious agents or cancer? This comprehensive course answers these questions as it explores the cells and molecules of the immune system. Immunology- Self vs Non-self, pathogens, human immune system, antigen-antibody reactions.	5	

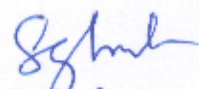
  
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 Revised Syllabus of B.Tech CE (for the students who were admitted in Academic Session 2010-2011)



8	<p><b>Information Transfer</b>                  Purpose: The molecular basis of coding and decoding genetic information is universal. Molecular basis of information transfer. DNA as a genetic material. Hierarchy of DNA structure- from single stranded to double helix to nucleosomes. Concept of genetic</p>	4	
	<p>code. Universality and degeneracy of genetic code. Define gene in terms of complementation and recombination.</p>		
9	<p><b>Cancer biology</b>                  Purpose: A basic understanding of cancer biology and treatment. The course is not designed for patients seeking treatment guidance but it can help to understand how cancer develops and provides a framework for understanding cancer diagnosis and treatment. Identification of the major types of cancer worldwide. Description of how genes contribute to the risk and growth of cancer. List and description of the ten cellular hallmarks of cancer. Definition of metastasis, and identification of the major steps in the metastatic process. Description of the role of imaging in the screening, diagnosis, staging, and treatments of cancer. Explanation of how cancer is treated.</p>	5	
10	<p><b>Techniques in bio physics</b>                  Purpose: Biophysics is an interdisciplinary science that applies approaches and methods traditionally used in physics to study biological phenomena. The techniques including microscopy, spectroscopy, electrophysiology, single-molecule methods and molecular modeling</p>	3	
11	<p><b>Stem cell</b>                  Purpose: Stem cells and derived products offer great promise for new medical treatments. Learn about stem cell types, current and possible uses, ethical issues.</p>	2	

  
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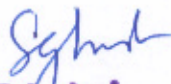


**Text / References:**

1. N. A. Campbell, J. B. Reece, L. Urry, M. L. Cain and S. A. Wasserman, "Biology: A global approach", Pearson Education Ltd, 2014.
2. E. E. Conn, P. K. Stumpf, G. Bruening and R. H. Doi, "Outlines of Biochemistry", John Wiley and Sons, 2009.
3. D. L. Nelson and M. M. Cox, "Principles of Biochemistry", W.H. Freeman and Company, 2012.
4. G. S. Stent and R. Calendar, "Molecular Genetics", Freeman and company, 1978.
5. L. M. Prescott, J. P. Harley and C. A. Klein, "Microbiology", McGraw Hill Higher Education, 2005.
6. Lewis J. Kleinsmith. "Principles of cancer biology", Pearson, 2016

Course Outcome: After completion of this course, the learners will be able to

1. describe with examples the biological observations lead to major discoveries.
2. explain

  
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# Syllabus for B.Tech(Electronics & Communication Engineering) Up to Fourth Year

Revised Syllabus of B.Tech ECE (for the students who were admitted in Academic Session 2010-2011)



## ECE SECOND YEAR: THIRD SEMESTER

A. THEORY							
Sl.No.	Field	Theory	Contact Hours/Week				Cr. Points
			L	T	P	Total	
1	M(CS)301	Numerical Methods	2	1	0	3	2
2	M302	Mathematics-III	3	1	0	4	4
3	EC301	1. Circuit Theory & Networks	3	1	0	4	4
4	EC302	2. Solid State Device	3	0	0	3	3
5	EC303	1. Signals & Systems	3	0	0	3	3
	EC304	2. Analog Electronic Circuits	3	1	0	4	4
6							
<b>Total of Theory</b>						<b>21</b>	<b>20</b>
B. PRACTICAL							
7	M(CS)391	Numerical Lab	0	0	2	2	1
8	EC391	Circuit Theory & Network Lab	0	0	3	3	2
9	EC392	Solid State Devices	0	0	3	3	2
10	EC393	1. Signal System Lab	0	0	3	3	2
11	EC394	2. Analog Electronic Circuits Lab	0	0	3	3	2
<b>Total of Practical</b>						<b>14</b>	<b>9</b>
<b>Total of Semester</b>						<b>35</b>	<b>29</b>

## ECE SECOND YEAR: FOURTH SEMESTER

A. THEORY							
Sl.No.	Field	Theory	Contact Hours/Week				Cr. Points
			L	T	P	Total	
1	HU401	Values & Ethics in Profession	3	0	0	3	3
2	PH401	Physics-II	3	1	0	4	4
3	CH401	Basic Environmental Engineering & Elementary Biology	2+1	0	0	3	3
4	EC401	1. EM Theory & Transmission Lines	3	1	0	4	4
5	EC402	2. Digital Electronic & Integrated Circuits	3	1	0	4	4
<b>Total of Theory</b>						<b>18</b>	<b>18</b>
B. PRACTICAL							
6	HU481	Technical Report Writing & Language Lab Practice	0	0	3	3	2
7	PH491	Physics-II Lab	0	0	3	3	2
8	EC491	1. EM Theory & Tx Lines Lab	0	0	3	3	2
9	EC492	2. Digital Electronic & Integrated Circuits Lab	0	0	3	3	2
<b>Total of Practical</b>						<b>12</b>	<b>8</b>
<b>Total of Semester</b>						<b>30</b>	<b>26</b>

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**CH401: Basic Environmental Engineering & Elementary Biology**

**Contacts** : 3L  
**Credits** : 3

**General**

Basic ideas of environment, basic concepts, man, society & environment, their interrelationship.

1L

Mathematics of population growth and associated problems, Importance of population study in environmental engineering, definition of resource, types of resource, renewable, non-renewable, potentially renewable, effect of excessive use vis-à-vis population growth, Sustainable Development.

2L

Materials balance: Steady state conservation system, steady state system with non conservative pollutants, step function.

1L

Environmental degradation; Natural environmental Hazards like Flood, earthquake, Landslide-causes, effects and control management; Anthropogenic degradation like Acid rain-cause, effects and control. Nature and scope of Environmental Science and Engineering.

2L

**Ecology**

Elements of ecology: System, open system, closed system, definition of ecology, species, population, community, definition of ecosystem- components types and function.

1L

Structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems, Mangrove ecosystem (special reference to Sundar ban); Food chain [definition and one example of each food chain], Food web.

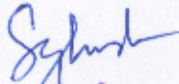
2L

Biogeochemical Cycle- definition, significance, flow chart of different cycles with only elementary reaction [Oxygen, carbon, Nitrogen, Phosphate, Sulphur].

1L

Biodiversity- types, importance, Endemic species, Biodiversity Hot-spot, Threats to biodiversity, Conservation of biodiversity.

2L

  
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**Air pollution and control**

Atmospheric Composition: Troposphere, Stratosphere, Mesosphere, Thermosphere, Tropopause and Mesopause. 1L

Energy balance: Conductive and Convective heat transfer, radiation heat transfer, simple global temperature model [Earth as a black body, earth as albedo], Problems. 1L

Green house effects: Definition, impact of greenhouse gases on the global climate and consequently on sea water level, agriculture and marine food. Global warming and its consequence, Control of Global warming, Earth's heat budget. 1L

Lapse rate: Ambient lapse rate Adiabatic lapse rate, atmospheric stability, temperature inversion (radiation inversion). 2L

Atmospheric dispersion: Maximum mixing depth, ventilation coefficient, effective stack height, smokestack plumes and Gaussian plume model. 2L


Definition of pollutants and contaminants, Primary and secondary pollutants: emission standard, criteria pollutant.

Sources and effect of different air pollutants- Suspended particulate matter, oxides of carbon, oxides of nitrogen, oxides of sulphur, particulate, PAN. 2L

Smog, Photochemical smog and London smog.

Depletion Ozone layer: CFC, destruction of ozone layer by CFC, impact of other green house gases, effect of ozone modification. 1L

Standards and control measures: Industrial, commercial and residential air quality standard, control measure (ESP, cyclone separator, bag house, catalytic converter, scrubber (ventury), Statement with brief reference). 1L

  
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**Water Pollution and Control**

Hydrosphere, Hydrological cycle and Natural water.

Pollutants of water, their origin and effects: Oxygen demanding wastes, pathogens, nutrients, Salts, thermal application, heavy metals, pesticides, volatile organic compounds. 2L

River/Lake/ground water pollution: River: DO, 5 day BOD test, Seeded BOD test, BOD reaction rate constants, Effect of oxygen demanding wastes on river[deoxygenation, reaeration], COD, Oil, Greases, pH. 2L

Lake: Eutrophication [Definition, source and effect]. 1L

Ground water: Aquifers, hydraulic gradient, ground water flow (Definition only) 1L

Standard and control: Waste water standard [BOD, COD, Oil, Grease],

Water Treatment system [coagulation and flocculation, sedimentation and filtration, disinfection, hardness and alkalinity, softening]

Waste water treatment system, primary and secondary treatments [Trickling filters, rotating biological contractor, Activated sludge, sludge treatment, oxidation ponds] tertiary treatment definition.

2L

Water pollution due to the toxic elements and their biochemical effects: Lead, Mercury, Cadmium, and Arsenic 1L

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**Land Pollution**

Lithosphere: Internal structure of earth, rock and soil 1L  
Solid Waste: Municipal, industrial, commercial, agricultural, domestic, pathological and hazardous solid wastes; Recovery and disposal method- Open dumping, Land filling, incineration, composting, recycling.  
Solid waste management and control (hazardous and biomedical waste). 2L

**Noise Pollution**

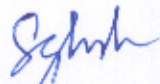
Definition of noise, effect of noise pollution, noise classification [Transport noise, occupational noise, neighbourhood noise] 1L  
Definition of noise frequency, noise pressure, noise intensity, noise threshold limit value, equivalent noise level.  $L_{10}$  (18 hr Index),  $Ld_n$ .  
Noise pollution control. 1L

**Environmental Management:**

Environmental impact assessment, Environmental Audit, Environmental laws and protection act of India, Different international environmental treaty/ agreement/ protocol. 2L

**References/Books**

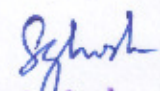
1. Masters, G. M., "Introduction to Environmental Engineering and Science", Prentice-Hall of India Pvt. Ltd., 1991.
2. De, A. K., "Environmental Chemistry", New Age International.

  
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CE(ES)302	Energy Science & Engineering	1L + 1T =	2 Credits
Module 1	<p><b>Introduction to Energy Science</b> Scientific principles and historical interpretation to place energy use in the context of pressing societal, environmental and climate issues; Introduction to energy systems and resources; Introduction to Energy, sustainability &amp; the environment.</p> <p><b>Tutorials:</b> Compile a World map showing Energy Reserves by source, Total Energy consumption, Per capita energy consumption and Carbon Footprint</p>		3L
Module 2	<p><b>Energy Sources</b> Overview of energy systems, sources, transformations, efficiency, and storage Fossil fuels (coal, oil, oil-bearing shale and sands, coal gasification) - past, present &amp; future; Remedies &amp; alternatives for fossil fuels - biomass, wind, solar, nuclear, wave, tidal and hydrogen; Sustainability and environmental trade-offs of different energy systems; possibilities for energy storage or regeneration (Ex. Pumped storage hydro power projects, superconductor-based energy storages, high efficiency batteries)</p> <p><b>Tutorials:</b> Compile a Word Map showing Alternative Energy source usage; Compile a Process diagram for a Pumped Storage project; Collect details of a typical North Sea oil platform. Compile a map of India showing existing potential and utilized potential for hydro power. List the pros and cons for Thermal, hydro, nuclear and solar power projects.</p>		4L
Module 3	<p><b>Energy &amp; Environment</b> Energy efficiency and conservation; introduction to clean energy technologies and its importance in sustainable development; Carbon footprint, energy consumption and sustainability; introduction to the economics of energy; How the economic system determines production and consumption; linkages between economic and environmental outcomes; How future energy use can be influenced by economic, environmental, trade, and research policy</p> <p><b>Tutorials:</b> Study the functioning of an Electro Static Precipitator in a thermal power plant, study the uses of coarse and fine Fly Ash from thermal power plants. Compile the safety provisions in design and construction of a reactor containment building</p>		5L
Module 4	<p><b>Civil Engineering Projects connected with the Energy Sources</b> Coal mining technologies, Oil exploration offshore platforms, Underground and under-sea oil pipelines, solar chimney project, wave energy caissons, coastal installations for tidal power, wind mill towers; hydropower stations above-ground and underground along with associated dams, tunnels, penstocks, etc.; Nuclear reactor containment buildings and associated buildings, design and construction constraints and testing procedures for reactor containment buildings; Spent Nuclear fuel storage and disposal systems</p> <p><b>Tutorials:</b> Compile a process diagram for a typical underground hydropower project; Collect details of a model solar chimney project; collect details of a wave energy project at Vizhinjam; Collect details of the Kalpasar (Tidal energy) project</p>		10L
Module 5	<p><b>Engineering for Energy conservation</b> Concept of Green Building and Green Architecture; Green building concepts (Green building encompasses everything from the choice of building materials to where a building is located, how it is designed and operated); LEED ratings; Identification of energy related enterprises that represent the breath of the industry and prioritizing these as candidates; Embodied energy analysis and use as a tool for measuring sustainability. Energy Audit of Facilities and optimization of energy consumption.</p> <p><b>Tutorials:</b> Draw a typical geometrical orientation of a house in your area to avoid sun's radiation in the bed room in the evening. Identify typical examples of Indian buildings having various LEED ratings; List various building materials with their embodied energy content. Do an Energy Audit of your Departmental Building in the college</p>		8L
Reference	<ol style="list-style-type: none"> <li>O.P. Gupta, Energy Technology, Khanna Book Publishing, (2019)</li> <li>Boyle, Godfrey (2004), Renewable Energy (2nd edition), Oxford University Press</li> <li>Boyle, Godfrey, Bob Everen, and Janet Ramage (Eds.) (2004), Energy Systems and Sustainability: Power for a Sustainable Future Oxford University Press</li> <li>Chakrabarti, Energy Engineering &amp; Management, PHI</li> <li>Schaeffer, John (2007), Real Goods Solar Living Sourcebook: The Complete Guide to Renewable Energy Technologies and Sustainable Living, Gasam</li> <li>Jean-Philippe, Zaccour, Georges (Eds.) (2005), Energy and Environment Set: Mathematics of Decision Making, Loulou, Richard; Waub, XVIII</li> <li>Risinen, Robert A. Kraushaar, Jack J. A. Kraushaar, Jack P. Ristinen, Robert A. (2006) Energy and the Environment, 2nd Edition, John Wiley</li> <li>UNDP (2000), Energy and the Challenge of Sustainability, World Energy assessment</li> <li>E.H Thorndike (1976), Energy &amp; Environment: A Primer for Scientists and Engineers,</li> </ol>		

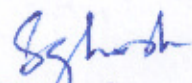
  
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**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**BACHELOR OF TECHNOLOGY IN MECHANICAL ENGINEERING**  
(Effective from academic session 2018-19)  
**Curriculum Structure**

Second Year Third Semester							
Sl No.	Category	Subject Code	Subject Name	Total No. of contact hours			Credits
				L	T	P	
<b>Theory</b>							
1	Basic Science course	BS-M301	Mathematics III	3	1	0	4
2	Basic Science course	BS-BIO301	Biology	3	0	0	3
3	Engineering Science Courses	ES-ECE301	Basic Electronics Engineering	3	0	0	3
4	Engineering Science Courses	ES-ME301	Engineering Mechanics	3	1	0	4
5	Professional Core courses	PC-ME301	Thermodynamics	3	1	0	4
6	Professional Core courses	PC-ME302	Manufacturing Processes	4	0	0	4
<i>Total Theory</i>				<b>19</b>	<b>3</b>	<b>0</b>	<b>22</b>
<b>Practical</b>							
1	Professional Core courses	PC-ME391	Practice of Manufacturing Processes	0	0	3	1.5
<i>Total Practical</i>				<b>0</b>	<b>0</b>	<b>3</b>	<b>1.5</b>
<b>Total of Third Semester</b>				<b>19</b>	<b>3</b>	<b>3</b>	<b>23.5</b>

Second Year Fourth Semester							
Sl No.	Category	Subject Code	Subject Name	Total No. of contact hours			Credits
				L	T	P	
<b>Theory</b>							
1	Engineering Science Courses	ES-ME401	Materials Engineering	3	0	0	3
2	Professional Core courses	PC-ME401	Applied Thermodynamics	3	1	0	4
3	Professional Core courses	PC-ME402	Fluid Mechanics & Fluid Machines	3	1	0	4
4	Professional Core courses	PC-ME403	Strength of Materials	3	1	0	4
5	Professional Core courses	PC-ME404	Metrology and Instrumentation	3	1	0	4
<i>Total Theory</i>				<b>15</b>	<b>4</b>	<b>0</b>	<b>19</b>
<b>Practical</b>							
1	Professional Core courses	PC-ME491	Practice of Manufacturing Processes and Systems Laboratory	0	0	3	1.5
2	Professional Core courses	PC-ME492	Machine Drawing- I	0	0	3	1.5
3	Mandatory courses	MC 481	Environmental Science	-	-	2	0
<i>Total Practical</i>				<b>0</b>	<b>0</b>	<b>8</b>	<b>3</b>
<b>Total of Fourth Semester</b>				<b>15</b>	<b>4</b>	<b>8</b>	<b>22</b>

  
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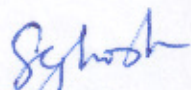
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<b>Subject Code</b> : BS-BIO301	<b>Category</b> : Basic Science course
<b>Subject Name</b> : Biology	<b>Semester</b> : Third
<b>L-T-P</b> : 3-0-0	<b>Credit</b> :3
<b>Pre-Requisites</b> : No-prerequisite	

**Course Content:**

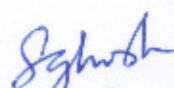
Module No.	Description of Topic	Contact Hrs.
1	<p align="center"><b>Introduction</b></p> <p><i>Purpose:</i> To convey that Biology is as important a scientific discipline as Mathematics, Physics and Chemistry.                      Bring out the fundamental differences between science and engineering by drawing a comparison between eye and camera, Bird flying and aircraft. Mention the most exciting aspect of biology as an independent scientific discipline. Why we need to study biology? Discuss how biological observations of 18th Century that lead to major discoveries. Examples from Brownian motion and the origin of thermodynamics by referring to the original observation of Robert Brown and Julius Mayor. These examples will highlight the fundamental importance of observations in any scientific inquiry.</p>	2

  
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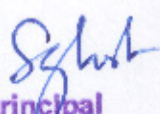
2	<p align="center"><b>Classification</b></p> <p><i>Purpose:</i> To convey that classification per se is not what biology is all about. The underlying criterion, such as morphological, biochemical or ecological be highlighted.</p> <p>Hierarchy of life forms at phenomenological level. A common thread weaves this hierarchy Classification. Discuss classification based on (a) cellularity- Unicellular or multicellular (b) ultrastructure- prokaryotes or eucaryotes. (c) energy and Carbon utilisation -Autotrophs, heterotrophs, lithotropes (d) Ammonia excretion – aminotelic, uricotelic, ureotelic (e) Habitataaquatic or terrestrial (e) Molecular taxonomy- three major kingdoms of life. A given organism can come under different category based on classification. Model organisms for the study of biology come from different groups. E.coli, S.cerevisiae, D. Melanogaster, C. elegance, A. Thaliana, M.musculus</p>	3
3	<p align="center"><b>Genetics</b></p> <p><i>Purpose:</i> To convey that "Genetics is to biology what Newton's laws are to Physical Sciences"</p> <p>Mendel's laws, Concept of segregation and independent assortment. Concept of allele. Gene mapping, Gene interaction, Epistasis. Meiosis and Mitosis be taught as a part of genetics. Emphasis to be give not to the mechanics of cell division nor the phases but how genetic material passes from parent to offspring. Concepts of recessiveness and dominance. Concept of mapping of phenotype to genes. Discuss about the single gene disorders in humans. Discuss the concept of complementation using human genetics.</p>	4
4	<p align="center"><b>Biomolecules</b></p> <p><i>Purpose:</i> To convey that all forms of life has the same building blocks and yet the manifestations are as diverse as one can imagine</p>	4

  
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	Molecules of life. In this context discuss monomeric units and polymeric structures. Discuss about sugars, starch and cellulose. Amino acids and proteins. Nucleotides and DNA/RNA. Two carbon units and lipids.	
5	<p align="center"><b>Enzymes</b></p> <p><i>Purpose:</i> To convey that without catalysis life would not have existed on earth.</p> <p>Enzymology: How to monitor enzyme catalysed reactions. How does an enzyme catalyse reactions? Enzyme classification. Mechanism of enzyme action. Discuss at least two examples. Enzyme kinetics and kinetic parameters. Why should we know these parameters to understand biology? RNA catalysis.</p>	4
6	<p align="center"><b>Information Transfer</b></p> <p><i>Purpose:</i> The molecular basis of coding and decoding genetic information is universal Molecular basis of information transfer. DNA as a genetic material. Hierarchy of DNA structure-from single stranded to double helix to nucleosomes. Concept of genetic code. Universality and degeneracy of genetic code. Define gene in terms of complementation and recombination.</p>	4
7	<p align="center"><b>Macromolecular analysis</b></p> <p><i>Purpose:</i> How to analyse biological processes at the reductionist level Proteins- structure and function. Hierarch in protein structure. Primary secondary, tertiary and quaternary structure. Proteins as enzymes, transporters, receptors and structural elements.</p>	5
8	<p align="center"><b>Metabolism</b></p> <p><i>Purpose:</i> The fundamental principles of energy transactions are the same in physical and biological world.</p> <p>Thermodynamics as applied to biological systems. Exothermic and endothermic versus endergonic and exergonic reactions. Concept of Keq and its relation to standard free energy. Spontaneity. ATP as an energy currency. This should include the breakdown of glucose to CO<sub>2</sub> + H<sub>2</sub>O (Glycolysis and Krebs cycle) and synthesis of glucose from CO<sub>2</sub> and H<sub>2</sub>O (Photosynthesis). Energy yielding and energy consuming reactions. Concept of Energy charge</p>	4
9	<p align="center"><b>Microbiology</b></p> <p>Concept of single celled organisms. Concept of species and strains. Identification and classification of microorganisms. Microscopy. Ecological aspects of single celled organisms. Sterilization and media compositions. Growth kinetics.</p>	3

  
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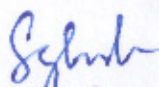
**Course Outcomes:**

After studying the course, the student will be able to:

1. Describe how biological observations of 18th Century that lead to major discoveries.
2. Convey that classification per se is not what biology is all about but highlight the underlying criteria, such as morphological, biochemical and ecological
3. Highlight the concepts of recessiveness and dominance during the passage of genetic material from parent to offspring
4. Convey that all forms of life have the same building blocks and yet the manifestations are as diverse as one can imagine
5. Classify enzymes and distinguish between different mechanisms of enzyme action.
6. Identify DNA as a genetic material in the molecular basis of information transfer.
7. Analyse biological processes at the reductionistic level
  
8. Apply thermodynamic principles to biological systems.
9. Identify and classify microorganisms.

**Learning Resources:**

1. Biology: A global approach: Campbell, N. A.; Reece, J. B.; Urry, Lisa; Cain, M, L.; Wasserman, S. A.; Minorsky, P. V.; Jackson, R. B. Pearson Education Ltd
2. Outlines of Biochemistry, Conn, E.E; Stumpf, P.K; Bruening, G; Doi, R.H. John Wiley and Sons
3. Principles of Biochemistry (V Edition), By Nelson, D. L.; and Cox, M. M.W.H. Freeman and Company
4. Molecular Genetics (Second edition), Stent, G. S.; and Calender, R. W.H. Freeman and company, Distributed by Satish Kumar Jain for CBS Publisher
5. Microbiology, Prescott, L.M J.P. Harley and C.A. Klein 1995. 2nd edition Wm, C. Brown Publishers
6. Biology for Engineers, Tata McGraw Hill (ISBN: 978-11-21439-931)

  
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**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
Syllabus for B. Tech in Civil Engineering  
(Applicable from the academic session 2018-2019)

**Semester VII (Fourth year]**

Sl. No.	Category	Code	Course Title	Hours per week			Credits
				L	T	P	
<b>Theory</b>							
1	Open Elective courses	CE(OE)701	Open Elective-II	2	0	0	2
2	Professional Elective courses	CE(PE)701	Elective III	2	1	0	3
3	Professional Elective courses	CE(PE)702	Elective IV	2	1	0	3
4	Professional Elective courses	CE(PE)703	Elective V	2	1	0	3
5	Professional Elective courses	CE(PE)704	Elective-VI	2	1	0	3
6	Professional Elective courses	CE(PE)705	Elective-VII	2	0	0	2
<b>Theory credits</b>							<b>16</b>
<b>Practical/ Sessional</b>							
1	Internship	CE(IN)791	Industrial Internship (after sixth semester)				1
2	Project	CE(PROJ)792	Project-1 (Project work)	0	0	10	5
<b>Practical credits</b>							<b>6</b>
<b>Total credits</b>							<b>22</b>

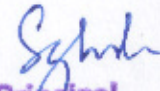
<b>CE(OE)701 (Open Elective-II)</b>	<b>CE(PE)701 (Elective-III)</b>
A: Metro Systems & Engineering	701A: Computational Hydraulics
B: ICT for Development	701B: Disaster Preparedness and Planning
C: Cyber Law & Ethics	701C: Hydraulic Structure
<b>CE(PE)702 (Elective-IV)</b>	<b>CE(PE)703 (Elective-V)</b>
702A: Prestressed Concrete	703A: Air and Noise Pollution and Control
702B: Repairs & Rehabilitation of Structures	703B: Physico-Chemical Processes for Water and Wastewater Treatment
702C: Finite Element Method	703C: Water and Air Quality Modelling
<b>CE(PE)704 (Elective-VI)</b>	<b>CE(PE)705 (Elective-VII)</b>
704A: Structural Dynamics	705A: Railway and Airport Engineering
704B: Advanced Structural Analysis	705B: Pavement Design
704C: Coastal Hydraulics and Sediment Transport	705C: Transport System Planning

**Syllabus for B.Tech(Civil Engineering) Up to Third Year**  
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<b>CE(PE)703A</b>	<b>Air and Noise Pollution and Control</b>	<b>2L + 1T</b>	<b>3 Credits</b>
<b>Course Outcome</b>	After going through this course, the students will be able to: <ol style="list-style-type: none"> <li>1. Define the basic concepts and terminologies regarding air pollution and noise pollution</li> <li>2. Describe the physics of air pollution and noise pollution</li> <li>3. Apply the methods of air pollution and noise pollution measurements</li> <li>4. Analyze different concepts of air and noise pollution solving mathematical problems</li> <li>5. Compare air and noise quality with allowable standards and limits</li> <li>6. Choose and design proper techniques for air pollution control and noise pollution control</li> </ol>		
<b>Prerequisite</b>	Class-XII level knowledge of Physics, Chemistry, Mathematics, Biology and Environmental Science; Undergraduate level knowledge of Statistics and Environmental Engineering		
<b>Module 1</b>	<b>Air Pollutants</b> Sources; Classification; Effects on Human, Vegetation, Material Effects of Air pollution on Atmosphere: Photochemical Smog, Ozone Layer Depletion, Acid Rain, Greenhouse Effect and Global Warming		4L+2T
<b>Module 2</b>	<b>Air Pollution Meteorology</b> Lapse Rate; Atmospheric Stability; Inversion; Plume Pattern		3L+1T
<b>Module 3</b>	<b>Dispersion of Air Pollutants</b> Point Source Gaussian Plume Model, Stability Classes, Stability Charts, Design of Stack Height		3L+1T
<b>Module 4</b>	<b>Air Quality</b> Methods of Measurement, Gaseous pollutants, Particulate pollutants Air Quality Standards and Indices: Ambient Air Quality Standard, NAAQS, Emission Standard, Air Quality Indices		4L+2T
<b>Module 5</b>	<b>Air Pollution Control</b> Control of Gaseous Pollutants: Adsorption, Absorption, Condensation Control of Particulate Pollutants: Settling chambers, Cyclone separators, Wet collectors, Fabric filters, Electrostatic precipitators Control of Pollution from Automobiles		5L+3T
<b>Module 6</b>	<b>Physics of Noise</b> Basics of Acoustics; Sound Pressure, Power and Intensity and their Interrelations		1L+1T
<b>Module 7</b>	<b>Measurement of Noise</b> Noise Level; Interrelation between Noise, Pressure, Power and Intensity Levels; Noise Meter; Noise Networks; Frequency Band Analysis; Decibel		4L+2T

	Addition Measurement of Community Noise: $L_{eq}$ , $L_{day}$ , $L_{night}$ , $L_{NP}$		
<b>Module 8</b>	<b>Source and Effect of Noise</b> Psychoacoustics and noise criteria, effects of noise on health; annoyance rating schemes		1L+1T
<b>Module 9</b>	<b>Noise Pollution Control</b> Noise Standards and Limits; Methods of Noise Pollution Control		3L+1T
<b>Reference</b>	<b>Sl.</b>	<b>Book Name</b>	<b>Author</b>
	1	Introduction to Environmental Engineering and Science	Masters, G.M., Ela, W.P.
	2	Environmental Engineering: A Design Approach.	Sincero, A., Sincero, G.
	3	Environmental Engineering. Volume-1 and Volume-2.	Garg, S.K.
	4	Air Pollution	Rao, M.N., Rao, H.V.N.
			<b>Publishing House</b>
			Prentice Hall / Pearson
			Prentice Hall
			Khanna Publishers
			Tata McGraw Hill

  
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**Semester VIII (Fourth year]**

Sl. No.	Category	Code	Course Title	Hours per week			Credits
				L	T	P	
<b>Theory</b>							
1	Humanities and Social Sciences including Management courses	CE(HS)801	Professional Practice, law & Ethics	2	0	0	2
2	Professional Elective Courses	CE(PE)801	Elective VIII	2	0	0	2
3	Open Elective courses	CE(OE)801	Open Elective-III	2	0	0	2
4	Open Elective courses	CE(OE)802	Open Elective-IV	2	0	2	2
<b>Theory credits</b>							<b>8</b>
<b>Practical/ Sessional</b>							
1	Comprehensive Viva Voce	CE(CV)881	Comprehensive Viva Voce				1
2	Project	CE(PROJ)882	Project-2 (Continued from VII)	0	0	10	5
<b>Practical credits</b>							<b>6</b>
<b>Total credits</b>							<b>14</b>

<b>CE(PE)801 (Elective-VIII)</b>		
801A: GIS & Remote Sensing 801B: Rock Mechanics 801C: Environmental laws and Policy 801D: Pavement Materials and Design		
<b>CE(OE)801 (Open Elective-III)</b>		<b>CE(OE)802 (Open Elective-IV)</b>
A: Human Resource Development and Organizational Behavior B: Bridge Engineering C: Deep Foundations D: Groundwater Contamination		A: Soft Skills and Personality Development B: Earthquake Engineering C: Urban Transport Planning D: Environmental Impact Assessment and Life cycle Analysis

**TOTAL CREDITS – [38 +(22+23)+(23+18)+(21+15)]=160**

SEM 1 & SEM 2	SEM3	SEM4	SEM5	SEM6	SEM7	SEM8	Total
38	22	23	23	18	21	15	160



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CE(PE)801C	Environmental Laws and Policy	2L	2 Credits	
Course Outcome	Upon completing the course, the students will be able to: <ol style="list-style-type: none"> <li>To apply the relevant measures to mitigate pollution from different sources.</li> <li>To understand the effects of the various pollutants on the environment as a whole according to the formulated guidelines</li> <li>To be able to give recommendations for alternatives to reduce pollution</li> <li>To formulate standards of the various parameters corresponding to their impact on the environment with changing time</li> </ol>			
Prerequisite	Basic Science, Biology, Environmental Sciences and Environmental Engineering (Including Air Quality Dispersion, Meteorology, Solid Waste Management, EIA)			
Module 1	<b>Introduction:</b> Environment, Nature, Ecosystem, Origin of Environmental laws, Concept of laws and policies, Environment and Governance	3L		
Module 2	<b>Sustainable Development and Environment:</b> Understanding of Climate change Concept of Carbon Footprint, Carbon Credit, Carbon Offsetting Use of Hybrid Energy (Conventional +Non Conventional) Use of Clean Development Mechanism	6L		
Module 3:	<b>Environmental Laws (Indian Perspective):</b> Indian Environmental Laws and Policies	8L		
Module 4:	<b>Environmental Laws (International Perspective):</b> Fundamental Principles and Application of International Environmental Law, Introduction to Trade and Environment Right to Environment as Human Right International Humanitarian Law and Environment Environment and Conflict Management Focus on International Protocols- UNFCCC & Kyoto Protocol, Treaty on Antarctic & Polar Regions, UN Conventions of Law of the Sea and Regional Sea Convention, Law on International Water Courses	11L		
Reference	Sl.	Book Name	Author	Publishing House
	1	Environmental Law and Policy	Aruna Venkat.	PHI Publication
	2	Environmental Law and Policy	James Salzman & Burton H. Thompson (Jr.),	Foundation Press.
	3	Environmental Law	Gurdip Singh	Eastern Book Company
4	Climate Change, Law, Policy and Governance	Usha Tandon	Eastern Book Company.	

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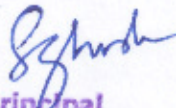
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<b>CE(OE)801D</b>	<b>Groundwater Contamination</b>	<b>2L + 0T</b>	<b>2 Credits</b>	
<b>Course Outcome</b>	On successful completion of this course, student should be able to: 1. To be able to understand the principles and theories regarding groundwater contamination with 2. To be able to formulate the various remedial measures for groundwater contamination			
<b>Prerequisite</b>	Basic Sciences, Hydrology, Meteorology and Groundwater Hydrology			
<b>Module 1</b>	<b>Introduction:</b> Definition of groundwater, hydrological properties of various water bearing strata, vertical distribution of subsurface water, groundwater in hydrologic cycle		2L	
<b>Module 2</b>	<b>Groundwater Hydraulics:</b> Darcy's Law, Dupuit's assumption, Application of Darcy's Law for simple flow systems, Governing differential equations for confined and unconfined aquifers, steady and unsteady flow solutions for fully penetrating wells, partially penetrating wells, Interference of wells, Test pumping analysis with steady and unsteady flows, Delayed yield, method of images		7L	
<b>Module 3:</b>	<b>Groundwater quality:</b> Indian & International standards		3L	
<b>Module 4:</b>	<b>Groundwater pollution:</b> Sources, Remedial and preventive measures		3L	
<b>Module 5:</b>	<b>Groundwater conservation:</b> Groundwater budget, seepage from surface water, artificial recharge with reclamation		3L	
<b>Module 6:</b>	<b>Models for Groundwater flow:</b> Sampling & Monitoring methods, transport mechanisms, modeling (advective and dispersive transport), (adsorption and chemical reaction), biodegradation kinetics, numerical flow and transport modeling, waste site characterization/investigation, groundwater remediation, legal issues in groundwater contamination		10L	
<b>Reference</b>	<b>Sl.</b>	<b>Book Name</b>	<b>Author</b>	<b>Publishing House</b>
	1	Elements of Hydrology and Groundwater	R.N. Saxena & D.C. Gupta	PHI
	2	Groundwater Contamination, Performance, Limitations and Impacts	Anna L. Powell	Nova Science Publishers

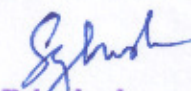
  
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<b>CE(OE)802D</b>	<b>Environmental Impact Assessment and Life Cycle Analyses</b>	2L	2 Credits
<b>Course Outcome</b>	After going through this course, the students will be able to: <ol style="list-style-type: none"> <li>To understand and evaluate the impact of any activity (large or small scale) on the surrounding environment</li> <li>To be able to formulate mitigation strategies to protect the environment leading to sustainability</li> <li>To be able to understand the intricacies of Life Cycle Analysis and apply basic knowledge for coherent existence</li> </ol>		
<b>Prerequisite</b>	Basic Sciences, Biology, Environmental Science and Environmental Engineering		
<b>Module 1</b>	<b>Introduction</b> Definition, Objective with legal aspect of Environmental Impact Assessment (EIA)	2L	
<b>Module 2</b>	<b>Methodology</b> for EIA with Base Line Studies, Screening, Scoping and Public Consultation	4L	
<b>Module 3</b>	<b>EIA Analysis</b> Data Collection & Environmental Impact Analysis, preparation of EIA report	5L	
<b>Module 4</b>	<b>EIA Mitigation and Audit</b> Mitigation and Impact Management with various case studies, Environmental Audit	5L	
<b>Module 5</b>	<b>Introduction to Life Cycle Analysis (LCA):</b> History, Definition, Standards and structure of LCA Goal and Scope of LCA, System of a product with boundary, unit process and functional unit	2L	
<b>Module 6</b>	<b>Life Cycle Interpretation and Inventory:</b> Limitation of LCA, Identification of significant issues, Evaluation, Reporting, Critical Review Inventory: Data Collection, Data Bases, Allocation, Validation	3L	
<b>Module 7</b>	<b>LCA Impact Assessment and Practice:</b>	4L	

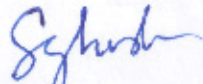
	Categories, Classification, Normalization, LCA Management, Life Cycle thinking, Sustainability			
<b>Module 8</b>	<b>Introduction:</b> Definition, Objective with legal aspect of Environmental Impact Assessment (EIA)			2L
<b>Reference</b>	<b>Sl.</b>	<b>Book Name</b>	<b>Author</b>	<b>Publishing House</b>
	1	Environmental Impact Assessment	R. R. Barthwal,	New Age International Publication
	2	Environmental Impact Assessment	Canter	McGraw Hill Publications
	3	Environmental Impact Assessment: Theory and Practice	M. Anji Reddy	B. S. Publication
	4	Environmental Impact Assessment: Theory and Practice	Peter Wathern	CRC Press
	5	Life Cycle Assessment (LCA): A Guide to Best Practice	Walter Klöpffer, Birgit Grahl	Wiley Publishers
	6	Environmental Life Cycle Assessment	Olivier Jolliet, Myriam Saade-Sheih, Shanna Shaked, Alexandre Jolliet, Pierre Crettaz	CRC Press
	7	Life Cycle Student Handbook	Mary Ann Curran,	Scrivener Publishing, Wiley

  
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**Semester IV (Second year]**

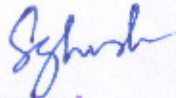
Sl. No.	Category	Code	Course Title	Hours per week			Credits
				L	T	P	
<b>Theory</b>							
1	Engineering Science Courses	CE(ES)401	Introduction to Fluid Mechanics	2	0	0	2
2	Engineering Science Courses	CE(ES)402	Introduction to Solid Mechanics	2	0	0	2
3	Professional Core courses	CE(PC)401	Soil Mechanics – I	2	1	0	3
4	Professional Core courses	CE(PC)402	Environmental Engineering -I	2	1	0	3
5	Professional Core courses	CE(PC)403	Surveying & Geomatics	2	1	0	3
6	Professional Core courses	CE(PC)404	Concrete Technology	2	1	0	3
7	Humanities and Social Sciences including Management courses	CE(HS)401	Civil Engineering - Societal & Global Impact	2	0	0	2
8	Mandatory Courses (non-credit)	CE(MC)401	Management I (Organizational Behavior)	2	0	0	0
<b>Theory credits</b>							<b>18</b>
<b>Practical/ Sessional</b>							
1	Professional Core courses	CE(ES)491	Fluid Mechanics Laboratory	0	0	2	1
2	Professional Core courses	CE(ES)492	Solid Mechanics Laboratory	0	0	2	1
3	Professional Core courses	CE(ES)493	Engineering Geology Laboratory	0	0	2	1
4	Professional Core courses	CE(PC)493	Surveying & Geomatics	0	0	2	1
5	Professional Core courses	CE(PC)494	Concrete Technology Laboratory	0	0	2	1
<b>Practical credits</b>							<b>5</b>
<b>Total credits</b>							<b>23</b>

  
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CE(PC)402	Environmental Engineering – I	2L + 1T	3 Credits	
<b>Course Outcome</b>	After going through this course, the students will be able to: <ol style="list-style-type: none"> <li>1. Define the basic concepts and terminologies of water supply engineering and solid waste management</li> <li>2. Describe different surface and groundwater sources; and composition and characteristics of municipal solid waste</li> <li>3. Apply the methods of quantifying water requirement and MSW generation</li> <li>4. Solve different mathematical problems regarding different components of water supply systems, distribution networks and MSW management systems</li> <li>5. Compare between different water samples based on their physical, chemical and biological characteristics</li> <li>6. Design different unit processes and operations involved in water treatment and MSW management</li> </ol>			
<b>Prerequisite</b>	Class-XII level knowledge of Physics, Chemistry, Mathematics, Biology and Environmental Science; Undergraduate level knowledge of Engineering Mechanics, Fluid Mechanics and Hydraulics			
<b>Module 1</b>	<b>Water Requirement Estimation</b> Water Demand: Different types of water demand; Per capita demand; Variations in demand; Factors affecting water demand Future Demand Forecasting: Design period; Population forecasting methods	2L + 2T		
<b>Module 2</b>	<b>Sources of Water</b> Surface Water Sources; Ground Water Sources	4L + 2T		
<b>Module 3:</b>	<b>Water Quality</b> Water Quality Characteristics: Physical, Chemical, and Biological parameters Drinking Water Standards: BIS; WHO; USEPA Water Quality Indices: Basic concept and examples	4L + 2T		
<b>Module 4:</b>	<b>Water Treatment</b> Typical flow chart for surface and groundwater treatments Unit Operation and Processes: Aeration, Plain Sedimentation, Sedimentation with Coagulation and Flocculation, Water Softening, Filtration, Disinfection	9L + 3T		
<b>Module 5:</b>	<b>Water Conveyance and Distribution</b> Hydraulic design of pressure pipes; Analysis of distribution network; Storage and distribution reservoirs; Capacity of reservoirs.	4L + 2T		
<b>Module 6</b>	<b>Characteristics of Municipal Solid Waste (MSW)</b> Composition and characteristics of MSW	1L + 1T		
<b>Module 7</b>	<b>Handling of MSW</b> Generation, collection and transportation of MSW	1L + 1T		
<b>Module 8</b>	<b>Engineered Systems for MSW Management</b> Methods of reuse/ recycle, energy recovery, treatment and disposal of MSW	3L + 1T		
<b>Reference</b>	<b>Sl.</b>	<b>Book Name</b>	<b>Author</b>	<b>Publishing House</b>
	1	Environmental Engineering Volume-1 and Volume-2	Garg, S.K.	Khanna Publishers
	2	Environmental Engineering	Peavy, H.S. Rowe, D.R. Tchobanoglous, G	Tata McGraw Hill Indian Edition
	3	Introduction to Environmental	Masters, G.M., Ela,	Prentice Hall / Pearson

  
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**Environmental Sciences**

**Code: MC-401**

**Contacts: 1L**

Name of the Course:	<b>Environmental Sciences</b>	
Course Code: MC-401	Semester: IV	
Duration: 6 months	Maximum Marks: 100	
<b>Teaching Scheme</b>	<b>Examination Scheme</b>	
Theory: 1hrs./week	Mid Semester exam: 15	
Tutorial: NIL	Assignment and Quiz : 10 marks	
Practical: NIL	Attendance : 5 marks	
Credit Points:	1	
<b>Objective:</b>		
1	Be able to understand the natural environment and its relationships with human activities.	
2	Be able to apply the fundamental knowledge of science and engineering to assess environmental and health risk.	
3	Be able to understand environmental laws and regulations to develop guidelines and procedures for health and safety issues.	
4	Be able to solve scientific problem-solving related to air, water, noise & land pollution	

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Pre-Requisite:	
1	Basic knowledge of Environmental science

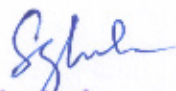
Unit	Content	Hrs/Unit	Marks/Unit
1	<p>Basic ideas of environment, basic concepts, man, society &amp; environment, their interrelationship (1L)</p> <p>Mathematics of population growth and associated problems, Importance of population study in environmental engineering, definition of resource, types of resource, renewable, non-renewable, potentially renewable, effect of excessive use vis-à-vis population growth, Sustainable Development. (2L)</p> <p>Materials balance: Steady state conservation system, steady state system with non-conservative pollutants, step function. (1L)</p> <p>Environmental degradation: Natural environmental Hazards like Flood, earthquake, Landslide-causes, effects and control/management; Anthropogenic</p>	6	

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	degradation like Acid rain-cause, effects and control. Nature and scope of Environmental Science and Engineering. (2L)		
2	<p>Elements of ecology: System, open system, closed system, definition of ecology, species, population, community, definition of ecosystem- components types and function. (1L)</p> <p>Structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems, Mangrove ecosystem (special reference to Sundar ban); Food chain [definition and one example of each food chain], Food web.( 2L)</p> <p>Biogeochemical Cycle- definition, significance, flow chart of different cycles with only elementary reaction [Oxygen, carbon, Nitrogen, Phosphate, Sulphur]. (1L)</p> <p>Biodiversity- types, importance, Endemic species, Biodiversity Hot-spot, Threats to biodiversity, Conservation of biodiversity.( 2L)</p>	6	


  
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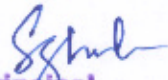
3	<p>Atmospheric Composition: Troposphere, Stratosphere, Mesosphere, Thermosphere, Tropopause and Mesopause. (1L)</p> <p>Energy balance: Conductive and Convective heat transfer, radiation heat transfer, simple global temperature model [Earth as a black body, earth as albedo], Problems.( 1L)</p> <p>Green house effects: Definition, impact of greenhouse gases on the global climate and consequently on sea water level, agriculture and marine food. Global warming and its consequence, Control of Global warming. Earth's heat budget.(1L)</p> <p>Lapse rate: Ambient lapse rate Adiabatic lapse rate, atmospheric stability, temperature inversion (radiation inversion).(2L)</p> <p>Atmospheric dispersion: Maximum mixing depth, ventilation coefficient, effective stack height, smokestack plumes and Gaussian plume model.(2L)</p> <p>Definition of pollutants and contaminants, Primary and secondary pollutants: emission standard, criteria</p>	11	
	<p>pollutant. Sources and effect of different air pollutants- Suspended particulate matter, oxides of carbon, oxides of nitrogen, oxides of sulphur, particulate, PAN. (2L)                  Smog, Photochemical smog and London smog.                  Depletion Ozone layer: CFC, destruction of ozone layer by CFC, impact of other green-house gases, effect of ozone modification. (1L)</p> <p>Standards and control measures: Industrial, commercial and residential air quality standard, control measure (ESP, cyclone separator, bag house, catalytic converter, scrubber (ventury), Statement with brief reference). (1L)</p>		

  
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4.	<p>Hydrosphere, Hydrological cycle and Natural water. Pollutants of water, their origin and effects: Oxygen demanding wastes, pathogens, nutrients, Salts, thermal application, heavy metals, pesticides, volatile organic compounds. (2L)</p> <p>River/Lake/ground water pollution: River: DO, 5-day BOD test, Seeded BOD test, BOD reaction rate constants, Effect of oxygen demanding wastes on river [deoxygenation, reaeration], COD, Oil, Greases, pH. (2L)</p> <p>Lake: Eutrophication [Definition, source and effect]. (1L)</p> <p>Ground water: Aquifers, hydraulic gradient, ground water flow (Definition only)(1L)</p> <p>Standard and control: Waste water standard [BOD, COD, Oil, Grease],</p> <p>Water Treatment system [coagulation and flocculation, sedimentation and filtration, disinfection, hardness and alkalinity, softening] Waste water treatment system, primary and secondary treatments [Trickling filters, rotating biological contractor, Activated sludge, sludge treatment, oxidation ponds] tertiary treatment definition. (2L)</p>	9	
5	<p>Water pollution due to the toxic elements and their biochemical effects: Lead, Mercury, Cadmium, and Arsenic (1L)</p> <p>Lithosphere; Internal structure of earth, rock and soil (1L)</p>	3	

  
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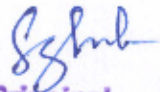
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	Solid Waste: Municipal, industrial, commercial, agricultural, domestic, pathological and hazardous solid wastes; Recovery and disposal method- Open dumping, Land filling, incineration, composting, recycling. Solid waste management and control (hazardous and biomedical waste).(2L)		
6	Definition of noise, effect of noise pollution, noise classification [Transport noise, occupational noise, neighbourhood noise] (1L) Definition of noise frequency, noise pressure, noise intensity, noise threshold limit value, equivalent noise level, $L_{10}$ (18hr Index) , $n L_d$ .Noise pollution control. (1L)	3	
7	Environmental impact assessment, Environmental Audit, Environmental laws and protection act of India, Different international environmental treaty/ agreement/ protocol. (2L)	2	

**Text books/ reference books:**

1. M.P. Poonia & S.C. Sharma, Environmental Studies, Khanna Publishing House (AICTE Recommended Textbook - 2018)
2. Masters, G. M., "Introduction to Environmental Engineering and Science", Prentice-Hall of India Pvt. Ltd.,1991.
3. De, A. K., "Environmental Chemistry", New Age International

  
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**Maulana Abul Kalam Azad University of Technology, West Bengal**  
*(Formerly West Bengal University of Technology)*  
**Syllabus for B. Tech in Computer Science & Engineering**  
 (Applicable from the academic session 2020-2021)

4	Professional Core Courses	PCC-CS404	Design & Analysis of Algorithms	3	0	0	3
5	Basic Science courses	BSC 401	Biology	2	1	0	3
6	Mandatory Courses	MC401	Environmental Sciences	1	-	-	1
<b>Practical</b>							
7	Engineering Science Course	PCC-CS 492	Computer Architecture	0	0	4	2
8	Professional Core Courses	PCC-CS494	Design & Analysis of Algorithms	0	0	4	2
<b>Total credits</b>							<b>21</b>

**Semester V (Third year)**

Sl. No.	Type of course	Code	Course Title	Hours per week			Credits
				L	T	P	
1	Engineering Science Course	ESC501	Software Engineering	3	0	0	3
2	Professional Core Courses	PCC-CS501	Compiler Design	3	0	0	3
3	Professional Core Courses	PCC-CS502	Operating Systems	3	0	0	3
4	Professional Core Courses	PCC-CS503	Object Oriented Programming	3	0	0	3
5	Humanities & Social Sciences including Management courses	HSMC-501	Introduction to Industrial Management (Humanities III)	3	0	0	3
6	Professional Elective	PEC-IT 501A/B/C/D	(Elective-I) Theory of	3	0	0	3

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**Biology**  
**Code: BSC 401**  
**Contacts: 2L+1T**

Name of the Course:	<b>Biology</b>	
Course Code: BSC-401	Semester: IV	
Duration: 6 months	Maximum Marks:100	
<b>Teaching Scheme</b>		<b>Examination Scheme</b>
Theory: 2hrs./week		Mid Semester exam: 15
Tutorial: 1 hour		Assignment and Quiz: 10 marks
		Attendance: 5 marks
Practical: NIL		End Semester Exam: 70 Marks
Credit Points:	3	
<b>Objective:</b>		
1	Bring out the fundamental differences between science and engineering	
2	Discuss how biological observations of 18 <sup>th</sup> Century that lead to major discoveries	
<b>Pre-Requisite:</b>		
1	Basic knowledge of Physics ,Chemistry and mathematics	

  
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Unit	Content	Hrs/Unit	Marks/Unit
1	To convey that Biology is as important a scientific discipline as Mathematics, Physics and Chemistry. Bring out the fundamental differences between science and engineering by drawing a comparison between eye and camera, Bird flying and aircraft. Mention the most exciting aspect of biology as an independent scientific discipline. Why we need to study biology? Discuss how biological observations of 18 <sup>th</sup> Century that lead to major discoveries. Examples from Brownian motion and the origin of thermodynamics by referring to the original observation of Robert Brown and Julius Mayor. These examples will highlight the fundamental importance of observations in any scientific inquiry.	2	
2	The underlying criterion, such as morphological, biochemical or ecological be highlighted. Hierarchy of life forms at phenomenological level. A common thread weaves this hierarchy Classification. Discuss classification based on (a) cellularity- Unicellular or multicellular (b) ultrastructure- prokaryotes or eucaryotes. (c)	3	

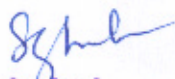
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	energy and Carbon utilisation -Autotrophs, heterotrophs, lithotropes (d) Ammonia excretion - aminotelic, uricotelic, ureotelic (e) Habitata- aquatic or terrestrial (e) Molecular taxonomy- three major kingdoms of life. A given organism can come under different category based on classification. Model organisms for the study of biology come from different groups. E.coli, S.cerevisiae, D. Melanogaster, C. elegance, A. Thaliana, M. musculus		
3	To convey that "Genetics is to biology what Newton's laws are to Physical Sciences" Mendel's laws, Concept of segregation and independent assortment. Concept of allele. Gene mapping, Gene interaction, Epistasis. Meiosis and Mitosis be taught as a part of genetics. Emphasis to be give not to the mechanics of cell division nor the phases but how genetic material passes from parent to offspring. Concepts of recessiveness and dominance. Concept of mapping of phenotype to genes. Discuss about the single gene disorders in humans. Discuss the concept of complementation using human genetics.	4	
4.	Biomolecules: To convey that all forms of life have the same building blocks and yet the manifestations are as diverse as one can imagine Molecules of life. In this context discuss monomeric units and polymeric structures. Discuss about sugars, starch and cellulose. Amino acids and proteins. Nucleotides and DNA/RNA. Two carbon units and lipids.	4	
5	Enzymes: To convey that without catalysis life would not have existed on earth Enzymology: How to monitor enzyme catalysed reactions. How does an enzyme catalyse reactions? Enzyme classification. Mechanism of enzyme action. Discuss at least two examples. Enzyme kinetics and kinetic parameters. Why should we know these parameters to understand biology? RNA catalysis.	4	

  
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6	<p><b>Information Transfer:</b>The molecular basis of coding and decoding genetic information is universal                  Molecular basis of information transfer. DNA as a genetic material. Hierarchy of DNA</p>	4	
	<p>structure- from single stranded to double helix to nucleosomes. Concept of genetic code. Universality and degeneracy of genetic code. Define gene in terms of complementation and recombination.</p>		
7	<p><b>Macromolecular analysis:</b> How to analyse biological processes at the reductionist level                  Proteins- structure and function. Hierarch in protein structure. Primary secondary, tertiary and quaternary structure. Proteins as enzymes, transporters, receptors and structural elements.</p>	5	
8	<p><b>Metabolism:</b> The fundamental principles of energy transactions are the same in physical and biological world.                  Thermodynamics as applied to biological systems. Exothermic and endothermic versus endergonic and exergonic reactions. Concept of <math>K_{eq}</math> and its relation to standard free energy. Spontaneity. ATP as an energy currency. This should include the breakdown of glucose to <math>CO_2 + H_2O</math> (Glycolysis and Krebs cycle) and synthesis of glucose from <math>CO_2</math> and <math>H_2O</math> (Photosynthesis). Energy yielding and energy consuming reactions. Concept of Energy charge</p>	4	

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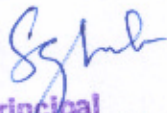
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9	Microbiology Concept of single celled organisms. Concept of species and strains. Identification and classification of microorganisms. Microscopy. Ecological aspects of single celled organisms. Sterilization and media compositions. Growth kinetics.	3	
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#### Text books/ reference books:

1. Biology: A global approach: Campbell, N. A.; Reece, J. B.; Urry, Lisa; Cain, M, L.; Wasserman, S. A.; Minorsky, P. V.; Jackson, R. B. Pearson Education Ltd
2. Outlines of Biochemistry, Conn, E.E; Stumpf, P.K; Bruening, G; Doi, R.H. John Wiley and Sons
3. Principles of Biochemistry (V Edition), By Nelson, D. L.; and Cox, M. M.W.H. Freeman and Company
4. Molecular Genetics (Second edition), Stent, G. S.; and Calender, R. W.H. Freeman and company, Distributed by Satish Kumar Jain for CBS Publisher
5. Microbiology, Prescott, L.M J.P. Harley and C.A. Klein 1995. 2nd edition Wm, C. Brown Publishers

  
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Revised Syllabus of B.Tech CE (for the students who were admitted in Academic Session 2010-2011)



**Civil Engineering**  
**Second Year – Third Semester**

A. THEORY							
Sl. No	Field	Theory	Contact hours per week				Cr. Points
			L	T	P	Total	
1	HU301	Values & Ethics in Profession	3	0	0	3	3
2	PH301	Physics - 2	3	1	0	4	4
3	CH301	Basic Environmental Engineering & Elementary Biology	(2+1)	0	0	3	3
4	CE301	Solid Mechanics	3	0	0	3	3
5	CE302	Surveying	3	1	0	4	4
6	CE303	Building Material & Construction	3	1	0	4	4
Total Theory						21	21
B. PRACTICAL							
7	PH391	Physics - 2	0	0	3	3	2
8	CE391	Solid Mechanics	0	0	3	3	2
9	CE392	Surveying Practice I	0	0	3	3	2
10	CE393	Building Design & Drawing	0	0	3	3	2
Total Practical						12	8
Total of Semester						33	29

**Second Year – Fourth Semester**

A. THEORY							
Sl. No	Field	Theory	Contact hours per week				Cr. Points
			L	T	P	Total	
1	M(CS)401	Numerical Methods	2	1	0	3	2
2	M402	Mathematics - 3	3	1	0	4	4
3	CE401	Fluid Mechanics	3	0	0	3	3
4	CE402	Structural Analysis	3	1	0	4	4
5	CE403	Soil Mechanics	3	1	0	4	4
Total Theory						18	17
B. PRACTICAL							
6	HU481	Technical Report Writing & Language Lab Practice	0	0	3	3	2
7	M(CS)491	Numerical Methods	0	0	2	2	1
8	CE491	Fluid Mechanics	0	0	3	3	2
9	CE492	Surveying Practice -II	0	0	3	3	2
10	CE493	Soil Mechanics Lab - I	0	0	3	3	2
Total Practical						14	9
Total of Semester						32	26

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**Basic Environmental Engineering & Elementary Biology**

Code: CH301

Contacts: 3L

Credits: 3

**General**

Basic ideas of environment, basic concepts, man, society & environment, their interrelationship.

1L

Mathematics of population growth and associated problems. Importance of population study in environmental engineering, definition of resource, types of resource, renewable, non-renewable, potentially renewable, effect of excessive use vis-à-vis population growth, Sustainable Development. 2L

Materials balance: Steady state conservation system, steady state system with non conservative pollutants, step function.

1L

Environmental degradation: Natural environmental Hazards like Flood, earthquake, Landslide-causes, effects and control/management; Anthropogenic degradation like Acid rain-cause, effects and control. Nature and scope of Environmental Science and Engineering.

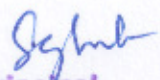
2L

**Ecology**

Elements of ecology: System, open system, closed system, definition of ecology, species, population, community, definition of ecosystem- components types and function. 1L

Structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems, Mangrove ecosystem (special reference to Sundar ban); Food chain [definition and one example of each food chain], Food web. 2L

Biogeochemical Cycle- definition, significance, flow chart of different cycles with only elementary reaction [Oxygen, carbon, Nitrogen, Phosphate, Sulphur]. 1L

  
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Biodiversity- types, importance, Endemic species, Biodiversity Hot-spot, Threats to biodiversity, Conservation of biodiversity. 2L

**Air pollution and control**

Atmospheric Composition: Troposphere, Stratosphere, Mesosphere, Thermosphere, Tropopause and Mesopause.

1L

Energy balance: Conductive and Convective heat transfer, radiation heat transfer, simple global temperature model [Earth as a black body, earth as albedo], Problems. 1L

Green house effects: Definition, impact of greenhouse gases on the global climate and consequently on sea water level, agriculture and marine food. Global warming and its consequence, Control of Global warming. Earth's heat budget. 1L

Lapse rate: Ambient lapse rate Adiabatic lapse rate, atmospheric stability, temperature inversion (radiation inversion).

2L

Atmospheric dispersion: Maximum mixing depth, ventilation coefficient, effective stack height, smokestack plumes and Gaussian plume model. 2L

Definition of pollutants and contaminants, Primary and secondary pollutants: emission standard, criteria pollutant.

Sources and effect of different air pollutants- Suspended particulate matter, oxides of carbon, oxides of nitrogen, oxides of sulphur, particulate, PAN. 2L

Smog, Photochemical smog and London smog.

Depletion Ozone layer: CFC, destruction of ozone layer by CFC, impact of other green house gases, effect of ozone modification. 1L

Standards and control measures: Industrial, commercial and residential air quality standard, control measure (ESP, cyclone separator, bag house, catalytic converter, scrubber (ventury), Statement with brief reference).

1L

**Water Pollution and Control**

Hydrosphere, Hydrological cycle and Natural water.

Pollutants of water, their origin and effects: Oxygen demanding wastes, pathogens, nutrients, Salts, thermal application, heavy metals, pesticides, volatile organic compounds. 2L

River/Lake/ground water pollution: River: DO, 5 day BOD test, Seeded BOD test, BOD reaction rate constants, Effect of oxygen demanding wastes on river[deoxygenation, reoeration] COD, Oil, Greases, pH

2L

Lake: Eutrophication [Definition, source and effect]. 1L

Ground water: Aquifers, hydraulic gradient, ground water flow (Definition only) 1L

Standard and control: Waste water standard [BOD, COD, Oil, Grease],

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## Syllabus for B.Tech(Civil Engineering) Up to Third Year

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Water Treatment system [coagulation and flocculation, sedimentation and filtration, disinfection, hardness and alkalinity, softening]

Waste water treatment system, primary and secondary treatments [Trickling filters, rotating biological contractor, Activated sludge, sludge treatment, oxidation ponds] tertiary treatment definition.

2L

Water pollution due to the toxic elements and their biochemical effects: Lead, Mercury, Cadmium, and Arsenic

1L

A

### Land Pollution

Lithosphere: Internal structure of earth, rock and soil

1L

Solid Waste: Municipal, industrial, commercial, agricultural, domestic, pathological and hazardous solid wastes; Recovery and disposal method- Open dumping, Land filling, incineration, composting, recycling.

Solid waste management and control (hazardous and biomedical waste).

2L

### Noise Pollution

Definition of noise, effect of noise pollution, noise classification [Transport noise, occupational noise, neighbourhood noise]

1L

Definition of noise frequency, noise pressure, noise intensity, noise threshold limit value, equivalent noise level,

$L_{10}$  (18 hr Index),  $L_{d_n}$ .

Noise pollution control.

1L

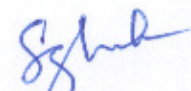
### Environmental Management:

Environmental impact assessment, Environmental Audit, Environmental laws and protection act of India, Different international environmental treaty/ agreement/ protocol.

2L

### References/Books

1. Masters, G. M., "Introduction to Environmental Engineering and Science", Prentice-Hall of India Pvt. Ltd., 1991.
- De, A. K., "Environmental Chemistry", New Age International.

  
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**Proposed Structure for Forthcoming Semester of B.Tech Courses on CE**

Fourth Year – Seventh Semester

A. THEORY							
Sl. No	Field	Theory	Contact hours per week				Cr. Points
			L	T	P	Total	
1	CE701	Environmental Engineering	3	0	0	3	3
2	CE702	Water Resource Engineering	3	0	0	3	3
3	CE703	Professional Elective II	3	0	0	3	3
4	CE704	Professional Elective III	3	0	0	3	3
5	CE705	Free Elective II	3	0	0	3	3
Total Theory						15	15
B. PRACTICAL							
6	HU781	Group Discussion	0	0	3	3	2
7	CE791	Environmental Engineering Lab	0	0	3	3	2
8	CE792	Civil Engineering Practice Sessional	0	0	3	3	2
9	CE793	Free Elective Laboratory	0	0	3	3	2
10	CE782	Industrial Training	4 weeks duration during 6 <sup>th</sup> -7 <sup>th</sup> Semester break				2
11	CE783	Project Part I				6	2
Total Practical						18	12
Total of Semester						33	27

Fourth Year – Eighth Semester

A. THEORY							
Sl. No	Field	Theory	Contact hours per week				Cr. Points
			L	T	P	Total	
1	HU801A HU801B	Organisational Behaviour/ Project Management	2	0	0	2	2
2	CE801	Professional Elective IV	3	0	0	3	3
3	CE802	Professional Elective V	3	0	0	3	3
Total Theory						8	8
B. PRACTICAL							
4	CE891	Structural Engineering Design Practice	0	0	6	6	4
5	CE881	Project Part II	0	0	12	12	6
6	CE882	Grand – Viva					3
Total Practical						18	13
Total of Semester						26	21

Free Elective II

CE705A Engineering Materials (ME303)

CE705B Electrical and Electronic Measurement (EE402)

Free Elective Lab

CE793A Material Testing Lab (ME493)

CE793B Electrical and Electronic Measurement Laboratory (EE492)

List of Electives:

Professional Elective – II

- CE703A Advanced Foundation Engineering
- CE703B Soil Stabilization and Ground Improvement Techniques
- CE703C Advanced Highway and Transportation Engineering

Professional Elective – III

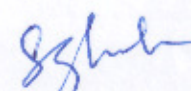
- CE704A Advanced Structural Analysis
- CE704B Hydraulic Structures

Professional Elective – IV

- CE801A Environmental Pollution and Control
- CE801B Water Resource Management and Planning
- CE801C Remote Sensing and GIS

Professional Elective – V

- CE802A Finite Element Method
- CE802B Dynamics of Soils & Foundations
- CE802C Design of Tall Buildings
- CE802D Pavement Design

  
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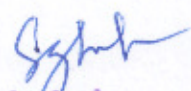


**Environmental Engineering**  
Code – CE 701  
Contact – 3L  
Credits- 3

Module	Broad Topic	Details of Course Content	Hours	Total
1	Water Demand	Water demands; Per capita demand; Variations in demand; Factors affecting demand; Design period; Population forecasting	3	36
2	Sources of Water	Surface water sources; ground water sources	2	
3	Water Quality	Impurities in water; Water quality parameters; Standards for potable water	2	
4	Conveyance of water	Hydraulic design of pressure pipes	2	
5	Water Treatment	Typical flow chart for surface and ground water treatments; Aeration, Plain sedimentation, Sedimentation with coagulation, Water Softening, Filtration, Disinfection.	8	
6	Water Distribution	Analysis of distribution network; Storage and distribution reservoirs; Capacity of reservoirs	4	
7	Sewage and Drainage	Definition of Common Terms, Quantity estimation for sanitary sewage and storm sewage	3	
8	Sewer Design	Hydraulic design of sewers, Partial flow diagrams and Nomograms	3	
9	Wastewater Characteristics	Physical, chemical and biological characteristics, DO, BOD and COD	3	
10	Wastewater Treatment	Typical flow chart for wastewater treatment; Primary Treatments; Secondary Treatments: Activated Sludge Process, Trickling Filter Process, Septic Tank	6	

**References:**

Sl. No	Name	Author	Publishers
1	Environmental Engineering.	S.K. Garg.	Khanna Publishers
2	Water Supply, Waste Disposal and Environmental Pollution Engineering. .	A.K. Chatterjee	Khanna Publishers.
3	Environmental Engineering, Vol II.	P. N. Modi.	
4	Environmental Modelling. .	Rajagopalan	Oxford University Press.
5	Environmental Engineering	P. V. Rowe	TMH

  
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**Water Resource Engineering**

Code – CE 702

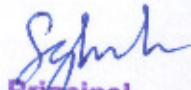
Contact – 31.

Credits- 3

Module	Details of Course Content	Hours	Total
1	Catchment area and Hydrologic cycle, Measurement of rainfall – Rain gauges, Estimation of missing rainfall data, checking of consistency, Optimum number of Rain gauges. Calculation of average rainfall over area – different methods, Frequency analysis of rainfall intensity duration curve. Rainfall mass curve, hyetograph, Examples	4	36
2	Evaporation, evapo-transpiration and infiltration: Processes, Factors affecting run off, estimation of run-off, rainfall run off relationship	4	
3	Stream flow measurement: Direct and indirect methods, Examples. Stage-discharge relationships	4	
4	Hydrographs: characteristics: Base flow separation. Unit Hydrographs. Derivation of unit hydrographs, S-curve, flood routing.	4	
5	Types of Irrigation systems, methods of irrigation: Water requirements of crops: Crop period or Base period, Duty & Delta of a crop, relation between Duty & Delta, Duty at various places, flow Duty & quantity Duty, factors affecting Duty, measures for improving Duty of water, crop seasons	4	
6	Canal Irrigation: Introduction, classification of irrigation canals, Efficient section, certain important definitions, Time factor, Capacity factor, full supply coefficient, Nominal duty, Channel losses, Examples.	2	
7	Design of unlined alluvial channels by silt Theories: Introduction, Kennedy's theory, procedure for design of channel by Kennedy's method, Lacey's theory, concept of True regime Initial regime and final regime, design procedure using Lacey's theory, examples	4	
8	Water logging and drainage: Causes, effects and prevention of waterlogging. Type of drains-open drains and closed drains (introduction only), Discharge and spacing of closed drains. Examples. Lining of Irrigation Canals : Objectives, advantages and disadvantages of canal lining, economics and requirements of canal lining, Design of lined Canals-examples	6	
9	Introduction to ground water flow, Darcy law; Wells: Definition, Types-open well or Dug well, Tube well, open well-shallow open well, deep open well, cavity formation in open wells, construction of open wells, Yield of an open well – Equilibrium pumping test, Recuperating test, examples, Tube wells - Strainer type, cavity type, slotted type. Examples.	4	

**References**

Sl. No	Name	Author	Publishers
1	Engineering Hydrology	K. Subramanya	Tata McGraw-Hill
2	A Text Book of Hydrology-	P. Jaya Ram Reddy	Laxmi Publications-New Delhi
3	Hydrology & Water Resource Engineering-	S.K Garg	Khanna Publishers.
4	Hydrology Principles, Analysis and Design	H. M. Raghunath.	
5	Hydraulics of Groundwater	J. Bear	McGraw-Hill
6	Water Resources Engineering Through Objective Questions	K. Subramanya	Tata McGraw-Hill
7	Irrigation & Water Power Engineering-	B.C Purnia, S Pande-	Standard Publication-New Delhi.
8	Irrigation Engineering	G.L Aswa	Wiley Eastern-New Delhi
9	Irrigation, Water Resource & Water Power Engineering-	Dr. P.N Modi-	Standard Book House-New Delhi

  
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**ENVIRONMENTAL ENGINEERING LAB**

CODE: CE-791

CRDIT-2

Experiment No.	Experiment Name	Type of Test
1.	Determination of turbidity for a given sample of water	Physical
2.	Determination of color for a given sample of water	
3.	Determination of solids in a given sample of water: Total Solids, Suspended Solids and Dissolved Solids	
4.	Determination of pH for a given sample of water	Chemical
5.	Determination of concentration of Chlorides in a given sample of water	
6.	Determination of carbonate, bi-carbonate and hydroxide alkalinity for a given sample of water	
7.	Determination of hardness for a given sample of water	
8.	Determination of concentration of Fluorides in a given sample of water	
9.	Determination of concentration of Iron in a given sample of water	
10.	Determination of the Optimum Alum Dose for a given sample of water through Jar Test	
11.	Determination of the Residual Chlorine in a given sample of water	
12.	Determination of the Chlorine Demand for a given sample of water	
13.	Determination of the Available Chlorine Percentage in a given sample of bleaching powder	
14.	Determination of amount of Dissolved Oxygen (DO) in a given sample of water	
15.	Determination of the Biochemical Oxygen Demand (BOD) for a given sample of wastewater	
16.	Determination of the Chemical Oxygen Demand (COD) for a given sample of wastewater	
17.	Determination of bacteriological quality of water: presumptive test, confirmative test and Determination of MPN	Bacteriological

  
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**Environmental Pollution and Control**

Code – CE 801A

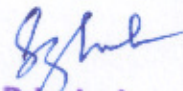
Contact – 3L

Credits- 3

Sl. No	Details of Course Content	Hours	Total
1.	<b>Introduction:</b> Environment, Pollution, Pollution control	2	36
2.	<b>Air Pollution:</b> Air Pollutants: Types, Sources, Effects, Air Pollution Meteorology: Lapse Rate, Inversion, Plume Pattern, Air Pollution Dispersion Model: Point Source Gaussian Plume Model, Stability Classes, Stability Charts, Design of Stack Height.	8	
3.	<b>Air pollution Control:</b> Self cleansing properties of the environment; Dilution method; Engineered Control of Air Pollutants: Control of the particulates, Control of Gaseous Pollutants, Control of Air pollution from Automobiles.	8	
4.	<b>Noise Pollution:</b> Definition; Sound Pressure, Power and Intensity; Noise Measurement: Relationships among Pressure, Power and Intensity, Levels, Frequency Band, Decibel Addition, Measures of community Noise i.e. $L_N$ , $L_{eq}$ , $L_{dn}$ , $L_{SN}$ ; Sources, ; Effects; Control.	4	
5.	<b>Water pollution:</b> Pollution Characteristics of Typical Industries, Suggested Treatments.	4	
6.	<b>Global Environmental Issues:</b> Ozone Depletion, Acid Rain, Global Warming-Green House Effects	4	
7.	<b>Administrative Control on Environment:</b> Functions of Central and State Pollution Control Boards; Environmental Clearance Process for Industries and Infrastructural Projects	4	
8.	<b>Environmental Laws:</b> Water Act, Air Act, Motor Vehicle Act	2	

**References:**

Sl. No	Name	Author	Publishers
1.	Introduction to Environmental Engineering and Science	G. Masters, W. Ela	PHI
2.	Environmental Engineering: A Design Approach	A. Sincero, G. Sincero	PHI
3.	Environmental Engineering	P. V. Rowe	TMH
4.	Environmental Engineering.	S.K. Garg,	Khanna Publishers
5.	Air Pollution	Rao and Rao	TMH
4.	Water Supply, Waste Disposal and Environmental Pollution Engineering, .	A.K.Chatterjee	Khanna Publishers.
5.	Environmental Engineering, Vol.II,	P. N. Modi,	
6.	Environmental Modelling, .	Rajagopalan	Oxford University Press.

  
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4	Professional Core Courses	PCC-CS404	Design & Analysis of Algorithms	3	0	0	3
5	Basic Science courses	BSC 401	Biology	2	1	0	3
6	Mandatory Courses	MC401	Environmental Sciences	1	-	-	1
<b>Practical</b>							
7	Engineering Science Course	PCC-CS 492	Computer Architecture	0	0	4	2
8	Professional Core Courses	PCC-CS494	Design & Analysis of Algorithms	0	0	4	2
<b>Total credits</b>							<b>21</b>

**Semester V (Third year)**

Sl. No.	Type of course	Code	Course Title	Hours per week			Credits
				L	T	P	
1	Engineering Science Course	ESC501	Software Engineering	3	0	0	3
2	Professional Core Courses	PCC-CS501	Compiler Design	3	0	0	3
3	Professional Core Courses	PCC-CS502	Operating Systems	3	0	0	3
4	Professional Core Courses	PCC-CS503	Object Oriented Programming	3	0	0	3
5	Humanities & Social Sciences including Management courses	HSMC-501	Introduction to Industrial Management (Humanities III)	3	0	0	3
6	Professional Elective	PEC-IT 501A/B/C/D	(Elective-I) Theory of	3	0	0	3

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**Syllabus for B. Tech in Electronics & Communication Engineering**

(Applicable from the academic session 2018-2019)

**Curriculum Structure**

**2nd Year: 3<sup>rd</sup> Semester**

A. Theory							
Sl No	Field	Theory	Contact Hours/week				Credit Points
			L	T	P	Total	
1.	EC301	Electronic Devices	3	0	0	3	3
2.	EC302	Digital System Design	3	0	0	3	3
3.	EC303	Signals and Systems	3	0	0	3	3
4.	EC304	Network Theory	3	0	0	3	3
5.	ES-CS301	Data Structure & Algorithm (ES)	3	0	0	3	3
6.	BS-M301	Probability & Statistics(BS)	3	0	0	3	3
Total Theory						18	18
B. Practical							
7.	EC391	Electronic Devices Lab.	0	0	2	2	1
8.	EC392	Digital System Design Lab.	0	0	2	2	1
9.	ES-CS391	Data Structure Lab(ES)	0	0	2	2	1
Total Practical						6	3
Total Credits						24	21
C. Non Credit Course							
	MC381	Environmental Science	0	0	2	2	0

**2ndYear: 4th Semester**

A. Theory							
Sl No	Field	Theory	Contact Hours/week				Credit Points
			L	T	P	Total	
1.	EC401	Analog Communication	3	0	0	3	3
2.	EC402	Analog Electronic Circuits	3	0	0	3	3
3.	EC403	Microprocessor & Microcontrollers	3	0	0	3	3
4.	ES-CS401	Design and Analysis of Algorithm(ES)	3	0	0	3	3
5.	BS-M401	Numerical Methods(BS)	2	0	0	2	2
6.	BS-B401	Biology for Engineers	2	1	0	3	3
Total Theory						14	17
B. Practical							
7.	EC491	Analog Communication Lab	0	0	2	2	1
8.	EC492	Analog Electronic Circuits Lab.	0	0	2	2	1
9.	EC493	Microprocessor & Microcontrollers Lab	0	0	2	2	1
10.	BS-M(CS)491	Numerical Methods Lab	0	0	2	2	1
11.	HS-HU481	Soft Skill Development Lab	0	0	2	2	1
Total Practical						10	5
Total Credits						24	22



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MC381	Environmental Science	0L:0T: 2P	0 credits
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**Purpose:** We as human being are not an entity separate from the environment around us rather we are a constituent seamlessly integrated and co-exist with the environment around us. We are not an entity so separate from the environment that we can think of mastering and controlling it rather we must understand that each and every action of ours reflects on the environment and vice versa. Ancient wisdom drawn from Vedas about environment and its sustenance reflects these ethos. There is a direct application of this wisdom even in modern times.

Idea of an activity based course on environment protection is to sensitize the students on the above issues through following two type of activities.

**(a) Awareness Activities:**

- i) Small group meetings about water management, promotion of recycle use, generation of less waste, avoiding electricity waste
- ii) Slogan making event
- iii) Poster making event
- iv) Cycle rally
- v) Lectures from experts

**(b) Actual Activities:**

- i) Plantation
- ii) Gifting a tree to see its full growth
- iii) Cleanliness drive
- iv) Drive for segregation of waste
- v) To live some big environmentalist for a week or so to understand his work
- vi) To work in kitchen garden for mess
- vii) To know about the different varieties of plants
- viii) Shutting down the fans and ACs of the campus for an hour or so

**Assessment:**

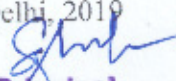
1. Attendance: 15
2. Assignment: 15
3. Posters : 15
4. Participation in events: 25
5. Assesment by Teacher: 40

**Grading: >90% : O**

- 80-90%: E
- 70-80%: A
- 60-70%: B
- 40-60%: C
- Below 40%: D

**Suggested Text/Reference Books**

M.P. Poonia & S.C. Sharma, Environmental Studies, Khanna Publishing House, New Delhi, 2019

  
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<b>Subject Code :</b> MC481	<b>Category:</b> Mandatory courses
<b>Subject Name :</b> Environmental Science	<b>Semester :</b> Fourth
<b>L-T-P : 0-0-2</b>	<b>Credit: 0</b>
<b>Pre-Requisites:</b> No-prerequisite	

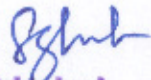
We as human being are not an entity separate from the environment around us rather we are a constituent seamlessly integrated and co-exist with the environment around us. We are not an entity so separate from the environment that we can think of mastering and controlling it rather we must understand that each and every action of ours reflects on the environment and vice versa. Ancient wisdom drawn from Vedas about environment and its sustenance reflects these ethos. There is a direct application of this wisdom even in modern times. Idea of an activity based course on environment protection is to sensitize the students on the above issues through following two types of activities.

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<b>BS-B401</b>	<b>Biology for Engineers</b>	<b>2L:1T:0P</b>	<b>3 credits</b>
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**Module 1.**

**2 hours**

**Introduction**

**Purpose:** To convey that Biology is as important a scientific discipline as Mathematics, Physics and Chemistry

Bring out the fundamental differences between science and engineering by drawing a comparison between eye and camera, Bird flying and aircraft. Mention the most exciting aspect of biology as an independent scientific discipline. Why we need to study biology? Discuss how biological observations of 18<sup>th</sup> Century that lead to major discoveries. Examples from Brownian motion and the origin of thermodynamics by referring to the original observation of Robert Brown and Julius Mayor. These examples will highlight the fundamental importance of observations in any scientific inquiry.

**Module 2.**

**3 hours**

**Classification**

**Purpose:** To convey that classification *per se* is not what biology is all about. The underlying criterion, such as morphological, biochemical or ecological be highlighted.

Hierarchy of life forms at phenomenological level. A common thread weaves this hierarchy Classification. Discuss classification based on

(a) cellularity- Unicellular or multicellular      (b) ultrastructure- prokaryotes or eucaryotes.  
(c) energy and Carbon utilization      -Autotrophs, heterotrophs, lithotropes (d) Ammonia excretion - aminotelic, uricotelic, ureotelic (e) Habitata- aquatic or terrestrial (e) Molecular taxonomy- three major kingdoms of life. A given organism can come under different category based on classification. Model organisms for the study of biology come from different groups. E.coli, S.cerevisiae, D. Melanogaster, C. elegance, A. Thaliana, M. musculus

**Module 3.**

**4 hours**

**Genetics**

**Purpose:** To convey that "Genetics is to biology what Newton's laws are to Physical Sciences"

Mendel's laws, Concept of segregation and independent assortment. Concept of allele. Gene mapping, Gene interaction, Epistasis. Meiosis and Mitosis be taught as a part of genetics. Emphasis to be give not to the mechanics of cell division nor the phases but how genetic material passes from parent to offspring. Concepts of recessiveness and dominance. Concept of mapping of phenotype to genes. Discuss about the single gene disorders in humans. Discuss the concept of complementation using human genetics.

  
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**Module 4.**

**4 hours**

***Biomolecules***

**Purpose:** To convey that all forms of life has the same building blocks and yet the manifestations are as diverse as one can imagine

Molecules of life. In this context discuss monomeric units and polymeric structures. Discuss about sugars, starch and cellulose. Amino acids and proteins. Nucleotides and DNA/RNA. Two carbon units and lipids.

**Module 5.**

**4 Hours**

***Enzymes***

**Purpose:** To convey that without catalysis life would not have existed on earth

Enzymology: How to monitor enzyme catalyzed reactions. How does an enzyme catalyze reactions. Enzyme classification. Mechanism of enzyme action. Discuss at least two examples. Enzyme kinetics and kinetic parameters. Why should we know these parameters to understand biology? RNA catalysis.

**Module 6.**

**4 hours**

***Information Transfer***

**Purpose:** The molecular basis of coding and decoding genetic information is universal  
Molecular basis of information transfer. DNA as a genetic material. Hierarchy of DNA structure from single stranded to double helix to nucleosomes. Concept of genetic code. Universality and degeneracy of genetic code. Define gene in terms of complementation and recombination.

**Module 7.**

**5 hours**

***Macromolecular analysis***

**Purpose:** How to analyse biological processes at the reductionistic level

Proteins- structure and function. Hierarch in protein structure. Primary secondary, tertiary and quaternary structure. Proteins as enzymes, transporters, receptors and structural elements.

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**Module 8.**

**4 hour**

***Metabolism***

**Purpose:** The fundamental principles of energy transactions are the same in physical and biological world.

Thermodynamics as applied to biological systems. Exothermic and endothermic versus endergonic and exergonic reactions. Concept of  $K_{eq}$  and its relation to standard free energy. Spontaneity. ATP as an energy currency. This should include the breakdown of glucose to  $CO_2 + H_2O$  (Glycolysis and Krebs cycle) and synthesis of glucose from  $CO_2$  and  $H_2O$  (Photosynthesis). Energy yielding and energy consuming reactions. Concept of Energy charge

**Module 9.**

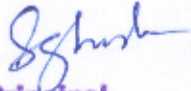
**3 hours**

***Microbiology***

Concept of single celled organisms. Concept of species and strains. Identification and classification of microorganisms. Microscopy. Ecological aspects of single celled organisms. Sterilization and media compositions. Growth kinetics.

**References:**

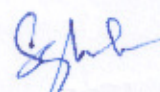
- 1) Biology: A global approach: Campbell, N. A.; Reece, J. B.; Urry, Lisa; Cain, M. L.; Wasserman, S. A.; Minorsky, P. V.; Jackson, R. B. Pearson Education Ltd
- 2) Outlines of Biochemistry. Conn, E.E; Stumpf, P.K; Bruening, G; Doi, R.H., John Wiley and Sons
- 3) Principles of Biochemistry (V Edition), By Nelson, D. L.; and Cox, M. M.W.H, Freeman and Company
- 4) Molecular Genetics (Second edition), Stent, G. S.; and Calender, R.W.H. Freeman and company, Distributed by Satish Kumar Jain for CBS Publisher
- 5) Microbiology, Prescott, L.M J.P. Harley and C.A. Klein 1995. 2nd edition Wm, C. Brown Publishers

  
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**Curriculum Structure**  
**Semester III (Second year)**

Sl. No.	Category	Code	Course Title	Hours per week			Credits
				L	T	P	
<b>Theory</b>							
1	Basic Science courses	CE(BS)301	Biology for Engineers	2	1	0	3
2	Engineering Science Courses	CE(ES)301	Engineering Mechanics	3	1	0	4
3	Engineering Science Courses	CE(ES)302	Energy Science & Engineering	1	1	0	2
4	Basic Science courses	CE(BS)301	Mathematics-III (Transform & Discrete Mathematics)	2	0	0	2
5	Humanities and Social Sciences including Management courses	CE(HS)301	Humanities-I (Effective Technical Communication)	3	0	0	3
6	Humanities and Social Sciences including Management courses	CE(HS)302	Introduction to Civil Engineering	1	1	0	2
<b>Theory credits</b>							<b>16</b>
<b>Practical/ Sessional</b>							
1	Engineering Science Courses	CE(ES)391	Basic Electronics	1	0	2	2
2	Engineering Science Courses	CE(ES)392	Computer-aided Civil Engineering Drawing	1	0	2	2
3	Engineering Science Courses	CE(ES)393	Life Science	1	0	2	2
<b>Practical credits</b>							<b>6</b>
<b>Total credits</b>							<b>22</b>

  
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**Syllabus for B. Tech in Electronics & Communication Engineering**

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**3rd Year: 5th Semester**

A. Theory							
Sl No.	Field	Theory	Contact Hours/week				Credit Points
			L	T	P	Total	
1.	EC501	Electromagnetic Waves	3	0	0	3	3
2.	EC502	Computer Architecture	3	0	0	3	3
3.	EC503	Digital Communication & Stochastic Process	3	1	0	4	3.5
4.	EC504	Digital Signal Processing	3	0	0	3	3
5.	PE-EC505	Program Elective I	3	0	0	3	3
6.	OE-EC506 A/B/C/D	Open Elective I	3	0	0	3	3
Total Theory						19	18.5
B. Practical							
7.	EC591	Electromagnetic Wave Lab	0	0	2	2	1
8.	EC592	Digital Communication Lab.	0	0	2	2	1
9.	EC593	Digital Signal Processing Lab.	0	0	2	2	1
Total Practical						6	3
C. Sessional							
10.	MC-HU581	Effective Technical Communication	0	0	3	3	0
Total Credits						28	21.5

**3<sup>rd</sup> Year: 6th Semester**

**C. Theory**

Sl No	Field	Theory	Contact Hours/week				Credit Points
			L	T	P	Total	
1.	EC601	Control System & Instrumentation	3	0	0	3	3
2.	EC602	Computer Network	3	0	0	3	3
3.	PE-EC603	Program Elective II	3	0	0	3	3
4.	OE-EC604	Open Elective II	3	0	0	3	3
5.	HS-HU601	Economics for Engineers	3	0	0	3	3
Total Theory						15	15
D. Practical							
6.	EC692	Computer Network Lab.	0	0	2	2	1
7.	EC691	Control System and Instrumentation Lab.	0	0	2	2	1
8.	EC681	Mini Project/ Electronic Design Workshop	0	0	4	4	2
Total Practical						8	4
Total Credits						23	19
9	MC681	Universal Human Values	2	0	0	2	0

*Syhadh*

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**Syllabus for B.Tech(Civil Engineering) Up to Third Year**  
Revised Syllabus of B.Tech CE (for the students who were admitted in Academic Session 2010-2011)



<b>MC681</b>	<b>Universal Human Values</b>	<b>2L:0T:0P</b>	<b>0 credits</b>
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**Module 1: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education**

1. Purpose and motivation for the course, recapitulation from Universal Human Values-I
2. Self-Exploration-what is it? - Its content and process; 'Natural Acceptance' and Experiential Validation- as the process for self-exploration
3. Continuous Happiness and Prosperity- A look at basic Human Aspirations
4. Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority
5. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
6. Method to fulfil the above human aspirations: understanding and living in harmony at various levels.

Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking

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

7. Understanding human being as a co-existence of the sentient 'I' and the material 'Body'
8. Understanding the needs of Self ('I') and 'Body' - happiness and physical facility
9. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)
10. Understanding the characteristics and activities of 'I' and harmony in 'I'
11. Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail
12. Programs to ensure Sanyam and Health.

Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one's own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease

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

13. Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship
14. Understanding the meaning of Trust; Difference between intention and competence
15. Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship
16. Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals
17. Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.

Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives

**Module 4: Understanding Harmony in the Nature and Existence - Whole existence as Coexistence**

18. Understanding the harmony in the Nature
19. Interconnectedness and mutual fulfilment among the four orders of nature- recyclability and self-regulation in nature
20. Understanding Existence as Co-existence of mutually interacting units in all-pervasive space
21. Holistic perception of harmony at all levels of existence.

Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.

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

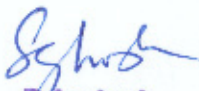
22. Natural acceptance of human values
23. Definitiveness of Ethical Human Conduct
24. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order
25. Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems, c. Ability to identify and develop appropriate technologies and management patterns for above production systems.
26. Case studies of typical holistic technologies, management models and production systems
27. Strategy for transition from the present state to Universal Human Order: a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers b. At the level of society: as mutually enriching institutions and organizations
28. Sum up.

Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions eg. to discuss the conduct as an engineer or scientist etc.

**3. READINGS:**

**3.1 Text Book**

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

  
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(Applicable from the academic session 2018-2019)

**Curriculum Structure**

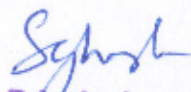
**3<sup>rd</sup> Semester**

**Theory:**

Sl. No.	CODE	Paper	Contact periods Per week			Total Contact Hrs	Credits
			L	T	P		
1	PC-EEE-301	Electric Circuit Theory	3	1	0	4	4
2	PC-EEE-302	Analog Electronics	3	0	0	3	3
3	PC-EEE-303	Electromagnetic field theory	3	0	0	3	3
4	ES-ME-301	Engineering Mechanics	3	0	0	3	3
5	BS-M-301	Mathematics-III	3	0	0	3	3
6	BS-EEE-301	Biology for Engineers	3	0	0	3	3
7	MC-EEE-301	Indian Constitution	3	0	0	3	0
		<b>TOTAL OF SEMESTER:</b>				22	19

**Practical / Sessional:**

Sl. No.	CODE	Paper	Contact periods Per week			Total Contact Hrs	Credits
			L	T	P		
1	PC-EEE-391	Electric Circuit Theory Laboratory	0	0	2	2	1
2	PC-EEE-392	Analog Electronics laboratory	0	0	2	2	1
3	PC-CS-391	Numerical Methods laboratory	0	0	2	2	1
		<b>Total of Practical / Sessional</b>				06	3
		<b>TOTAL OF SEMESTER:</b>				28	22

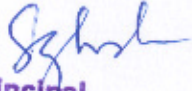
  
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**Syllabus for B.Tech(Civil Engineering) Up to Third Year**  
Revised Syllabus of B.Tech CE (for the students who were admitted in Academic Session 2010-2011)



<b>Name of the course</b>	<b>INDIAN CONSTOTUTION</b>
<b>Course Code: MC-EEE 301</b>	<b>Semester: 3<sup>rd</sup></b>
<b>Duration: 6 months</b>	<b>Maximum Marks: 100</b>
<b>Teaching Scheme</b>	<b>Examination Scheme</b>
Theory: 3 hrs/week	Mid Semester Exam: 15 Marks
Tutorial: 0 hr/week	Assignment & Quiz: 10 Marks
Practical: 0 hrs/week	Attendance: 05 Marks
Credit Points: 0	End Semester Exam: 70 Marks
<b>Objective:</b>	
1.	To have basic knowledge about Indian Constitution.
2.	To understand the structure and functioning of union, state and local self-government.
3.	To understand the structure, jurisdiction and function of Indian judiciary.
<b>Pre-Requisite</b>	
1.	NIL

1	<b>Indian Constitution:</b> Sources and constitutional history, Features: Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy	5	
2	<b>Union government and its administration:</b> Structure of the Indian Union: Federalism, Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha. <b>State government and its administration:</b> Governor: Role and Position, CM and Council of ministers, State Secretariat: Organisation, Structure and Functions	10	
3	<b>Supreme court:</b> Organization of supreme court, procedure of the court, independence of the court, jurisdiction and power of supreme court. <b>High court:</b> Organization of high court, procedure of the court, independence of the court, jurisdiction and power of supreme court. <b>Subordinate courts:</b> constitutional provision, structure and jurisdiction. National legal services authority, Lok adalats, family courts, gram nyayalays. Public interest litigation (PIL): meaning of PIL, features of PIL, scope of PIL, principle of PIL, guidelines for admitting PIL.	10	

  
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4	<b>Local Administration:</b> District's Administration head: Role and Importance. Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation, Pachayati raj: Introduction, PRI: Zila Pachayat, Elected officials and their roles, CEO Zila Pachayat: Position and role, Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy.	10	
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Text books:

1. Indian polity, M, Laxmikanth, MC Graw Hill education, 5<sup>th</sup> Edition.

Reference books

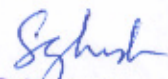
1. DD Basu, " Introduction to the constitution of India", 21<sup>st</sup> Edition, Lexis Nexis Books Publication Ltd, India

Course Outcome: After completion of this course, the learners will be able to

1. describe
  - different features of Indian constitution..
  - power and functioning of Union, state and local self-government.
  - structure, jurisdiction and function of Indian Judiciary.
  - basics of PIL and guideline for admission of PIL.
  - Functioning of local administration starting from block to Municipal Corporation.
2. identify authority to redress a problem in the profession and in the society.

Special Remarks:

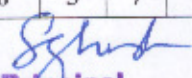
The above mentioned outcomes are not limited. Institute may redefine outcomes based their program educational objective.

  
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**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**BACHELOR OF TECHNOLOGY IN MECHANICAL ENGINEERING**  
(Effective from academic session 2018-19)  
**Curriculum Structure**

Third Year Fifth Semester							
Sl No.	Category	Subject Code	Subject Name	Total No. of contact hours			Credits
				L	T	P	
<b>Theory</b>							
1	Professional Core courses	PC-ME501	Heat Transfer	3	1	0	4
2	Professional Core courses	PC-ME502	Solid Mechanics	3	1	0	4
3	Professional Core courses	PC-ME503	Kinematics & Theory of Machines	3	1	0	4
4	Humanities and Social Sciences including Management courses	HM-HU501	Effective Technical Communication	3	0	0	3
5	Mandatory courses	MC501	Essence of Indian Knowledge Tradition	-	2	-	0
<i>Total Theory</i>				<b>12</b>	<b>5</b>	<b>0</b>	<b>15</b>
<b>Practical/ Sessional</b>							
1	Professional Core courses	PC-ME591	Mechanical Engineering Laboratory I (Thermal)	0	0	3	1.5
2	Professional Core courses	PC-ME592	Machine Drawing-II	0	0	3	1.5
3	Project (Summer internship)	PW-ME581	Project-I (30 hrs. Total)	0	0	2	1
<i>Total Practical</i>				<b>0</b>	<b>0</b>	<b>8</b>	<b>4</b>
<b>Total of Fifth Semester</b>				<b>12</b>	<b>5</b>	<b>8</b>	<b>19</b>

Third Year Sixth Semester							
Sl No.	Category	Subject Code	Subject Name	Total No. of contact hours			Credits
				L	T	P	
<b>Theory</b>							
1	Professional Core courses	PC-ME601	Manufacturing Technology	4	0	0	4
2	Professional Core courses	PC-ME602	Design of Machine Elements	3	1	0	4
3	Professional Elective courses	PE-ME601	Elective-I	3	0	0	3
4	Professional Elective courses	PE-ME602	Elective-II	3	0	0	3
5	Humanities and Social Sciences including Management courses	HM-HU601	Operations Research	3	0	0	3
6	Mandatory courses	MC601	Constitution of India	-	2	-	0
<i>Total Theory</i>				<b>16</b>	<b>3</b>	<b>0</b>	<b>17</b>
<b>Practical/ Sessional</b>							
1	Professional Core courses	PC-ME691	Mechanical Engineering Laboratory II (Design)	0	0	3	1.5
2	Project (or Summer internship)	PW-ME681	Project-II (90 hrs. Total)	0	0	4	2
<i>Total Practical</i>				<b>0</b>	<b>0</b>	<b>7</b>	<b>3.5</b>
<b>Total of Sixth Semester</b>				<b>16</b>	<b>3</b>	<b>7</b>	<b>20.5</b>

  
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**Syllabus for B.Tech(Civil Engineering) Up to Third Year**  
 Revised Syllabus of B.Tech CE (for the students who were admitted in Academic Session 2010-2011)



<b>Subject Code : MC601</b>	<b>Category: Mandatory Courses</b>
<b>Subject Name : Constitution of India</b>	<b>Semester : Sixth</b>
<b>L-T-P : 0-2-0</b>	<b>Credit: 0</b>
<b>Pre-Requisites:</b>	

**Course Objectives:**

The objectives of this course help the students to

1. To provide basic information about Indian constitution.
2. To identify individual role and ethical responsibility towards society.
3. To understand human rights and its implications.

**Course Contents:**

Module No.	Description of Topic	Contact Hrs.
1	Introduction to the Constitution of India, The Making of the Constitution and Salient features of the Constitution. Preamble to the Indian Constitution Fundamental Rights & its limitations.	4
2	Directive Principles of State Policy & Relevance of Directive Principles State Policy Fundamental Duties. Union Executives – President, Prime Minister Parliament Supreme Court of India.	5
4	Special Provision for SC & ST Special Provision for Women, Children & Backward Classes Emergency Provisions. Human Rights –Meaning and Definitions, Legislation Specific Themes in Human Rights-Working of National Human Rights Commission in India Powers and functions of Municipalities, Panchyats and Co - Operative Societies.	5
5	Special Provision for SC & ST Special Provision for Women, Children & Backward Classes Emergency Provisions. Human Rights –Meaning and Definitions, Legislation Specific Themes in Human Rights-Working of National Human Rights Commission in India Powers and functions of Municipalities, Panchyats and Co - Operative Societies.	5

**Course Outcomes:**

On completion of the course student will

1. Have general knowledge and legal literacy and thereby to take up competitive examinations.
2. Understand state and central policies, fundamental duties.
3. Understand Electoral Process, special provisions.
4. Understand powers and functions of Municipalities, Panchayats and Co-operative Societies,

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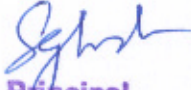
**Syllabus for B.Tech(Civil Engineering) Up to Third Year**  
Revised Syllabus of B.Tech CE (for the students who were admitted in Academic Session 2010-2011)



5. Understand Engineering ethics and responsibilities of Engineers
6. Understand Engineering Integrity & Reliability

**Learning Resources:**

1. D.D. Basu, Introduction to the Constitution on India, 19<sup>th</sup>/ 20<sup>th</sup> Students Edition, Prentice Hall EEE, 2001.
2. C.E. Haries, M.S. Pritchard and M.J. Robins, Engineering Ethics, Thompson Asia, 2003.
3. M.V. Pylee, An Introduction to Constitution of India, Vikas Publishing, 2002.
4. M. Govindarajan, S. Natarajan and V.S. Senthilkumar, Engineering Ethics, Prentice Hall of India Pvt. Ltd., New Delhi, 2004.
5. B.K. Sharma, Introduction to the Constitution of India, PHI Learning, New Delhi, 2011.
6. Latest Publications, Indian Institute of Human Rights, New Delhi.

  
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**Syllabus for B. Tech in Computer Science & Engineering**  
 (Applicable from the academic session 2020-2021)

	courses		Computation/Artificial Intelligence/ Advanced Computer Architecture/ Computer Graphics				
7	Mandatory Courses	MC- CS501A/B	Constitution of India/ Essence of Indian Knowledge Tradition	-	-	-	0
<b>Practical</b>							
8	Professional Core Courses	ESC-591	Software Engineering		0	4	2
9	Professional Core Courses	PCC-CS592	Operating Systems		0	4	2
10	Professional Core Courses	PCC-CS593	Object Oriented Programming		0	4	2
<b>Total credits</b>							<b>24</b>

<b>Semester VI (Third year)</b>							
Sl. No.	Type of course	Code	Course Title	Hours per week			Credits
				L	T	P	
1	Professional Core Courses	PCC-CS601	Database Management Systems	3	0	0	3
2	Professional Core Courses	PCC-CS602	Computer Networks	3	0	0	3
3	Professional Elective courses	PEC-IT601A/B/C/D	(Elective-II) Advanced Algorithms/ Distributed Database Management System/ Signals & Systems / Image Processing	3	0	0	3
4	Professional Elective courses	PEC-IT602A/B/C/D	(Elective-III) Parallel and Distributed Algorithms/ Data Warehousing & Data Mining/Human Computer Interaction/Pattern Recognition	3	0	0	3

**Syllabus for B.Tech(Civil Engineering) Up to Third Year**  
Revised Syllabus of B.Tech.CE (for the students who were admitted in Academic Session 2010-2011)



**Constitution of India**


**Code: MC-CS501**

**Contacts: 3L**

Name of the Course:	<b>Constitution of India</b>
Course Code: MC-CS501	Semester: V
Duration: 6 months	Maximum Marks:100
<b>Teaching Scheme</b>	<b>Examination Scheme</b>
Theory:	Mid Semester exam: 15
Tutorial: NIL	Assignment and Quiz: 10 marks
Practical: NIL	Attendance : 5 marks
Credit Points:	0

Unit	Content	Hrs/Unit	Marks/Unit
1	<b>Introduction:</b> Constitution' meaning of the term,, Indian Constitution: Sources and constitutional history, Features: Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy	3	
2	<b>Union Government and its Administration :</b> Structure of the Indian Union: Federalism, Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha	6	

3.	<b>State Government and its Administration Governor:</b> Role and Position, CM and Council of ministers, State Secretariat: Organisation, Structure and Functions	6	
4.	<b>Local Administration District's Administration head:</b> Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation, Pachayati raj: Introduction, PRI: Zila Pachayat, Elected officials and their roles, CEO Zila Pachayat: Position and role, Block level: Organizational Hierarchy (Different 4.departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy	8	
5.	<b>Election Commission Election Commission:</b> Role and Functioning, Chief Election Commissioner and Election Commissioners, State Election Commission: Role and Functioning, Institute and Bodies for the welfare of SC/ST/OBC and women		

  
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**Syllabus for B.Tech(Civil Engineering) Up to Third Year**  
Revised Syllabus of B.Tech CE (for the students who were admitted in Academic Session 2010-2011)



**Text book and Reference books:**

1. 'Indian Polity' by Laxmikanth
2. 'Indian Administration' by Subhash Kashyap
3. 'Indian Constitution' by D.D. Basu
4. 'Indian Administration' by Avasti and Avasti

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**Syllabus for B. Tech in Civil Engineering**  
(Applicable from the academic session 2018-2019)

**Semester VIII (Fourth year]**

Sl. No.	Category	Code	Course Title	Hours per week			Credits
				L	T	P	
<b>Theory</b>							
1	Humanities and Social Sciences including Management courses	CE(HS)801	Professional Practice, law & Ethics	2	0	0	2
2	Professional Elective Courses	CE(PE)801	Elective VIII	2	0	0	2
3	Open Elective courses	CE(OE)801	Open Elective-III	2	0	0	2
4	Open Elective courses	CE(OE)802	Open Elective-IV	2	0	2	2
<b>Theory credits</b>							<b>8</b>
<b>Practical/ Sessional</b>							
1	Comprehensive Viva Voce	CE(CV)881	Comprehensive Viva Voce				1
2	Project	CE(PROJ)882	Project-2 (Continued from VII)	0	0	10	5
<b>Practical credits</b>							<b>6</b>
<b>Total credits</b>							<b>14</b>

<b>CE(PE)801 (Elective-VIII)</b>		
801A: GIS & Remote Sensing 801B: Rock Mechanics 801C: Environmental laws and Policy 801D: Pavement Materials and Design		
<b>CE(OE)801 (Open Elective-III)</b>	<b>CE(OE)802 (Open Elective-IV)</b>	
A: Human Resource Development and Organizational Behavior <b>B: Bridge Engineering</b> C: Deep Foundations D: Groundwater Contamination	A: Soft Skills and Personality Development B: Earthquake Engineering C: Urban Transport Planning D: Environmental Impact Assessment and Life cycle Analysis	

**TOTAL CREDITS - [38 +(22+23)+(23+18)+(21+15)]=160**


SEM 1 & SEM 2	SEM3	SEM4	SEM5	SEM6	SEM7	SEM8	Total
38	22	23	23	18	21	15	160



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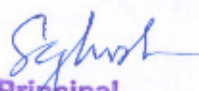
CE(HS)801A	Professional Practice, law & Ethics	2L	2 Credits
Module 1	<p><b>Professional Practice</b> – Respective roles of various stakeholders: Government(constituting regulatory bodies and standardization organizations, prescribing norms to ensure safety of the citizens); Standardization Bodies (ex. BIS, IRC)(formulating standards of practice);professional bodies (ex. Institution of Engineers(India), Indian Roads Congress, IA/COA, ECI, Local Bodies/ Planning Authorities) (certifying professionals and offering platforms for interaction),Clients/ owners (role governed by contracts); Developers (role governed by regulations such asRERA); Consultants (role governed by bodies such as CEAD); Contractors (role governed by contracts and regulatory Acts and Standards); Manufacturers/ Vendors/ Service agencies (rolegoverned by contracts and regulatory Acts and Standards)</p> <p><b>Professional Ethics</b> – Definition of Ethics, Professional Ethics, Business Ethics, Corporate Ethics, Engineering Ethics, Personal Ethics; Code of Ethics as defined in the website of Institution of Engineers (India); Profession, Professionalism, Professional Responsibility, Professional Ethics; Conflict of Interest, Gift Vs Bribery, Environmental breaches, Negligence, Deficiencies in state-of-the-art, Vigil Mechanism, Whistleblowing, protected disclosures.</p>	4L	
Module 2	<p>General Principles of Contracts Management: Indian Contract Act, 1972 and amendments covering General principles of contracting; Contract Formation &amp; Law; Privacy of contract; Various types of contract and their features; Valid &amp; Voidable Contracts; Prime and subcontracts; Joint Ventures &amp; Consortium; Complex contract terminology; Tenders, Request For Proposals, Bids &amp; Proposals; Bid Evaluation; Contract Conditions &amp; Specifications; Critical /"Red Flag" conditions; Contract award &amp; Notice To Proceed; Variations &amp; Changes in Contracts; Differing site conditions; Cost escalation; Delays, Suspensions &amp; Terminations; Time extensions &amp; Force Majeure; Delay Analysis; Liquidated damages &amp; Penalties; Insurance &amp; Taxation; Performance and Excusable Non-performance; Contract documentation; Contract Notices; Wrong practices in contracting (Bid shopping, Bid fixing, Cartels); Reverse auction; Case Studies; Build-Own-Operate &amp; variations; Public- Private Partnerships; International Commercial Terms.</p>	18L	

  
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Module 3:	Arbitration, Conciliation and ADR (Alternative Dispute Resolution) system. Arbitration – meaning, scope and types – distinction between laws of 1940 and 1996; UNCITRAL model law – Arbitration and expert determination; Extent of judicial intervention; International commercial arbitration; Arbitration agreements – essential and kinds, validity, reference and interim measures by court; Arbitration tribunal – appointment, challenge, jurisdiction of arbitral tribunal, powers, grounds of challenge, procedure and court assistance; Award including Form and content, Grounds for setting aside an award, Enforcement, Appeal and Revision; Enforcement of foreign awards – New York and Geneva Convention Awards; Distinction between conciliation, negotiation, mediation and arbitration, confidentiality, resort to judicial proceedings, costs; Dispute Resolution Boards; Lok Adalats.	5L		
Module 4:	Engagement of Labour and Labour & other construction-related Laws: Role of Labour in Civil Engineering; Methods of engaging labour- on rolls, labour sub-contract, piece rate work; Industrial Disputes Act, 1947; Collective bargaining; Industrial Employment ( Standing Orders) Act,1946; Workmen's Compensation Act, 1923; Building & Other Construction Workers (regulation of employment and conditions of service) Act (1996) and Rules (1998); RERA Act 2017, NBC 2017	2L		
Module 5:	Law relating to Intellectual property: Introduction – meaning of intellectual property, main forms of IP, Copyright, Trademarks, Patents and Designs, Secrets; Law relating to Copyright in India including Historical evolution of Copy Rights Act, 1957, Meaning of copyright – computer programs, Ownership of copyrights and assignment, Criteria of infringement, Piracy in Internet – Remedies and procedures in India; Law relating to Patents under Patents Act, 1970 including Concept and historical perspective of patents law in India, Patentable inventions with special reference to biotechnology products, Patent protection for computer programs, Process of obtaining patent – application, examination, opposition and sealing of patents, Patent cooperation treaty and grounds for opposition, Rights and obligations of patentee, Duration of patents – law and policy considerations, Infringement and related remedies.	1L		
Reference	Sl.	Book Name	Author	Publishing House
	1	Legal Aspects of Building and Engineering Contracts	B.S. Patil	
	2	The National Building Code	BIS	
	3	Indian Contract Act	Dutta	Eastern Law House

  
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