DEPARTMENT OF CIVIL ENGIEERING
INDUS INSTITUTE OF TECHNOLOGY & ENGINEERING
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SR NO	CODE	SUBJECTS	TEACHING SCHEME			CREDITS	HOURS	EXAMINATION SCHEME					
								THEORY			PRACT		
								CIE					TOTAL
			L	T	P			MID	IE	ESE	CIE	ESE	
1	SH0101	Differential Calculus & Matrix Algebra	04	02	00	05	06	30	10	60	00	00	100
2	SH0002	Engineering Chemistry	03	00	02	04	05	30	10	60	40	60	200
3	ME0004	Mechanical Workshop	00	00	02	01	02	00	00	00	40	60	100
4	ME0002	Elements of Mechanical Engineering	03	00	02	04	05	30	10	60	40	60	200
5	CE0001	Computer Programming	03	00	02	04	05	30	10	60	40	60	200
6	CV0002	Engineering Mechanics	03	02	00	04	05	30	10	60	00	00	100
7	CV0001	Environmental Science	01	00	02	02	03	30	10	60	40	60	200
8	SH0102	Technical English	01	02	00	02	03	30	10	60	00	00	100
TOTAL			18	06	10	26	34	210	70	420	200	300	1200

ME/CVL/AUTO ENGINEERING, SEMESTER –I TEACHING & EXAMINATION SCHEME WITH EFFECT FROM JULY 2017

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			TEACHING SCHEME					EXAMINATION SCHEME					
ME/CVL/AUTO ENGINEERING, SEMESTER –II TEACHING & EXAMINATION SCHEME WITH EFFECT FROM JULY 2017													
								THEORY			PRACT		
						CREDITS	HOURS	CIE					TOTAL
SR NO	CODE	SUBJECTS	L	T	P			MID	IE	ESE	CIE	ESE	
1	SH0201	Integral Calculus and Linear Algebra	04	02	00	05	06	30	10	60	00	00	100
2	SH0001	Engineering Physics	03	00	02	04	05	30	10	60	40	60	200
3	EL0001	Electrical Workshop	00	00	02	01	02	00	00	00	40	60	100
4	EL0002	Elements of Electrical Engineering	03	00	02	04	05	30	10	60	40	60	200
5	ME0001	Engineering Graphics	01	06	00	04	07	30	10	60	00	00	100
6	EC0001	Basic Electronics	02	00	02	03	04	30	10	60	40	60	200
7	MT0001	Materials Science	03	00	00	03	03	30	10	60	00	00	100
8	SH0202	Business Communication and Presentation Skill	01	02	00	02	03	30	10	60	00	00	100
TOTAL			**17**	**10**	**08**	**26**	**35**	**210**	**70**	**420**	**160**	**240**	**1100**

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SR NO	CODE	SUBJECTS	TEACHING SCHEME			CREDITS	HOURS	EXAMINATION SCHEME					TOTAL
								THEORY			PRACT		
								CIE					
			L	T	P			MID	IE	ESE	CIE	ESE	
1	SH0301	DIFFERENTIAL EQUATIONS AND INTEGRAL TRANSFORMS	3	2	0	4	5	30	10	60	0	0	100
2	CV0301	FLUID MECHANICS–I	3	0	2	4	5	30	10	60	40	60	200
3	CV0302	GEOTECHNIQUES AND APPLIED GEOLOGY	2	0	2	3	4	30	10	60	40	60	200
4	CV0303	BUILDING CONSTRUCTION AND MATERIALS	3	2	0	4	5	30	10	60	0	0	100
5	CV0304	STRENGTH OF MATERIALS	3	2	2	5	7	30	10	60	40	60	200
6	CV0305	SURVEYING–I	3	0	2	4	5	30	10	60	40	60	200
7	SH0307	HUMAN VALUES AND PROFESSIONAL ETHICS	1	0	0	0	1	30	10	60	0	0	100
	TOTAL		18	06	08	24	32	210	70	420	160	240	1100

B-TECH CIVIL ENGINEERING, SEMESTER –III TEACHING & EXAMINATION SCHEME WITH EFFECT FROM JULY 2017

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SR NO	CODE	SUBJECTS	TEACHING SCHEME			CREDITS	HOURS	EXAMINATION SCHEME					TOTAL
B-TECH CIVIL ENGINEERING, SEMESTER –IV TEACHING & EXAMINATION SCHEME WITH EFFECT FROM JULY 2017													
								THEORY			PRACT		
								CIE					
			L	T	P			MID	IE	ESE	CIE	ESE	
1	SH0401	COMPLEX VARIABLES AND NUMERICAL ANALYSIS	3	2	0	4	5	30	10	60	0	0	100
2	CV0401	FLUID MECHANICS–II	3	2	0	4	5	30	10	60	0	0	100
3	CV0402	STRUCTURAL ANALYSIS-I	4	2	0	5	6	30	10	60	0	0	100
4	CV0403	CONCRETE TECHNOLOGY	3	0	2	4	5	30	10	60	40	60	200
5	CV0404	BUILDING AND TOWN PLANNING	3	2	0	4	5	30	10	60	0	0	100
6	CV0405	SURVEYING–II	3	0	2	4	5	30	10	60	40	60	200
7	CE0407	CYBER SECURITY AND INTELLECTUAL PROPERTY RIGHT	1	0	0	0	1	30	10	60	0	0	100
	TOTAL		**20**	**08**	**04**	**25**	**32**	**210**	**70**	**420**	**80**	**120**	**900**

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SR NO	CODE	SUBJECTS	TEACHING SCHEME			CREDITS	HOURS	EXAMINATION SCHEME					
								THEORY			PRACT		TOTAL
								CIE					
			L	T	P			MID	IE	ESE	CIE	ESE	
		B-TECH CIVIL ENGINEERING, SEMESTER –V TEACHING & EXAMINATION SCHEME WITH EFFECT FROM JULY 2017											
1	CV0501	DESIGN OF RC STRUCTURES	4	2	0	5	6	30	10	60	0	0	100
2	CV0502	SOIL MECHANICS	3	0	2	4	5	30	10	60	40	60	200
3	CV0503	HIGHWAY ENGINEERING	3	0	2	4	5	30	10	60	40	60	200
4	CV0504	STRUCTURAL ANALYSIS-II	4	2	0	5	6	30	10	60	0	0	100
5	CV0505	ENGINEERING HYDROLOGY	3	2	0	4	5	30	10	60	0	0	100
6	CV0506	ENVIRONMENTAL ENGG-I	3	0	2	4	5	30	10	60	40	60	200
7	SH0507	TECHNICAL COMMUNICATION AND SOFT SKILL	1	0	0	0	1	30	10	60	0	0	100
		TOTAL	**21**	**06**	**06**	**26**	**33**	**210**	**70**	**420**	**120**	**180**	**1000**

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B-TECH CIVIL ENGINEERING, SEMESTER –VI TEACHING & EXAMINATION SCHEME WITH EFFECT FROM JULY 2017													
SR NO	CODE	SUBJECTS	TEACHING SCHEME			CREDITS	HOURS	EXAMINATION SCHEME					TOTAL
			L	T	P			THEORY			PRACT		
								CIE			CIE	ESE	
								MID	IE	ESE			
1	CV0601	DESIGN OF STEEL STRUCTURES	4	2	0	5	6	30	10	60	0	0	100
2	CV0602	FOUNDATION ENGINEERING	3	0	2	4	5	30	10	60	40	60	200
3	CV0603	ENVIRONMENTAL ENGG-II	3	0	2	4	5	30	10	60	40	60	200
4	CV0604	IRRIGATION AND WATER RESOURCE ENGG	4	2	0	5	6	30	10	60	0	0	100
5	CV0605	ESTIMATING AND COSTING	Elective-I										
	CV0606	BRIDGE ENGINEERING		3	2	0	4	5	30	10	60	0	0	100
	CV0613	MOOC'S											
6	CV0607	GREEN BUILDING & SUSTAINABLE DEVELOPMENT	Elective-II										
	CV0608	TRAFFIC ENGINEERING											
	CV0609	PRESTRESSED CONCRETE		3	2	2	4	5	30	10	60	0	0	100
	CV0610	AIR POLLUTION CONTROL											
	CV0611	SOIL EROSION & CONSERVATION											
	CV0612	GROUND WATER ENGINEERING											

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SR NO	CODE	SUBJECTS	L	T	P	CREDITS	HOURS	MID	IE	ESE	CIE	ESE	TOTAL
7	SH0607	ADVANCED TECHNICAL COMMUNICATION AND SOFT SKILL	1	0	0	0	1	30	10	60	0	0	10
		TOTAL	**21**	**10**	**04**	**27**	**35**	**210**	**70**	**420**	**80**	**120**	**900**

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B-TECH CIVIL ENGINEERING, SEMESTER –VII TEACHING & EXAMINATION SCHEME WITH EFFECT FROM JULY 2017													
SR NO	CODE	SUBJECTS	TEACHING SCHEME			CREDITS	HOURS	EXAMINATION SCHEME					
								THEORY			PRACT		TOTAL
								CIE					
			L	T	P			MID	IE	ESE	CIE	ESE	
1	CV0701	EARTHQUAKE ENGG	3	0	2	4	5	30	10	60	40	60	200
2	CV0702	CONSTRUCTION PROJECT MANAGEMENT	4	2	0	5	6	30	10	60	0	0	100
3	CV0703	PROFESSIONAL PRACTICE AND VALUATION	3	0	0	3	3	30	10	60	0	0	100
4	CV0704	ADVANCED CONSTRUCTION TECHNIQUES & EQUIPMENT	3	2	0	4	5	30	10	60	0	0	100
5	CV0705	RAILWAY BRIDGE AND TUNNEL	3	0	0	3	3	30	10	60	0	0	100
6	CV0706	ENVIRONMENTAL IMPACT ASSESSMENT (EL-III)	3	2	0	4	5	30	10	60	0	0	100
	CV0707	PROJECT PLANNING & QUALITY CONTROL (EL-III)											
	CV0708	CONTRACT MANAGEMENT (EL-III)											
	CV0709	REINFORCED EARTH STRUCTURES & GEOSYNTHESIS (EL-III)											
	CV0710	REMOTE SENSING & GEO-INFORMATICS (EL-III)											

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SR NO	CODE	SUBJECTS										
	CV0711	HYDROPOWER ENGINEERING (EL-III)										
	CV0713	ADVANCED DESIGN OF RCC STRUCTURES (EL-III)										
7	CV0712	DISASTER MANAGEMENT	1	0	0	0	1	30	10	60	0	0	100
		TOTAL	**20**	**06**	**02**	**23**	**28**	**210**	**70**	**420**	**40**	**60**	**800**

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	B-TECH CIVIL ENGINEERING, SEMESTER –VIII TEACHING & EXAMINATION SCHEME WITH EFFECT FROM JULY 2017											
			TEACHING SCHEME			**CREDITS**	**HOURS**	**EXAMINATION SCHEME**				
								THEORY			**PRACT**	
SR NO	**CODE**	**SUBJECTS**	**L**	**T**	**P**			**CIE**				**TOTAL**
								MID	**IE**	**ESE**	**CIE**	**ESE**	
1	CV0801	Project	00	00	40	20	40	00	00	00	40	60	100
		TOTAL	**00**	**00**	**40**	**20**	**40**	**00**	**00**	**00**	**40**	**60**	**100**

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1ST SEMESTER

SR NO	CODE	SUBJECTS	TEACHING SCHEME			CREDITS	HOURS	EXAMINATION SCHEME					
								THEORY			PRACT		
								CIE					
			L	T	P			MID	IE	ESE	CIE	ESE	TOTAL
1	SH0101	Differential Calculus & Matrix Algebra	04	02	00	05	06	30	10	60	00	00	100
2	SH0002	Engineering Chemistry	03	00	02	04	05	30	10	60	40	60	200
3	ME0004	Mechanical Workshop	00	00	02	01	02	00	00	00	40	60	100
4	ME0002	Elements of Mechanical Engineering	03	00	02	04	05	30	10	60	40	60	200
5	CE0001	Computer Programming	03	00	02	04	05	30	10	60	40	60	200
6	CV0002	Engineering Mechanics	03	02	00	04	05	30	10	60	00	00	100
7	CV0001	Environmental Science	01	00	02	02	03	30	10	60	40	60	200
8	SH0102	Technical English	01	02	00	02	03	30	10	60	00	00	100
TOTAL			18	06	10	26	34	210	70	420	200	300	1200

ME/CVL/AUTO ENGINEERING, SEMESTER –I TEACHING & EXAMINATION SCHEME WITH EFFECT FROM JULY 2017

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Subject: **Differential Calculus & Matrix Algebra**								
Program: **B.Tech All Branches**				Subject Code: SH0101			Semester: **I**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
4	2	0	5	60	00	40	00	100

Course Objectives:

1. To provide mathematical knowledge and skills needed to support their concurrent and subsequent engineering studies.
2. To provide an ability to apply knowledge of basic science and engineering fundamentals.
3. To provide an ability to undertake problem identification, formulation and solution.
4. To provide an ability to analyze different mathematical models within science and technology and work creatively, systematically and critically.
5. To provide an ability to find strategies for the solution of different types of mathematical models using knowledge about the possibilities and limitations of the different methods and tools.
6. To provide an ability to develop abstract, logical and critical thinking and the ability to reflect critically upon their work and work of others.
7. To provide an ability to insight their strengths and weakness as learners and to appreciate the value of errors or mistakes as powerful motivators to enhance learning and understanding.

Contents

    UNIT I   **Differential Calculus**   **10 hrs.**

        Derivatives of nth Derivative of some Elementary Functions
        Leibnitz's Theorem
        Taylor's Series and Maclaurin's Series Expansions
        Indeterminate Forms.
        Functions of Several Variables: Limit and Continuity

    UNIT II   **Partial Differentiation and its Applications**

13 hrs.

Partial Differentiation
Variable Treated as Constant, Total Derivative
Partial Differentiation of Composite Functions: Change of Variable-Differentiation of an Implicit Function -Euler's Theorem
Jacobian, Error and Approximations
Taylor's Theorem for Function of two Variables
Maxima and Minima of Functions of two Variables: with and without constraints
Lagrange's Method of Undetermined Multipliers.

UNIT III   Basic of Matrix algebra   13 hrs.

Concepts of Determinants and Matrices, Types of Matrices
Row Echelon and Reduced Row Echelon form
Inverse of a Matrix, Rank of a Matrix, Normal Form
System of Linear Homogeneous Equations
System of Non-Homogeneous Equations, Gaussian Elimination Method

UNIT IV   Vector Differential Calculus   12hrs.

Curvilinear coordinate system, Cartesian, Spherical and Cylindrical coordinate system
Vector Differentiation, Directional Derivative, Gradient of a Scalar Function and Conservative Field
Directional Derivative, Gradient of a Scalar Function and Conservative Field
Divergence and Curl, Related Properties of Gradient, Sums of Divergence and Curl

Subject: **Engineering Chemistry**								
Program: **B.Tech All Branches**				Subject Code: SH0002			Semester: **I/II**	
Teaching Scheme				**Examination Evaluation Scheme**				
				University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)- Theory	Continuous Internal Evaluation (CIE)- Practical	Total
Lecture	**Tutorial**	**Practical**	**Credits**					
3	0	2	4	60	60	40	40	200

Course Outcomes:

1. To study the basic concepts of chemistry & Engineering Applications of Chemistry.

2. To address the principles of general chemistry and specific topics relevant to various engineering disciplines, wherein the students should apply this learning in their respective areas of expertise.

3. To present sound knowledge of chemistry fundamentals.

4. To enrich students to understand the role of Applied Chemistry in the field of science and engineering.

5. To inculcate habit of scientific reasoning to do the task rationally.

6. To develop an ability to identify, formulate & solve chemistry & Engineering related Problems.

7. To provide mathematical knowledge and skills needed to support their concurrent and subsequent engineering studies.

8. Understand the various basic concepts used in engineering and process calculations.

9. Use fundamental chemistry concepts with direct application to the built environment.

10. Solve chemistry problems typically found on the Fundamentals of Engineering exam.

CONTENTS

UNIT I   **(A) Electrochemistry**   **7 hrs.**

Conductance, Cell constant and its determination; Electrochemical Cell, Galvanic Cell, Electrolytic Cell, Types of electrodes, Single electrode potentials, Reference Electrodes, Standard Hydrogen Electrode (SHE), Standard Calomel Electrode (SCE), Quinhydrone Electrode, EMF series, Cell emf measurement, Nernst equation, Conductometric titrations, Numerical.

(B) Corrosion   **6 hrs.**

Definition and types of corrosion, Dry (chemical corrosion), Wet (Electrochemical corrosion) and its mechanisms; Types of electrochemical corrosion, (differential aeration, galvanic, concentration cell, water line, pitting, stress, erosion and soil corrosion, Caustic embrittlement, Factors affecting on corrosion (Metallic and Environmental), Pourbaix diagram, Protective measures to control Corrosion, Sacrificial anode and Cathode process for corrosion control.

UNIT II   **Water Treatment Technology**   **10 hrs.**

Sources of water, Soft Water & Hard Water, Types of hardness, Units of hardness measurement, Impurities in water, Disadvantages of hard water, Determination of water hardness by EDTA method, Alkalinity of water and its significance, Boiler feed water, Scale and sludge formation in boilers and pipes etc , Boiler Corrosion, Water softening through Soda lime process, Zeolite Process & Ion-exchange Process, Characteristics of Potable water, Specifications for drinking water (BIS and WHO standards), Sources and quality of drinking water, Treatment of water for domestic use: Filtration, Coagulation, Sedimentation and Disinfection, Concept of water harvesting, storage and recycling. Desalination through Electro Dialysis & Reverse Osmosis, Numerical problems.

UNIT III   **(A) Dimensions, Units & Energy balances**   **6 hrs.**

Dimensions and Units: Basic chemical calculations – atomic weight, molecular weight, equivalent weight, Mole concept, Inter-conversion of concentration units.
Material Balance without chemical reactions: Flow diagram for material balance, simple material balance with or without recycles or bypass.
Material Balance involves chemical reactions: concept of limiting reactant, conversion, yield, selectivity and liquid phase reaction, gas phase reaction with or without recycle or bypass.

(B) Instrumental Techniques   **6hrs.**

Fundamentals of Spectroscopy; Principles and applications of UV-visible, IR, NMR, Mass & Atomic absorption Spectroscopy; Principles and applications of Chromatographic techniques including TLC, PC, Gas, HPLC.

UNIT IV   **(A) Advance Organic Materials**   **6 hrs.**

Liquid Crystals: Introduction, classification and applications, Organic Electronic Materials: Introduction, types and applications, Chemical Sensors: Introduction, types and applications, Ionic Liquids: Introduction and applications, Chromic Materials: Introduction, types and applications.

(B) Catalysis & Adsorption   **7hrs.**

Catalysis: Types of catalysis, Positive & Negative catalysis, Homogeneous and Heterogeneous catalysis, Characteristics of Catalytic action, Poisoning of catalysis, Promoters, Auto Catalysis, Acid-Base Catalysis, Industrial Applications of Catalysts. Adsorption: Types of adsorption, adsorption isotherm: Freundlich adsorption isotherm, Langmuir adsorption Isotherm, Determination of surface area by BET method, Application of adsorption.

Text Books

1. P.C. Jain, M. Jain, Engineering Chemistry, Dhanpat Rai Publishing Company, New Delhi, **2005**.

2. Shashi Chawla, Textbook of Engineering Chemistry, Dhanpat Rai Publishing Co.**2004**.

Reference Books

1. Dara, S.S., Umare S.S.; A Text Book of Engineering Chemistry (Twelfth edition); S. Chand. Co. 2010.
2. P. Atkins, J.D. Paula, Physical Chemistry, Oxford University Press, **2002**.
3. A. J. Mee, Physical Chemistry, 6th Ed. English Language Book Society and Heinemann Educational Books Ltd. London, **1962**.
4. Douglas A. Skoog, Donald M. West, Fundamentals of Analytical Chemistry, Cengage Learning, Ninth Edition, **2014**.
5. Puri B. R., Sharma L. R. , Pathania M.S; Principles of Physical Chemistry; Vishal Publishing Co. (46nd Edition), **2013**.

6. Arthur E. Morris, Gordon Geiger and H. Alan Fine, Handbook on Material
    & Energy Balance Calculations in Material Processing,Third Edition, **2011**.

Digital Learning Resources & Moocs

1. http://freevideolectures.com/blog/2010/11/130-nptel-iit-online-courses/
2. http://nptel.ac.in/courses/113108051/
3. http://ocw.mit.edu/index.htm
4. https://www.khanacademy.org/

List of Practical:

1. Determination of the alkalinity of unknown water sample.
2. Estimation of hardness of water sample by EDTA method.
3. Estimation of dissolved oxygen in water sample.
4. Determination of metal ions (Ca^{2+}/Zn^{2+}) from the mixture by EDTA titration.
5. Determination of metal ions (Pb^{2+}/Mg^{2+}) from the mixture by EDTA titration.
6. Determination of the concentration of chloride ions in unknown water sample.
7. Thin Layer Chromatography (TLC) and Paper Chromatography (PC).
8. Determination of strength of Acid or Base by pH meter.
9. Determination of strength of Acid or Base by Conductometer.
10. To calculate the Acid value of the given sample of oil.
11. Determination of the saponification value of a given oil sample.
12. Determination of iron content from unknown sample by spectrophotometer.

Text Books:

1. G. H. Jeffery, J. Bassett, J. Mendham, R. C. Denney, Vogel's Textbook of Quantitative
    Chemical Analysis, 5th Edition, Longman Group of Publication, UK, **1989**.
2. Manual on Engineering Chemistry, S.K. Bhasin, S. Rani, Dhanpat Rai Publishing Company,
    New Delhi, 2011.

Subject: **Mechanical Workshop**								
Program: **B.Tech All Branches**				Subject Code: ME0004			Semester: **I/II**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
0	0	2	1	60	00	40	00	100

Content

Unit - I
1. **Introduction**
   Introduction to Mechanical Workshop, Safety, and Safety rules, Safety Slogans, Tools and Equipments used for safety purpose.

Unit- II
2. **Fitting Shop:**
   Introduction, Fitting materials, Tools and Equipments used in Fitting, Fitting Joints.
   1 Job in for practical demonstration

Unit- III
3. **Carpentry Shop:**
   Introduction, Carpentry materials, Tools and Equipments used in Carpentry, Carpentry Joints.
   1 Job in for practical demonstration

Unit- IV
4. **Welding Shop:**
   Introduction, Welding Tools, Equipments and Machines, Various Welding Joints
   1 Job in for practical demonstration

Text Books

1. Workshop Technology Vol. 1 and 2, by Raghuvanshi B.S. Dhanpat Rai & Sons 1998.

Reference Books

1. Mechanical Workshop Practice by K C John, PHI Learning.
2. Workshop Technology by Chapman W.A. J and Arnold E. Viva low priced student edition, 1998.
3. Workshop Practices, H S Bawa, Tata McGraw-Hill, 2009.
4. Workshop Practices and Materials, B J Black, CRC Press

Web Resources
1. www.nptel.ac.in

Subject: **Elements of Mechanical Engineering**								
Program: **B.Tech All Branches**				Subject Code: ME0002			Semester: **I/II**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	0	2	4	60	60	40	40	200

Content

Unit - I

1. **Basic Concepts of Thermodynamics**
   Basic units and dimensional analysis, Intensive and Extensive Properties, Energy, heat, temperature, specific heat capacity, Interchange of heat, change of state, mechanical equivalent of heat, Internal energy, enthalpy, entropy, efficiency, Open and Closed systems, statements of Zeroth Law, First law and its limitations, Second law of Thermodynamics

2. **Properties of Gases**
   Ideal and Real Gases, Gas laws, Boyle's law, combined gas law, gas constant, Internal energy, Relation between C_p and C_v, Enthalpy, Non flow process, constant volume process, Constant pressure process, Isothermal process, Poly-tropic process, Adiabatic process.

Unit- II

3. **Fuels and Lubricants**
   Different types of fuels, their properties and applications. Different types of lubricants, their properties and applications.

4. **Internal Combustion Engines**
   Classifications, Difference between I.C. and E.C. , Otto four-stroke engine, Diesel-four-stroke engine, Difference between Otto cycle and Diesel engine, Two-stroke engines, Difference between two- stroke and four-stroke engines, indicated power (ip), Brake power (bp), Efficiencies.

Unit- III

5. **Properties of Steam**
   Introduction, steam formation, types of steam, enthalpy, specific volume of steam and dryness fraction of steam, Internal energy, steam tables, Measurement of dryness fraction throttling calorimeter, separating calorimeter, Combined calorimeter.

6. **Steam Boilers**
   Introduction, Classification, Simple vertical and horizontal boiler, Boiler details, Boiler performance. Functioning of different mountings and accessories.

Unit- IV

7. **Refrigeration and Air-conditioning**
   Introduction, Refrigerant, Vapor compression & absorption cycles & system, basic applications.

8. **Transmission of Motion and Power**
   Introduction, Couplings methods of drive, power transmission elements, shaft and axle, Belt-drive, pulleys, power transmitted by a belt, Chain drive, Friction drive, Gear drive.

Text Books

1. Basant Agrawal 'Basic mechanical Engineering' Wiley-India, 2008.
2. Shanmugam G and Palanichamy M S, 'Basic Civil and Mechanical Engineering', Tata McGraw Hill publishing Co., New Delhi.

Reference Books
1. Elements of Mechanical Engineering by K.P. Roy and Prof. S.K. Hajra Chaudhary, Media Promoters and publishers Pvt. Ltd. Bombay

2. A Text Book of Elements of Mechanical Engineering by S. M. Bhatt, H. G. Katariya, J. P. Hadiya – Books India Publications, New Delhi
3. Basic & Applied Thermodynamics by P K Nag - Tata McGraw Hill Pvt. Ltd., Mumbai

Web Resources
1. www.nptel.ac.in

Subject: **Computer Programming**			
Program: **B.Tech All Branches**		Subject Code: CE0001	Semester: **I/II**

Teaching Scheme				Examination Evaluation Scheme				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	0	2	4	60	60	40	40	200

Course Outcomes:

1. Identify the parts of the computer system.

2. Adequately explain functioning of computer components.

3. Explain the process of problem solving using computer

4. Design an algorithmic solution for a given problem

5. Write a maintainable C program for a given algorithm.

6. Trace the given C program manually.

Contents:

Unit No	Sub unit	Name of Topic	Hours
		UNIT 1	
1	**1.1**	**Introduction to Programming** What is programming?, Problem solving methods with examples-Algorithm and Flowchart, Types of Programming languages ,Characteristics of higher level language, Some Programming languages	**4**
	1.2	**Introduction to 'C'** Introduction, Importance of C, Sample C programs, Basic structure of C programs, Programming style, executing a C program.	**3**

		Introduction, Character Set, C tokens, Keywords and Identifiers, Constants, Variables, Data types, Declaration of Variables, Defining symbolic constants.	
	1.3	**Operators and Expression:** Introduction, Arithmetic of Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Bitwise Operators, Special Operators, Arithmetic Expressions, Evaluation of expressions, Precedence of arithmetic operators, Type conversions in expressions, Mathematical function.	4
		UNIT 2	
2	2.1	**Decision Making Statements** Introduction, Decision making with IF statement, Simple IF statement, the IF ELSE statement, Nesting of IF … ELSE statements, The ELSE IF ladder, The switch statement, the turnery (? :) Operator, the GOTO statement,	4
	2.2	**Looping** WHILE statement, the DO statement, The FOR statement, Jumps in loops Break and continue.	5
	2.3	**Array & Handling of Character strings:** Introduction, One-dimensional arrays, Two-dimensional arrays, Initialization of two dimensional arrays, Concept of Multidimensional arrays.	4
		UNIT 3	
3	3.1	**Handling of Character strings:** Introduction, Declaring and initializing string variables, Reading string from terminal, Writing string to screen, Arithmetic operations on characters, Putting string together, String Operations : String Copy, String Compare, String Concatenation and String Length, String Handling functions, Table of strings	5
	3.2	**User-Defined Functions :** Introduction, Need for user-defined functions, Return values and their types, Calling a function, category of functions, No	5

		arguments and no return values, Arguments with return values, Handling of non-integer functions, Nesting of functions, Recursion, Functions with arrays, The scope and Lifetime of variables in functions.	
		UNIT 4	
4	4.1	**Pointers:** Introduction, Understanding pointers, Accessing the address of variable, Declaring and initializing pointers, Accessing a variable through its pointer, Pointer expressions, Pointer increments and scale factor, Pointers and arrays, Pointers and character strings, Pointers and Functions, Pointers and structures	5
	4.2	**Structures and Unions:** Introduction, Structure definition, Giving values to members, Structure initialization, Comparison of structures, Arrays of structures, Arrays within structures, Structures within Structures, Structures and functions, Unions,	2
	4.3	**Introduction to Object Oriented Concepts & Programming** Review of fundamental concepts of Object-oriented programming, Introduction to C++, class and objects, Functions in C++,Constructors & Destructors	4
		TOTAL	**45**

Text Books:

1. Programming in ANSI C, by Balagurusamy, Publisher - Tata McGraw Hill.
2. Object-oriented programming with C++,E.Balagurusamy, 2nd Edition, TMH.

Reference Books:

1. Introduction to C by Reema Thareja, Publisher-Oxford
2. Programming with ANSI and Turbo C, by Ashok N Kamthane, Publisher – Pearson Education.
3. Let us C, by Yashwant Kanitkar, Publisher – BPB Publication

Online Courses:

1. http://nptel.ac.in/courses/106105085/2
2. https://onlinecourses.nptel.ac.in/iitk_cs_101/preview
3. https://onlinecourses.nptel.ac.in/noc15_cs15/preview

Subject: **Engineering Mechanics**								
Program: **B.Tech All Branches**				Subject Code: CV0002			Semester: **I/II**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	0	4	60	00	40	00	100

Course Objectives:

1. To provide fundamental knowledge of Engineering Mechanics.
2. To make students realize the importance of applications of engineering Mechanics in their day to day life.
3. To focus on the applicability aspect of the subject in their respective branch.

Course Outcomes:

1. Students will be able to understand the fundamentals of mechanics.
2. Students should be able to apply the knowledge of Engineering Mechanics to solve complex Problems by making them comprehensible and simple.
3. Students should be able to construct free-body diagrams.
4. To calculate the reactions necessary to ensure static equilibrium.
5. Students will be able to calculate centre of gravity and moment of inertia.
6. Students can analyse the dry surfaces in contact with each other considering friction between Surfaces.
7. Students will be able to determine the parameters of motion for the bodies in motion.

COURSE CONTENTS

UNIT - I   (08 HRS)

Introduction: Beginning and Development of Engineering Mechanics, Fundamental Principles of Mechanics, Idealizations in Mechanics, Branches of Mechanics, Units.

Coplanar Forces: Effect of Force, Characteristics of Force, Principle of Transmissibility of Forces, System of Forces, Resultant Force, Composition of Forces, Methods for Resultant Force, All major Laws of Forces, Principle of Equilibrium, Analytical Method for the Equilibrium of Coplanar Forces, Lami's Theorem.

Non-Coplanar Forces: Moment of a Force, Graphical Representation of Moments, Types of Moments, Varignon's Principle of Moments, Application of Moments, Levers, Types of Levers.

UNIT - II   (12 HRS)

Beams: Types of Loads, Types of Supports, Types of Beams, Analytical Method for Determination of Support Reactions of a Beam (Simply Supported Beam, Cantilever Beam).

Friction: Static Friction, Limiting Friction, Normal Reaction, Angle of Friction, Coefficient of Friction, Laws of Friction, Equilibrium of a Body on a Rough Horizontal Plane, Equilibrium of a Body on a Rough Inclined Plane, Equilibrium of a Body on a Rough Inclined Plane Subjected to a Force Acting Along the Inclined Plane, Equilibrium of a Body on a Rough Inclined Plane Subjected to a Force Acting Horizontally. Ladder & Wedge Friction.

UNIT - III   (13 HRS)

Centre of Gravity: Centroid, Methods for Centre of Gravity, Centre of Gravity by Geometrical Considerations, Axis of Reference, Centre of Gravity of Plane Figures, Centre of Gravity of Symmetrical Sections, Centre of Gravity of Unsymmetrical Sections, Centre of Gravity of Solid Bodies, Pappus Guldinus Theorem.

Moment of Inertia

Moment of Inertia of Plane area, Methods for Moment of Inertia, Moment of Inertia by Integration Method, Moment of Inertia of simple lamina, Parallel and Perpendicular Axis Theorem, Moment of Inertia of Built-up Section.

UNIT IV   (15 HRS)

Graphical Method: Method for the Resultant of two Co- Planar forces, Equilibrium of Coplanar Forces (Force Polygon), Funicular Polygon Method to find Support Reactions, Graphical Method for determination of CG, MI.

Kinematics & Kinetics: Linear Motion, Relative Motion, Rectilinear Motion of Particle, Curvilinear Motion of Particle Newton's Second Law of Motion, Work, Work Done by Force, Energy, Law of Conservation of Energy, Work- Energy Principle, Power, Efficiency.

Mechanical Vibrations: Simple Harmonic Motion, Vibrations, D'alembert's Principle, Classification of Vibration, Damping and Vibration, Derivation of Free Vibration without Damping

Text Books:

      1.   R C Hibbler, 'Engineering Mechanics', Pearson Publication.

Reference Books:
1. Ferdinand P. Beer & E. Russell Johnston, "Statics and Dynamics"- McGraw Hill Publication.
2. S. Ramamrutham, 'Engineering Mechanics', Dhanpat Rai Publication.
3. Basudeb Bhattacharya, 'Engineering Mechanics', Oxford University Press.
4. R S Khurmi, 'Engineering Mechanics', S Chand Publication.
5. S B Junnarkar, H J Shah, 'Applied Mechanics', Charotar Publishing House.

Web Resources:

1. http://nptel.ac.in/courses/122102004/
http://textofvideo.nptel.iitm.ac.in/122102004/

Subject: **Environmental Science**								
Program: **B.Tech All Branches**				Subject Code: CV0001			Semester: **I/II**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
1	0	2	2	24/60	24/60	16/40	16/40	200

Course Objectives:

1. To make students understand the importance of Environment in their day to day life.

2. To make students familiar with environmental Bio-diversity and related concepts.

3. Also to make students familiar with environmental legislations.

Course Outcomes:

1. Students will be able to understand the studies and importance related to environmental problems.

2. Students will be able to understand the legal procedures pertaining to environmental legislations

3. Students should be able to apply the knowledge gained in their respective branches of engineering & technology.

Course Contents:

UNIT I   **(04 HRS)**

Concepts of Environmental Sciences: Environment, Levels of organizations in environment, Structure and functions in an ecosystem; Biosphere, its Origin and distribution on land, in water and in air, Broad nature of chemical composition of plants and animals, Natural Resources: Renewable and Non-renewable Resources, Forests, water, minerals, Food and land (with example of one case study); Energy, Growing energy needs, energy sources (conventional and alternatives)

UNIT II   **(05 HRS)**

Biodiversity and its conservation: Biodiversity at global, national and local levels; India as a mega-diversity nation; Threats to biodiversity (biotic, abiotic stresses), and strategies for conservation. Environmental Pollution: Types of pollution- Air, water (including urban, rural, marine), soil, noise, thermal, nuclear; Pollution prevention; Management of pollution- Rural/Urban/Industrial waste management [with case study of any one type, e.g., power (thermal/nuclear), fertilizer, tannin, leather, chemical, sugar], Solid/Liquid waste management, disaster management.

UNIT III   (04 HRS)

Environmental Biotechnology: Biotechnology for environmental protection- Biological indicators, bio-sensors; Remedial measures- Bio-remediation, phytoremediation, bio-pesticides, bio-fertilizers; Bio-reactors- Design and application. Social Issues and Environment: Problems relating to urban environment- Population pressure, water scarcity, industrialization; remedial measures; Climate change- Reasons, effects (global warming, ozone layer depletion, acid rain) with case studies.

UNIT IV   (05 HRS)

Legal issues- Environmental legislation (Acts and issues involved), Environmental ethics. Environmental Monitoring: Monitoring- Identification of environmental problem, tools for monitoring (remote sensing, GIS); Sampling strategies- Air, water, soil Sampling techniques.

Text Books:

1. R C Hibbler, 'Engineering Mechanics', Pearson Publication.

Reference Books:
1. Ferdinand P. Beer & E. Russell Johnston, "Statics and Dynamics"- McGraw Hill Publication.
2. S. Ramamrutham, 'Engineering Mechanics', Dhanpat Rai Publication.
3. Basudeb Bhattacharya, 'Engineering Mechanics', Oxford University Press.
4. R S Khurmi, 'Engineering Mechanics', S Chand Publication.
5. S B Junnarkar, H J Shah, 'Applied Mechanics', Charotar Publishing House.

Web Resources:
1. http://nptel.ac.in/courses/122102004/
2. http://textofvideo.nptel.iitm.ac.in/122102004/

List of Practicals:
1. Plotting of bio geographical zones and expanse of territorial waters on the map of India.
2. Identification of biological resources (minimum 20) (plants, animals, birds) at a specific locations.

3. Determination of:
   (i) pH value
   (ii) Water holding capacity
   (iii) Electrical conductivity of different types of soils.
4. Determination of energy content of plants by bomb calorimeter.
5. Measurement and classification of noise pollution.
6. Determination of particulate matter from an industrial area by high volume sampler.
7. Determination of ico-chemical parameters (Alkalinity, Acidity) of tap water well water, rural water supply industrial effluent and sea water & potability issues.
8. Determination of ico-chemical parameters (Salinity, COD, BOD) of tap water well water, rural water supply industrial effluent and sea water & potability issues.
9. Demonstration of Remote Sensing and GIS methods.
10. Understanding Environmental Biotechnology Processes.

Subject: **Technical English**								
Program: **B.Tech All Branches**				Subject Code: SH0102			Semester: **I**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
1	2	0	2	60	00	40	00	100

Course Objectives:

1. To help students develop comprehension and soft skills

2. To increase student's ability to improve and utilize the technical skills necessary for reading and writing.

3. To improve students' communication skills in both technical and professional contexts.

Course Content:

Unit 1:
Language Focus Vocabulary
Technical vocabulary, Synonyms and Antonyms, Idiom & Proverbs, One Word Substitutes, Phrasal Verbs, Collocations.

Unit 2:
Language Focus Grammar (Rules & Exception)

Sub-Verb-Agreement, Tenses, Numerical adjectives, Conjunction and Preposition clauses, Noun and adjective clauses, Relative clauses, Imperative and infinitive structures, Question pattern, Auxiliary verbs (Yes or No questions), Contrasted time structures, Adverbial clauses of time, place and manner, Intensifiers, Basic pattern of sentences(Simple, Complex, Compound Construction).

Unit 3:
Listening
Listening to lectures, seminars, workshops, TED Talks, Writing a brief summary or answering questions on the material listened.

Unit 4:
Speaking
Phonetics (Pronunciation, stress and intonation), Role Play Activity, Group Discussion & Debate (Acceptance & Arguing each other's view points), Verbal & Non-Verbal Communication.

Reference Books:

1. English for Engineers and Technologists, Volumes 1 and 2, Department of Humanities and Social Sciences, Anna University, Chennai, Orient Longmans Publication, 2008.

1. Balasubramanyam, M and Anbalagan, G., Perform in English, Anuradha Publications, Kumbakonam, 2010.
2. Meenakshi Raman and Sangeetha Sharma, Technical Communication: Principles and Practice, Oxford University Press, New Delhi, 2004.
3. KiranmaiDutt, P. et al., A Course on Communication Skills, Edition Foundation Books, New Delhi, 2007.
4. Ashraf Rizvi, M., Effective Technical Communication, Tata McGraw Hill Publication, New Delhi, 2008.
5. Geoffrey Leech, Jan Swartvik, 'A Communicative Grammar of English', ELBS – Longman.
6. Norman and Lewis, 'English Made Easy', Oxford Publication.
7. E- Writing: 21st –Century Tools for Effective Communication, Dianna Booher, Macmillan India Ltd., 2007, ISBN – 1403-93202-6
8. R. K Bansal, spoken English for India (Orient Longman, Madras, 1972.

Web resources/ MOOCs:

1. Grammar Clauses: https://www.khanacademy.org/humanities/grammar/syntax-sentences-and-clauses

2. Parts of Speech Conjunctions & Prepositions: https://www.khanacademy.org/humanities/grammar/parts-of-speech-the-preposition-and-the-conjunction
3. Nouns: https://www.khanacademy.org/humanities/grammar/parts-of-speech-the-noun
4. Verbs: https://www.khanacademy.org/humanities/grammar/parts-of-speech-the-verb
5. Pronouns: https://www.khanacademy.org/humanities/grammar/parts-of-speech-the-pronoun
6. Adjectives & Adverbs: https://www.khanacademy.org/humanities/grammar/parts-of-speech-the-modifier
7. Syntax: Conventions of Standard English: https://www.khanacademy.org/humanities/grammar/syntax-conventions-of-standard-english

2ND SEMESTER

SR NO	CODE	SUBJECTS	TEACHING SCHEME			CREDITS	HOURS	EXAMINATION SCHEME					TOTAL
								THEORY			PRACT		
								CIE					
			L	T	P			MID	IE	ESE	CIE	ESE	
1	SH0201	Integral Calculus and Linear Algebra	04	02	00	05	06	30	10	60	00	00	100
2	SH0001	Engineering Physics	03	00	02	04	05	30	10	60	40	60	200
3	EL0001	Electrical Workshop	00	00	02	01	02	00	00	00	40	60	100
4	EL0002	Elements of Electrical Engineering	03	00	02	04	05	30	10	60	40	60	200
5	ME0001	Engineering Graphics	01	06	00	04	07	30	10	60	00	00	100
6	EC0001	Basic Electronics	02	00	02	03	04	30	10	60	40	60	200
7	MT0001	Materials Science	03	00	00	03	03	30	10	60	00	00	100
8	SH0202	Business Communication and Presentation Skill	01	02	00	02	03	30	10	60	00	00	100
TOTAL			**17**	**10**	**08**	**26**	**35**	**210**	**70**	**420**	**160**	**240**	**1100**

ME/CVL/AUTO ENGINEERING, SEMESTER –II TEACHING & EXAMINATION SCHEME WITH EFFECT FROM JULY 2017

Approved Vide Agenda Item No. 03 of Minutes of Meeting of Academic Council held on 11 July 17

Subject: **Integral Calculus and Linear Algebra**								
Program: **B.Tech All Branches**				Subject Code: SH0201			Semester: **II**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
4	2	0	5	60	00	40	00	100

Course Objectives:

1. To provide mathematical knowledge and skills needed to support their concurrent and subsequent engineering studies.

2. To provide an ability to apply knowledge of basic science and engineering fundamentals.

3. To provide an ability to undertake problem identification, formulation and solution.

4. To provide an ability to analyze different mathematical models within science and technology and work creatively, systematically and critically.

5. To provide an ability to find strategies for the solution of different types of mathematical models using knowledge about the possibilities and limitations of the different methods and tools.

6. To provide an ability to develop abstract, logical and critical thinking and the ability to reflect critically upon their work and work of others.

7. To provide an ability to insight their strengths and weakness as learners and to appreciate the value of errors or mistakes as powerful motivators to enhance learning and understanding.

CONTENTS

UNIT I   Infinite Series   8 hrs.

Standard Infinite Series: Geometric Series and Harmonic Series
Tests for Convergence and Divergence

Comparison Test, Cauchy's Integral test, D'alembert's ratio Test, Cauchy's nth Root Test

Alternating Series Leibnitz's Theorem, Absolute Convergence and Conditionally Convergence, Power Series

UNIT II   **Multiple Integration**   **13 hrs.**

Curve Tracing: Curves in Cartesian and Polar Form
Reduction Formulae
Double Integral, Change of order of Integration in Double integral
Change of Variables in Double Integral from Cartesian to polar
Application of Double Integral to find area and volume
Triple Integral

UNIT III   **Linear Algebra**   **14 hrs.**

Eigen Values and Eigen Vectors - Properties of Eigen Values and Eigen Vectors
Cayley-Hamilton Theorem – Diagonalization, Powers of a Matrix
Real Matrices: Symmetric, Skew Symmetric, Orthogonal
Complex Matrices: Hermition, Skew Hermition, Unitary Matrices.

UNIT IV   **Vector Integral Calculus**   **13 hrs.**

Vector Integration: Integration of a Vector Function of a Scalar Argument
Line Integrals: Work Done, Potential, Conservative Field and Area
Introduction to Surface Integrals, Volume Integrals
Green's Theorem in Plane, Stokes' Theorem, Gauss Divergence Theorem

Text Books

1. B.V.RAMANA: "HIGHER ENGINEERING MATHAMATICS", TATA McGraw Hill**.**
2. R K Jain, S R K Iyengar: " Advanced Engineering Mathematics. Third Edition", Narosa Publishing House

Reference Books

1. Erwin Kreyszig: "Advanced Engineering Mathematics (8th Edition) ",Wiley Eastern Ltd., New Delhi.
2. Murray Spiegel : "Advanced Mathematics for Engineering & Science: Schaum's Outline Series" ,Tata - McGraw Hill Publication
3. Dr. B.S. Grewal : "Higher Engineering Mathematics", Khanna Publishers, New Delhi

4. Merel C Potter, J L Goldberg: "Advanced Engineering Mathematics (3rd Edition)"

Web Resources & Moocs

1. http://freevideolectures.com/blog/2010/11/130-nptel-iit-online-courses/
2. http://nptel.ac.in/video.php?subjectId=122107036
3. http://ocw.mit.edu/index.htm
4. https://www.khanacademy.org/

Subject: **Engineering Physics**								
Program: **B.Tech All Branches**				Subject Code: SH0001			Semester: **I/II**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	0	2	4	60	60	40	40	200

Course Objectives:

1. An ability to apply knowledge of basic physics, mathematical foundations and engineering theory in the modeling and design of real-world problems (**fundamental engineering analysis skills).**
2. An ability to design and conduct experiments, as well as to analyze and interpret data **(information retrieval skills).**
3. An ability to analyze a problem , identify and formulate using the concept of physics and to solve engineering problem**(engineering problem solving skills).**
4. Recognition of the need for, and an ability to engage in continuing professional development and life-long learning **(continuing education awareness).**
5. An ability to use current techniques, skills, and tools necessary for Physics and engineering practice **(practical engineering analysis skills).**

Course Content:

UNIT-I   **[12]**

Wave motion and Sound
Propagation of waves, longitudinal and transverse waves, mechanical and non-mechanical waves
Introduction to sound waves, Characteristics and Properties of Sound, Absorption co-efficient,
Reverberation time, Sabine's formula (without derivation), Factors affecting architectural acoustics,
Introduction of Ultrasonic waves, Generation of ultrasonic waves, Detection of ultrasonic waves,
Applications of Ultrasonic waves: NDT, SONAR & others.

Optics
Introduction to Reflection, Refraction and Total Internal Reflection;

Wavefront and Huygen's principle;Interference: Types of interferences, Thin film interference, Newton's rings and its applications

Diffraction of light waves: Types of Diffraction, Single-slit Fraunhoffer diffraction, Plane diffraction grating, Resolving power of grating, Rayleigh Criterion, Optical polarization (Introduction)

UNIT-II   [11]

Quantum Mechanics

Black body radiation: Planck's law (without derivation), Wien's displacement law and Rayleigh – Jeans' law from Planck's theory; Compton effect (Theory and experimental verification), De-Broglie theorem, Uncertainty principle; Schrodinger's wave equation – Time independent and time dependent equations – Physical significance of wave function, Particle in one dimensional rigid box.

Laser

Energy levels in atoms, Absorption, Spontaneous Emission and Stimulated Emission of light, Relation between Einstein's Coefficients, Population Inversion, Metastable State, Pumping Mechanism, Optical Resonators, Fundamentals of LASER, Characteristics of Laser radiation
Types of Laser: Solid State Laser (Nd-YAG laser), Gas laser (He-Ne laser), Applications of Laser: Medical, Industrial, Holography (introduction).

UNIT-III   [12]

Electromagnetism & Dielectrics

Coulomb's law for distribution of charges, Gauss's law and applications, Electric current and Equation of continuity, Electric field intensity, Electric flux, Electric dipole moment, Electric field due to dipole, Introduction to dielectrics, Polarizability, Types of polarization – electronic, ionic, orientational, Polarization of dielectrics, Gauss's law in presence of dielectric, Dielectric constant, Electric susceptibility and Permittivity, Internal (Local) field in dielectric, ClausiusMossotti equation (with derivation)

Magnetic field, Steady current, Biot-Savart law, Ampere's law and applications, Faradays law of Induction, Lenz's Law; Effect of magnetic field on current carrying conductor, Lorentz force

Magnetism

Basic important terms and units in Magnetism, Concept and origin of magnetic moment, magnetic susceptibility, Total angular momentum, Diamagnetism, Paramagnetism, Ferromangnetism, Ferrimagnetism, Antiferromagnetism, Domain theory of Ferromagnetism, Curie temperature and hysteresis loss

UNIT-IV   [10]

Superconductivity

Superconductivity: Zero resistance, Critical temperature, Meissner effect, Critical field, General properties of superconductors**,** Type-I and Type-II superconductors, BCS theory of Superconductor, High temperature superconductors
Applications of Superconductors: SQUID, Maglev

Nanophysics

Nanoscale, Surface to volume ratio, Surface effects on nanomaterials, Quantum size effect, Electron confinement, Nanoparticles and Nanomaterials, Properties of Nanomaterials
Advantages & Disadvantages of Nanomaterials**,**
Synthesis of nanomaterials: Laser ablation, ball milling, chemical vapor deposition, sol gel, Carbon nanotubes: structure, synthesis, properties and applications, Applications of Nanomaterials.

Text Books:

1. Engineering Physics by Rajendran (Tata Mc Graw Hill)
2. Engineering Physics by D.K. Bhattacharya, Poonam Tandon (Oxford University Press)

Reference Books:

1. Resnick and Haliday, Physics Part-I & II, Wiley Eastern publication
2. Engineering Physics by P. Khare&Swarup (Jones & Bartlett Learning)
3. A textbook of Engineering Physics by S.O. Pillai (New Age International)
4. An introduction to Electrodynamics by David Griffiths (Pearson Education)
5. Optics by A. Ghatak (Tata McGraw-Hill)
6. Engineering Electromagnetics by W H Hayt& J A Buck (Tata McGraw-Hill)
7. Engineering Physics by K. Rajagopal (Prentice Hall India)
8. Engineering Physics by M. N. Avadhanulu, P. G. Khirsagar (S.Chand Pub.)

Web resources:

1. http://www.nptel.iitm.ac.in/courses/Webcourse-contents/IIT%20Guwahati/engg_physics/index_cont.htm
2. http://ncert.nic.in/html/learning_basket.htm
3. http://science.howstuffworks.com/laser1.htm
4. http://physics-animations.com/Physics/English/optics.htm
5. http://www.epsrc.ac.uk

Approved Vide Agenda Item No. 03 of Minutes of Meeting of Academic Council held on 11 July 17

6. http://www.pitt.edu/~poole/physics.html#light
7. https://www.khanacademy.org/science/physics

MOOCs:

https://www.edx.org/course/subject/physics

List of Experiments:

1 <u>Photocell:</u> To verify the inverse square law using photocell.

2 <u>Ultrasonic Interferometer:</u> To determine the wavelength and velocity of ultrasonic wave through ultrasonic interferometer.

3 <u>Determination of Refractive index</u>: To determine the refractive index of a given material (prism) using spectrometer.

4 <u>Resolving power of grating</u>: To determine resolving power of a diffraction grating.

5 <u>Newton's Ring:</u> To determine the wavelength of monochromatic light

6 <u>Planck's Constant :</u> To determine the Planck's Constant using LED

7 <u>Determination of Wavelength of Laser:</u> To determine the wavelength of LASER using diffraction grating.

8 <u>Determination of wavelength of laser using single slit</u>

9 <u>Dielectric constant:</u> To determine the dielectric constant of a dielectric substance.

10 <u>Hysteresis loss:</u> To determine the Hysteresis loss in a Ferromagnetic material.

11 <u>To determine the magnetic field at the center of a coil and its variation with distance and radius of the coil.</u>

12 <u>To verify the Faraday's law of electromagnetic induction.</u>

Text Books

1. B.V.RAMANA: "HIGHER ENGINEERING MATHAMATICS", TATA McGraw Hill**.**
2. R K Jain, S R K Iyengar: " Advanced Engineering Mathematics. Third Edition", Narosa Publishing House

Reference Books

1. Erwin Kreyszig: "Advanced Engineering Mathematics (8th Edition) ",Wiley Eastern Ltd., New Delhi.
2. Dr. B.S. Grewal : "Higher Engineering Mathematics", Khanna Publishers, New Delhi
3. Murray Spiegel : "Advanced Mathematics for Engineering & Science: Schaum's Outline Series" ,Tata - McGraw Hill Publication
4. Merel C Potter, J L Goldberg: "Advanced Engineering Mathematics (3rd Edition)"Oxford India Publication.

Digital Learning Resources & Moocs

1. http://freevideolectures.com/blog/2010/11/130-nptel-iit-online-courses/
2. http://nptel.ac.in/video.php?subjectId=122107036
3. http://ocw.mit.edu/index.htm
4. https://www.khanacademy.org/

Subject: **Electrical Workshop**			
Program: **B.Tech All Branches**	Subject Code: EL0001		Semester: **I/II**

Teaching Scheme				Examination Evaluation Scheme				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
0	0	2	1	00	60	00	40	100

Course Objectives:

After completion of this course, expected outcomes from the students:

1. **Fundamental Engineering Analysis Skill**: Ability to apply knowledge of Electrical Engineering.
2. **Information Retrieval Skills:** Ability to design electrical circuits and conduct experiments with electrical engineering as well as to analyze and interpret data.
3. **Practical Engineering Analysis Skills:** Ability to acquire new knowledge to use modern engineering tools and equipments to analyze problems necessary for engineering practice. Knowledge of basic electrical and electronic device.

LIST OF EXPERIMENTS

Exp. No.	Title	Learning Outcome
1	Introduction to symbols and abbreviations used in electrical engineering.	• Basic knowledge of symbols and abbreviations that are used in electrical engineering
2	Introduction to IE rules.	• Understanding of safety rules • Safety precautions to be taken in the laboratory
3	Identify different types of cables/wires, switches, fuses, MCB, ELCB, MCCB with their ratings and usage.	• To understand basic working principle of different protective devices

		• To recognize the practical applications of these protective devices by their demonstration
4	Performance of Electric shock phenomena, precautions, preventions, earthing.	• To identify the importance of earthing in electric network. • To understand, how earthing works
5	Measuring instruments like Ammeter, Voltmeter, Wattmeter, Watt-hour Meter, and Megger with their description and usage.	• To get familiar with different measuring devices • To understand the working principle on which these devices work
6	To measure earthing resistance using insulation tester (Megger).	• Basic knowledge of earthing resistance • Working principle of insulation tester (megger)
7	Wiring of power distribution arrangement using single phase MCB distribution board with ELCB, Main switch and Energy meter.	• To identify different components used in wiring scheme • Basic knowledge of designing a simple wiring scheme • To identify the principle and working of energy meter
8	Wiring of light/fan circuit using Two way switches (Staircase wiring), Wiring of fluorescent lamps and light sockets (6 A)	• Basic knowledge of staircase wiring • Wiring of fluorescent lamps • Identification of sockets
9	Wiring of backup power supply including inverter, battery and load for domestic installations.	• To have the basic idea of inverter and battery • Basic knowledge of back-up power supply
10	Demonstration and measurement of power consumption of Electric Iron, Mixer Grinder, Single phase pump, exhaust fan or other home appliance.	• To have the knowledge of working of electric iron, mixer grinder and pump • To demonstrate the power consumption by these devices

11	Preparing the drawing for wiring a newly built room, without any electrical wiring along with a bill of materials with specifications; the room may be a class-room, an office, a shop, a clinic, a small workshop etc.	• Exercise for students to make a wiring scheme for any of the given example • To estimate the total cost of appliances, materials and wiring

Subject: **Elements of Electrical Engineering**								
Program: **B.Tech All Branches**				Subject Code: EL0002			Semester: **I/II**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	0	2	4	24/60	24/60	16/40	16/40	200

Course Outcome:

1. **Fundamental Engineering Analysis Skill**: Ability to apply knowledge of Electrical Engineering.

2. **Information Retrieval Skills:** Ability to design electrical circuits and conduct experiments with electrical engineering as well as to analyze and interpret data.

3. **Engineering Problem Solving Skills:** Ability to identify, formulate and solve engineering problems.

4. **Practical Engineering Analysis Skills:** Ability to acquire new knowledge to use modern engineering tools and equipment's to analyze problems necessary for engineering practice.

Contents:

UNIT-I [07]

DC Circuits

Elementary Concepts:

Ohm's Law and Kirchhoff's Laws, Analysis of series, parallel and series-parallel circuits; Star–Delta conversion; Nodal analysis, Mesh analysis, voltage sources and current sources, Super position theorem, Thevenin's theorem, Norton's theorem, Equvalence of thevenin's and norton's theorem, Maximum power transfer theorem.

UNIT-II [12]

Electrostatics:

Electric charge and Laws of electrostatic, Capacitor; Capacitor in series and parallel, variable capacitor, Instantaneous voltage and current in capacitor, charging and discharging of capacitor, Energy stored in a capacitor, types of capacitor.

Magnetic Circuit:

Magneto motive force, magnetic field strength, reluctance, Relation between magnetic circuit parameter, Laws of magnetic circuit, composite magnetic circuit: series magnetic circuit, parallel magnetic circuit, comparison of Electric and magnetic circuit, Effect of magnetic field on current carrying conductor; Statically and dynamically induced EMF; Concepts of self inductance, mutual inductance, energy stored in inductor, coefficient of coupling; Inductance in series and parallel; Hysteresis and Eddy current losses.

UNIT-III [16]

Single Phase A.C. Circuits:

Generation of sinusoidal voltage, Definition of average value, root mean square value, form factor and peak factor; Phasor representation of alternating quantities; Analysis with phasor diagrams of R, L, C, R-L, R-C and R-L-C circuits; Concepts of Real power, Reactive power, Apparent power and Power factor, methods to improve power factor, Series, Parallel and Series - Parallel circuits; Power in AC circuit, Resonance in series and parallel circuits.

Three Phase A.C. Circuits:

Necessity and Advantages of three phase systems, Generation of three phase power, definition of Phase sequence, balanced supply and balanced load; Relationship between line and phase values of balanced star and delta connections; Power in balanced three phase circuits, measurement of power by two wattmeter method; Work, Power, Energy, Problems

UNIT-IV [13]

Transformers: Principle of operation and construction of single phase transformers (core and shell types). EMF equation, losses, efficiency.

DC Machines: Working principle of DC machine as a generator and a motor; DC series motor, DC shunt motor, DC compound motor constructional features.

Induction Motor: Concept of rotating magnetic field; Principle of operation, types and constructional features, slip and its significance.

Text Books:

1. A. Chakrabarti, "Basic Electrical Engineering", Tata McGraw Hill
2. A.E Fitzgerald, David E. Higginbotham, Arvin Grabel, "Basic Electrical Engineering", 5th Edition, Tata McGraw Hill.

Reference Books:

1. Vincent Del. Toro (2012), "Principles of Electrical Engineering", Prentice Hall, India
2. Electrical Estimating & Costing by Surjit Singh (Dhanpat Rai & sons).
3. J.N. Swamy, "Elements of Electrical Engineering" Mahajan Publishing House.
4. Nagrath I.J. and D. P. Kothari (2001), "Basic Electrical Engineering", Tata McGraw Hill.
5. Rajendra Prasad (2009), "Fundamentals of Electrical Engineering", Prentice Hall, India

Web Resources:

1. www.nptel.ac.in
2. www.youtube.com

Subject: **Engineering Graphics**								
Program: **B.Tech All Branches**				Subject Code: ME0001			Semester: **I/II**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
1	6	0	4	24/60	00	16/40	00	100

Content:

Unit - I

1. **Introduction to engineering graphics**
   Principles of Engineering Graphics and their Significance – Drawing Instruments and their Use – Conventions in Drawing – Lettering – BIS Conventions- Dimensioning systems – polygons-types of lines

2. **Engineering curves**
   Classification and application of Engineering Curves, Construction of different methods of Ellipse, parabola and Hyperbola, construction of Conics, Cycloid Curves – Cycloid, Hypocycloid, Epicycloids, Involutes and Spirals.

Unit- II

3. **Projections of Points and Lines**
   Introduction to principal planes of projections, Projections of the points located in same quadrant and different quadrants, Projections of line with its inclination to one reference plane and with two reference planes. True length and inclination with the reference planes.

4. **Projections of Planes**
   Projections of planes (polygons, circle, and ellipse) with its inclination to one reference plane and with two reference planes, Concept of auxiliary plane method for projections of the plane.

Unit- III

5. **Projections of Solids**
   Classification of solids. Projections of solids (Cylinder, Cone, Pyramid, Prism) along with frustum of cone and pyramid with their inclinations to one reference plane and with two reference planes.

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Unit- IV

6. **Orthographic And Sectional Orthographic Projections**
   Fundamental of projection along with classification, Projections from the pictorial view of the object on the principal planes for view from front, top and sides using first angle projection method and third angle projection method, introduction of section of objects, full sectional view.

7. **Isometric Projections**
   Isometric Scale, Conversion of orthographic views into isometric projection, isometric view or drawing.

Text Books

1. P.J. Shah, "A Text Book of Engineering Graphics"   Publication: S.Chand.
2. A Text Book of Machine Drawing By P. J. Shah S.Chand & Company Ltd., New Delhi

Reference Books

1. N.D.Bhatt , "Elementary Engineering Drawing", Charotar Publishing House, Anand

2. P.D.Patel, " Engineering Graphics" Publication: Mahajan

3. A text book of Engineering Drawing by R.K.Dhawan, S.Chand &Company Ltd., New Delhi

4. A text book of Engineering Drawing by P.S.Gill, S.K.Kataria & sons, Delhi

Web Resources
1. www.nptel.ac.in

Subject: **Basic Electronics**								
Program: **B.Tech All Branches**				Subject Code: EC0001			Semester: **I/II**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
2	0	2	3	24/60	24/60	16/40	16/40	200

Course Outcome:

After completion of the course, the student will be able to –

1. Recognize basic electronic components and devices used for different electronic functions
2. Explain the concepts of semiconductor physics
3. Design and test basic electronic circuits using active components
4. Solve basic problems in simple electronic circuits

Contents

UNIT 1 [10]

Energy Bands in Solids
Charged Particles, Field Intensity, Potential Energy, The eV Unit of Energy, Nature of Atom, Atomic Energy Levels, Electronic Structure of the Elements, Energy distribution of electrons, Fermi-Dirac function, Energy Band Theory of Crystals, Insulators, Semiconductors and Metals

Transport Phenomena in Semiconductors
Mobility and Conductivity, Electrons and Holes in an Intrinsic Semiconductor, Donor and Acc in a Semiconductor, Electrical properties of Ge and Si, Hall Effect, Conductivity Modulatio of Charges, Diffusion, The Continuity Equation, Injected Minority–Carrier Charge, Pot Semiconductor,

UNIT 2 [10]

Junction –Diode Characteristics: Open circuit p-n Junction, p-n Junction as a Rectifier, Current Components in a p-n diode, Volt-Ampere Characteristic, Temperature Dependence of the V/I Characteristic, Diode Resistance, Space Charge, Transition Capacitance, Charge-Control Description of a Diode, Diffusion Capacitance, Junction Diode Switching Times, Breakdown Diodes, Tunnel Diode, Semiconductor Photodiode, Photovoltaic Effect, Light – Emitting Diodes, Schottky diode, varactor diode, GUNN diode, SCR

Diode Circuits:

Diode as a Circuit Element, Load-Line Concept, Piecewise Linear Diode Model, Clipping Circuits, Clipping at Two Independent Levels, Comparators, Sampling Gate, Rectifiers, Other Full-Wave Circuits, Capacitor Filters, Additional Diode Circuits

UNIT 3   [5]

Transistor Characteristics:
Junction Transistor, Transistor Current Components, Transistor as an Amplifier, CB Configuration, CE Configuration, CC Configuration, Analytical Expressions for Transistor Characteristics Maximum Voltage Rating, Phototransistor, Transistor biasing.

UNIT4   [7]

Field Effect Transistors:
Junction FET, JFET Volt-Ampere Characteristics, MOSFET

Operational Amplifiers:
Introduction to Op Amps, Inverting Amplifier, Non-inverting amplifier, Op Amp applications

Introduction to Data converters:
ADC & DAC

Introduction to Microprocessors and Microcontrollers:
Basic digital ICs, Architecture of processors and controllers

Text book

1. 'Integrated Electronics' By J. Millman and C. C. Halkias, Chetan Parikh, 2nd Ed., Tata McGraw Hill Publication

Reference Books

1. 'Electronic Principles' by Albert Malvino and David Bates, 7th Ed., Tata McGraw Hill Publication
2. 'Electronic Devices and Circuit Theory' by Robert Boylestad and Louis Nashelsky, 9th Ed., Prentice Hall India
3. "Digital Electronics" by Morris Mano, 2006

List of Experiments

1. To plot VI characteristics of PN junction diode

2. To plot VI characteristics of Zener diode

3. To plot VI characteristics of Tunnel diode

4. To measure ripple factor of a rectifier

5. Build and test wave shaping circuits

6. To plot input and output VI characteristics of CB configuration using BJT

7. To plot input and output VI characteristics of CE configuration using BJT

8. To plot input and output VI characteristics of CC configuration using BJT

9. To plot drain and transfer characteristics of a JFET

10. To build and test inverting and non-inverting amplifier

11. To build an LED driver circuit and test

12. To build and test an integrator and differentiator with Op Amp

Subject: **Materials Science**								
Program: **B.Tech All Branches**				Subject Code: MT0001			Semester: **I/II**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	0	0	3	24/60	00	16/40	00	100

1. Course Outcomes

- Evaluate different materials for engineering applications.
- To categorize material according to their properties and requirement.
- To classify materials and understand the importance of each material in order to find applications in other fields of engineering.

2. Contents

		Time Allotted
Unit 1	Introduction, Engineering requirement of different materials, Classification of Engineering materials, Properties of engineering materials , Criteria for selection of materials for engineering application. Crystal Physics; Structure of crystalline solids; Lattices, unit cells; Indexing of directions and planes, notations, Interplanar spacings and angles, Crystal structure analysis - Bragg's law for X-ray diffraction.	8 hours
Unit 2	Ferrous metals & Alloys- Pig iron, cast iron, carbon steel, alloy steels- Classification, properties, composition and applications. Non-Ferrous Metals & Alloys- Important non-ferrous metals (Al, Cu, Pb, Zn, Sn, Mg, Ti, Ni,), Non-ferrous alloys (Cu alloys, Al alloys, Mg-alloys, Ni-alloys) – Composition, properties, classification and applications.	12 hours
Unit 3	Introduction, Simple crystal structure, Classification- Traditional (clay-products, refractories, abrasives, cement) and Engineering Ceramics- Glass Ceramics, Properties of ceramics, Application of	12 hours

	Ceramics, Glasses, Glass structure, Properties and application of Glass, Types of glass. Introduction, Classification and forms of Polymers, Thermosetting & thermoplastic polymer, types of polymerizations, Molecular weight, Plastics, Natural rubber and synthetic rubber, Applications of polymeric materials.	
Unit 4	Introduction, Classification & Applications, Dispersion-strengthened, Composites, Particulate Composites, Fiber-reinforced Composites: Influence of Fiber Length, Influence of Fiber Orientation and Concentration, The Fiber Phase, The Matrix Phase, Polymer-Matrix. Composites, Metal-Matrix Composites, Ceramic - Matrix Composites, Carbon–Carbon Composites, Processing of Fiber-Reinforced Composites. Smart materials (Shape memory material, Piezo electric material) Photoconductors, Bio-materials, Nano materials, Dielectric materials, magnetic materials, metamaterials, Cryogenics, Optical Fiber.	14 hours

3. Text Book(s)

1) Material Science and Metallurgy by O.P Khanna, Dalpat Rai Publications
2) Engineering Materials by R. K Rajput, S. Chand Publications.
3) Material Science & Engineering – An Introduction by W.D. Callister, John Wiley.

4. Reference Books
1) Introduction to Materials Science for Engineers – James Shackelford, Pearson, Prentice Hall; 8 edition.
2) Elements of Materials Science –by L.H. Vanvlack, Addision-Wisley Series
3) Element s of Metal lurgy by D. Swarup, Rastogi Publication
4) Engineering Materials by S.C. Rangwala and P.S. Rangwala, Charotar publication house Pvt. Ltd.
5) Materials Science and Engineering by Willing F. Smith, TMH publication

5. Web Resources
http://nptel.ac.in/

Subject: **Business Communication and Presentation Skills**								
Program: **B.Tech All Branches**				Subject Code: SH0202			Semester: **II**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
1	2	0	2	60	00	40	00	100

Course Objectives:

1. To orient students about the varied uses of business communication.

2. Under the importance of personality and its reflection in communication.

3. Train students to develop business correspondence in writing and presentation skills.

Course Content:

Unit 1:
Business Communication- **Role of Communication in Information Age**, concept and meaning of communication; skills necessary for technical communication; Communications in a technical organization; Barriers to the process of communication. Style and organization in technical communication covering, Language skills, Objectivity, clarity, precision, and organizational etiquettes as defining features of technical communication.

Unit 2:
Effective Presentation Skills-Oral Presentation and professional speaking, Elements of effective presentation; Planning and preparing a model presentation; organizing the presentation to suit the audience and context; Basics of public speaking and Group Discussion.

Unit 3:
Reading- Intensive reading, Predicting content, Interpretation, Inference from text, skimming & scanning techniques of reading, Critical Interpretation, Editorial of newspapers.

Unit 4:
Writing: Basic Writing skill development & Paragraph development(Unity, coherence, cohesive devices), Letters; Inquiry- reply to inquiry, Complain, request , business letters, Using e-mail for business communication; Language in e-mail.

Reference Books:

1. Fred Luthans, Organizational Behaviour, McGraw Hill
2. Lesikar and petit, Report writing for Business
3. M. Ashraf Rizvi, Effective Technical Communication, McGraw Hill
4. Wallace and masters, Personal Development for Life and Work, Thomson Learning
5. Hartman Lemay, Presentation Success, Thomson Learning
6. Malcolm Goodale, Professional Presentations
7. Farhathullah, T. M. Communication skills for Technical Students
8. Michael Muckian, John Woods, The Business letters Handbook
9. Herta A. Murphy, Effective Business Communication
10. Lehman, Dufrene, Sinha BCOM, Cengage Learning

Web resources/ MOOCs:

1. Business Conversation Rule 1 :https://www.youtube.com/watch?v=wB8mr4iViy0
2. Business English Conversations Rule 2: https://www.youtube.com/watch?v=wB8mr4iViy0
3. Business English Conversations 3: https://www.youtube.com/watch?v=wB8mr4iViy0
4. Business English Conversations Rule 4: https://www.youtube.com/watch?v=wB8mr4iViy0
5. Business English Conversations Rule 5: https://www.youtube.com/watch?v=wB8mr4iViy0
6. English Presentation Video: https://www.youtube.com/watch?v=wB8mr4iViy0
7. Powerful Presentation Skills: Body Language: https://www.youtube.com/watch?v=wB8mr4iViy0
8. Make Body Language Your Superpower: https://www.youtube.com/watch?v=wB8mr4iViy0
9. Make a Presentation Like Steve Jobs: https://www.youtube.com/watch?v=wB8mr4iViy0

3RD SEMESTER

SR NO	CODE	SUBJECTS	TEACHING SCHEME			CREDITS	HOURS	EXAMINATION SCHEME					TOTAL
								THEORY			PRACT		
								CIE					
			L	T	P			MID	IE	ESE	CIE	ESE	
1	SH0301	DIFFERENTIAL EQUATIONS AND INTEGRAL TRANSFORMS	3	2	0	4	5	30	10	60	0	0	100
2	CV0301	FLUID MECHANICS–I	3	0	2	4	5	30	10	60	40	60	200
3	CV0302	GEOTECHNIQUES AND APPLIED GEOLOGY	2	0	2	3	4	30	10	60	40	60	200
4	CV0303	BUILDING CONSTRUCTION AND MATERIALS	3	2	0	4	5	30	10	60	0	0	100
5	CV0304	STRENGTH OF MATERIALS	3	2	2	5	7	30	10	60	40	60	200
6	CV0305	SURVEYING–I	3	0	2	4	5	30	10	60	40	60	200
7	SH0307	HUMAN VALUES AND PROFESSIONAL ETHICS	1	0	0	0	1	30	10	60	0	0	100
TOTAL			18	06	08	24	32	210	70	420	160	240	1100

B-TECH CIVIL ENGINEERING, SEMESTER –III TEACHING & EXAMINATION SCHEME (BOS-14/06/2017)
WITH EFFECT FROM JULY 2017

Approved Vide Agenda Item No. 03 of Minutes of Meeting of Academic Council held on 11 July 17

Subject: **Differential Equations and Integral Transforms**								
Program: **B. Tech Civil Engineering**				Subject Code: SH0301			Semester: **III**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	0	4	60	00	40	00	100

1. **Course Outcomes:**

   - To provide an ability to see differential equations as a rigorous way of modelling physical phenomena.
   - To provide an ability to derive major differential equations from physical principles.
   - To provide an ability to understand the role of initial and boundary conditions in determining the solutions of equations.
   - To provide an ability to choose and apply appropriate methods for solving differential equations.
   - To provide an ability to undertake problem identification, formulation and solution.
   - To provide an ability to calculate Laplace transforms and inverse Laplace transforms and uses them to solve differential equations (Initial value problems, Boundary value problems).
   - To provide an ability to understand various concepts of Control System -Theory using Laplace Transform.

2. **Contents:**

UNIT-I   **[12 Hours]**
Ordinary Differential Equations with applications: Revision of ordinary differential equation: Introduction of Mathematical Modeling, Basic Definitions, First Order First Degree Differential Equations, Variable Separable equation, Homogeneous Equation, Exact Differential Equations, Reduction of Non-exact Differential Equations to exact form using Integrating Factors, First Order Linear Differential Equation, Bernoulli Equation, Applications: Orthogonal Trajectories, Simple Electric Circuits, Solution of Linear differential equations of higher order with constant coefficients, complimentary function and particular integral.

UNIT-II   **[12 Hours]**
Ordinary and Partial Differential Equations with applications: Method of variation of parameters, Method of Undetermined coefficients, Linear differential equations with variable coefficients (Cauchy's and Legendre forms), Simultaneous linear differential equations, Bessel and Legendre functions, Application of Linear differential equation - Application ofDeflection of Beams, Electric circuits, Series Solution of Ordinary Differential Equations – Power series method, Formation of Partial differential equations, Directly Integrable equations, Method of separation of variables, solution of one dimensional wave equation, heat equation and Laplace equation.

UNIT-III   **[12 Hours]**
Laplace transforms: Relation between Laplace and Fourier Transform, Definition, Linearity property, Laplace transforms of elementary functions, Shifting theorem, Inverse Laplace transforms, Laplace transforms of derivatives and integrals, Convolution theorem, Application of Laplace transform in solving ordinary differential equations, Laplace transforms of periodic, Unit step and impulse functions.

UNIT-IV   **[12 Hours]**
Fourier series, Fourier Integrals, Fourier Transforms and Z-Transforms: Fourier series, Drichlet's conditions, Euler's formula, Fourier expansion of periodic functions, Fourier series of even and odd functions, Half range Fourier series, Fourier integral theorem (only statement), Fourier sine and cosine integrals, Complex form of Fourier integral, Fourier transforms, Fourier sine and cosine transforms, Introduction to Z-transforms:Definition and Standard Z-transforms, Linearity Property, dumping Rule and some standard results, Some useful Z-transforms.

3. **Text books:**

    1. Erwin Kreyszig: Advanced Engineering Mathematics (8th Ed.) , Wiley Eastern Ltd., New Delhi.

4. **Reference Books:**

    1) B. V. Ramana: Higher Engineering Mathematics, Mc Graw Hill, New Delhi.
    2) Dr. B.S. Growl: Higher Engineering Mathematics, Khanna Publishers, New Delhi.
    3) R K Jain, S R K Iyengar: Advanced Engineering Mathematics. Third Edition, Narosa Publishing House
    4) Merel C Potter, J L Goldberg: Advanced Engineering Mathematics (3rd Ed.), Oxford India Publication.
    5) Murray Spiegel: Advanced Mathematics for Engineering & Science: (Schaum's Outline Series),Tata – McGraw Hill Publication

5. Digital resources

http://freevideolectures.com/blog/2010/11/130-nptel-iit-online-courses/
http://nptel.ac.in/video.php?subjectId=122107036
http://ocw.mit.edu/index.htm
https://www.khanacademy.org/

Subject: **Fluid Mechanics-I**								
Program: **B. Tech Civil Engineering**				Subject Code: CV0301			Semester: **III**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	0	2	4	24/60	24/60	16/40	16/40	200

Course Objectives:

- Provide fundamental knowledge of fluids.
- Develop basic understanding of Fluid properties.
- Give the knowledge of behavior of Fluid under various conditions.

Course Outcomes:

- Apply fundamental principles of fluid mechanics for the solution of practical civil engineering problems of water conveyance in pipes, pipe networks, and open channels.
- Know basics of fluid kinematics and dynamics and their applications.
- To study various fluid flow measuring devices.

COURSE CONTENTS:

UNIT-I [12]

Properties of Fluid:

Approved Vide Agenda Item No. 03 of Minutes of Meeting of Academic Council held on 11 July 17

Introduction, Types of Fluid, Fluid properties, thermodynamics properties, compressibility and bulk modulus, surface tension and capillarity

Fluid static

Pressure and its measurement; Pascal's law; hydrostatic pressure, atmospheric, absolute, gauge and vacuum pressure; Pressure measurement through Piezometer and Manometer, Total pressure, intensity of pressure, centre of pressure, Pressure on horizontal, vertical, inclined and curved surface, Floating Bodies, Buoyancy and centre of buoyancy, meta centre and meta centre height, Condition of equilibrium of floating and submerged body, determination of meta-centric height by experimental and Analytical method, stable and unstable equilibrium, pressure in case of accelerated rigid body motion.

UNIT-II   [18]

Fluid Kinematics: Types of fluid motion, methods of describing fluid flow -Langrangian and Eulerian method, In viscid flows, velocity and acceleration, flow rate, Continuity equation, Potential flows, flow lines, velocity potential and stream function, Flownet its characteristic and utility, circulation and vorticity, Vortex flow - forced vortex flow, free vortex flow, equation of motion for vortex flow, equation of forced vortex flow and free vortex flow.

Fluid Dynamics: Equations of motion Euler and Bernoulli's equations of motion, application of Bernoulli's Equation, momentum of fluid in motion, momentum equation and momentum correction factor, Application of momentum equation, forces on a pipe bend, free jets

UNIT-III   [10]

Measurement of Flow: Orifice & Mouth piece Classification, hydraulic coefficients, experimental determination of hydraulic coefficient, discharge through all types of office & mouthpiece, time of emptying the tank through orifice and mouthpiece Notches and Weirs Classification, discharge through various types of Notches and weirs, time of emptying a reservoir or a tank with notches & weirs Venturimeter Nozzles and bend meter.

UNIT-IV   [14]

Fundamentals of Laminar and Turbulent Flows: Reynolds experiment, critical Reynolds number and its determination, laminar flow through pipes and Hagen-Poiseuille equation, stokes law, measurement of viscosity, causes, characteristics and factors affecting turbulence, types of turbulence, shear and pressure relationships, Darcy-Weisbach equation for turbulent flow through pipe, shear stress velocity distribution in pipes.

Flow Through Pipes: Introduction, Major and minor losses of energy in pipes, hydraulic gradient, total

energy line, Pipes in series and parallel, flow through branched pipes, Hydraulic transmission of power, Water hammer and its effect

Text Books:
1. Bansal.R.K,"A text book of Fluid Mechanics and Hydraulic Machines", Laxmi Publication private Ltd.,,golden house, New Delhi,(Text Book)
2. Rajput.R.K,"A text book of Fluid Mechanics", S Chand Publication private Ltd.
3. Modi P N and Seth S M, "Hydraulics and Hydraulic Machines", Standard Book House, Nai Sarak New Delhi, 2000.

Reference Books:
1. Jain A K, "Fluid Mechanics including Hydraulic Machines", Khanna Publishers, New Delhi, 2000.
2. Ranga Raju K. G., Flow through Open channel, Tata McGraw-Hill Publishing Company Ltd, New Delhi,1997.
3. Subramanya K. "Flow in Open Channels", Tata McGraw-Hill Publishing Company Ltd, New Delhi, 1998.
4. Chow V. T. "Open Channel Hydraulics", McGraw-Hill Book Company, International edition, New Delhi, 1973.

Web resources:
1. NPTEL- http://nptel.ac.in/courses/105101082/1
2. E Fluids- http://www.efluids.com/
3. The National Engineering Delivery System - www.needs.org

MOOCs:
1. Introduction to fluid mechanics-https://www.mooc-list.com/tags/fluid-mechanics

List of Experiments:
1. Introduction to Laboratory, Lab Manual and Lab components.
2. To study buoyancy and floatation.
3. To determine the meta-centric height.
4. Verification of Bernoulli's theorem.

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5. Verification of relationship between energy loss and velocity and determination of friction factor for a pipe.

6. Reynolds experiment: Establishment of laminar, transition & turbulent flows.

7. Calibration of rectangular notches

8. Calibration of triangular notches

9. Determination of the co-efficient of discharge, velocity and contraction.

10. Verification of law of hydrostatic pressure

11. Calibration of orifice meter.

12. Calibration of venturimeter.

13. Study of a pitot-tube

Subject: **Geotechniques and Applied Geology**								
Program: **B. Tech Civil Engineering**				Subject Code: CV0302			Semester: **III**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
2	0	2	3	24/60	24/60	16/40	16/40	200

Course Objectives:

1. Prepare Civil Engineering students for a career in Geotechniques and Applied Geology.

2. Basic knowledge and understanding in the most central part of Applied Geology including rocks, minerals and types of soil.

Course Outcome:

1. Understand the role of Applied Geology in the design and construction process of underground openings in rocks.
2. Be able to apply Geological concepts and approaches on rock engineering projects.
3. Be able to use the Geological literature to establish the geotechnical framework needed to properly design and construct heavy civil works rock projects.
4. Be able to understand the concepts of Geotechniques as a basic requirement for soil mechanics.
5. To be able to apply Geotechniques in basic problems related to construction.

COURSE CONTENTS:

UNIT-I FUNDAMENTALS OF GEOLOGY [06]

Introduction to Geology: Introduction, Basics of the earth, parts of the earth, Branch of geology, Scope of Engineering Geology.

Geological work of Natural agencies: Introduction, Definition: Weathering, Erosion, And Denudation. Types of weathering, Factors affecting weathering, Products of weathering. Geological work of Wind (Erosion, Sediment transport and deposition) and water (River profile and geological Work) and its engineering considerations.

UNIT-II ROCKS AND MINERALS [12]

Structural Features of Rocks: Introduction, types of Rocks and rock classification and its formation cycle. **Faults**: Terminology, Classification, Effects of Faulting. **Folds**: Parts of Folds and terminology, Classification and position of axial plane.

Engineering properties of rocks and laboratory measurement: Rocks as Materials for construction: Building stones, Road materials. Rocks as sites for construction: Laboratory test, in-situ test.

Site Improvement in Rocks: Introduction, Grouting, Backfilling and Site reinforcement, Rock Bolting, Soil Stabilization.

Minerals: Introduction, Properties of Minerals: Physical Properties, Optical Properties

UNIT-III EARTHQUAKES AND GEOTECHNIQUES [10]

Earthquake: Introduction, terminologies, types of seismic waves, classification of earthquakes, causes of earthquakes, effects of earthquakes, Recording of an earthquakes, Earthquake zoning of India and other continents, Earthquake problems in India, Tsunami: engineering consideration, tsunami warning system.

Geotechniques: Introduction to types of soils and its formation, Geotechnical Engineering, its scope and limitations.

Basics of Soil Properties and simple Tests: Introduction to 2-Phase & 3-Phase diagrams, Volumetric Relationships, Volume-Mass Relationships, Volume-Weight Relationships and their correlations. Water Content, Specific Gravity, Mass Density, Relative Density and determination of each. Illustrative Examples and Problems.

UNIT-IV [08]

Particle Size Analysis and Plasticity Characteristics of Soils: Introduction, Sieve Analysis, Stoke's Law, Theory of Sedimentation Analysis, Hydrometer method, Limitation of Sedimentary analysis, Particle size distribution and its uses, Plasticity of Soils, Consistency limits: Liquid Limit, Plastic Limit, Shrinkage Limit and its determination, Shrinkage parameters, Plasticity liquidity and consistency indices, Flow index, sensitivity, thixotropy, activity of soils, uses of consistency limits. Illustrative examples and problems.

Soil Classification Systems: Introduction, Particle size classification, Classification Systems, AASHTHO, USC, IS Classification, Field Identification.

Text Books:
1. Engineering and general Geology : Parbin Singh
2. Engineering Geology : D.S.Arora
3. Rock Mechanics for Engineering : B.P. Verma

Reference Books:
1. Engineering Geology:D venkat Reddy.
2. Introduction to rock mechanics: Richard E. Goodman

3. Engg. Behavior of rocks : Farmar I.W.

Web resources:
1. Geology and Geophysics - http://guides.lib.lsu.edu/geol
2. Engineering Geology - https://www.journals.elsevier.com/engineering-geology
3. NPTEL - http://nptel.ac.in/courses/105105106/

MOOCs:
1. Geological Engineering - https://www.mooc-list.com/tags/geological-engineering
2. Mining Engineering - https://www.mooc-list.com/instructor/stephen-fityus

List of Experiments
1. Identification and Description of Physical Properties of Minerals
2. Identification and Description of Geotechnical Characteristics of Rocks IS: 123 (1975)
3. Study of Tectonic Features of India.
4. Study of Lineament And Fault/Shears of Maharashtra
5. Study of Principal Litho- logical Groups of India
6. Study Epicenters of India & Surrounding Areas
7. Study of Convective Current Mechanism for Engineering Continental Drift
8. Study of parts of fold.
9. Study of parts of fault
10. Study of mineral availability in India
11. Study of seismic zoning of India.
12. Study of Sections across Asia.
13. Study of profile of River Narmada.
14. Study of lithosphere of earth.
15. Study of different layers of atmosphere.
16. To determine specific gravity of rock aggregate.

Subject: **Building Construction and Materials**								
Program: **B. Tech Civil Engineering**				Subject Code: CV0303				Semester: **III**
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	0	4	24/60	0	16/40	0	100

Course Objectives:

1. Explore career options in the building construction industry.
2. Develop sound safety practices.
3. Demonstrate desirable work habits.
4. To have safe and professional work practices.

Course Outcomes:

1. Learn and use the terms common to the Building Industry.
2. Identify and use safely hand and power tools commonly used in the Building Industry.
3. Able to understand and utilize basic principles used in Building Construction.
4. Improve construction layout skills.

COURSE CONTENTS:

UNIT-I [09]

Introduction: Overview of construction practices, theory and methods. **Subsurface Investigation:** Objectives, methods of boring like wash boring, percussion etc.,

Shallow Foundations: Necessity, types, setting out, excavation, construction, failures of foundation and remedial measures.

UNIT-II   **[19]**

1. **Masonry Construction :**

    a. Stone masonry: Technical terms, lifting appliances, joints, types –random (uncoursed) rubble, coursed rubble, dry rubble masonry, Ashlar masonry- Ashlar fine, chamfered fine.

    b) Brick masonry: Technical terms, bonds in brick work- English bond, single & double Flemish bond, garden wall bond, raking bond, Dutchbond

    c) Composite masonry: Stone facing with brick backing, brick facing with concrete backing.

    d) Hollow concrete blocks and construction

    e) Cavity walls: Brick cavity walls, position of cavity at foundation, roof and at opening levels.

    f) Lintels & arches: Lintels – types, construction. Arches – technical terms, types – brick arches, rough, axed, stone arches, flat – semi circular.

2. **Plain and Reinforced Concrete Construction:** Pre-cast and cast-in-situ Construction.

3. **Doors and Windows :**

a) Doors: Location, technical terms, size, types, construction, suitability.

b) Windows: Factors affecting selection of size, shape, location and no. of windows, types, construction, suitability, fixtures and fastenings.

c) Ventilators: Ventilators combined with window, fan light.

UNIT-III   **[14]**

Stairs and Staircases: Definition, technical terms, requirements of good stair, fixing of going and rise of a step, types of steps, classification, example – stair planning, elevators, escalators.

Floorings : Introduction, essential requirements of a floor, factors affecting selection of flooring material, types of ground floors, brick, flag stone, tiled cement concrete, granolithic, terrazzo, marble, timber flooring, upper floor- timber, timber floor supported on RSJ flag stone floor resting on RSJ, jack arch

Floor, reinforced concrete floor, ribbed floor, pre cast concrete floor.

Roofs and Roof Coverings: Introduction, requirements of good roof technical terms, classification, types of roof coverings for pitched roof. A.C. sheet roofs – fixing of A.C. sheets, laying of big six sheets, G.I. Sheets roofs, slates, flat roof – advantages, dis-advantages, types of flat terraced roofing.

Wall Finishes: Plastering, pointing and painting.

UNIT-IV   **[12]**

Temporary Works: Timbering in trenches, types of scaffoldings, shoring, underpinning

Special Treatments: Fire resistant, water resistant, thermal insulation, acoustical construction and anti-termite treatment.

Building Materials: Introduction, Building materials like bricks, stones, lime, timber, mortar, cement, concrete, sand, aggregate, Paints and varnishes, glass, metals, plastic and many more (Classification, Uses, Properties, Requirements, Characteristics)

Text Books:
1. Building Construction by B.C Punammia
2. Building Construction by S. C. Rangwala
3. Allen, Iano, "Fundamentals of Building Construction: Materials and Methods, 6th Edition

Reference Books:
1. Building Construction by Sushil Kumar
2. Building Construction by Gurcharan Singh
3. Building Materials by S.S Bhavikatti
4. Building Materials by P.C. Varghese
5. Elements of Civil Engineering R B Khasiya

Web resources:
1. Building Construction http://wbdg.org/ccb/ccb.php
2. Building Construction http://www.construction.com/
3. Building Construction http://sweets.construction.com/

4. Building Construction http://www.thomasnet.com/
5. http://www.library.ethz.ch/en/Resources/Construction-materials-resources
6. NPTEL- http://nptel.ac.in/courses/105102088

MOOCs: Modern building design https://www.mooc-list.com/tags/construction

Subject: **Strength of Materials**							
Program: **B. Tech Civil Engineering**				Subject Code: CV0304			Semester: **III**
Teaching Scheme				**Examination Evaluation Scheme**			
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	2	5	24/60	24/60	16/40	16/40	200

Course Objectives:
1. To provide the basic concepts and principles of strength of materials.
2. To give an ability to calculate stresses and deformations of objects under external loadings.
3. To give an ability to apply the knowledge of strength of materials on engineering applications and design problems.

Course Outcomes:
1. Understand the concepts of stress and strain at a point as well as the stress-strain relationships for homogenous, isotropic materials.
2. Calculate the stresses and strains in axially-loaded members, circular torsion members, and members subject to flexural loadings.
3. Calculate the stresses and strains associated with thin-wall spherical and cylindrical pressure vessels.

4. Design simple bars, beams, and circular shafts for allowable stresses and loads.

COURSE CONTENTS:

UNIT-I [12]

Simple Stress and Strain: Introduction to axial and Normal Stresses (Tensile, Compressive, Shear and thermal), Introduction to Strains (Linear, Shear, Lateral, Thermal and Volumetric Strains), Elastic Constants (Modulus of Elasticity, Poisson's ratio, modulus of rigidity, bulk modulus), Relationship between (E, G & K), Analysis of stress and strain for uniform, composite bars and prismatic bars.

UNIT-II [15]

Shear Force and Bending Moment:
Statically Determinate Beams: Relationship between Loading, Shear Force and Bending Moment, Shear force and bending moment diagrams for beams subjected to loads (concentrated loads, uniformly distributed loads, uniformly varying loads and their combinations)
Stress in Beams:
Bending Stresses in Beams: Introduction, theory of pure bending, section modulus, beam of uniform strength, relationship between moment of resistance, bending stress, moment of inertia, and radius of curvature and modulus of elasticity.

UNIT-III [15]

Torsion: Introduction, pure torsion formula, analysis of strength and stiffness criteria of solid and hollow circular shaft, Shaft in Series and Parallel, Combination of Torsion and Bending.
Shear Stresses in Beams: Horizontal shear stress, Shear stress distribution across beam sections, distribution of Shear stress for standard sections.

UNIT-IV [12]

Principal Stress and Strain: Introduction, Principle stresses and strains, Normal, Tangential and Resultant Stress by Analytical and Graphical Method (Mohr's circle Method) Principal stresses and Principal Strains.

Stresses in thin and thick cylinders: Introduction, lame's equation. Numerical problems on thin cylindrical and spherical shells, thick cylinder and compound cylinders.

Text Books:
1. Strength of Material', R.K. Bansal, Laxmi publication.
2. Strength of Material', S. Timoshenko.
3. Strength of Material', S. Ramamrutham, Dhanpat Rai and Sons publication.

Reference Books:
1. Strength of Material', R.K.Rajput, S.Chand publication
2. 'Strength of Material', M.N.Patel, C.S.Sanghvi, J.S.Thakur, Mahajan Publishing House.
3. Strength of Material', R.Subramaniam, Oxford University Press.
4. 'Strength of Material', R.S.Khurmi&N.Khurmi, S.Chand Publication.
5. 'Mechanics of Strucutres- Vol – 1', H.J.Shah and S.B.Junnarkar, Charotar Publishing House.

Web resources:
1. Matweb- http://www.matweb.com/
2. Material Science - http://www.istl.org/02-spring/internet.html
3. Strength of Material - https://en.wikibooks.org/wiki/Strength_of_Materials
4. Strength of Material - http://nptel.ac.in/courses/105105108

MOOCs:
1. Mechanics of Material - https://www.mooc-list.com/tags/materials
2. Mechanics of Materials I: Fundamentals of Stress & Strain and Axial Loading- https://www.mooc-list.com/course/mechanics-materials-i-fundamentals-stress-strain-and-axial-loading-coursera
3. Structures - https://www.mooc-list.com/tags/structures

List of Experiments
1. Introduction to Laboratory, Lab Manual and Lab components.

2. To study the Brinell hardness testing machine & perform the Brinell hardness test.

3. To study the Rockwell hardness testing machine & perform the Rockwell hardness test.

4. To study the impact testing machine and perform the impact Test(Izod test)

5. To study the impact testing machine and perform the impact Tests(Charpy test)

6. To study the universal testing machine (UTM) and perform the tensile test.

7. To perform double shear test on given specimen.

8. To perform compression test on Timber.

9. To perform torsion test on mild steel.

10. To perform Beam Deflection and Beam Bending.

Subject: **Surveying–I**								
Program: **B. Tech Civil Engineering**				Subject Code: CV0305			Semester: **III**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	0	2	4	24/60	24/60	16/40	16/40	200

Course Objectives:

1. To understand the importance of surveying in the field of civil engineering
2. To study the basics of linear/angular measurement methods like chain surveying, compass surveying
3. To study the significance of plane table surveying in plan making
4. To know the basics of leveling and theodolite survey in elevation and angular measurements

5. To understand tachometric surveying in distance and height measurements

Course Outcomes:

1. Carry out preliminary surveying in the field of civil engineering applications such as structural, highway engineering and geotechnical engineering.
2. Plan a survey, taking accurate measurements, field booking, plotting and adjustment of traverse.
3. Use various conventional instruments involved in surveying with respect to utility and precision.
4. Plan a survey for applications such as road alignment and height of the building
5. Undertake measurement and plotting in civil engineering.

COURSE CONTENTS:

UNIT-I   [13]

Introduction and Overview of Surveying : Introduction, Objective of surveying, Basic principles of surveying, classification, plans and maps, scales, units of measurements, plotting.

Measurement of Distance: Chain Surveying: Introduction, Methods of Measuring Distance, different chain types, Errors in chaining, chain surveying, Field work, plotting chain surveying data, Numerical problems.

UNIT-II   [14]

Measurement of Directions: Compass surveying: Introduction, Magnetic bearing, compass, designation of bearings, calculations of included angles from bearings, traversing with chain and compass, local attraction, plotting and adjusting a traverse, numerical problems.

Measurements of Elevations – Levelling: Introduction, Terminology, direct method of levelling, temporary adjustments of level, reduction of levels, other methods of levelling, curvature and refraction, field problems in levelling, precision and errors in levelling.

UNIT-III   [14]

Measurements of Elevations – **Contouring:** Introduction, characteristics of contours, methods of contouring, preparing of contouring maps, uses of contour maps.

Computation of Areas and volumes: Introduction, Area of a traverse, determining areas from plans, partitioning of land. Volume from cross section, Prismoidal correction, curvature correction, capacity of reservoirs, formulas, numerical problems.

Applications of Minor Instruments: Principles and Uses of Planimeter, Abney Level, Tangent, Clinometers, Box Sextant, Pantograph

UNIT-IV   [13]

Plane table Surveying : Introduction, setting up plane table, methods, two-point and three point problems, errors in plane tabling, advantages and disadvantages.

Setting out Works: Introduction, instruments and methods, laying out buildings, setting out culverts, bridges and tunnels.

Text Books:

1. Surveying – I by N.N. Bask

Reference Books:

1. Surveying Vol.I, II and III by Dr. B.C. Punamia

2. Surveying and Levelling Vol. I and II by T.P Kanetkar and S.V Kulkarni

3. Surveying Vol. I, II and III by Dr. K.R. Arora

4. Surveying Vol. I and II by S. K. Duggal

Web resources:

1. https://celebrating200years.noaa.gov/foundations/leveling/welcome.html
2. Surveying - http://www.scopesurveying.com.au
3. CEPT - http://cept.ac.in/labs/surveying-leveling

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4. NPTEL - http://nptel.ac.in/courses/105107122/16

5. Surveying and Mapping - http://www.gps.gov/applications/survey

MOOCs:

1. Surveying - https://www.mooc-list.com/categories/engineering

2. Surveying and leveling - https://www.mooc-list.com/tags/engineering

3. https://www.fig.net/resources/proceedings/fig_proceedings/fig2015/ppt/ts04f/TS04F_gilliron_merminod_7703_ppt.pdf

List of Experiments:

1. Introduction to civil engineering surveying laboratory

2. Chain and tape survey

3. Compass surveying (Prismatic Compass)

4. Compass surveying (Surveyors' Compass)

5. Compass and Chain-Tape survey

6. To determine the reduced levels of points using dumpy level

7. Profile leveling and cross sectional leveling using dumpy level.

8. Contour surveying

9. Application of Minor instruments like Plannimeter, Abney level etc.

10. Plane table surveying

11. Setting out works- distances, angles

12. Setting out works – coordinates

13. Setting out positions of column centers of a multi storey building

Subject: Human Values and Professional Ethics								
Program:B.Tech. ALL				Subject Code:SH0307			Semester: III	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)- Theory	Continuous Internal Evaluation (CIE)- Practical	Total
1	0	0	0	24/60	0	16/40	0	100

Course Objectives:
- ➢ To create an awareness on Engineering Ethics and Human Values.
- ➢ To understand social responsibility of an engineer.
- ➢ To appreciate ethical dilemma while discharging duties in professional life.

Unit 1: Values and Self Development [04]

Social Values and individual Attitudes, Work ethics, Indian vision of Humanism, Moral and non moral valuation, Standards and principles, Value judgments. Importance of cultivation of values, Sense of duty, Devotion, Self reliance, Confidence, Concentration, Truthfulness, Cleanliness, Honesty, Humanity, Power of faith, National unity, Patriotism, Love for nature, Discipline.

Unit 2: Personality and Behavior Development [04]

Soul and scientific attitude. Goad and scientific attitude, positive thinking, integrity and discipline, punctuality, love and kindness. Avoiding fault, finding. Free from anger, Dignity of labor, Universal brotherhood and religious tolerance, True friendship, Happiness vs. suffering love for truth. Aware of self destructive habits, Association and cooperation, doing best, saving nature.

Unit 3: Character and Competence [04]

Science vs. God, Holy books vs. Blind faith, Self management and good health, Science of reincarnation, Equality, Nonviolence, Humility, Role of women, All religions and same message, Mind your mind, Self control, Honesty, Studying effectively.

Unit 4: Engineering Ethics [04]

Senses of 'Engineering Ethics', variety of moral issues, types of inquiry, moral dilemmas, moral autonomy, Kohlberg's theory, Gilligan's theory, consensus and controversy, models of professional roles, theories about right action, self interest, customs and religions, uses of ethical

theories, Valuing time, Co-operation and commitment, Code of ethics, Sample codes – IEEE, ASCE, ASME and CSI.

Text Books:

1. Chakraborty, S. K., Values and Ethics for Organization Theory and Practice, Oxford University Press, New Delhi, 2001

2. Gaur R. R., Sangal R., Bagaria G. P., *A foundation course in Value Education*, 2009.

3. Gaur R. R., Sangal R., Bagaria G. P*., Teacher's Manual*, 2009.

4. Mike Martin and RolandSchinzinger, *Ethics in Engineering*, Mc Graw Hill. New York, 1996.

Reference Books:

1. Govindrajan M., Natrajan S. and Senthil Kumar V. S., Engineering Ethics (including Human Values), Prentice hall of India Ltd., New Delhi, 2004.
2. Frankena, W. K., *Ethics*, Prentice Hall of India, New Delhi, 1990.
3. Dhar P. L., Gaur R. R., *Science and Humanism*, Commonwealth Publishers, 1990.
4. TripathyA. N., *Human Values*, New Age International Publishers, 2003.
5. Seebauer E. G. and Robert L. Berry, *Fundamentals of Ethics for Scientists andEngineers*, Oxford University Press, 2000.
6. Banerjee B. P., *Foundations of Ethics and Management*, Excel Books, 2005.
7. Bajpai B. L., *Indian Ethos and Modern Management*, New Royal Book Company, 2004.

4TH SEMESTER

SR NO	CODE	SUBJECTS	TEACHING SCHEME			CREDITS	HOURS	EXAMINATION SCHEME					TOTAL
								THEORY			PRACT		
								CIE					
			L	T	P			MID	IE	ESE	CIE	ESE	
1	SH0401	COMPLEX VARIABLES AND NUMERICAL ANALYSIS	3	2	0	4	5	30	10	60	0	0	100
2	CV0401	FLUID MECHANICS–II	3	2	0	4	5	30	10	60	0	0	100
3	CV0402	STRUCTURAL ANALYSIS-I	4	2	0	5	6	30	10	60	0	0	100
4	CV0403	CONCRETE TECHNOLOGY	3	0	2	4	5	30	10	60	40	60	200
5	CV0404	BUILDING AND TOWN PLANNING	3	2	0	4	5	30	10	60	0	0	100
6	CV0405	SURVEYING–II	3	0	2	4	5	30	10	60	40	60	200
7	CE0407	CYBER SECURITY AND INTELLECTUAL PROPERTY RIGHT	1	0	0	0	1	30	10	60	0	0	100
		TOTAL	**20**	**08**	**04**	**25**	**32**	**210**	**70**	**420**	**80**	**120**	**900**

B-TECH CIVIL ENGINEERING, SEMESTER –IV TEACHING & EXAMINATION SCHEME (BOS-14/06/2017) WITH EFFECT FROM JULY 2017

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Subject: **Complex Analysis and Numerical Methods**								
Program: **B. Tech CIVIL ENGINEERING**				Subject Code: SH0401			Semester: **IV**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	0	4	60	00	40	00	100

1. **Course outcomes:**

After completion of this course students will be able to gain knowledge about following

- To provide an ability to understand, interpret and use the basic concepts: complex number, analytic function, harmonic function, Taylor and Laurent series, singularity, residue, conformal mapping, meromorphic function.
- To provide an ability to prove certain fundamental theorems about analytic functions, e.g. Cauchy's integral formula
- To provide an ability to determine the images of curves under simple complex mappings.
- To provide an ability to determine the stability of certain dynamical systems using complex functions.
- To provide an ability to use conformal mapping to solve certain applied problems regarding heat conduction, electrical engineering and fluid mechanics.
- To provide an ability to use Taylor and Laurent expansions to derive properties of analytic and meromorphic functions.

2. **Contents:**

UNIT-I [12 Hours]

Complex Analytic Functions:
Complex Numbers, Demoivere's Theorem, Roots of Complex Numbers, Elementary complex functions, Complex planes, Curves in complex planes, Concept of neighborhood in The complex plane, Analytic function, Cauchy- Riemann equations (Cartesian and polar forms – without proof), Harmonic functions, conformal mappings, some standard conformal transformations.

UNIT-II [12 Hours]

Interpolation

Finite differences and Interpolation: Finite differences Forward, Backward & Central difference operators and difference tables. Interpolation, Interpolation Formulae with equal intervals: Newton's forward, Newton's backward, Central difference interpolation by Stirling's formulae

Interpolation Formulae with unequal intervals: Lagrange's & Newton's divided difference interpolation**Numerical Integration:** Trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8 rule.

Numerical differentiation: Using Newton's forward and backward interpolation formula

UNIT-III   [12 Hours]

Numerical Methods: Basic Errors.
Solution of Algebraic and Transcendental Equations: Bisection method, Regula-Falsi method, Newton-Raphson method, Convergence condition for these methods.
Numerical methods in Linear Algebra: Gauss-Jacobi, Gauss-seidel method
Largest Eigen values and corresponding Eigen vectors: By power method
Numerical Solutions of ordinary differential equations: Taylor's Method, Euler's Method, Improved Euler Method (Heun's Method), Runge-Kutta method of order four

UNIT-IV   [12 Hours]

Complex Integration: Complex integration, Cauchy's integral theorem and Cauchy's integral formula (without proof), Singularities, Taylor's and Laurent's series, Cauchy-Residue theorem, Residues & Contour integration, Applications of residue to evaluate real integrals.

3. **Text books:**

   1) Erwin Kreyszig: Advanced Engineering Mathematics (8th Edition) Wiley Eastern Ltd., New Delhi (1999).

4. **Reference Books:**

   1) R. V. Churchill and J. W. Brown: Complex variables and applications (7th Edition), McGraw-Hill (2003)
   2) B. V. Ramana: Higher Engineering Mathematics, McGraw Hill, New Delhi (2008).
   3) Merel C Potter, J L Goldberg: Advanced Engineering Mathematics (3rd Edition) Oxford India Publication (2005).
   4) Dr. B.S. Growl: Higher Engineering Mathematics, Khanna Publishers, New Delhi (2000).

5) R K Jain, S R K Iyengar: Advanced Engineering Mathematics. Third Edition, Narosa Publishing House (Reprint2014).
6) Murray Spiegel: Advanced Mathematics for Engineering & Science: (Schaum's   Outline Series), TataMcGraw Hill Publication (2009).

5. Digital learning resources :

http://freevideolectures.com/blog/2010/11/130-nptel-iit-online-courses/
http://nptel.ac.in/video.php?subjectId=122107036
http://ocw.mit.edu/index.htm
https://www.khanacademy.org/

Subject: **Fluid Mechanics-II**								
Program: **B. Tech CIVIL ENGINEERING**				Subject Code: CV0401			Semester**: IV**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	0	4	24/60	0	16/40	0	100

Course Objectives

1. Provide fundamental knowledge of fluid.
2. Develop basic understanding of Fluid properties.
3. Give the knowledge of behavior of fluid under various conditions.

Course Outcomes

1. Understand the fundamentals of Fluid Mechanics and related applications.
2. Know basics of fluid kinematics and dynamics and their applications.
3. Formulate basic equations for Fluid Engineering problems.
4. Calibrate various fluid flow measuring devices.
5. Understand the necessity and concept of dimensional analysis, boundary layer and compressible fluid flow.

COURSE CONTENTS

[14]

UNIT-I

Dimensional Analysis and Similitude :

Fundamental dimensions, Physical Quantity and Dimensions, dimensional homogeneity, Buckingham's pi-theorem, non- dimensional numbers and their physical significance; Geometric, kinematic and dynamic similarities, model laws, model testing and its analysis, scale effects, undistorted and distorted models.

Boundary Layer Analysis:

Assumptions and concept of Boundary layer theory, boundary layer thickness, displacement momentum and energy thickness, laminar and turbulent boundary layer on flat plate, laminar sub layer, smooth and rough boundaries, local and average friction coefficient and separation and control.

UNIT-II [15]

Uniform flow in open channel:

Development of uniform flow, resistance law, factors affecting Manning's roughness coefficient, conveyance, section factor for uniform flow computations, computation of uniform flow, efficient channel sections, hydraulic exponent for uniform flow computations.

Specific Energy:

Specific energy Equation, Specific Energy curve and its limitations, critical depth and section factor for critical flow computations, open channel flow transitions. Introduction to RVF, Types of Hydraulic Jumps, Characteristics of Hydraulic Jump. Derivation & Numerical based on above topic.

Basic concepts of open channel flow:

Introduction, Open channel flow v/s pipe flow, classification of open channel flow based on space and time criteria, velocity distribution and pressure distribution in open channel, continuity equation, momentum equation and energy equation in open channel.

UNIT-III [10]

Gradually varied flow:

Introduction, Assumptions in GVF analysis, dynamic equation of GVF, classification of channel slopes, GVF profiles, its identification and computation. Derivation & Numerical based on above topic.

Rapidly Varied Flow:

Introduction to RVF, Types of Hydraulic Jumps, Characteristics of Hydraulic Jump. Derivation & Numerical based on above topic.

UNIT-IV [15]

Water Turbines:

Impulse turbine-Reaction turbines- Significance of specific speed-Unit, quantities, Concept of performance characteristics for water turbines.

Centrifugal pumps:

Classification and selection criterion, pump applications, centrifugal pumps, classification of centrifugal pumps, Pumps in series and parallel, specific speed, Unit quantities and characteristics curves, Cavitation in turbines and pumps. Operation of a reciprocating pump. Centrifugal pumps versus reciprocating pumps, rotary displacement pumps.

Text Books

1. Fluid Mechanics and Fluid Power Engineering – D.S. Kumar– Kataria & Sons – New Delhi
2. A text of Fluid Mechanics – R. K. Rajput – S. Chand & Company Ltd., Delhi

Reference Books

1. Fluid Mechanics & Hydraulics Machines-R.K.Bansal-Laxmi Publications.Delhi
2. Engineering Fluid Mechanics –K.L. Kumar, Eurasia Publication House, Delhi
3. Mechanics of Fluid – B.S. Massey – English Language Book Society (U.K.)
4. Fluid Mechanics- Yunush A. Cengel, John M. Cimbala- MH, Delhi
5. Introduction to Fluid Mechanics and Fluid Machines – S.K. Som and G. Biswas- MH, Delhi
6. Hydraulics and Fluid Mechanics Including Hydraulic Machine- PN Modi, & SM Seth-
7. Theory and Application of Fluid Mechanics- K.Subramanya-TMH Delhi
8. A text of Fluid Mechanics – R. K. Rajput – S. Chand & Company Ltd., Delhi

Web resources

http://nptel.ac.in/courses/112105171/

http://nptel.ac.in/courses/112104118

Moocs:

https://www.mooc-list.com/course/fundamentals-engineering-exam-review-courserahttps://www.mooc-list.com/course/wind-waves-and-tides-alternative-energy-systems-coursera

Approved Vide Agenda Item No. 03 of Minutes of Meeting of Academic Council held on 11 July 17

Subject: **Structural Analysis-I**								
Program**: B.Tech. CIVIL ENGINEERING**				Subject Code: CV0402			Semester: **IV**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)-Theory**	**Continuous Internal Evaluation (CIE)-Practical**	**Total**
4	2	0	5	24/60	0	16/40	0	100

Course Objectives

1. To gain a fundamental understanding of the concepts of stress and strain by analysis of solids and structures.

2. To study engineering properties of materials, force-deformation and stress-strain relationship

3. To learn fundamental principles of equilibrium, compatibility, and force-deformation relationship, and principle of superposition in linear solids and structures

4. To analyze; determinate and indeterminate axial members, tensional members and beams to determine axial forces, torque, shear forces, bending moments, slopes and deflection.

5. To determine stress, strain, and deformation of bars, beams and springs.

6. To be able to perform structural analysis by hand computations and design axial and tensional members.

Course Outcomes

1. Analyze and design structural members subjected to tension, compression, torsion, bending and combined stresses using the fundamental concepts of stress, strain and elastic behavior of materials.

2. Utilize appropriate materials in design considering engineering properties, sustainability, cost and weight.

3. Perform engineering work in accordance with ethical and economic constraints related to the design of structures and machine parts.

COURSE CONTENT

UNIT-I [18]

Fundamentals

Types of statically determinate & indeterminate structures, static and kinematic indeterminacy of structure (2D and 3D elements), Maxwell's reciprocal theorems. Computation of internal forces in statically determinate structures.

Strain Energy

Resilience, proof resilience strain energy in tension, compression, shear, bending, torsion, gradual, sudden and impact loads

UNIT-II [19]

Slope and Deflection of Determinate Beams and Plane Trusses

Relationship between slope deflection and moment of curvature, method to calculate slope and displacement of determinate structures (Double integration method, Macaulay's method, Conjugate beam method, Moment area method, Unit load Method).

UNIT-III [20]

Influence lines for Determinate Structures

Influence lines for reactions in statically determinate structures – influence lines for member forces in pin-jointed frames – Influence lines for shear force and bending moment in beam sections – Calculation of critical stress resultants due to concentrated and distributed moving loads.

Arches

Arches as structural forms, Types of arches – Analysis of three hinged arches, parabolic and circular arches – Settlement and temperature effects.

UNIT-IV [15]

Direct and Bending Stresses

Columns subjected to direct and eccentric loads, Maximum and minimum stresses in columns, core and kernel of section, Dams subjected to hydraulic pressure, retaining walls subjected to earth pressure and chimney subjected to wind pressure.

Columns and Struts

Introduction, short and long columns, Euler's theory on columns (Assumptions and standard cases), effective length and slenderness ratio, Rankine's formula, Numerical problems.

Text Books:

1. Mechanics of Structures - S B Junnarkar& H J Shah Charotar Pub House

2. R.C. Hibbeler, Structural Analysis, Prentice Hall Publishing Company, Current Edition

Reference Books:

1. Theory of Structures – R.S.KhurmS.Chand
2. Structural Analysis 1-S S BhavikattiVikasPublising House Pvt Limited
3. Theory of Strucutres – RamamruthamDhanpatRai Publishing House
4. Theory of Structures – B.C.Punamia, Ashokkumar Jain, Arunkumar Jain LaxmiPublicatio

Web resources:

www.Nptel.ac.in

MOOCS:

https://www.mooc-list.com/course/elements-structures-edx

Subject: **Concrete Technology**								
Program**: B. Tech CIVIL ENGINEERING**				Subject Code: CV0403			Semester: **IV**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)-Theory**	**Continuous Internal Evaluation (CIE)-Practical**	**Total**
3	0	2	4	24/60	60	16/40	40	200

Course Objectives:

1. To understand the properties of ingredients of concrete
2. To study the behavior of concrete at its fresh and hardened state
3. To study about the concrete design mix
4. To know about the procedures in concreting
5. To understand special concrete and their use

Course Outcomes:

1. Test all the concrete materials as per IS code
2. Design the concrete mix using ACI and IS code methods
3. Determine the properties of fresh and hardened of concrete
4. Design special concretes and their specific applications
5. Ensure quality control while testing/ sampling and acceptance criteria

COURSE CONTENT

UNIT-I

[18]

Concrete Ingredients:

Cement, Chemical composition, hydration of cement, Types of cement, manufacture of OPC by wet and dry, process (flow charts only) Testing of cement – Field testing, Fineness by sieve test and Blaine's air permeability test, Normal consistency, testing time, soundness, Compression strength of cement and grades of cement, Quality of mixing water, Fine aggregate – grading, analysis, Specify gravity, bulking, moisture content, deleterious materials. Coarse aggregate – Importance of size, shape and texture. Grading of aggregates – Sieve analysis, specific gravity, Flakiness and elongation index, crushing, impact and abrasion tests.

UNIT-II [12]

Fresh Concrete:

Workability- factors affecting workability, Measurement of workability – slump test, flow tests, Compaction factor and Vee-Bee consistometer tests, Segregation and bleeding. Process of manufactures of concrete: Batching, Mixing, Transporting, Placing, Compaction, Curing, Finishing. Various Chemical and Mineral admixtures.

UNIT-III [14]

Hardened Concrete:

Factors affecting strength of Concrete, w/c ratio, gel/space ratio, maturity concept, Effect of aggregate properties, relation between compressive strength, and tensile strength, bond strength, modulus of rupture. Elasticity – Relation between modulus of elasticity and Strength, factors affecting modulus of elasticity, Poisson , Ratio, Shrinkage – plastic shrinkage and drying shrinkage, Factors affecting shrinkage, Creep – Measurement of creep, factors affecting creep, effect of creep.

Testing of hardened concrete

Compressive strength, split tensile strength, Flexural strength, factors influencing strength test results.

UNIT-IV [10]

Concrete Mix Design:

Concept of Mix design, variables in proportioning, exposure conditions, Procedure of mix design as per IS 10262-1982, Numerical examples of Mix Design.

Special Concrete:

Introduction and characteristics of high strength concrete, high performance concrete, fibre reinforced concrete, mass concrete, light weight and heavy weight concrete, Precast concrete, ready mix concrete.

IS Codes:

1. Bureau of Indian Standards, IS 456:2000 – Plain and Reinforced Concrete – Code of Practice, 2000.

2. Bureau of Indian Standards, IS 10262:2009 - Recommended guidelines for concrete mix design.

Text Books:

1. "Concrete Technology" - Theory and Practice, M.S.Shetty, S.Chand and Company, New Delhi, 2002.

References Books:

1. "Properties of Concrete", Neville, A.M.: ELBS, London

2. "Concrete Mix Design" - N. KrishnaRaju, Sehgal – publishers

List of Experiments:

1. Sieve Analysis For Coarse and Fine Aggregate
2. Determination Of Aggregate Crushing Value
3. Determination Of Aggregate Impact Value
4. Shape Test For Aggregate
5. Dorry Abrasion Test / Deval Abrasion Test
6. Determination Of Specific Gravity And Water Absorption Of Aggregate
7. Determination of Consistency of Standard Cement Paste
8. Determination of Initial And Final Setting Time of Ordinary Portland Cement And Effect Of Certain Admixture
9. Determination of Compressive Strength of Cement
10. Compaction Factor Test For Concrete
11. Slump Test For Concrete
12. Compression Test For Concrete Cubes
13. Split Cylinder Test For Concrete
14. Concrete Mix Design.

Subject: **Building and Town Planning**								
Program**: B. Tech CIVIL ENGINEERING**				Subject Code: CV0404			Semester**: IV**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	0	4	24/60	0	16/40	0	100

Course Objectives:

1. To understand the concept of building planning and architecture.
2. To understand the various building codes to be followed while planning a building.
3. To have the knowledge of various building components.

Course Outcomes:

After studying this subject students will be able to:
4. Comprehend local building byelaws and provisions of National Building Code in respect of building and town planning
5. Discuss various aspects of principles of planning and architecture in planning building and mass composition
6. Explain the principles of planning and design considerations to construct earthquake resistant building
7. Prepare working drawings, foundation plans and other executable drawings with proper details for residential buildings

COURSE CONTENTS

UNIT- I   **[14]**

Building planning:
Introduction to building drawing, different types of buildings and residential building, importance of site selection-climate and its influence and orientation in building planning, principals of planning and architecture, Numerical problems.

Building Bye laws:
Introduction to building bye laws, objectives of need of building bye laws, study of General Development Control Regulation (GDCR), study of National Building Code (NBC).

Planning of Residential and Public building:
Introduction to Every component part of building and its importance in planning, planning according to the requirements of client, Funds available and Site conditions, Green building and water harvesting.

UNIT- II

Planning for Natural Disaster: [18]
Introduction, Categories of building (Seismic Zone, importance of Building and SBC of soil), and General planning and design aspects.

Preparation of working drawings:
 Guidelines of preparing the drawing (Plan, Section and Elevation), Positions of various components of building, Drafting material and their utilization, Conventional signs and symbols.

Perspective drawing:
 Necessity- principals and characteristics of perspective drawing, introduction to perspective elements, classification of perspective projection, distance points.

UNIT- III   [12]

Town planning:
 Introduction, Evolution of Town planning, principals and Necessity of town planning, Growth of towns.

Surveys:
General, Necessity, Collection, Types and Uses of survey, Methods adopted for collection of data, Drawings and reports.

UNIT- IV   [10]

Elements of City planning:
 Circulation, Zoning and land use, Housing, Landscape pattern, Master plan, Town Centre, Civic centers, Shopping Centre, Town Planning Schemes, CBD.
Approved Vide Agenda Item No. 03 of Minutes of Meeting of Academic Council held on 11 July 17

Elements of Neighborhood:

Concept, Principals, Objectives and Elements of Neighborhood Planning, Slums – General, Causes, Characteristics, Effect of slums and works on improvement.

Text Books

1. Building drawing by M.G.Shah, C.M. Kale and S.Y.Patki, Tata Mcgraw Hill, New Delhi.

2. Building planning, designing and scheduling by Gurcharan Singh, Standard Book House, New Delhi.

Reference Books:

1. Planning and designing building by Y.S. Sane, Allies Book Stall.

2. Town Planning by G.K.Hiraskar, Dhanpatrai& Sons Delhi.

3. Town Planning by S.C. Rangwala, Charotar Publishing House, Anand.

4. General Development Control Regulations (GDCR) published by AUDA and GICEA.

5. National Building Code-2005 (NBC), New Delhi.

Web Resources:

1. ocw.mit.edu
2. nptel.ac.in

Subject: **Surveying-II**								
Program: **B. Tech CIVIL ENGINEERING**				Subject Code: CV0405			Semester: IV	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	0	2	4	24/60	60	16/40	40	200

Course Objectives:

1. To understand the importance of surveying in the field of civil engineering
2. To study the basics of linear/angular measurement methods like chain surveying, compass surveying.
3. To study the significance of plane table surveying in plan making
4. To know the basics of leveling and theodolite survey in elevation and angular measurements
5. To understand tachometric surveying in distance and height measurements

Course Outcomes:

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

1. carry out preliminary surveying in the field of civil engineering applications such as structural, highway engineering and geotechnical engineering
2. plan a survey, taking accurate measurements, field booking, plotting and adjustment of traverse
3. use various conventional instruments involved in surveying with respect to utility and precision
4. plan a survey for applications such as road alignment and height of the building
5. undertake measurement and plotting in civil engineering

COURSE CONTENTS

UNIT- I   [14]
Theodolite surveying: Introduction, vernier theodolite, Terminology, temporary adjustments, measuring horizontal and vertical angles, theodolite traversing, errors in theodolite work, precision in linear and angular measurements, numerical problems.

Tachometry Surveying: Introduction, Basic principles of stadia tachometry, methods, field work, errors, effect of errors on distance and elevation, precision, numerical problems.

UNIT- II   [13]
Curve Surveying: Introduction, Types of Curves (Circular, compound, reverse, transition, spiraling compound, spiraling reverse, lemniscates, vertical), Numerical problems.

Trigonometric Leveling: Introduction, basic principles of trigonometric leveling, calculation of height and distances, refraction and curvature, axis-signal correction, determining differences in elevation, numerical problems.

UNIT- III   [13]
Theory of Errors and survey Adjustments : Introduction, errors , laws of weights, principle of least squares, most probable value, method of correlates, probable and distribution error, triangulation adjustment, method of equal shifts, Numerical problems.

Engineering surveys: Introduction, route surveys, longitudinal and cross-sectional leveling, topographic surveys, city surveys, underground surveys.

UNIT- IV   [14]
Modern surveying Instruments: introduction, electromagnetic spectrum, radar, electromagnetic distance measurement, EDM equipment, Corrections, Total stations.

Modern Methods of surveying: Introduction, remote sensing, basic concepts in remote sensing, remote sensing in India, application of RM, satellite based positioning systems, GIS and its applications.

Text Book:
1. Surveying and Leveling by R Subramanian (Oxford publication)

Reference Books:
1. Surveying Vol.I, II and III by Dr. B.C. Punamia
2. Surveying and Levelling Vol. I and II by T.P Kanetkar and S.V Kulkarni
3. Surveying Vol. I, II and III by Dr. K.R. Arora
4. Surveying Vol. I and II by S. K. Duggal
5. Surveying and Levelling by N.N. Basak
6. Surveying and Levelling by R. Agor
7. Advanced Surveying by R. Agor.
8. Roy, S.K., Fundamentals of Surveying, Prentice Hall India, New Delhi
9. Subramanian, R., Surveying and Leveling, Oxford University Press, New Delhi

Web Resources:
http://www.aboutcivil.org/surveying-levelling%20II.html
http://nptel.ac.in/course.php?disciplineId=105

List of Experiments

1. Theodolite surveying.

2. Tachometric surveying.

3. Curve surveying.

4. Introduction to total station, components, temporary adjustments.

5. Horizontal and sloping distance measurement using total station.

6. Measurement of horizontal and vertical angles using total station.

7. Orientation of total station using compass and measurement of magnetic bearings. Measurement of coordinates (N, E, Z) of various point.

Subject: **Cyber Security and Intellectual Property Rights**								
Program: **B.Tech. Civil Engineering**				Subject Code: CE0407			Semester: **IV**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
1	0	0	0	60	0	40	0	100

UNIT-I [3]

Introduction:
Information Security Overview, Cyber security, Cyber security objectives and policies, Differences between Information Security & Cyber security, Cyber security Principles, Introduction of Cyber crime, Classifications of Cybercrimes.

UNIT-II [3]

Security Threats and vulnerabilities:

Overview of Security threats, Hacking Techniques, Password Cracking, Insecure Network connections, Malicious Code, Programming Bugs, Cyber crime and Cyber terrorism, Information Warfare and Surveillance. Application security (Database, E-mail and Internet).

UNIT-III   [3]

Overview of Security Management:

Overview of Security Management , Security Policy , Security Procedures and Guidelines , Risk Management , Security Laws**,** System Security (Desktop, email,web), **I**ntrusion Detection Systems, Security Technology-Firewall and VPNs ,Backup Security Measures.

UNIT-IV   [3]

Cyber law- Intellectual property right:

Introduction, Objectives of Intellectual property law, Types of IPR, Advantages of IPR, IPR in India, Offences and Penalties.

Text Books

1. "Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", Nina Godbole, Sunit Belapur, Wiley India Publications, April, 2011

Reference Books

1. Charles P. Pfleeger, Shari Lawerance Pfleeger, "Analysing Computer Security ", Pearson Education India.
2. .K. Pachghare, "Cryptography and information Security", PHI Learning Private Limited, Delhi India.
3. Dr. Surya Prakash Tripathi, Ritendra Goyal, Praveen kumar Shukla ,"Introduction to Information Security and Cyber Law" Willey Dreamtech Press.
4. Schou, Shoemaker, " Information Assurance for the Enterprise", Tata McGraw Hill.
5. CHANDER, HARISH**,"** Cyber Laws And It Protection **"** , PHI Learning Private Limited ,Delhi ,India

5TH SEMESTER

SR NO	CODE	SUBJECTS	TEACHING SCHEME			CREDITS	HOURS	EXAMINATION SCHEME					
			L	T	P			THEORY			PRACT		TOTAL
								CIE					
								MID	IE	ESE	CIE	ESE	
1	CV0501	DESIGN OF RC STRUCTURES	4	2	0	5	6	30	10	60	0	0	100
2	CV0502	SOIL MECHANICS	3	0	2	4	5	30	10	60	40	60	200
3	CV0503	HIGHWAY ENGINEERING	3	0	2	4	5	30	10	60	40	60	200
4	CV0504	STRUCTURAL ANALYSIS-II	4	2	0	5	6	30	10	60	0	0	100
5	CV0505	ENGINEERING HYDROLOGY	3	2	0	4	5	30	10	60	0	0	100
6	CV0506	ENVIRONMENTAL ENGG-I	3	0	2	4	5	30	10	60	40	60	200
7	SH0507	TECHNICAL COMMUNICATION AND SOFT SKILL	1	0	0	0	1	30	10	60	0	0	100
TOTAL			**21**	**06**	**06**	**26**	**33**	**210**	**70**	**420**	**120**	**180**	**1000**

B-TECH CIVIL ENGINEERING, SEMESTER –V TEACHING & EXAMINATION SCHEME (BOS-14/06/2017) WITH EFFECT FROM JULY 2017

Approved Vide Agenda Item No. 03 of Minutes of Meeting of Academic Council held on 11 July 17

Subject: Design of RC Structures								
Program: **B.Tech. Civil Engineering**				Subject Code: CV0501			Semester: **V**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	0	4	24/60	0	16/40	0	100

Course Objectives:

1. To learn the fundamentals of reinforced concrete structural properties and behaviors.

2. To become informed about the optimum design criteria and procedures.

3. To understand the basic principles and design methods of reinforced concrete members.

4. To clarify code requirements and specifications and understand the background of code

Course Outcomes

1. Identify the typical failure modes of RC building

2. Develop the ability to analyze and design simple reinforced concrete building frames.

3. Apply the principles, procedures and current Indian code requirements to the analysis and design

4. Assess loads, prepare layout, analyze, design and detail of various structural elements for RC framed structure

COURSE CONTENTS:

UNIT-I   **[9]**

Introduction to Reinforced Cement Concrete (RCC): Properties of Concrete and Reinforcing Steel, Introduction to Working stress and Limit state methods, Characteristic and Design Value and Partial Safety Factors, Loads and Load Factors, Load Combinations.

Design Philosophies for Reinforced Cement Concrete (RCC): Limit State of Flexure, Design of Singly Reinforced Beams, Design of Doubly Doubly Reinforced Beams, Concept of Flanged Beam or T-Beam..

UNIT-II [15]
Limit State of Shear: Nominal Shear Stress, Design Shear Strength of Concrete, Minimum Shear Reinforcement, Design of Shear Reinforcement, Design of Beams for Shear.

Limit State of Torsion: Reinforcement in members subjected to Torsion, Design of Beams for torsion. Bond, Development Length, Limit State of Serviceability: Deflections and Crack Width.

UNIT-III [15]
Solid Slabs: Introduction to Yield Line Theory and simple problems, One-way Slab, Simply Supported One-way Slab, Design of One Way Slab, Two Way Slabs, Simply Supported Two-Way Slab, Design of Two-Way Slab Reinforcement detailing for One way and Two Way Slabs.

Design of Staircases: Classification of Stairs, Terms Used, Design Requirement d for Stair, Design of Transversely and Longitudinally Supported Staircase.

Load Calculation: Loads on Slabs, Loading on Beams from One-way and Two-way Slab, Wall Loads and Self-weight of Beams, Unit Loads

UNIT-IV [15]
Limit State of Compression: Minimum eccentricity, Effective Length of Compression Members, Slender Limits for Columns, Design of Short axially loaded columns in compression, Members subjected to combined Axial load and Uniaxial bending, Members subjected to combined Axial Load and Biaxial bending, Design of Slender compression members

Design of Foundations: Classification of Foundations, Types of Footings, General Soil Design Consideration, General Structural Design Consideration, Transfer of Load at base of Column, Design of Axially Loaded Pad Footings, Design of Eccentrically Loaded Footings.

Text Books:

4. Dr. B. C. Punmia, Ashok Kr. Jain, Arun Kr. Jain, 'Reinforced Concrete Structures – Volume-I', Laxmi Publication.
5. Dr. H. J. SHAH, 'Reinforced Concrete (Elementary Reinforced Concrete) Volume-I', Charotar Publishing House Pvt. Ltd., 10th Edition.

Reference Books:

4. P. C. VARGHESE, 'Limit State Design of Reinforced Concrete', Prentice Hall India (PHI), Second Edition.
5. S. U. Pillai and D. Menon, Reinforced Concrete Design, Tata Mcgraw-Hill 3rd Edition, 2009.
6. M.L. Gambhir, Fundamentals of Reinforced Concrete Design, Prentice Hall India, 2006
7. Use of Design Aids (Sp16) — Use of Sp34.

Web resources:

4. nptel.ac.in/courses/105105105/
5. https://ocw.mit.edu/courses/civil-and-environmental-engineering/1-054-mechanics-and-design-of-concrete-structures-spring-2004/lecture-notes/
6. www.readorrefer.in/article/Limit-State-Of-Collapse--Compression_3742
7. https://www.vssut.ac.in/lecture_notes/lecture1424715726.pdf

MOOCs:

Subject: Soil Mechanics								
Program: **B.Tech. Civil Engineering**				Subject Code: CV0502			Semester: **V**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	0	2	4	24/60	24/60	16/40	16/40	200

Course Objectives:

1. The course will help determination of various soil parameters theoretically and experimentally based on laws of mechanics

2. This course will provide good understanding of various index (preliminary) and engineering properties of soil

3. This course will provide determination of soil through various methodology and application for design of shallow and deep foundation systems for various civil engineering structures.

4. The course also discusses details of foundations, its selection procedures as per soil conditions

Course Outcomes

1. The course covers various topics like compaction, shear strength, consolidation, earth pressure, stress distribution which gives insight to students to analyze soil parameters based on application and need of project site.

2. Student will able to understand about soil testing procedures, experimentation techniques and related issues.

3. Student will learn Simulation of mechanics on soil as a material to understand its behaviour before failure and estimating its permissible values.

4. Students will learn the details of foundations, its selection procedures as per soil conditions and various modifications available for various degrees of loads.

COURSE CONTENTS:

UNIT-I [12]

Introduction and Basic Properties of Soil: Soil 3 Phase system, Volume Mass relationships, Volume weight relationships, Water content Determination, Dry density determination, Sp Gravity, Mass Density and Relative density

Soil Classification System: Particle size classification, Classification systems: AASHTO, USC, ISC, Field Identification of soil

Soil Classification: Particle size analysis: Sieve Analysis (Coarse grained soil) and Sedimentation Analysis (Fine grained soil)

a) Sieve Analysis, Particle size Distribution curve and its uses, Coefficient of Uniformity and Curvature.

b) Sedimentation Analysis: Stokes Law, Theory of Sedimentation, Hydrometer Method, Combined Sieve and Sedimentation Curve.

c) Consistency Limits: Liquid Limit and Plastic limit and its determination as per IS 2720,Shrinkage Limit and its determination, Consistency Indices, Flow and Toughness Index, Sensitivity, Thixotropy, Activity, Uses of Consistency Limits.

UNIT-II [15]

Compaction: Objective/Importance of Compaction, Difference between Standard Proctor test and Modified Proctor test and its applications, Effect of Compaction on properties of soil, Factors affecting Compaction, Methods of compaction used in the field, Significance of Placement water content and Relative compaction. Numerical for finding OMC and Dry density with the help of graphs

Consolidation: Objective of Consolidation, Initial, Primary and Secondary consolidation, Spring Analogy for Primary Consolidation, Consolidation Test and Results, Determination of coefficient

of Consolidation Cv(Square root of Time fitting method, log t Method), **Pre-consolidation**: Causes and Determination.

Practical Case Studies: 2 different case studies with two different methods and Numericals (Minimum 10 covering all the subtopics)

UNIT-III [16]

Permeability: Definition and objective of permeability, Darcy's law and its validity, Determination of Coefficient of Permeability: Constant Head and Falling Head Test, Factors affecting Permeability, Field Test for Permeability (Pumping In and Pumping out test), Numerical.

Stresses due to applied load: Causes of stresses and its significance in design of various geotechnical engineering aspects, Stress Strain curve of soil, typical values of E for different soil, Geostatic stress: Vertical and Horizontal stress

Vertical stresses due to concentrated load (Boussinesq's Solution and its limitations),Isobar diagram and its relevance, Vertical stress under circular and rectangular area, Basics of Newmark's chart, Westgaard's solution to find stresses, Approximate methods to find out stresses (Equivalent point load and 2:1 load distribution method) **,**Concept of Effective stress and its significance.

UNIT-IV [12]

Shear Strength: Introduction, Mohr's Circle and characteristics of Mohr's circle, Mohr Coulomb theory and Revised Mohr Coulomb theory, Different types of shear test with its advantages and limitations: (Direct shear, Triaxial with different drainage conditions, Unconfined compression strength test, Vane shear test), Mohr coulomb failure criterion, Modified failure envelope, Shear characteristics of cohesive and cohesion less soil.

Concept of Liquefaction and its hazards

Text Books:
1. Soil Mechanics and Foundation Engineering By: Dr K.R.Arora

Reference Books:

1. Soil Mechanics By: B.C. Punmia

2. Soil Mechanics and Geotechnical Engineering By: V.N.S. Murthy

3. Foundation Engineering By: B.M. Das

Web resources:

1. nptel.ac.in/courses/105103097

2. https://ocw.mit.edu/courses/civil-and-environmental-engineering/1-361-advanced-soil-mechanics-fall-2004/index.htm

3. http://engineering.siu.edu/civil/facilities/teaching-labs/soil-mechanics.php

4. https://web.njit.edu/~knoxt/ugcourses/outlines/ce341.ht

MOOCs:

1. https://www.mooc-list.com/instructor/stephen-fityus

List of Practical:

1. To Determine the Consolidation Characteristics of a Soil Specimen
2. To Determine Shear Parameters of Sandy Soil Using Direct Shear Test
3. To determine shear strength of Cohesive soil using vane shear test.
4. To Determine the Unconfined Compressive Strength of Cohesive Soil
5. To Determine the Compaction Characteristics of a Soil Sample By Proctor's Test
6. To Determine the Strength of the Soil Using Triaxial Test.
7. To Determine the Swell Pressure of Cohesive Soil (Black Cotton Soil)
8. To Determine The Swell Index of Cohesive Soil.
9. To determine the permeability of a soil specimen by the constant head permeameter.
10. To determine the permeability of a soil specimen by the falling head permeameter.

Subject: Highway Engineering								
Program: **B.Tech. Civil Engineering**				Subject Code: CV0503			Semester: **V**	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)-Theory**	**Continuous Internal Evaluation (CIE)-Practical**	**Total**
3	0	2	4	24/60	24/60	16/40	16/40	200

Course Objectives:

1. To introduce students with the principles and practices of transportation engineering which focuses on traffic and transportation engineering and highway engineering.

2. To enable the students to have a strong analytical and practical knowledge of Planning, Designing and solving the transportation problems.

3. To introduce the recent advancements in the field of Sustainable Urban

4. Development, Traffic Engineering and Management, Systems Dynamics Approach to Transport Planning, Highway Design and Construction, Economic and

5. Environment Evaluation of Transport Projects.

Course Outcomes

1. Understand the factors influencing road vehicle performance characteristics and design.

2. Apply basic science principles in estimating stopping and passing sight distance requirements.

3. Understand basic traffic stream parameters and models, traffic flow models, and queuing theory.

4. Design basic horizontal alignment of the highway

5. Design of flexible pavement layers.

COURSE CONTENTS:

UNIT-I [15]

Highway Planning and Development: Highway planning in India, Development, Rural and urban roads, **Road** departments in India, Road classification, Road authorities i.e. IRC, CRRI, NHAI, etc.

Field Surveys: Reconnaissance, Aerial surveys, Location surveys, Location of bridges, Problems in rural and urban areas.

Highway Geometric Design: Topography and physical features, Cross section elements like carriageway **width**, formation width, right of way, etc., friction, Light reflecting characteristics, roughness, camber, sight distances, horizontal alignment, design speed, minimum radius, super-elevation, transition curve, gradients, design of summit and valley curves, software used in highway geometric design like MX-Road.

UNIT-II   [13]

Road Material: Sub grade soil and its classification, CBR and Plate load test, Aggregates and their types, physical and engineering properties, Fillers, Bitumen, Characteristics, Emulsions and cutbacks, Basic tests on all materials, Bituminous Paving Mixes (Marshall Mix Design)

Bituminous Surface Treatments: Prime Coats, Tack Coats, Surface Dressing, Seal Coats, Colour Coats and Non-Skid Coats, Fog Spray, Built up Spray Grout.

Soil Stabilization: Introduction, Mechanical Soil Stabilisation, Soil-Cement Stabilisation, Soil-Lime Stabilisation, Stabilisation of soil using Bituminous Material.   .

UNIT-III   [15]

Highway Pavements: Functions and Desirable Characteristics of Pavement, Pavement Courses, Pavement Types, Comparison of Rigid and Flexible Pavements, Factors Affecting Pavement Design, Design of Flexible pavement, Design of rigid pavement.

Low Cost Roads: Stabilized earth, Gravel roads, W.B.M. roads, High Cost Roads: bituminous roads, cement concrete roads.

Overlay Design and Construction: Need for Overlays, Different types of Overlays Design, Overlay Design by Benkelman Beam Deflection Studies.

UNIT-IV [15]

Highway Maintenance: Introduction, Pavement Failures, Maintenance of Highways, Pavement Evaluation, Strengthening of Existing Pavements.

Highway Drainage: Surface and Subsurface Drainage arrangements and design.

Roadside Developments & Administration and Finance: Arboriculture, street lighting, Financing of road projects, administration of roads, PPP models, Road safety audit.

Text Books:

1. Dr. S.K. Khanna and Dr. C.E. G. Justo, "Highway Engineering", Nem Chand & Bros., Roorkee.

Reference Books:

1. L.R. Kadiyali, "Highway Engineering", Khanna Publishers, New Delhi.
2. Dr. S.K. Khanna and Dr. C.E. G. Justo, "Highway Engineering", Nem Chand & Bros., Roorkee.
3. S.K. Sharma, "Principles, Practice and Design of Highway Engineering", S. Chand & Co., New Delhi.
4. IRC – 37 "Guidelines for Design of flexible Pavements", IRC, New Delhi, 2001.
5. IRC: 58, 2002: "Guidelines for the Design of Plain Jointed Rigid Pavements for Highways", IRC, N. Delhi, December, 2002.

Web resources:

1. https://ocw.mit.edu/courses/transportation-courses
2. http://nptel.ac.in/courses/105105107/
3. https://www.civil.iitb.ac.in/tvm/1100_LnTse/401_lnTse/plain/plain.html
4. http://www.aboutcivil.org/highway-transportation-engineering-lectures-notes.html

MOOCs:

1. https://www.mooc-list.com/course/highway-engineering-openlearning

List of Experiments

1. Determination of Aggregate Impact Value
2. Determination Of Aggregate Crushing Value
3. Shape Test For Aggregate
4. Dorry Abrasion Test/Deval Abrasion Test
5. Aggregate Stripping Value Test
6. Determination Of Specific Gravity And Water Absorption Of Aggregate
7. California Bearing Ratio Test
8. Penetration Test
9. Softening point test for Bitumen.
10. Ductility test for Bitumen
11. Flash and Fire Point test for Bitumen.
12. Specific gravity test for Bitumen
13. Marshall Stability Test on Bituminous Mixes.

Subject: Structural Analysis-II								
Program: **B.Tech. Civil Engineering**				Subject Code: CV0504			Semester: **V**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
4	2	0	5	24/60	0	16/40	0	100

Course Objectives:

1. To extend the concepts taught in Structural Analysis I (Determinate Structures) to indeterminate structures.
2. To enable the student get a feeling of how real-life structures behave**.**
3. The purpose of this course is to introduce the concepts of Flexibility and Stiffness methods of analysis
4. To introduce the fundamentals of Structural Dynamics

Course Outcomes

After learning the course the students should be able to:

1. Apply equilibrium and compatibility equations to determine response of statically determinate and indeterminate structures.

2. Determine displacements and internal forces of statically indeterminate structures by classical, iterative and matrix methods.

3. Determine internal forces and reactions in determinate and indeterminate structures subjected to moving loads.

COURSE CONTENTS:

UNIT-I   [13]
INFLUENCE LINES FOR INDETERMINATE STRUCTURES:
Introduction – Muller Breslau Principle & its application to determinate structures – Muller Breslau Principle extension to indeterminate structures – Numericals.
BEAMS CURVED IN PLAN:
Introduction – Solving for moments – shear and torsion – Circular beams on several supports – Numericals.

UNIT-II   [15]
PLASTIC ANALYSIS OF STRUCTURES:

Statically indeterminate axial problems – Beams in pure bending – Plastic moment of resistance – Plastic modulus – Shape factor – Load factor – Plastic hinge and mechanism – Plastic analysis of indeterminate beams and frames – Upper and lower bound theorems.

APPROXIMATE ANALYSIS OF BUILDING FRAMES:

Introduction – Lateral Loads on Building Frames: Portal Method and Cantilever Method Problems

UNIT-III   [16]
FLEXIBILITY METHOD:

Equilibrium and compatibility – Determinate vs Indeterminate structures – Indeterminacy – Primary structure – Compatibility conditions – Analysis of indeterminate pin-jointed plane frames– continuous beams – rigid jointed plane frames (with redundancy restricted to two).

STIFFNESS METHOD:

Element and global stiffness matrices – Analysis of continuous beams – Coordinate transformations – Rotation matrix – Transformations of stiffness matrices, load vectors and displacements vectors – Analysis of pin-jointed plane frames and beams.

UNIT-IV   [10]
FINITE ELEMENT METHOD:

Introduction – Discretization of a structure – Displacement functions – Truss element –Beam element – Plane stress and plane strain - Triangular elements.

NON LINEAR ANALYSIS:

Introduction to geometric and material non-linearity, basic concepts and effects of non-linear aspects on structural behavior

Text Books:
1. BhaviKatti, S.S, "Structural Analysis – Vol. 1 Vol. 2", Vikas Publishing House Pvt. Ltd., New Delhi, 2008
2. Structural Analysis – II, Dr. R Vaidyanathan, Dr. P. Perumal, Laxmi Publications
3. Basic Structural Analysis – C S Reddy

Reference Books:
1. Gere, G. M. and Weaver, Jr. W., Matrix Analysis of Framed Structures, CBS Publishers.
2. Pandit & Gupta, Matrix Analysis of Structures, Tata McGraw Hill Publications (2003).
3. Structural Analysis, R C Hibler, Pearson 2012.

Web resources:
1. http://www.aboutcivil.org/structural-engineering.html
2. http://nptel.ac.in/courses/105101085/

3. https://ocw.mit.edu/courses/civil-and-environmental-engineering/1-051-structural-engineering-design-fall-2003/lecture-notes/
4. https://www.kullabs.com/classes/subjects/units/lessons/notes/note-detail/7811

MOOCs:
1. https://www.edx.org/course/elements-structures-mitx-2-01x-1

Subject: Engineering Hydrology								
Program: **B.Tech. Civil Engineering**				Subject Code: CV0505			Semester: **V**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)-Theory**	**Continuous Internal Evaluation (CIE)-Practical**	**Total**
3	2	0	5	24/60	0	16/40	0	100

Course Objectives:
1. The knowledge of hydrology is prerequisite for the irrigation engineering and also for design of hydraulic structure. So one of the objective of this course is to impart the knowledge of hydrology that deals with the occurrence, distribution, movement and properties of water on the earth
2. To impart the knowledge of various irrigation techniques , requirements of the crops
3. To learn about distribution systems for canal irrigation, design of unlined and lined irrigation canals design sediment problems associated with canal

Course Outcomes
1. Various components of hydrologic cycle that affect the movement of water in the earth
2. Various Stream flow measurements technique
3. Students will learn the concepts of movement of ground water beneath the earth
4. They will able to understand the basic requirements of irrigation and various irrigation techniques, requirements of the crops
5. Distribution systems for canal irrigation and the basics of design of unlined and lined irrigation canals design

COURSE CONTENTS:
UNIT-I [14]
Introduction to Hydrology: Need Of water resources projects, Preliminary aspects of Environmental Impact Assessment of Water Resources Projects, Hydrologic cycle, scope and application, hydro-metrology, hydrologic equation, hydrologic models, water resources engineering

Precipitation and Abstractions: Mechanism of precipitation, types and forms of precipitation, characteristics of precipitation in India, measurement techniques, rain gauge network, estimation of missing data, test for consistency of rainfall record, rainfall hyetograph, rainfall mass curve, areal average rainfall, intensity duration curves, evaporation, factors affecting evaporation, evaporimeters, estimation of evaporation, transpiration, evapotranspiration, measurement of evapotranspiration,

evapotranspiration equations, infiltration ,infiltration capacity, measurement of infiltration infiltration indices**.**

UNIT-II   [16]

Stream Gauging: Site selection for stream gauging, direct methods of discharge measurements

Run Off And Hydrograph: Introduction, Run Off characteristics of streams, computation of runoff, rainfall-runoff relationships, components of hydrograph and factors affecting shape of hydrograph, base flow separation, effective rainfall hyetograph, unit hydrograph theory, derivation of unit hydrograph, synthetic unit hydrograph.

UNIT-III   [09]

Ground Water Hydrology: Occurrence, distribution of ground water, specific yield of aquifers, movement of groundwater, Darcy's law, permeability, safe yield of a basin, compressibility of aquifer, storage coefficient, specific storage, hydraulics of wells under steady & introduction to unsteady condition in confined and unconfined aquifers, yield of wells, pumping and recuperation tests, types of tube wells.

UNIT-IV   [15]

Flood: Computation of design flood using rational, empirical, unit hydrograph and flood frequency methods (Gumbel's method)
Flood Routing: Reservoir and Channel flood routing method

Text Books:
1. Subramanya, K., Engineering Hydrology, Tata McGraw Hill, New Delhi

Reference Books:
1. Raghunath, H.M., Hydrology – Principles, Analysis and Design, 1986, Wiley Eastern Ltd.
2. Raghunath, H.M., Groundwater, 1987, Wiley Eastern Ltd., New Delhi
3. Garg, S.P., Groundwater and Tube Wells, 1993, Oxford & IBH Publishing Co.
4. Modi, P.N., Irrigation Water Resources and Water Power Engineering, Standard Book House, New Delhi.

Web resources:
1. http://www.aboutcivil.org/engineering-hydrology-lectures-notes.html
2. nptel.ac.in/courses/105103026/
3. https://ocw.un-ihe.org/mod/folder/view.php?id=511

MOOC'S

1. https://www.mooc-list.com/course/water-resources-management-and-policy-coursera

Subject: Environmental Engineering–1								
Program: **B.Tech. Civil Engineering**				Subject Code: CV0506			Semester: **V**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	0	2	4	24/60	24/60	16/40	16/40	200

Course Objectives:
1. To explain Importance of water supply engineering
2. Identify sources of water for potable use and to Calculate water demand for future population
3. To gain an understanding of the effects of wastewater discharges on the aquatic environment
4. To acquire an understanding of the fundamental scientific concepts and detailed technical understanding of the technologies required for domestic and industrial wastewater treatment
5. Understand the principles involved in the design and selection of appropriate unit processes

Course Outcomes
1. Understand water quality concepts and their effect on treatment process selection
2. Appreciate the importance and methods of operation and maintenance of water supply systems
3. Students will able to estimate the population of a given area
4. Students will understand the principles involved in the design and selection water coveyence structures.

COURSE CONTENTS:
UNIT-I [14]
General: Environment and its components, Water Resources, Importance of water, Suitability of water, Role of an Environmental Engineer, Historical overview.

Water Demand: Selection of Sources of water, Water Demand, Types of Water Demand, factors affecting water consumption, Fluctuations in water demand, Peak factor, Population Forecasting methods, Design flow, Design periods, Effects of variations in demand on the design capacities for various water supply components

UNIT-II [14]
Quality of Water: The hydrological cycle, Water quality parameters, types of impurities in water- Physical, Chemical and Biological, Drinking Water Standards as per BIS

Collection and Conveyance of Water: Intake structures, Jack wells, Hydraulics of conduits, selection of pipe materials, pipe joints, Head loss through Pipes, Design of gravity main and pressure main

Pumps and Pumping: Necessity of Pumping, Types of Pumps, Selection of Pumping unit, Determination of BHP of Pumps.

UNIT-III   [14]
Treatment of Water: Historical overview of water treatment, Water Treatment Processes, Treatment plant for water, Selection of treatment train, selection of treatment plant site, design criteria for treatment plant units and their design.

UNIT-IV   [12]
Distribution of Water: Types of Storage and distribution reservoirs,Method of distributing water, types of distribution systems and their components, Different types of Valves, Capacity and Pressure requirements, Design of distribution systems, Hydraulic analysis of distribution systems, Hardy Cross & Newton's method

Text Books
   1. Santosh kumar Garg, "Water Supply Engineering", Environmental Engineering (vol.1); Khanna Publishers

Reference Books:
1. B.C.Punmia, Ashok Jain and Arun Jain, "Environment engineering-1, Water Supply Engineering", Laxmi Publications (P) Ltd. New Delhi
2. A.M.Malek and B.R.Shah, Water And Wastewater Engineering , Mahajan Publishing House
3. H.S. Peavy, D.R. Rowe and G. Tchbanoglous, "Environmental Engineering", McGraw Hill International Edition.
4. M.L. Davis and D.A. Cornwell, "Introduction to Environmental Engineering", McGraw Hill International edition.
5. Metcalf and Eddy "Wastewater Engineering: Treatment, disposal Reuse", Tata-McGraw Hill, New Delhi.
6. G.S.Birdie, "Water supply and sanitary engineering",
7. Viessman, Clark and Hammer, "Water supply and pollution control", Prentice Hall
8. Clair sawyer , Perry McCarty,Gene Parkin, "Chemistry for Environmental Engineering and Science", McGraw hill Education
9. Introduction to environmental engineering and science by Gilbert masters
10. P.N.Modi, "Water supply engineering: volume 1",Standard book house

Web resources:

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1. http://nptel.ac.in/courses/103107084/
2. civilengineering-notes.weebly.com/water-supply-engineering.html
3. https://ocw.mit.edu/...engineering/1...water...wastewater...engineering.../lecture-notes
4. www.civilenggforall.com › Water supply engineering

MOOC'S

https://www.mooc-list.com/course/natural-attenuation-groundwater-contaminants-new-paradigms-technologies-and-applications

List of Experiments
1. Determination of pH
2. Determination of Turbidity
3. Determination of Electrical Conductivity
4. Determination of Alkalinity
5. To determine the concentration of residual chlorine in the given water sample
6. To find the amount of chlorides present in the given water sample
7. Determination of acidity of Water
8. Determination of Hardness of water sample.

Subject: **Technical Communication and Soft Skills**								
Program: **B.Tech. All Branches**				Subject Code: **SH0507**			Semester: **V**	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)- Theory	Continuous Internal Evaluation (CIE)- Practical	Total
1	0	0	0	60	0	40	0	100

Course Objectives:

- To enable students to interact with a degree of fluency and spontaneity that makes regular interaction with fluent English speakers quite possible without strain for either party.
- To understand with ease virtually everything heard or read.
- To express themselves spontaneously, very fluently and precisely, differentiating finer shades of meaning even in the most complex situations.
- To understand sentences and frequently used expressions related to areas of most immediate relevance (e.g. very basic personal and family information, shopping, local geography, employment).
- To communicate in simple and routine tasks requiring a simple and direct exchange of information on familiar and routine matters
- To understand the main ideas of complex text on both concrete and abstract topics, including technical discussions in their field of specialization.

Course Content:

	Sr. No.	Content
Listening	1	**Listening: Cloze test**
	2	**Listening to Talks (BBC, TED) 1**
	3	**Listening to Talks 2**

Speaking	4	**Phonetics: Sounds & Symbols & Accent Patterns**
	5	**Vocabulary Games: Intermediate Level**
	6	**Vocabulary Games: Intermediate Level**
	7	**Building Dialogues: Situational Conversation**
	8	**Role Play**
	9	**Group Discussion**

Reading	10	**How to Read effectively**
	11	**Reading to Remember : SQ3R**

Writing	12	**Grammar Intermediate: Sentence Transformation**
	13	**Common Errors in English**
	14	**Précis Writing**
	15	**Effective Paragraph Writing**

6TH SEMESTER

B-TECH CIVIL ENGINEERING, SEMESTER –VI TEACHING & EXAMINATION SCHEME (BOS-14/06/2017) WITH EFFECT FROM JULY 2017

S R N O	CODE	SUBJECTS		TEACHING SCHEME			CREDITS	HOURS	EXAMINATION SCHEME					
									THEORY			PRACT		
									CIE					
				L	T	P			MID	IE	ESE	CIE	ESE	TOTAL
1	CV0601	DESIGN OF STEEL STRUCTURES		4	2	0	5	6	30	10	60	0	0	100
2	CV0602	FOUNDATION ENGINEERING		3	0	2	4	5	30	10	60	40	60	200
3	CV0603	ENVIRONMENTAL ENGG-II		3	0	2	4	5	30	10	60	40	60	200
4	CV0604	IRRIGATION AND WATER RESOURCE ENGG		4	2	0	5	6	30	10	60	0	0	100
5	CV0605	ESTIMATING AND COSTING	Elective-I	3	2	0	4	5	30	10	60	0	0	100
6	CV0606	BRIDGE ENGINEERING												
7	CV0613	MOOC'S												
8	CV0607	GREEN BUILDING & SUSTAINABLE DEVELOPMENT	Elective-II	3	2	2	4	5	30	10	60	0	0	100
9	CV0608	TRAFFIC ENGINEERING												
10	CV0609	PRESTRESSED CONCRETE												
11	CV0610	AIR POLLUTION CONTROL												
12	CV0611	SOIL EROSION & CONSERVATION												
13	CV0612	GROUND WATER ENGINEERING												

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14	SH0607	ADVANCED TECHNICAL COMMUNICATION AND SOFT SKILL	1	0	0	0	1	30	10	60	0	0	10
		TOTAL	**21**	**10**	**04**	**27**	**35**	**210**	**70**	**420**	**80**	**120**	**900**

Subject: **Design of Steel Structures**

Program: **B.Tech. Civil Engineering**	Subject Code:CV0601	Semester: **VI**

Teaching Scheme				Examination Evaluation Scheme				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)-Theory**	**Continuous Internal Evaluation (CIE)-Practical**	**Total**
4	2	0	5	24/60	0	16/40	0	100

Course Objectives:

1. To provide detailed knowledge of design and detailing of steel structures as per the Indian standards.

2. To make students familiar with adaptation of steel structures in real life situations.

Course Outcome:

3. Calculate Dead Load, Live Load and Wind Load on panel points of a Roof Truss as per IS-875-1984.

4. Design Bolt Connection of Angle Section to Gusset Plate & Welded Connection of Angle Section to Gusset PlateLacing System (Single or Double) for Built up Column , Batten System for Built up Column , laterally Restrained Simply Supported beamPurlin made upAngle SectionSlab Base Foundationunder Axially Loaded Column made up of Single H Section

5. Analyze and Design Axially Loaded Tension Member made up of Angle SectionStrut made up of Angle Section , Axially Loaded Column

COURSE CONTENTS:

UNIT-I [18]

Types of Structural Steel, Mechanical Properties of Steel, Structural Steel Products (Rolled Sections, Built-up Sections), Hollow Sections, Cold-formed Steel Sections, Stainless SteelDesign Philosophies: Working Stress Method, Ultimate Load Design, Limit States Design. Characteristic and Design Value and Partial Safety Factors, Loads, Load Factors and Load Combinations (Dead Loads, Live Loads, Wind Loads, Earthquake Loads etc. According to IS 875 Part 1, 2, 3 and IS 1893 Part-1. Types of Tension Members, Slenderness Ratio, Design of Tension Members, Indian Code Provisions for Design of Tension Member.Basics of Plastic Theory, Buckling Behaviour of Structural Steel, Cross-Section Classification.

UNIT-II [18]

Design of Compression Members: Classification of Cross-Section, Effective Length of Compression Members, Limiting Slenderness Ratio, Buckling curve as per IS 800:2007, Design Example. Built-up compression members, Lacing, Battening, Compression members composed of two components back to back, Design Examples

Design of Beams: Classification of Cross-Section, Lateral Torsional Buckling, Effective Length, Design of Laterally Supported Beams, Design of Laterally Unsupported Beams, Shear Strength of Steel Beams and Design Example.

UNIT-III [18]

Bolted Connections: Rivets and Riveted connections, Bolted connections, Behaviour of bolted joints, Pin connection, Simple connection, Moment resisting connection, Beam to beam connections, Beam and Column Splices.

Welded Connections: Welding Process, Types, Properties of welds, Types of joints, Weld symbols and specifications, Design of welds, Simple joints, Moment resistant connections, Continuous Beam to Column connections, Continuous Beam to beam connections.

UNIT-IV [18]

Design of Members Subjected to Combined Bending and Compression

Types of column bases, Slab Base, Gusseted Base, Design of moment resisting base 07plate, Foundation bolts.

Industrial Buildings: Roof trusses, roof and side coverings, design loads, design of purlin, girt, eave struts and elements of truss, end bearing.

Text Books:

6. N. Subramanian, 'Design of Steel Structures', Oxford University Press.

Reference Books:

1. S. K. Duggal; LIMIT STATE DESIGN OF STEEL STRUCTURES books, TwelfthReprint, Tata Mcgraw Hill
2. Dayaratnam, P., "Design of Steel Structures", Second edition, S. Chand & Company, 2003.
3. S.S. Bhavikatti; "Design of Steel Structures" (By Limit State Method As Per Is: 8002007).

Web resources:

1. http://nptel.ac.in/courses/105106113/3_multi_storey/2_loading.pdf
2. http://nptel.ac.in/courses/105106113/2_industrial_building/2_loads.pdf
3. http://nptel.ac.in/courses/105106113/2_industrial_building/5_plastic_analysis.pdf
4. http://nptel.ac.in/downloads/105106112/
5. https://www.slideshare.net/babunaveen/steel-connections
6. https://www.slideshare.net/abhishekmewada54/ppt-of-trusses

MOOCs:

Subject: **Foundation Engineering**								
Program: **B.Tech. Civil Engineering**				Subject Code: CV0602			Semester: **VI**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	-	2	4	24/60	24/60	16/40	16/40	200

Course Objectives:

The objective of this course is to introduce different foundation systems and designs.

Course Outcome:

1. To know the importance to plan and undertake site investigation.

2. To learn about types and purpose of different foundation system.

3. To design shallow and deep foundation

4. Analyze various earth pressure theories and design various retaining structures.

5. Understand the need of various ground improvement techniques and able to select suitable method for the same.

6. Solve different bearing capacity and settlement examples based on various methods.

COURSE CONTENTS:

UNIT-I   **[10]**

Site Investigation

Introduction, Stages in Sub – surface Exploration, Depth of exploration, Openexcavations, methods of exploration, Borings and methods of borings, Types of samples,design features affecting the sample disturbance, Different types of samplers, StandardPenetration test and its corrections, Cone penetration test (static cone , dynamic conepenetration test), In-situ vane shear test, In-situ testing using a pressure meter, Geophysical Methods (Seismic Methods, Electrical resistivity methods) and theirlimitations, sub soil investigation reports. Scalars & Vectors, Dot and cross products, Co-ordinate systems and conversions

UNIT-II [17]

Earth Pressure Theories and designing of retaining wall

Introduction, Different types of lateral earthpressure, Rankine's earth pressure theories, Derivation of Earth pressure at rest,Rankine's earth pressure for cohesive and cohesion less soil, Coulombs wedgetheory, Numerical based on above concepts.

Design of Retaining Wall

Introduction, types of retaining wall,principles of the design of retaining walls, modes of failure of retaining wall,Design of gravity and cantilever retaining wall, Illustrative examples &Problems.Faraday's law, Displacement current, Maxwell's equations in point and integral forms for time varying fields.

UNIT-III [13]

Bearing capacity of shallow foundation

Basic definitions,Terzaghi's bearing capacity theory, types of shear failure, effect of water table onbearing capacity, Bearing capacity of square and circular footings,Vesics bearingcapacity theory, Meyerhof's bearing capacity theory, eccentrically loadedfoundation, IS code method (cohesive and cohesion less soil),Settlement ofFoundation: Types and its Causes, Immediate settlement of cohesive and non-cohesive soils, allowable soil pressure for cohesion less soil by different methods,Plate load test. Numerical based on bearing capacity and settlement.

Pile foundation

Necessity of pile foundation, classification of piles(based on material, transfer of loads, installation method, uses, displacement ofsoil), methods of pile driving, construction of bored piles, driven cast in-situconcrete piles, load carrying capacity of piles, static methods for driven piles andbored piles (sand and clay), Negative skin friction, Dynamic formulae, Pile loadtest, group action of pile (sand and clay), settlement of pile group, Introduction tolaterally loaded piles.Illustrative examples &amp, Problems.

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UNIT-IV   **[14]**

Ground improvement techniques

Introduction, need of ground improvement, factors affecting selection of suitable technique, Improvement in cohesive and cohesion less soil.

Miscellaneous topics:

Geosynthetics, Machine Foundation

Text Books:

7. Soil Mechanics and Foundation Engineering By: Dr K.R.Arora

Reference Books:

8. Soil Mechanics and Geotechnical Engineering By: V.N.S. Murthy

9. Foundation Engineering By: B.M. Das

Web resources:

8. http://web.itu.edu.tr/~teymurb/fe1lecture1.pdf

9. http://nptel.ac.in/courses/105101083/

10. http://nptel.ac.in/courses/105101083/download/lec26.pdf

11. https://www.slideshare.net/VivekMishra16/pile-foundation-ppt

12. http://nptel.ac.in/courses/105101083/20

MOOCs:

1. https://www.mooc-list.com/tags/engineering

List of Experiments

1. Particle size analysis of given soil sample

2. Particle size analysis using hydrometer

3. To Determine In-Situ Dry Density by the Sand Replacement Method

4. To Determine the Dry Density Of the Soil by Core Cutter Method

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5. To determine the permeability of a soil specimen by the constant head permeameter

6. To determine the permeability of a soil specimen by the falling head permeameter

7. To determine Shear Parameters Using Direct Shear Test : Cohesive soil

8. To determine Shear Parameters Using Direct Shear Test : Cohesion less soil

9. To determine shear strength of Cohesive soil using vane shear test

10. To determine the Unconfined Compressive Strength of Cohesive Soil

11. To determine the Consolidation Characteristics of a Soil Specimen: Cohesive soil

12. To determine the Consolidation Characteristics of a Soil Specimen: Cohesion less soil

13. To determine the Compaction Characteristics of a Soil Sample by standard Proctor's Test

14. To determine the Compaction Characteristics of a Soil Sample by modified Proctor's Test

15. To determine the free swell index characteristics of soil sample

16. To determine the swell pressure of Cohesive Soil.

17. To determine the Strength of the Soil Using Triaxial Test.

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Subject: **Environmental Engineering-II**								
Program: **B.Tech. Civil Engineering**				Subject Code: CV0603			Semester: **VI**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)-Theory**	**Continuous Internal Evaluation (CIE)-Practical**	**Total**
3	0	2	4	24/60	24/60	16/40	16/40	200

Course Objectives:

1. To provide awareness of the environmental effects of pollutants

2. To provide knowledge of the pollutants, their characteristics

3. To manage systems to mitigate the adverse effect of the pollutants.

Course Outcome:

After learning the course the students should be able to:

1. Understand the role of microorganisms in various components of environments

2. Design and prepare drainage plan of buildings

3. Understand and design solid waste management system

4. Understand various environmental Acts.

5. Understand the quality and characteristics of waste water

6. Carry out preliminary sewer designs.

COURSE CONTENTS:

UNIT-I [10]

Introduction: Definition of various terms, Need for treatment of waste water,Selection of Treatment train and Plant site, Wastewater treatment plant, Layoutand section

Wastewater Characteristics: Quality parameters: BOD, COD, TOC, Solids,DO, Nitrogen, Phosphorus etc., Standards of disposal into natural watercoursesand on land as per BIS.

UNIT-II [16]

Collection of wastewater: Sewerage systems, Separate, combined, and partiallyseparate, components of sewerage appurtenances, wastewater quantity and itsvariations, Peak factor, quantity of storms water, rational method

Hydraulic design of sewers: Types of sewers, Materials for sewers, planning ofsewerage system, Hydraulic elements of Circular sewers, Storm Water Drains,Design of sewers, laying of sewers, Cleaning and Maintenance of sewers

UNIT-III [12]

Unit operations involved in Wastewater treatment system: Preliminarytreatment, screening and grit removal units, oil and grease removal, Primarytreatment, secondary treatment, activated sludge process, trickling filter, sludge digestion and drying beds, stabilization pond, septic tank, soakage systems,recent trends in sewage treatment, Advanced Wastewater Treatment :Nitrogenand phosphorous removal.

Industrial Wastewater Treatment: Various industry and their wastewatercharacteristics, methods of treatment to industrial wastewater, Common Effluent Treatment Plants

UNIT-IV [16]

Treated Wastewater Disposal and Reuse: Disposal of wastewater in streams,self-purification, DO-SAG curve, Streeter Phelp equation, waste waters reuse.

House Drainage: Pipes and Traps, Sanitary fittings, Systems of Plumbing

Solid waste management: solid waste collection, transport and disposal methods

Reference Books:

1. H.S. Peavy, D.R. Row & G. Tchobanoglous, Environmental Engineering, McGraw Hill International Edition

2. M. L. Davis and D.A. Cornwell, Introduction to Environmental Engineering:- 2 nd edition-1997, McGraw Hill International Edition

3. Metcalf and Eddy,(Revised by G. Tchobanoglous) Wastewater Engineering: Treatment, disposal Reuse, Tata-McGraw Hill, New Delhi

4. B.C.Punmia, Arun K. Jain,AshokK.Jain; "Environmental Engineering-2,Wastewater engineering",Laxmi Publications (P) Ltd

Web resources:

1. http://nptel.ac.in/courses/105104102/
2. https://www.slideshare.net/abhiiii4558/28737268-wastewatertreatmentppt
3. https://www.slideshare.net/bibhabasumohanty/hydraulic-design-of-sewer
4. https://www.slideshare.net/mohamedramzy2013/industrial-wastewater-treatment

MOOCs:

2. https://www.mooc-list.com/tags/engineering

Subject: **Irrigation and Water Resource Engineering**								
Program: **B.Tech. Civil Engineering**				Subject Code: CV0604			Semester: **VI**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
4	2	0	5	24/60	0	16/40	0	100

Course Objectives:

This course attempts to provide knowledge and skills for effective irrigation practice and to develop theoretical and practical knowledge in order to implement the irrigation designs and operate irrigation systems along with design of hydraulic structures like dams, spillway, cross drainage works and diversion head works.

Course Outcome:

After completion of this course, the students shall be able

1   To explain various methods of irrigation.

2   To compute water requirement for crops.

3   Implement sprinkler irrigation system and drip irrigation system.

4   To carry out stability analysis of gravity dam.

5   To carry out study of embankments.

6   To design ogee spillway

7   To carry out the detail study of diversion head works and cross drainage works.

COURSE CONTENTS:

UNIT-I [17]

Irrigation & Irrigation Methods: Irrigation: Definition, merits, demerits,irrigation in India, water quality of irrigation water, Irrigation methods:Detailed classification, Surface methods: Over view of border, basin & furrowmethods, Pressurized methods: Over view of drip & sprinkler systems

Water Requirements of Crops: Crop seasons and crops in India, Terms used in crop water requirement; Soil-water- plant relationship: Classification of soil water, soil moisture constants, extraction pattern of moisture in root zone, Duty of water and delta, factors affecting on duty and delta, relation between duty- delta , Irrigation efficiencies and calculation of efficiencies.

Canal Irrigation: Classifications of canals, alignment of canal, design of lined canal to carry clear and sediment laden water, design of unlined canal to carry sediment laden water (regime approaches) and clear water (tractive stress approach), cross section of irrigation channels, necessity, advantages, disadvantages, suitability and types of lining, economics of canal lining.

UNIT-II [21]

Dams: Introduction, Types of dams, their advantages and disadvantages,selection of site for dam, site investigations.

Gravity Dam: Introduction, Design of gravity dam, Load combinations, failure of dam and its stability, elementary & practical profile of the gravity dam, joints, galleries, shafts, foundation treatment.

Embankment Dams: Types of embankment dams, factors affecting design of embankment dam, causes of failure of embankment dams, criteria of design of earth dams, computation of free board in embankment dam, seepage through embankment dam and foundation, seepage control through embankment dam andits foundation.

UNIT-III [14]

Cross-drainage structures: Introduction, Types of cross-drainage structures, selection of suitable type, classification of aqueducts, design aspects of cross- drainage structures.

Canal regulation structures: Necessity, location and types of canal falls, functions and design aspects of head regulator and cross regulator, canal escapes, canal outlets.

UNIT-IV [20]

Spillways & Energy Dissipation: Introduction, location, Types of spillways,components, spillway gates, jump-height curve and tail water curves, differenttypes of energy dissipaters, Design of Ogee Spillway.

Diversion Headwork: Introduction,types of Diversion Headworks, Location of 10 canal headwork, component parts of diversion headwork, types of weir & barrages, causes of failure of weirs and their remedies, Bligh's, Lane's and Khosla's theories, Design criteria for weir and barrages.

Text Books:

8. Garg S K, Irrigation Engineering and Hydraulic Structures, Khanna Publishers, NewDelhi, (1999).Subramanian, 'Design of Steel Structures', Oxford University Press.

Reference Books:

1. Modi, P.N., Irrigation Water Resources and Water Power Engineering, StandardBook House, New Delhi

2. USBR, Design of Gravity Dams, Design manual for concrete gravity dams, Denver,Colorado, (1976).

3. Asawa G L, Irrigation Engineering, New Age International (P)Ltd, New Delhi,(1996).

4. Sherad J L, Woodward R J Gizienski, S C and Clevenger W A, Earth and Earth and Rock fill dams, John Wiley and Sons Inc.,USA, (1963).

5. Creager William P., Justin Joel D, Hinds Julian, Engineering for dams, Nem Chand and Bros, Roorkee (U P), (1995).

Web resources:

1. http://nptel.ac.in/courses/105105110/pdf/m3l04.pdf

2. http://nptel.ac.in/courses/105105110/pdf/m3l02.pdf

3. http://nptel.ac.in/courses/Webcourse-contents/IIT%20Kharagpur/Water%20Resource%20Engg/pdf/m3l03.pdf

4. https://www.slideshare.net/gauravhtandon1/gravity-dam

5. https://www.slideshare.net/opprtunities/spillway

6. https://www.slideshare.net/bibhabasumohanty/diversion-headwork

7. https://www.slideshare.net/gauravhtandon1/cross-drainage-works-46361065

MOOCs:

1. https://www.mooc-list.com/tags/engineering

Subject: **Estimating and Costing**								
Program: **B.Tech. Civil Engineering**				Subject Code: CV0605			Semester: **VI**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
4	2	0	5	24/60	0	16/40	0	100

Topic Details   **Hours**
UNIT – 1:   **[16]**

1. GENERAL: Purpose and importance of estimation, role of surveyor works. Types of estimates approximate estimating techniques for various civil engineering works, reading of working drawings, ISI code for measurements. 06

2. ESTIMATION OF BUILDINGS: Building components, measurement techniques for earthwork and masonry in foundation, measurementand estimation of different building components.Measurement and estimation of different R. C. C. items inclusive of reinforcement, estimation of beam,column, slab, footing

and staircase etc.Estimation of finishing work and different types of roofs.Measurement and estimation of different woodwork and steelwork. Typical estimation of load bearing and a R. C. C. framed structure of one / two storeyed building along with schedule of materials and task force

UNIT – 2:   **[10]**

ESTIMATING OF OTHER CIVIL ENGINEERING STRUCTURES:
Estimating of different roads and culverts. Earthwork estimation for earthen dam and irrigation channels. Rough estimation of domestic water supply, sanitation

and septic tanks. Estimation of domestic electrical fixtures and work.

UNIT – 3: [14]
ANALYSIS OF RATES: Purpose and principal factors affecting the rates of an item of work, output of labour force. Analysis of rates for important building items and other typical civil engineering works mentioned above, S. O. R. statements.
14

UNIT – 4: [14]
ABSTRACTING AND BILLING: Abstracting methods relevant to ISI standards, preparation of abstract statements, cost analysis and statement.
SPECIFICATION WRITING: Purpose and basic principles of specifications, types of specification, study of important specification.Specification drafting for important civil engineering items - brief and detailed specification

TEXT BOOK:
1. Dutta B. N. , " Estimating and Costing ", S. Dutta & Co., Lukhnow - 1 (1997)
REFERENCE BOOKS:
1. Birdie G. S. , " Text book of Estimating and Costing ", DhanpatRai& Sons, Delhi - 6 (1988)
2. Rangwala S. C. , " Elements of Estimating and Costing ", Charotar Publishing Pvt. Ltd., Anand - 1 (1996).

Subject: **Bridge Engineering**								
Program: **B. Tech. Civil Engineering**				Subject Code: CV0606			Semester: **VI**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	0	4	24/60	0	16/40	0	100

Course Objectives:

1. Introduction to Bridge

2. To learn about principles of bridge engineering.

Course Outcomes:

1. In depth Know how about Bridges.

COURSE CONTENTS:

UNIT-I

[12]

Introduction

History of Bridge Development, Components of a Bridge, Definitions, Classification of Bridges, Requirements of an ideal bridge

Bridge site Investigation and Planning

Selection of bridge site, bridge alignment, collection of bridge design data, sub surface investigations

UNIT-II

[14]

Bridge Hydrology

Determination of flood discharge, waterway, economic span, scour depth, depth of foundation, afflux, clearance, freeboard.

Standards of loadings for bridge design

Types of loading for road bridges, dead load, live load, simplified equivalent loading, impact effect of live load, wind load, lateral loads, longitudinal forces, centrifugal forces, seismic force, factors due to water currents, earth pressure, buoyance, temperature stresses, deformation stresses, secondary stresses, erection stresses, loadings for railway bridges, loads for military bridges, loads for rating, requirements of traffic in design of highway bridges.

UNIT-III

[14]

Low cost bridges

Introduction, types of low cost bridges, causeways, timber bridges, suspension bridges, floating bridges, flying bridges, culvert, scupper, soil steel bridges, polyethylene pipes

Bridge superstructures

Types of bridge superstructures, bridge flooring, choice of superstructure type

Design of R.C.C Beam and Slab Bridges

Design of slab bridges, design of girder bridges, standard design of superstructure, limit state design of bridges

UNIT-IV

[14]

Bridge details
Bridge bearings, joints in bridges, railing, Articulation

Bridge architecture
General, history of bridge architecture, necessity of aesthetics, requirements of bridge aesthetics

Text Books:

1. S. P. Bindra ,"Principles and Practice of Bridge Engineering", Dhanpat Rai Publications

Reference Books:

1. S. Ponnuswamy, "Bridge Engineering , Second Edition", Tata McGraw-Hill Education

2. T. R. Jagadeesh, M. A. Jayaram, "Design of Bridge Structures", PHI Learning Private Limited

3. N. K. Raju, "Design of Bridges", Oxford and IBH Publishing Co. Private Limited

Web resources:

1. civildigital.com/bridge-engineering-components-classification-bridges/

4. ascelibrary.org/journal/jbenf2

5. www.aboutcivil.org/bridges.html

6. https://engineering.buffalo.edu/civil-structural.../research/.../bridge-engineering.html

7. https://www.slideshare.net/soniafaisal/bridge-engineering

MOOCs:

1. Bridge Design (https://www.mooc-list.com/tags/bridge-design)

Subject: **Green Building and Sustainable Development**								
Program: **B. Tech. Civil Engineering**				Subject Code: CV0607			Semester: **VI**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	0	4	24/60	0	16/40	0	100

Course Objectives:

1. This course explores Concept of Green building and sustainable development.

2. It gives brief about GBC Guidelines.

3. To study Existing Green building projects.

Course Outcomes:

1. Understanding of Green building Concept and sustainable development.

2. Basic know how of GBC Guidelines.

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3. Practical knowledge of existing Green Building projects.

COURSE CONTENTS:

UNIT-I [14]

Green Building & Sustainable Development Concept

Overview of green building movement, Concept of Green building and sustainable development, Issues and strategies of Green building and sustainable development, Objectives, Principals and Benefits of Green building design, Introduction to High performance building , Integrated design process of high performance building, Green project requirements and strategies, Overview of various green rating systems worldwide.

UNIT-II [14]

Green Building Materials and Indoor environment Quality

Introduction, Low emitting materials, Building and material reuse, Construction waste management, Regional materials, Life cycle cost assessment of building materials and products, Factors affecting indoor environment quality, Ventilation and filtration, Building materials and finishes: Emittance level, Indoor Environment quality best practice

UNIT-III [14]

Water and Energy efficiency designs

Introduction, Waste water strategy and water reuse/recycling, Water fixtures and water use reduction strategies, Impact of energy and atmosphere – introduction, A building envelop, Intelligent energy management system, Mechanical system: Air conditioning, Heating and ventilation, Electric power and lighting system, Solar energy system

UNIT-IV [12]

GBC Guidelines

Introduction, IGBC green new building Rating system – Overview and process – project checklist, Sustainable architecture and design, Site selection and planning, Water conservation & energy efficiency, Building materials and resources, Indoor Environment quality, Innovation and development

Tutorials

1. Significance of green design to the region of Ahmedabad city.
2. Comprehensive study of green building materials available in the market with respect to its materialistic composition and value aspect.
3. Life cycle cost assessment for different energy efficient designs and materials.
4. Detail study of IGBC Green building rating systems.
5. Detail study of GRIHA Green building rating systems.
6. Detail study of LEED Green building rating systems.
7. Study of Existing Green building projects.

Text Books:

8. Hand book of Green building Design and construction, Sam Kubba by Elsevier Architecture press.
9. Green building: principals and practice in residential construction by Abe Kruger and Carl Seville, Cengage Learning.

Reference Books:

01. IGBC Green New building rating system (Version 3.0), March 2015.
02. GRIHA Manual Volume-1: Introduction to National Rating System by Ministry of New and Renewable Energy, Government of India and the energy and resource institute, New Delhi.

Web resources:

01. http://www.civilprojectsonline.com/category/green-building
02. http://www.wncgbc.org/about/importance-of-green-building
03. https://igbc.in/igbc
04. https://www.slideshare.net/sidevils/ppt-green
05. https://greenbuildingsolutions.org/what-is-green-building

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MOOCs:

1. Planning for Sustainable Development (https://ocw.mit.edu/courses/urban-studies-and-planning/11-366j-planning-for-sustainable-development-spring-2006)

2. Sustainable building design for tropical climates: principles and guidelines for EAC (https://www.mooc-list.com/course/sustainable-building-design-tropical-climates-principles-and-guidelines-eac-pok)

Subject: **Traffic Engineering**								
Program: **B. Tech. Civil Engineering**				Subject Code: CV0608			Semester: **VI**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	0	4	24/60	0	16/40	0	100

Course Objectives:

1. Introduction to Traffic Engineering.

2. To develop background regarding terminologies, relations and theoretical models for traffic flow and volume.

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3. To get idea about Traffic Simulation Techniques

Course Outcomes:

1. Understanding about Traffic Engineering.

2. Knowledge regarding terminologies, relations and theoretical models for traffic flow and volume.

3. Basic idea about Traffic Simulation Techniques.

COURSE CONTENTS:

UNIT-I [13]

Traffic Engineering Administration and Function

Definition, Traffic Engineering, Function, Importance of traffic engineering.
Road user characteristics
Elements of Traffic Operation, Human Behaviour and Factors in human behaviour, Permanent and temporary Physical Factors, Visual factors of road user, PIEV Theory
Vehicle characteristics
Physical characteristics of vehicle, Types Dimensions, Turning radius, Design Features, Operating characteristics of Vehicles, resistance and power requirements, breaking ability, Acceleration.

UNIT-II [14]

Traffic Flow Characteristics

Basic Traffic Flow parameters, Definition, Time and Space mean speed, Relation between traffic flow parameters.

Traffic Volume Study and Characteristics

The traffic volume study, purpose of traffic volume study, Methods of traffic volume study, Analysis and presentation of volume data, Pedestrian studies.

Origin- Destination & Parking Surveys

Need & Methods of O-D survey, Need of parking Surveys, Definition, and Types of parking Surveys.

UNIT-III   **[15]**

Spot Speed studies and Characteristics

Speed and Journey time, Definitions, Factors Affecting spot speed, Purpose & Methods of spot speed study, Spot speed characteristics.

Traffic Signals

Introduction of Traffic Signals, Fixed Time and Vehicle Actuated Signals, optimum cycle length, Co-ordinated control of Signals, Delay at signalized Intersections, Various methods for signal time design.

Highway Capacity

General, Importance of "Capacity" in Highway Transportation, Passenger Car units (PCUs),

Capacity of uninterrupted Flow conditions, Level of Service, Factors Affecting Level of Service, capacity of Signalized Intersection.

UNIT-IV   **[12]**

Traffic Signs and Road Markings

Importance of traffic signs, General Principles & Types of Traffic Signing, Location, Height and Maintenance of Traffic Signs. Function, Types of Road Marking, General Principles of pavement marking, Material and color, Pedestrian and Cyclist Crossings, Word message and Object markings.

Accident Studies and Safety

Accident reporting and Recording, Causes of Accident, Purposes of Accident Studies, Collision Diagram, Preventive Measures for Accidents, The CHI-Square test.

Simulation of Traffic

Introduction, Advantage of Simulation Techniques, Steps in Simulation, Scanning Techniques, software for simulation.

NOTE:

Apart from the above curriculum, a week's time has to be given to perform surveys on field.
The subject requires Practical component to perform Surveys on field, however being an elective subject and looking into the constraint that elective subject contains three hours of theory

component only, a week during the running term or after the term end has to be allotted for carrying out following field surveys:

   a. Spot speeds Survey

   b. Classified traffic volume study with use of hand count, tape, video recorder

   c. Parking survey

   d. Headway Survey

   e. Pedestrian flow survey

   f. Stopped delay & Travel time delay Study on Signalized Intersection.

   g. Saturation flow measurement at Signalized Intersection.

   h. Origin-Destination Survey

Data interpretation after carrying out the surveys is also a part of this subject.

Text Books:

   1. L.R.Kadiyali, "Traffic Engineering and Transport Planning," Khanna Publishers, New Delhi.

   2. S.C. Saxena, "Traffic Planning and Design".

Reference Books:

   1. Dr. S. K. Khanna and Dr.C.E.G. Justo,"Highway Engineering", Nem Chand & Bros., Roorkee.

   2. L. J. Pingnataro, Traffic Engineering; Theory and Practice. Prentice Hall, Englewood Clitts, 1973.

   3. M. Wohl and B. V. Martin, Traffic System Analysis for Engineering and Planners, McGraw-Hill. New York, 1983.

   4. D. R. Drew, Traffic Flow Theory and Control, McGraw Hill. New York 1968.

   5. W. R. Mc Shane, R. P. Roess and E. S. Prassas, Traffic Engineering, Prentice Hall, New Jersey, 1990.

Web resources:

   1. http://nptel.ac.in/course.php?disciplineId=105

   2. https://www.ntnu.edu/studies/courses/TBA4286#tab=omEmnet

   3. https://www.sciencedaily.com/terms/traffic_engineering_%28transportation%29.html

Subject: **Prestressed Concrete**								
Program: **B. Tech. Civil Engineering**				Subject Code: CV0609			Semester: **VI**	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation**	**Continuous Internal Evaluation**	**Total**

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						(CIE)- Theory	(CIE)- Practical	
3	2	0	4	24/60	0	16/40	0	100

Course Objectives:
1. This course gives Knowledge about Prestressing process.
2. To study applications of prestressed concrete in construction projects.

Course Outcomes:
1. Knowledge about Prestressing Concept.
2. Applications of prestressed concrete in construction Industry.

COURSE CONTENTS:

UNIT-I   [15]

Basic Concept of Prestressing
Need for High Strength Steel and Concrete, Advantages of Prestressed Concrete, Applications of Prestressed Concrete, Materials for Prestressed Concrete: High-Strength Concrete, High-Tensile Steel.

Introduction to Prestressing Systems
Tensioning Devices, Pretensioning Systems, Post-Tensioning Systems, Thermo-Electric Prestressing, Chemical Prestressing.

Analysis of Prestress and Bending Stresses
Basic Assumptions, Analysis of Prestress, Resultant Stresses at a Section, Pressure Line or Thrust Line and Internal Resisting Couple, Concept of Load Balancing, Stresses in Tendons, Cracking Moment.

Losses of Prestress
Loss Due to Elastic Deformation of Concrete, Loss Due to Shrinkage of Concrete, Loss Due to Creep of Concrete, Loss Due to Relaxation of Stress in Steel, Loss Due to Anchorage Sleep, Loss of Stress Due to Friction, Total Losses Allowed for Design.

UNIT-II   [12]

Deflection of Prestress Concrete Members
Factors Influencing Deflections, Short Term Deflections of Uncracked Members, Effect of Tendon Profile on Deflections, Deflections Due to Self-Weight and Imposed Loads, Prediction of Long Time Deflections, Deflection of Cracked Members, Requirements of various codes of practice.

Flexural Strength of Prestressed Concrete Sections

Simplified Code Procedures (IS: 1343-1980), Shear and Principle Stresses, Ultimate Shear Resistance of Prestress Concrete Members, Design of Shear Reinforcement as per IS: 1343-1980.

UNIT-III   [15]

Philosophy of Limit-State Design

Limit State Design Criteria for Prestressed Concrete Members, Design Loads and Strengths, Partial Factors for Loads.

Design of Prestressed Concrete Sections

Design of Section for Flexure, Design of Section for Axial Tension, Design of Section for Compression and Bending, Design of Section for Shear and Torsion, Estimation of Self-Weight of Beams, Design of Pretensioned Beams, Design of Post-Tensioned Beams, Design Examples.

UNIT-IV   [12]

Prestressed Concrete Bridges

Advantages of Prestressed Concrete Bridges, Pretensioned Prestressed Concrete Bridge Decks, Post-tensioned Prestressed Concrete Bridge Decks, Design of Post-tensioned Prestressed Concrete Slab Bridge Deck.

Text Books:
   10. N. Krishna Raju, 'Prestressed Concrete', Tata Mc Graw Hill Publishing Co. Ltd, New Dehi.
   11. Praveen Nagarajan, 'Prestressed Concrete Design', Pearson Publication.

Reference Books:
   12. S K Mallick, A P Gupta, Prestressed concrete, Oxford and IBI Series.
   13. R. H. Evans, Bennet E W, Prestressed concrete theory and design, Chapman and Hall, London.
   14. T. Y. Lin, Design of Prestressed Concrete Structures, Asia Publishing House.

Web resources:
   15. http://www.cement.org/cement-concrete-basics/products/prestressed-concrete
   16. https://theconstructor.org/concrete/prestressed-concrete-principles-advantages/28/
   17. https://www.slideshare.net/rajeshbburde/prestressed-concrete-36691505
   18. http://www.learnerstv.com/Free-Engineering-Video-lectures-ltv075-Page1.html

MOOCs:
   3. Reinforced   &   Prestressed   Concrete   for   Construction   Managers

(http://mooc.live/reinforced-prestressed-concrete-for-construction-managers-online-course)

Subject: **Air Pollution Control**		
Program: **B. Tech. Civil Engineering**	Subject Code: CV0610	Semester: **VI**

Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)- Theory	Continuous Internal Evaluation (CIE)- Practical	Total
3	2	0	4	24/60	0	16/40	0	100

Course Objectives:

3. Introduction to Air Pollutants.

4. To develop Framework about Air pollution Control.

Course Outcomes:

2. Briefing about Air Pollutants.

3. In depth Know how about Air Pollution Control.

COURSE CONTENTS:

UNIT-I   [12]

Introduction
Atmosphere, Composition of Clean air, Air Pollutants, Sources of Air pollution, National Ambient Air Quality Standards, Units of measure, Air pollution Episodes, Kyoto Protocol
Effects of Air Pollutants
Sources and classification of air pollutants, Methods of Analysis of air pollutants, Air pollution and its effects on human beings, plants and animals - Economic effects of air pollution - Effect of air pollution on meteorological conditions

UNIT-II   [14]

Fate of Air Pollutants

Carbon monoxide, NOx, SOx, Hydrocarbons, Lead, Hazardous Air pollutants (HAPs), Photochemical Oxidants, Particulate matter etc.

Legislation

The Environment (Protection) Act1986, The Air (Prevention and Control of Pollution) Act 198, Motor vehicle Act.

UNIT-III [14]

Air pollution Meteorology

Stability of atmosphere and turbulence, temperature lapse rate and stability – Adiabatic lapse rate - Wind Rose - Inversion – Wind velocity and turbulence – Plume rise and effective height of Stack

Atmospheric Dispersion

Dispersion of air pollutants, factors affecting air pollutants, Gaussian Dispersion model and numerical, Air Quality Modeling

UNIT-IV [14]

Air Pollution Control of Particulate Pollutants

Cyclone Separators, Bag House Filter, scrubbers, Electrostatic precipitator Theory and working of equipment only).

Air Pollution Control of Gaseous Pollutants

Absorption - Absorption equipment - adsorption and combustion devices, Flue Gas Desulfurization (FGD) (Theory and working of equipment only).

Text Books:

1. C. S. Rao ,"Environmental Pollution Control Engineering", New Age International (P) Limited Publishers

Reference Books:

1. Kenneth Wark and C Warner, "Air pollution: Its origin and control", Harper and Row Publication,1981

2. Mackenzie L. Davis, David A. Cornwell, "Introduction to Environmental Engineering", McGraw Hill (India) Private Limited

3. Henry Crawford Perkins ,"Air Pollution", McGraw hill Publication

4. Martin Crawford, "Air Pollution control Theory", McGraw hill Publication

Web resources:

1. http://nptel.ac.in/course.php?disciplineId=105

2. www.http://cpcb.nic.in

Subject: **Soil Erosion and Conservation**								
Program: **B.Tech. Civil Engineering**				Subject Code: CV0611			Semester: **VI**	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	0	4	24/60	0	16/40	0	100

Course Objectives:

1. To study soil-water-plant relationship

2. To study methods for Soil Conservation

Course Outcomes:

1. In depth study about soil relationship and soil conservation

COURSE CONTENTS:

UNIT-I [12]

Conservation and the Environment: Soil erosion
Introduction and factors affecting soil erosion, Effects of soil erosion, Conservation ethics, Development, conservation and quality of water resources, Impact of conservation practices on the environment

Soil-Water-Plant relationships
Soil moisture constants , saturation capacity,field capacity, moisture equivalent , permanent wilting percentage , available water, soil water potential, energy concept, soil moisture measurement methods ,plant water relationship, soil profile, land use classification

UNIT-II [18]

Water Erosion

Mechanics of water erosion, Factors affecting erosion by water, Raindrops and soil erosion, Types of erosion, Soil losses and estimation of water erosion losses,Measurement of water erosion.

Wind Erosion Control Practices

Principles of water erosion control, Land classification for soil conservation, Control Practices: Mechanical & biological methods

UNIT-III   [12]
Water Erosion

Mechanics of wind erosion, Avalanching and dunes, Factors affecting wind erosion, Methods of estimating of wind erosion

Wind Erosion Control Practices

Principles of wind erosion control, Control practices.

UNIT-IV   [12]
Soil Conservation in Special Problem Areas & Forests
Soil conservation in hilly areas, Control of gullies, Waterlogged and wet lands, Role of forests in soil conservation.
Conservation Structures
Temporary and permanent structures, Functional requirement and limitations of control structures.

Text Books:

1. Tripathi, R.P. and Singh, H.P., Soil Erosion and Conservation, New Age International Publishers, New Delhi.

Reference Books:

1. Ghanshyam Das, Hydrology and Soil Conservation Engineering, Prentice Hall of India Pvt. Ltd., New Delhi.

2. Dhruvanarayana, V.V., Soil and Water Conservation Research in India, Indian Council of Agricultural Research.

3. Singh, G., Venkatramanan, C., Sastry, C. and Joshi, B.P., Manual of Soil & Water Conservation Practices, Oxford IBH Publishing Co. Pvt. Ltd., New Delhi, 1990.

4. Bennet, H.H., Elements of Soil Conservation, McGraw Hill Book Co.

Web resources:

1. http://nptel.ac.in/course.php?disciplineId=105
2. https://en.wikipedia.org/wiki/Soil_erosion
3. www.omafra.gov.on.ca/english/engineer/facts/12-053.html
4. www.conserve-energy-future.com/causes-effects-solutions-of-soil-erosion.php

MOOCs:

1. Soil Science (https://www.mooc-list.com/tags/soil-science)
2. Sustainable Soil Management: Soil for life (https://www.mooc-list.com/course/sustainable-soil-management-soil-life-edx)

Subject: **Ground Water Engineering**								
Program: **B. Tech. Civil Engineering**				Subject Code: CV0612			Semester: **VI**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	0	4	24/60	0	16/40	0	100

Course Objectives:

5. Introduction to Ground Water.

6. To provide knowledge and skills for effective management of Ground Water.

Course Outcomes:

4. Conduct Ground Water survey to estimate the quality and quantity of ground water.

5. Design of Wells.

6. Ground Water Exploration & Artificial recharge.

COURSE CONTENTS:

UNIT-I   **[15]**

Introduction
Groundwater in Hydrologic cycle, groundwater reservoir, water bearing formations, groundwater use, Causes & Effects of changes in ground water quality, conjunctive use of ground water.
Ground water investigation
Surface and subsurface method, Remote sensing techniques, Hydrologic investigations.
Ground water quality
Factors affecting ground water quality, Water quality requirements, Groundwater quality degradation, Reasons of groundwater quality degradation, Remedial measures for improving ground water quality.

UNIT-II   **[11]**

Aquifer Properties
Aquifer properties, Specific yield, Storage Coefficients, Hydrological Terms, Movement of Groundwater, Darcy's Law, and Factors affecting permeability. Numerical based on above topics.
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Ground Water Flow

Ground Water flow potential, Ground Water flow problems, Relationships between different parameters, numerical based on above topics.

UNIT-III [15]

Well Hydraulics

Flow into a well, Steady Radial flow into a well, Unsteady radial flow into a well, Law of times, Theis Recovery, Leaky Artesian aquifer, Unsteady radial flow in an unconfined aquifer, Multiple aquifer performance test, Fluctuations in groundwater, Image Wells, Method of images, Recharge boundary, Multiple well systems, Partial penetration of wells, Well loses, Cavity well, Specific Capacity & Safe yield. Derivations & Numerical based on above topics.

UNIT-IV [15]

Tube Wells & Their Design

Types of Tube Wells. Selection of the type of tube well. Design of Tube wells. Sanitary protection of tube wells.

Tube Well Construction

Construction of Bored & Driven Tube wells. Tube well drilling equipment's & methods. Miscellaneous drilling methods. Choice of drilling methods. Installation of well screens & checking well alignment.

Ground Water Recharge

Recharge of Ground Water. Methods of artificial recharge.

Text Books:

1. H.M. Raghunath ,"Ground Water Engineering", New Age International (P) Limited Publishers

Reference Books:

1. D.K. Todd, "Ground Water Hydrology", John Wiley & Sons
2. Herman Bower, "Groundwater Hydrology", McGraw Hill (India) Private Limited
3. K.R. Karanth," Ground Water Assessment, Development & Management", McGraw hill Publication

Web resources:

1. www.nptel.ac.in
2. www.ocw.mit.edu
3. www.ngwa.org/

4. www.groundwaterinternational.co
5. www.cgwb.gov.in

Subject: **Advanced Technical Communication and Soft Skills**								
Program: **B.Tech. All Branches**				Subject Code: **SH0607**				Semester: **VI**
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)-Theory**	**Continuous Internal Evaluation (CIE)-Practical**	**Total**
1	0	0	0	60	0	40	0	100

	Sr. No.	**Content**
Speaking	1	**Vocabulary Games: Advanced Level**
	2	**Role Play 1**
	3	**Role Play 2**
	4	**Role Play 3**
	5	**Selected speeches & Songs: Declamation 1**
	6	**Selected speeches & Songs: Declamation 1**
	7	**Report Presentation Seminar**
	8	**Report Presentation Seminar**
	9	**Report Presentation Seminar**
	10	**Interview Skills (Mock Interview Sessions 2)**

Writing	11	**Writing Reports**
	12	**Making Proposals**
	13	**Resume Building**
	14	**Letter, Email application**

Reference Books:

Fred Luthans, Organizational Behaviour, McGraw Hill

Lesikar and petit, Report writing for Business

M. Ashraf Rizvi, Effective Technical Communication, McGraw Hill

Wallace and masters, Personal Development for Life and Work, Thomson Learning

Hartman Lemay, Presentation Success, Thomson Learning

Malcolm Goodale, Professional Presentations

Farhathullah, T. M. Communication skills for Technical Students

Michael Muckian, John Woods, The Business letters Handbook

Herta A. Murphy, Effective Business Communication

Lehman, Dufrene, Sinha BCOM, Cengage Learning

Web resources/ MOOCs:

Introduction to English Language & Literature Mod-1 Lec-1
https://www.youtube.com/watch?v=xC3M9EqduyI
The English Language Mod-1 Lec-
https://www.youtube.com/watch?v=HsR4jFszFdw#action=share
International English Mod-1 Lec-4
https://www.youtube.com/watch?v=FT4cQkXCc8g
Effortless EnglishRule-1 English Phrases:https://www.youtube.com/watch?v=r5z-lilm-gg

Pronunciation Training Techniques:
https://www.youtube.com/watch?v=wB8mr4iViy0

Make Body Language Your Superpower:
https://www.youtube.com/watch?v=wB8mr4iViy0

English Job Interviews | Best Answers to Questions:
https://www.youtube.com/watch?v=wB8mr4iViy0

7TH SEMESTER

S R N O	CODE	SUBJECTS	TEACHING SCHEME			CREDITS	HOURS	EXAMINATION SCHEME					
								THEORY			PRACT		TOTAL
								CIE					
			L	T	P			MID	IE	ESE	CIE	ESE	

B-TECH CIVIL ENGINEERING, SEMESTER –VII TEACHING & EXAMINATION SCHEME (BOS-14/06/2017) WITH EFFECT FROM JULY 2017

S R N O	CODE	SUBJECTS	L	T	P	CREDITS	HOURS	MID	IE	ESE	CIE	ESE	TOTAL
1	CV0701	EARTHQUAKE ENGG	3	0	2	4	5	30	10	60	40	60	200
2	CV0702	CONSTRUCTION PROJECT MANAGEMENT	4	2	0	5	6	30	10	60	0	0	100
3	CV0703	PROFESSIONAL PRACTICE AND VALUATION	3	0	0	3	3	30	10	60	0	0	100
4	CV0704	ADVANCED CONSTRUCTION TECHNIQUES & EQUIPMENT	3	2	0	4	5	30	10	60	0	0	100
5	CV0705	RAILWAY BRIDGE AND TUNNEL	3	0	0	3	3	30	10	60	0	0	100
6	CV0706	ENVIRONMENTAL IMPACT ASSESSMENT (EL-III)	3	2	0	4	5	30	10	60	0	0	100
7	CV0707	PROJECT PLANNING & QUALITY CONTROL (EL-III)											
8	CV0708	CONTRACT MANAGEMENT (EL-III)											
9	CV0709	REINFORCED EARTH STRUCTURES & GEOSYNTHESIS (EL-III)											
10	CV0710	REMOTE SENSING & GEO-INFORMATICS (EL-III)											
11	CV0711	HYDROPOWER ENGINEERING (EL-III)											
12	CV0713	ADVANCED DESIGN OF RCC STRUCTURES (EL-III)											
13	CV0712	DISASTER MANAGEMENT	1	0	0	0	1	30	10	60	0	0	100
		TOTAL	**20**	**06**	**02**	**23**	**28**	**210**	**70**	**420**	**40**	**60**	**800**

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Subject: Earthquake Engineering								
Program: B. Tech. Civil Engineering				Subject Code: CV0701			Semester: VII	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)-Theory	Continuous Internal Evaluation (CIE)-Practical	Total
3	0	2	4	24/60	60	16/40	40	200

COURSE OBJECTIVES:

1. To illustrate to students of structural and architectural engineering the problems and solutions in attaining efficient earthquake-resistant structures and facilities.

2. To achieve this objective, after a brief discussion of the general goals in seismic-resistant design and construction of structures and facilities, the different sources of damage that can be triggered by an earthquake are discussed and illustrated.

COURSE CONTENTS:

UNIT-I [15]

Introduction:

Fundamental of Structural Dynamics:

Static load v/s Dynamic load, Simplified Single Degree of Freedom (SDOF) System, Mathematical Modelling of SDOF System, Response of SDOF System to different types of Vibrations like Free, Undamped, Damped and Forced Vibration, Response of Building to Earthquake Ground Motion, Multi-degree of Freedom System (MDOF), Work Examples. Periods and Modes of Vibration for MDOF System.

UNIT-II [14]

Earthquake Basics:

Earth Interior, Plate Tectonics, Faults, Seismic Waves, Consequences of Earthquake, Earthquake Parameters, Magnitude & Intensity, Scales, Seismic Zones of India.

Earthquake Resistant Masonry Features:

Categories of Masonry Buildings, Behaviour of Unreinforced Masonry Wall, Behaviour of Reinforced Masonry Wall, Box Action and Bands, Infill Walls, Confined Masonry Construction, Seismic Design of Masonry Buildings.

UNIT-III [13]

Earthquake Design Philosophy, Earthquake Proof v/s Earthquake Resistant Design, Four

Virtues of Earthquake Resistant Structure (Strength, Stiffness, Ductility and Configuration), Structural Configuration, Lateral Load Resisting Systems.

 Introduction to IS: 1893 (Part-1) – 2002, Assumption in Earthquake Resistant Design, Structural Modelling, Seismic Methods of Analysis, Seismic Coefficient Method, Base Shear and Lateral Load Distribution along Height. Modal Analysis of Building Frame, Response Spectrum Method. Work Example

UNIT-IV [12]

Rigid Diaphragm Effect, Centre of Mass and Centre of Stiffness. Ductile Detailing of Structures: Importance of Ductility, Types of Ductility, Ductile Detailing of Beam as per IS: 13920 – 1993, Ductile Detailing of Column as per IS: 13920 – 1993, Reinforcement in Beam-Column Joint.

Text Books:

1. A.K. Chopra, 'Dynamics of Structures', Pearson Publication.
2. S.K. Duggal, 'Earthquake Resistant Design of Structures', Oxford University Press.
3. Clough & Penzin, 'Dynamics of Structures'.

Reference books

1. Mario Paz, 'Structural Dynamics'.
2. C.V.R. Murthy, 'Earthquake Tips', NICEE.
3. IITK-GSDMA EQ 26 – V – 3.0, 'Design Example of a Six Storey Building.

Web Resources:

1. nptel.ac.in/courses/105105104/pdf/m16l39.pdf

2. www.nptel.ac.in/courses/105101004/6

3. nptel.ac.in/courses/105101004/

List of Experiments

1. Introduction to Earthquake engineering laboratory and equipments.
2. Calculation of dynamic property of SDOF system
3. Dynamics of a one storied building frame with planar asymmetry subjected to harmonic base motions.
4. Dynamics of a multi storied building frame subjected to harmonic base motion.
5. Dynamics of a multi storied building frame subjected to periodic (non- harmonic) base motion.
6. Vibration isolation of a secondary system.
7. Dynamics of a vibration absorber.
8. Dynamics of a multi storied building frame with and without an open ground floor.
9. Dynamics of one span and two span beams.
10. Earth quake induced waves in rectangular water tanks.
11. Dynamics of free standing rigid bodies under base motions.
12. Seismic wave amplification, liquefaction and soil structure interactions.

Subject: **Construction Project Management**								
Program: **B. Tech. Civil Engineering**				Subject Code: CV0702			Semester: **VII**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
4	**2**	**0**	**5**	**24/60**	**0**	**16/40**	**0**	**100**

COURSE OBJECTIVES:

1. To make students understand about methods, materials, and equipments used to construct projects.
2. To make students understand the legal implications of contract, common, and regulatory law to manage a construction project.
3. T train students to apply scheduling techniques to project planning activities.
4. To train students to analyze professional decisions based on ethical principles.

COURSE CONTENTS:

UNIT-I [17]

Introduction:

Need for scientific management of project, Scope and special aspect of construction management, Special characteristics of construction industries, Engineer as manager, engineering economy in construction project, Stages in construction, Project Planning.

Project Management:

Functions of Construction Management and processes planning, organizing, staffing, directing, controlling and evaluating, Work break down structure for various projects. Project Feasibility, Evaluation of project management, Forms of project management. Methods of Planning and

programming: Bar charts and milestone charts, Network Methods (CPM & PERT), Comparison of CPM and PERT techniques.

UNIT-II [19]

Network:

Elements of network**,** , Features and rules of network diagram, Development of network, Time Estimation and Computation, , Procedure for CPM, Advantages, Uses and application of CPM in project management.

Critical Path Method (CPM) Network Analysis:

CPM process, CPM networks, Activity time estimation, Earliest event time, Latest allowable occurrence time, Start and Finish times of activity, Types of Float and their significance, critical activity and critical path, Time grid diagram and updating of network.

Program Evaluation and Review Techniques (PERT) network analysis:

Slack,Critical path, Activities and Project time estimations for probabilistic model, Evaluation of project completion time probabilities, Comparison between Deterministic and probabilistic approaches.

Material Management:

Scope of material management, Importance of material management, Types of Materials, Stages of material management

UNIT-III [16]

Material Management:

Scope of material management, Importance of material management, Types of Materials, Stages of material management

Cost Model:

Introduction, Project cost, Indirect and Direct project cost, Slope of direct cost curve, Total project cost and optimum duration, contracting the network for cost optimization, Steps in cost optimization.

Resource allocation and Resource scheduling:

Resource usage profiles: Histograms, Resource smoothing, Resource leveling, various schedules i.e. Material, labour, Equipment etc. Resource allocation models with and without constraints.

Cash Flow Analysis and Expenditure scheduling: Cash flow for owner and contractor

UNIT-IV   [20]

Job Layout:

General principles of job layout, Factors governing the layout of construction project, advantages of job layout, Supervision and safety in large construction project.

Lean Construction:

Introduction, Principle application of lean construction, difference between lean construction and project management approaches.

Value Engineering:

Definition, Objectives of Value Engineering, Approach For Value Engineering, Process and Methodology, Function Analysis System Techniques, Benefits of Value Engineering.

Quality Control in Construction:

Important aspects of quality control, methods, quality control manuals.

Text Books:

1. K K Chitkara ; "Construction Project Management", McGraw Hill publications.
2. O'Brien, "CPM in construction management"
3. Neeraj Kumar Jha, "Construction Project Management – Theory and Practice"

Reference Books:

1. Dharwadkar, P.P. ; "Management in construction industry"

2. Gehlot and Dhir, "Construction planning and management"

3. Peurifoy, R.L., "Construction planning, equipment & methods"

4. Sharma, S.C., "Construction equipment and its management"

5. Punmia & Khandelwal, "Project planning & control with CPM

Web resources:

1. http://nptel.ac.in/courses/112107142/29

2. https://onlinecourses.nptel.ac.in/noc17_mg01/preview

3. https://ocw.mit.edu/courses/civil-and.../1-040-project-management.../lecture-notes

MOOCs:

1.https://www.mooc-list.com/course/construction-project-management
coursera?page=3https://www.mooc-list.com/course/construction-project-management-
coursera?page=3

Subject: **Professional Practice and Valuation**								
Program**: B.Tech. Civil Engineering**				Subject Code: CV0703			Semester**: VII**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)-Theory**	**Continuous Internal Evaluation (CIE)-Practical**	**Total**
3	**0**	**0**	**3**	**24/60**	**0**	**16/40**	**0**	**100**

Course Objectives:

1. To elaborate on how ethical considerations may play a role in the execution of an engineering project, and the importance of probity in all facets of the engineering profession.

2. Identify and describe the important components, functions and benefits of teamwork, partnering, client service, negotiation, dispute resolution, and effective decision making in professional practice.

3. To describe the importance of the following issues as they pertain to the daily operation of an engineering organization; interpersonal relationships, marketing and business development, partnering and team development, litigation and claims, and dispute resolution.

<u>**COURSE CONTENTS:**</u>

UNIT-I [14]

GENERAL

Purpose and importance of estimation, role of surveyor works. Types of estimates approximate estimating techniques for various civil engineering works, reading of working drawings, ISI code for measurements

ESTIMATION OF BUILDINGS

Building components, measurement techniques for earthwork and masonry in foundation, measurement and estimation of different building components. Measurement & estimation of different R. C. C. items inclusive of reinforcement, estimation of beam column, slab, footing and staircase etc. Estimation of finishing work and different types of roofs. Measurement and estimation of different woodwork and steelwork. Typical estimation of load bearing and a R. C. C. framed structure of one / two storeyed building along with schedule of materials and task force

UNIT-II [15]

ESTIMATING OF OTHER CIVIL ENGINEERING STRUCTURES:

Estimating of different roads and culverts. Earthwork estimation for earthen dam and irrigation channels. Rough estimation of domestic water supply, sanitation and septic tanks. Estimation of domestic electrical fixtures and work.

UNIT-III [13]

ANALYSIS OF RATES: Purpose and principal factors affecting the rates of an item of work, output of labour force. Analysis of rates for important building items and other typical civil engineering works mentioned above, S. O. R. statements.

UNIT-IV [12]

ABSTRACTING AND BILLING

Abstracting methods relevant to ISI standards, preparation of abstract statements, cost analysis and statement.

SPECIFICATION WRITING

Purpose and basic principles of specifications, types of specification, study of important specification. Specification drafting for important civil engineering items - brief and detailed specification

Text Books:

1. Estimation & Costing in civil Engineering - B.N. Dutta.

2. Elements of Estimation & Costing – Rangwala.

3. Estimation, costing, specification & valuation in Civil Engg. By M. Chakroborti.

Reference Books:

1. Birdie G. S. , " Text book of Estimating and Costing ", Dhanpat Rai& Sons, Delhi - 6 (1988)

Web resources:

1. nptel.ac.in/courses/105103093/14

2. nptel.ac.in/courses/105103093/15

3. nptel.ac.in/courses/105103023/35

MOOCs:

1. https://www.mooc-list.com/course/construction-cost-estimating-and-cost-control-coursera?page=7

Subject: **Advanced Construction Techniques And Equipment**								
Program**: B. Tech. Civil Engineering**				Subject Code: CV0704			Semester**: VII**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	**2**	**-**	**4**	**24/60**	**0**	**16/40**	**0**	**100**

COURSE OBJECTIVES:

1. To train the students with the latest and the best in the rapidly changing fields of Construction Engineering, Technology and Management.

2. To prepare the students to be industry leaders who implement the best engineering and management practices and technologies in the construction industry.

3. To continually work with industry to enhance the program's effectiveness and the opportunities for innovation in the construction industry.

4. To train students with the advanced technologies and management approaches.

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COURSE CONTENTS

UNIT-I [15]

Pile Foundations

Introduction, uses, selection of pile, types of piles, pile spacing, group of piles, efficiency of group of piles, pile cap and pile shoe, load tests on piles, pile driving, pulling of piles, loads on piles, causes of failures of piles, pile driving formulas.

Coffer Dams

Definition, uses, selection of coffer dams, types of coffer dams, design features of coffer dams; leakage prevention, economic height.

UNIT-II [14]

Caissons

Definition, uses, construction material, types of caissons, loads on caisson, design features of caissons, floating of caissons, cutting edges, sinking of caisson, tilting of caisson, caisson diseases

Control of Ground Water in Excavations

Methods- pumping, well points, bored wells, electro-osmosis, injections with cement, clays and chemical, freezing process, vibro-flotation

Temporary Works

Form work for R.C.C. wall, slab, beam and column, Centering for arches of large spans and dams, design features for temporary works, slip formwork, false work for bridges, Specialty form work.

UNIT-III [13]

Construction of Earthquake Resistant Buildings

Planning of earthquake resistant building, Construction of walls –provision of corner reinforcement, Construction of beams and columns. Base isolation

Special Structures

Tall structures, spatial structures, Pre-stressed structures

Construction Equipments

Introduction to construction Equipment, their contribution and importance in construction industry, Classification of Equipment, Financial aspects related to construction equipments: Discounted present worth analysis, Depreciation, cost of owning and operating construction equipment, Basics of equipment replacement

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UNIT-IV [12]

Equipment Fundamentals

Related to performance of IC engines, rim pull, drawbar pull, Co-efficient of traction, Gradability, Soil fundamentals.

Equipment

Tractors and related equipment, Excavating Equipment, Belt Conveyor system, Hauling equipment, Overview of other construction equipment

Text Books:

1. S.P. Arora & S.P. Bindra, A Text Book of Building Construction, Dhanpat Rai & Sons, New Delhi.

2. S.K. Sarkar and S. Saraswati, Construction Technology, Oxford University Press, New Delhi.

3. B.C. Punamia, Building Construction, Laxmi Publications, New Delhi

4. S.C. Rangwala, Building Construction, Charotar Publication Pvt Ltd. Anand

Reference Books:

1.R. Chudley, Construction Technology Vol. I, II, III, IV, Longman Group Limited, London, Ist Edition, 1977.

2.R. Chudley (revised by R. Greeno), Building Construction Handbook, AddisonWesley, Longman Group, England, 3rd ed., 1999.

3. S.S. Ataev, Construction Technology, Mir Publishers, Moscow, 1985

Web resources:

1. http://nptel.ac.in/courses/105106144/

2. https://www.scribd.com/document/245903911/advanced-construction-equipments-pdf

3. https://sites.google.com/a/venusict.org/actech/lecture-notes

MOOCs:

1. https://www.mooc-list.com/tags/construction-management.

Subject: **Railway Bridge and Tunnel Engineering**								
Program**: B. Tech. Civil Engineering**				Subject Code: CV0705			Semester**: VII**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)-Theory**	**Continuous Internal Evaluation (CIE)-Practical**	**Total**
3	**0**	**0**	**3**	**24/60**	**0**	**16/40**	**0**	**100**

Course Objectives:

1. To make students know about requirements of railway track for high speed trains, safety aspects and maintenance.

2. To make students understand about different types of bridges, their components, loads/stresses acting on bridges, requirement and function of the components, hydrological design, methods of erection, maintenance of bridges.

3. To make students understand about importance, types, methods of construction, mucking, ventilation, lining and lighting in Tunnels.

COURSE CONTENTS:

UNIT-I [14]

Introduction:

Role of Transportation, Advantages of railways, Current scenario of Indian Railways, recent developments

Railway Track:

Permanent way and its basic requirements, types of gauges, selection of gauges, concept of coning of wheels.

Track, Track Stresses and Tractive Resistances

Introduction, types of Track stresses, types of tractive resistances.

Rails:

Functions, types of rails and comparisons, standard rail sections, buckling of rails: Causes and preventive measures, theory of creep: causes, effects and remedial measures.

Sleepers:

Function, requirements, classification and spacing of sleepers.

Ballast:

Functions, requirements, specifications of track ballast

Track fittings and Fastenings

UNIT-II [15]

Track Alignment:

Basic requirements, factors affecting selection of good alignment.

Geometric Design of Track:

Necessity of geometric design, details of geometric design, design of tracks.

Points and Crossings:

Important terms, track layouts and sketches of turn outs, diamond crossing, gauntlet track, gathering line.

Railway Stations and Yards:

Purpose, facilities at railway station, Classification of stations, requirements of yards, types of yards.

Signaling and interlocking:

Objectives of signaling, classification of signals, interlocking- necessity and functions.

UNIT-III [13]

General:

Site investigation, waterway calculation, scours depth, afflux, and economic span.

Classification:

Classification of superstructures with respect to structural behavior and materials used types of substructures, bridge bearings, movable bridges, temporary bridges.

Construction methods:

Methods of erection of various types of bridges, superstructures and substructures

Maintenance:

Testing and strengthening of bridges.

UNIT-IV [12]

Necessity/ advantages of tunnels, classification of tunnels, size and shape of tunnels, shafts, methods of tunneling in hard and soft ground, Lighting and ventilation in tunnels, Dust control, safety measures, economics of tunneling.

Text Books:

1. Satish Chandra and M.M. Agrawal, Railway Engineering, Oxford University Press, New Delhi
2. S.C. Saxena and S. P. Arora, A Text Book of Railway Engineering, Dhanpat Rai & Sons, New Delhi
3. S.C. Rangwala, K.S. Rangwala and P.S. Rangwala, Principles of Railway Engineering, Charotar Publishing House, Anand.

Reference Books

1. 4. S.P. Bindra, Principles and Practice of Bridge Engineering, Dhanpat Rai & Sons, New Delhi

2. S.C. Saxena, Tunnel Engineering, Dhanpat Rai & Sons, New Delhi

3. D.J. Victor, Essential of Bridge Engineering, Oxford & IBH Pub. Co. Ltd. Mumbai Sharma, S.C., "Construction equipment and its management"

4. Punmia&Khandelwal, "Project planning & control with CPM

Web Resources

1. nptel.ac.in/courses/105107123

2. nptel.ac.in/courses/105103093/24

Subject: **Environmental Impact Assessment**								
Program: **B. Tech. Civil Engineering**				Subject Code: CV0706			Semester: **VII**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)-Theory**	**Continuous Internal Evaluation (CIE)-Practical**	**Total**
3	2	0	4	24/60	0	16/40	0	100

Course Objectives:

In depth study about Environment, its impacts and EIA Process.

Course Outcomes:

Gaining Knowledge about EIA from theory as well as case studies.

COURSE CONTENTS:

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UNIT-I [14]

Introduction of EIA

Environment and Sustainable development, Nature and Scope of Environmental Issues and Impacts, Purpose and Aim of EIA.

Law, Policy and Institutional arrangements for EIA Process

Preparation of Terms of Reference, Screening, Initial Environmental Examination (IEE), Scoping, Full-Scale Assessment, EIA Review and Decision Making, Monitoring and Follow-Up, Public Involvement Techniques, Impact analysis, Mitigation and Impact management.

UNIT-II [14]

Reporting of EIA

Guidelines for Effective EIA Report Preparation, Elements of an EIA Report.

Environmental Monitoring and Audit

Objectives, Scope and Development of Environmental Management System, Environmental management Plan, Environmental Impact Statement (EIS).

UNIT-III

[14]

EIA Methodologies

Introduction, Criteria for the selection of EIA Methodology, Ad-hoc method, Checklist Method, Matrix method, Network method, Environmental Media Quality Index method, Overlay method, Cost/benefit Analysis etc.

Inception and Evolution of Environmental Impact Assessment in the World and in India and the Environmental Clearance Process in the Country.

UNIT-IV

[12]

Prediction and Assessment of Impacts on Environmental Attributes

Air;Water; Noise; Socio-economic; Cultural & Biological

Case studies

Case studies and preparation of Environmental Impact assessment statement for various Industries.

Text Books:

1. Y. Anjaneyulu,"Environmental Impact Assessment Methodologies", B.S. Publication

Reference Books:

1. Rau Whooten,"Environmental Impact Analysis Handbook"; McGraw Hill publications
2. Larry Canter ,"Environmental Impact Assessment"McGraw Hill publications
3. R K Jain , "Environmental Impact Analysis – A Decision Making Tool"
4. Judith Petts "Handbook of Environment Impact Assessment ",McGraw Hill Publications
5. John Glasson, RikiTherivel and Andrew Chadwick," Introduction to Environmental Impact Assessment", Third Edition.

Web resources:

1. https://ocw.mit.edu/courses/environment-courses/
2. http://nptel.ac.in
3. http://www.moef.nic.in/division/introduction-8
4. https://www.slideshare.net/ShubhranshuUpadhyay/env-impact-assesment

MOOCs:

1. Environmental Impacts (https://www.mooc-list.com/tags/environmental-impacts)
2. Climate Change (https://www.mooc-list.com/tags/environment)

Subject: **Project Planning and Quality Control**								
Program: **B. Tech. Civil Engineering**				Subject Code: CV0707			Semester: **VII**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	0	4	24/60	0	16/40	0	100

Course Objectives:

To present a framework for various aspects of Construction Project Management.

To Introduce to different facts of Construction Industry.

To represent the importance of Planning and Quality in Construction Industry.

Course Outcomes:

Basic Know how about Construction Project Management.

Practical Approach to Construction Industry.

To Understand Importance of Planning and Quality in Construction Projects.

COURSE CONTENTS:

UNIT-I   **[14]**

Construction Project Development

Construction as Industry and its challenges, Roles and Objectives of Construction Management; Definition & Scope of Project; Definition, Concept & Scope of Project Management, Project Purpose and Types; Role, Responsibilities and Competencies of a Project Manager; Enhancing the Probability of Success of a Project; Project Planning and Implementation Cycle; Main Causes of Project Failure.

A Practical Approach to Project Management at Construction Site –Guidelines

UNIT-II   **[13]**

Project Organization

Organizational Influences on Project Management –Cultures and styles, Communications, Structures, Process Assets, Enterprise Environmental Factors; Influence of Organizational Structures on Projects, Types of Organizational Structures – Functional, Matrix and Projectized, Criteria to help determine a suitable organizational form in a given project environment.

Construction Project Concept Analysis & Feasibility Study

Project Need Analysis; Project Feasibility Study; Project investment Analysis and Appraisal; Project Implementation strategy; Feasibility Study: Concept, Purpose, Analyzing Factors affecting

Project Feasibility – Market Analysis, Technical Analysis and Financial Analysis; Feasibility Report – Case Studies.

UNIT-III   [14]

Quality Management

Concept; Importance; Quality; Quality History; Quality Inspection; Quality

Engineering; Quality Management; Quality Assurance; Quality Control; Quality Control Tools; PDCA Cycle

Quality Management System (QMS)

Introduction; Quality Standards; Standards Organizations; International

Organization for Standardization (ISO); ISO 9000 Quality Management System;ISO Certification - Process Methodology & Schedule.

UNIT-IV   [13]

Total Quality Management (TQM) & Six Sigma

Definition & Concept: Principles of TQM – Basic Components, Six Sigma Methodology; Six Sigma Analytic Tool Sets

A Practical Approach: Quality Assurance Processes/Techniques for Construction Projects

An Overview and Guidelines for Quality Control Plan in Construction Projects

A Practical Approach: Quality Management Checklist & Documentation

Text Books:

1. Chitkara K K, (2011), "Construction Project Management- Planning, Scheduling and Controlling"-– Tata McGraw Hill Education Private Limited.

2. PMBOK Guide – 5th Edition

Reference Books:

1. Punmia B C, Khandewal, (2012), "Project Planning and Control with PERT and CPM" – Laxmi Publications Private Limited.

2. Rangwala S C, (2012), "Construction of structures and management of works" –Charotar Publishing House Private Limited.

3. Kotadia A S, (2012), "Construction Management and Equipments" – Mahajan Publishing House

Web resources:

1. http://www.aboutcivil.org/construction-management.html

2. http://nptel.ac.in/course.php?disciplineId=105

3. www.civilprojectsonline.com

MOOCs:

1. Fundamentals of Project Planning and Management (https://www.mooc-list.com/tags/project-planning)

2. Initiating and Planning Projects (https://www.mooc-list.com/tags/project-planning)

3. Construction Project Management (https://www.mooc-list.com/tags/project-management)

Subject: **Contract Management**								
Program: **B. Tech. Civil Engineering**				Subject Code: CV0708			Semester: **VII**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)-Theory**	**Continuous Internal Evaluation (CIE)-Practical**	**Total**
3	2	0	4	24/60	0	16/40	0	100

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Course Objectives:

1. To study in detail contract and various terms associated with it.
2. To brief about various contracts prevailing in Construction Industry.
3. To understand specifications thoroughly.
4. To give idea about tendering process.

Course Outcomes:

1. Understanding of Contract and other terms associated with it.
2. Knowledge about various contracts prevailing in Construction Industry.
3. Basic know how of Specifications.
4. General idea of tendering process.

COURSE CONTENTS:

UNIT-I   [14]

Introduction

General Introduction to Contract, Definitions- Contract Management, Employer, Engineer, Contractor.

Contract Law

Definition of Contract, Contract Elements, Essentials of a Valid Contract, Performance of Contract, Damages.

Contract Documents

Tender notice, Conditions of Contract, Bill of Quantities, Specifications and Drawings.

Contract for Engineering and Architectural Services

Owner's choice, Nature of contract between Owner and Engineer, Liabilities of Engineer and Architect, Specimen Agreement Form.

UNIT-II   [12]

Contract between Owner and Contractor

Relationship between Employer and Contractor, Forms of Contract, Subcontract, Essential features of concession Agreement, Parts of concession Agreement.

Conditions of Contract

Definition of terms used, Security Deposit, general obligations, suspension of work, time limit for completion, Incentives and Compensation, Measurement and payment to contractor, Additions and deviations, Execution of work, subletting, Breach of contract, Final Payment, Claims, Arbitration.

UNIT-III
[14]
Specifications
General, Objects of Specification, Purpose of Specification, Types of Specification, Importance of Specification, Classification of Specification, Specification Writing, Sources of Information.
Typical Specifications
Specification for Excavation, Specification for Cement Plaster, Specification for Cement Pointing, Specification for RCC, Specification for Brickwork, Specification for Flooring work, Specification for Road and Bridge works.

UNIT-IV
[14]
Tender
Definition, Types of Tender, Classification of Tender, NIT, Advertisement of Tender, Tender Form, Pre-Qualification of Bidders, Submission of Tender, Opening of Tender, Consideration and Scrutiny of Tender, Acceptance of Tender, Revocation of Tender.
Dispute Resolution
Definition, Governing Document, Arbitration Process, Dispute Avoidance.
Miscellaneous
FIDIC, Tort, Document Management, Fast track delivery.

Text Books:
9. Civil Engineering Contracts and Estimates by Dr. B. S. Patil
10. Estimation, Costing and Valuation by Rangwala

Reference Books:

10. Construction Project Management by K. N. Jha

11. Harris, F., and McCaffer, R., 2005, Modern Construction Management, 5th Edition, Blackwell Publishing.

12. Indian Contract Act (1872)

Web resources:

13. www.fidic.org

14. www.cpwd.gov.in

15. https://en.wikipedia.org/wiki/Contract_management

16. https://theconstructor.org

17. www.civiltutorial.org

18. http://civilblog.org

MOOCs:

4. Construction Cost Estimating and Cost Control (https://www.mooc-list.com/tags/construction)

5. Contract Management: Building Relationships in Business (https://www.mooc-list.com/tags/contracts)

Subject: **Reinforced earth structures & Geosynthetics**								
Program: **B. Tech. Civil Engineering**				Subject Code: CV0709			Semester: **VII**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation**	**Continuous Internal Evaluation**	**Total**

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						(CIE)- Theory	(CIE)- Practical	
3	2	0	4	24/60	0	16/40	0	100

Course Objectives:

1. To know Fundamentals about Reinforced soil.

2. To introduce to Geosynthetics.

3. To apply Geosynthetics to Construction Projects.

Course Outcomes:

1. Fundamental knowledge of Reinforced soil.

2. Study of Geosynthetics and its application in Construction Industry.

COURSE CONTENTS:

UNIT-I   **[11]**

FUNDAMENTALS OF REINFORCED SOIL

Reinforced Earth

Historical background of reinforced soil, principle of reinforced soil, mechanism of reinforced earth.

Geosynthetics

Introduction, types of Geosynthetics, Function of Geosynthetics and basics of their manufacturing methods, application of Geosynthetics (Landfills, railway tracks, canals etc).

UNIT-II   **[10]**

Testing methods of Geosynthetics

Introduction, properties of Geosynthetics, Techniques for testing of properties (Index properties) like specific gravity, thickness, stiffness weight. Testing of mechanical properties like

compressibility and properties. Testing of survivability properties, soil – Geosynthetic characteristics and its test (pull out test).

UNIT-III [13]

DESIGN & BEHAVIOUR OF REINFORCED WALL & EMBANKMENTS

Reinforced Earth wall

Introduction, Behaviour of RE wall: Internal failure mode, external failure mode, Design methodologies of RE wall (by experience, by cost – availability, by specification, by function), Design principles, and Design procedure for reinforced retaining wall.

Note: Illustrative examples & Problems.

Embankments

Introduction, Failure mechanism of embankments: over slope stability failure, lateral spreading, embankment settlement, bearing failure. Stability analysis for every failure mechanism.

UNIT-IV [20]

APPLICATION IN SHALLOW FOUNDATION & PAVEMENTS

Shallow foundation

Introduction, Modes of failures, Factors to be considered while designing, Geometrical parameters of the reinforced foundation soil, mechanical foundation model.

Pavements

Introduction, Unpaved Road: load diffusion model, pavement behaviour after load transmission, kinematics of subgrade deformation. Paved road: Geosynthetic layer at subgrade level, Geosynthetic layer at the asphalt overlay base level, Importance of tack coat

Drainage & filtration application in geosynthetics

Introduction, minimum requirement, Factors to be considered, criteria of geotextiles filter: permeability, FHWA permittivity criteria, and retention criteria. Design procedure for geotextile filter, design related drainage factors.

Note: Illustrative examples & Problems.

Text Books:

1. Designing with Geosynthetics : Robert M Koerner

Reference Books:

1. Fundamentals of Geosynthetics engineering By Sanjay kumar Shukla and jianhua Yin

2. Geosynthetics in civil Engineering By: R.W.Sersby

3. Handbook of Geosynthetics.

Web resources:

1. http://nptel.ac.in/course.php?disciplineId=105

2. https://theconstructor.org/building/geosynthetics-in-civil-engineering-construction-works/14148

Subject: **Remote Sensing and Geo-informatics**								
Program: **B. Tech. Civil Engineering**				Subject Code: CV0710			Semester: **VII**	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	0	4	24/60	0	16/40	0	100

Topic Details   Hours

UNIT – 1:   **[15]**
Basic concepts of GIS: Geographical Information System-Information systems, spatial and non- spatial information, geographical concept and terminology, advantages of GIS, Basic component of GIS. Commercially available GIS hardware and Software.
GIS Data: Field data, statistical data, maps, aerial Photographs, satellite data, points , lines, and areas features, vector and raster data, data entry through keyboard, digitizer and scanners, pre processing of data rectification and registration, interpolation techniques.

UNIT – 2:   **[15]**

G.P.S. Segments: Spaces Segment, Control Segment, User Segment, Features of G.P.S. Satellites, Principle of Operation, Surveying with G.P.S.: Methods of observations, Absolute Positioning, Relative Positioning, differential G.P.S., Kinematics of G.P.S.,

G.P.S. Receivers: Navigational Receivers, Surveying Receivers, Geodetic Receivers, Computation of Co- ordinates:- Transformation from Global to Local Datum , Geodetic Coordinates to map co- ordinates , G.P.S. Heights and mean sea level Heights. Applications of G.P.S.

UNIT – 3:   **[15]**

Remote Sensing(RS): Electromagnetic remote sensing process. Physics of radiant energy: Nature of Electromagnetic radiation, Electromagnetic spectrum. Energy Source and its Characteristics. Atmospheric influences: Absorption, Scattering. Energy interaction with Earth Surfaces: Spectral reflectance Curve. Image Acquisition: Photographic sensors, Digital Data, Earth Resource satellites, Image resolution. Image Interpretation.

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REFERENCES:
Text Books:
1. Kang-Tsung Chang, *Introduction to Geographical Information Systems*, McGraw Hill Higher Education.
2. K. Anjali Rao, *Remote sensing and GIS*, BS Publications.
Reference Books:
1. Lo C.P.Yeung A K W ,*Concepts and Techniques of GIS*, Prentice Hall, India

Subject: **Hydro Power Engineering**								
Program: **B. Tech. Civil Engineering**				Subject Code: CV0711			Semester: **VII**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	0	4	24/60	0	16/40	0	100

Course Objectives:

1. To introduce to various sources of Energy.

2. To study Hydropower, Surface, Tidal and Underground plants.

3. To study other Hydro related Structures and Elements.

Course Outcomes:

1. Introduction to various sources of Energy.

2. Brief about Hydropower, Surface, Tidal and Underground plants.

3. Understanding of other Hydro related Structures and Elements.

COURSE CONTENTS:

UNIT-I [15]

Introduction

Sources of energy, Hydroelectric power vs. other sources of power, Elements of hydropower scheme, Hydropower development in India.

Hydropower Plants

Run-off-River plants, valley dam plants, diversion canal plants, low and high head plants, Pumped Storage Plants, Layout and components of all above plants. Study of some typical type of Hydro Power plants.

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Load and Power Studies

Load Curve, Load Factor, capacity factor, utilization factor, diversity factor, load duration curve, firm power, secondary power, Load prediction.

UNIT-II [12]

Tidal Power Plants

Introduction, Types and location of Tidal Power Plants, Tidal Power in India. Issues in Tidal Power Generation.

Surface Power Plants

Surface power stations, criteria for determining their size, lighting and ventilation.

Underground Power Plants

Types and location of underground power station, its components, types of layout, limitations of underground power plants.

UNIT-III [14]

Hydraulic Turbines

Types and classification, constructional features, hydraulic analysis, selection, characteristic curves, governing of turbine, design of Turbines.

Draft Tubes

Introduction, Types and classification, Draft-Tube Theory, efficiency of draft tube. Numerical based on draft tube analysis.

UNIT-IV [13]

Intake Structures

Location, function and types of intakes, energy losses at intake trash rack..

Penstock & Power Canals

Classification of penstocks, Design of Penstocks, economic diameter, bends, manifolds, anchor blocks, design criteria of power canals.

Water Hammer & Surge Tanks

Rigid and elastic water column theories, water hammer pressure. Behaviour of surge tanks, types of surge tanks, hydraulic design, design of simple surge tank.

Text Books:

1. Dandekar and Sharma," Water Power Engineering", Vikas Publishing House, New Delhi,1996.
2. Deshmukh M.M.," Water Power Engineering", Dhanpat Rai Publications, New Delhi, 1998.
3. Barrows H. K., "Water Power Engineering", McGraw Hill Book Co., New York.,1943

Reference Books:

1. Varshney R.S," Hydropower Structures", Nem chand and Bros., Roorkee (U.P.), 1992.
2. Ivan E Houk, "Irrigation Engineering Vol-II," John Willy & Sons, New York, 1951
3. Novak, "Hydraulic Structures"
4. Chaudhary M.H.," Hydraulic Transients"

Web resources:

1. http://nptel.ac.in
2. https://www.studentenergy.org/topics/hydro-power
3. http://www.renewableenergyworld.com/hydropower/tech.html

MOOCs:

1. Nil

Subject: **Advanced Design of RCC Structures**								
Program: **B.Tech. Civil Engineering**				Subject Code: CV0713			Semester: **VII**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	0	4	24/60	0	16/40	0	100

Course Objectives:

1. To study in detail Design of RCC Structural Elements.

2. In-depth study of RCC Structures like Retaining Wall, Water Tanks etc.

Course Outcomes:

1. Detailing of RCC Structural Elements.

2. Study of RCC Structures used in Industry.

COURSE CONTENTS:

UNIT-I [14]

Deep Beam

Introduction – Definitions – Design and details of reinforcement.

Beams Curved in plan

Introduction – Circular beam – Circular arc fixed at ends – Design of beams curved in plan.

Flat Slabs

Advantages of flat slabs – Theory of Flat slab – Bending moments for flat slab –Permissible shear stresses – reinforcement in flat slab – Moments in column – Design of flat slab.

Circular Slabs

Introduction – Study of the different loading and support cases for a circular slab – Design of circular slab.

UNIT-II [12]

Shear Walls

Introduction – reinforcement in wall – calculation of axial loads and eccentricity – Design axial strength of a braced wall – walls subjected to in-plane axial loads and moments.

Pile and Raft Foundation

Introduction –Forces and moments acting on foundation – IS code provisions – Design of foundation.

UNIT-III [14]

Retaining wall

Introduction – functions of retaining wall – theories of earth pressure – stress analysis of soil – stress analysis of soil – surcharged soil condition – minimum depth of foundation – stabilities of retaining wall – reinforced concrete retaining wall – cantilever retaining wall – design principles – wall proportion – joints –reinforcement details – design of reinforced concrete retaining wall – design of cantilever type retaining wall.

UNIT-IV [14]

Water Tanks

Introduction – special considerations – special requirements – control joints – fundamentals of RCC design elements – design of different types of tank: rectangular, circular, elevated and intze type.

Text Books:

  2.   Reinforced Concrete Design, S. Pillai, D. Menon, McGraw Hill Publishers.

Reference Books:

1. Reinforced Concrete Structures Vol-1, 2: B.C.Punmia
2. Advanced Reinforced Concrete Design,N. Krishna Raju (CBS Publishers & Distributors).
3. Advanced Reinforced Concrete Design, P.C.Varghese (Prentice Hall of India)
4. R. Krishnaraju, R. N. Pranesh, Design of Reinforced Concrete IS: 456-2000, New Age International Publication (P) Ltd., New Delhi.
5. Reinforced Concrete Vol. II, Dr. H. J. Shah, Charotar Publication House.
6. Design of Reinforced Concrete Structures, S. Ramamurtham, Dhanpat Rai Publishing Company.
7. Design of R.C.C. Structural Elements, Volume 1 By S.S. Bhavikatti.
8. Bureau of Indian Standards, IS 1905:1987 - Code of Practice for Structural Use of Unreinforced Masonry 1987.

Web resources:

1. http://www.aboutcivil.org
2. http://nptel.ac.in
3. http://www.nptelvideos.in
4. www.civilprojectsonline.com
5. http://freevideolectures.com

MOOCs:

1. Elements of Structures (https://www.mooc-list.com/tags/structures)
2. Structural Engineering Design(https://ocw.mit.edu/courses/civil-and-environmental-engineering/1-051-structural-engineering-design-fall-2003)
3. Mechanics and Design of Concrete Structures (https://ocw.mit.edu/courses/civil-and-environmental-engineering/1-054-mechanics-and-design-of-concrete-structures-spring-2004/index.html)

Subject: **Disaster Management**								
Program: **B. Tech. Civil Engineering**				Subject Code: CV0712			Semester: **VII**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)-Theory**	**Continuous Internal Evaluation (CIE)-Practical**	**Total**
1	-	0	0	24/60	0	16/40	0	100

Course Objectives:

1. To explain students the conceptual applications and principles of management to mitigate various disasters.

Course Outcome:

1. Understand disasters, disaster preparedness and mitigation measures.
2. Understand role of IT, remote sensing, GIS in risk reduction.
3. Understand disaster management acts and guidelines along with the role of various stack-holders during disasters.

COURSE CONTENTS:

UNIT-I [03]

Introduction

Concepts and definitions: disaster, hazard, vulnerability, risk, capacity, impact, prevention, mitigation)

UNIT-II [04]

Disasters classification

Natural disasters (floods, drought, cyclones, volcanoes, earthquakes, tsunami, landslides, coastal erosion, soil erosion, forest fires etc.); manmade disasters (industrial pollution, artificial flooding in urban areas, nuclear radiation, chemical spills etc); hazard and vulnerability profile of India, mountain and coastal areas, ecological fragility

UNIT-III [06]

Disaster Impacts

Disaster Impacts (environmental, physical, social, ecological, economical, political, etc.); health, psycho-social issues; demographic aspects (gender, age, special needs); hazard locations; global and national disaster trends; climate-change and urban disasters. Disaster Risk Reduction **Disaster management cycle**

Phases; prevention, mitigation, preparedness, relief and recovery; structural and non-structural measures; risk analysis, vulnerability and capacity assessment; early warning systems, Post-disaster environmental response (water, sanitation, food safety, waste management, disease control); Roles and responsibilities of government, community, local institutions, NGOs and other stakeholders; Policies and legislation for disaster risk reduction, DRR programmes in India and the activities of National Disaster Management Authority.

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UNIT-IV [02]

Applications of Science and Technology for Disaster Management and Mitigation

Geo-informatics in Disaster Management (RS, GIS and GPS), Disaster Communication System (Early Warning and Its Dissemination), Land use planning and development regulations, Disaster safe designs and Development Regulations, Disaster safe designs and Construction structural and Non structural Mitigation of Disasters. Science and Technology Institutions for Disaster Management in India.

Text Books:

3. Ghosh G.K., 2006, Disaster management, APH Publishing Corporation.

Reference Books:

4. Pradeep Sahni, 2004, Disaster Risk Reduction in South Asia, Prentice Hall.
5. Singh B. K., 2008, Handbook of Disaster Management: techniques and guidelines, Rajat Publications

Web resources:

4. http://nidm.gov.in/PDF/Disaster_about.pdf
5. https://www.slideshare.net/Jyothi19587/disaster-ppt
6. https://www.slideshare.net/SayefAmin1/natural-disaster-its-causes-effects
7. https://www.slideshare.net/rahulp4/man-made-disasters-23947076
8. https://www.slideshare.net/urveshprajapati3990/disaster-management-in-india-56546805
9. www.ndmindia.nic.in/presentation/Presentation%20by%20JS%20(DM)%20(1).ppt
10. https://www.geospatialworld.net/article/information-technology-and-natural-disaster-management-in-india/
11. http://www.bvicam.ac.in/news/NRSC%202007/pdfs/papers/st_230_03_02_07.pdf
12. http://eagri.tnau.ac.in/eagri50/ENVS302/pdf/lec13.pdf
13. http://nptel.ac.in/courses/105105104/pdf/m16l39.pdf
14. https://www.unisdr.org/we/inform/events/50220

MOOCs:

15. https://www.mooc-list.com/tags/disaster-management

Approved Vide Agenda Item No. 03 of Minutes of Meeting of Academic Council held on 11 July 17

					Examination Evaluation Scheme				
Subject: **Disaster Management**
	Program: **B.Tech. Civil Engineering**		Subject Code:CV0712		Semester: **VI**
	**Teaching Scheme**		**Examination Evaluation Scheme**	
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
1	-	0	0	24/60	0	16/40	0	100

Course Objectives:

2. To explain students the conceptual applications and principles of management to mitigate various disasters.

Course Outcome:

4. Understand disasters, disaster preparedness and mitigation measures.
5. Understand role of IT, remote sensing, GIS in risk reduction.
6. Understand disaster management acts and guidelines along with the role of various stack-holders during disasters.

COURSE CONTENTS:

UNIT-I [03]

Introduction

Concepts and definitions: disaster, hazard, vulnerability, risk, capacity, impact, prevention,mitigation)

UNIT-II [04]

Disasters classification

Natural disasters (floods, drought, cyclones, volcanoes, earthquakes,tsunami, landslides, coastal erosion, soil erosion, forest fires etc.); manmade disasters (industrialpollution, artificial flooding

in urban areas, nuclear radiation, chemical spills etc); hazard andvulnerability profile of India, mountain and coastal areas, ecological fragility

UNIT-III   [06]

Disaster Impacts

Disaster Impacts (environmental, physical, social, ecological, economic, political, etc.); health,psycho-social issues; demographic aspects (gender, age, special needs); hazard locations; globaland national disaster trends; climate-change and urban disasters. Disaster Risk Reduction

Disaster management cycle

Phases; prevention, mitigation, preparedness, relief andrecovery; structural and non-structural measures; risk analysis, vulnerability and capacityassessment; early warning systems, Post-disaster environmental response (water, sanitation,food safety, waste management, disease control); Roles and responsibilities ofgovernment,community, local institutions, NGOs and otherstakeholders; Policies and legislation for disasterrisk reduction, DRR programmes in India and the activities of National DisasterManagementAuthority.

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UNIT-IV   [02]

Applications of Science and Technology for Disaster Management and Mitigation

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Publications

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19. http://nidm.gov.in/PDF/Disaster_about.pdf

20. https://www.slideshare.net/Jyothi19587/disaster-ppt

21. https://www.slideshare.net/SayefAmin1/natural-disaster-its-causes-effects

22. https://www.slideshare.net/rahulp4/man-made-disasters-23947076

23. https://www.slideshare.net/urveshprajapati3990/disaster-management-in-india-56546805

24. www.ndmindia.nic.in/presentation/Presentation%20by%20JS%20(DM)%20(1).ppt

25. https://www.geospatialworld.net/article/information-technology-and-natural-disaster-management-in-india/

26. http://www.bvicam.ac.in/news/NRSC%202007/pdfs/papers/st_230_03_02_07.pdf

27. http://eagri.tnau.ac.in/eagri50/ENVS302/pdf/lec13.pdf

28. http://nptel.ac.in/courses/105105104/pdf/m16l39.pdf

29. https://www.unisdr.org/we/inform/events/50220

MOOCs:

6. https://www.mooc-list.com/tags/disaster-management

8$^{\text{TH}}$ SEMESTER

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SR NO	CODE	SUBJECTS	TEACHING SCHEME			CREDITS	HOURS	EXAMINATION SCHEME					
								THEORY			PRACT		TOTAL
								CIE					
			L	T	P			MID	IE	ESE	CIE	ESE	
1	CV0801	Project	00	00	40	20	40	00	00	00	40	60	100
TOTAL			**00**	**00**	**40**	**20**	**40**	00	00	00	40	60	100

B-TECH CIVIL ENGINEERING, SEMESTER –VIII TEACHING & EXAMINATION SCHEME WITH EFFECT FROM JULY 2017

Subject: **Project**								
Program: **B. Tech Civil Engineering**				Subject Code: CV0801			Semester**: VIII**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)-Theory**	**Continuous Internal Evaluation (CIE)-Practical**	**Total**
0	0	40	20	00	60	00	40	100

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