Faculty of Engineering & Technology

Syllabus

For

Bachelor of Technology (B. Tech.)

in

Civil Engineering

(2018-19)

(Approved by the Academic Council vide Resolution No. …….dated…….)

BACHELOR OF TECHNOLOGY

Semester - I

THEORY PAPERS		No. of Teaching Hours			Marks Allocation			
Code	**Subject/Paper**	L	T	P	IA	EA	Total	**Credits**
BTBSC 101	Engineering Mathematics-I	3	1	-	30	70	100	4
BTBSC 102	Engineering Physics	3	1	-	30	70	100	4
BTHSMC 103	Communication Skills	2	-	-	30	70	100	2
BTESC 104	Programming for Problem Solving	2	-	-	30	70	100	2
BTESC 105A/ BTESC 105B	Basic Electrical Engineering/ Basic Civil Engineering	2	-	-	30	70	100	2
PRACTICALS/ VIVA VOCE		**No. of Teaching Hours**			**Sessional**	**Practical**	**Total**	**Credits**
BTBSC 106	Engineering Physics Lab	-	-	2	30	20	50	1
BTHSMC 107	Language Lab	-	-	2	30	20	50	1
BTESC 108	Computer Programming Lab	-	-	2	30	20	50	1
BTESC109A/ BTESC109B	Basic Electrical Engineering Lab/ Basic Civil Engineering Lab	-	-	2	30	20	50	1
BTESC 110	Computer Aided Engineering Graphics	-	-	2	30	20	50	1
BTSODECA111	Social Outreach, Discipline & Extra Curricular Activities	-	-	-	-	-	50	1
	Total	**12**	**2**	**10**	**300**	**450**	**800**	**20**

SECOND SEMESTER

THEORY PAPERS		No. of Teaching Hours			Marks Allocation			
Code	**Subject/Paper**	L	T	P	IA	EA	Total	**Credits**
BTBSC 201	Engineering Mathematics-II	3	1	-	30	70	100	4
BTBSC 202	Engineering Chemistry	3	1	-	30	70	100	4
BTHSMC 203	Human Values	2	-	-	30	70	100	2
BTESC 204	Basic Mechanical Engineering	2	-	-	30	70	100	2
BTESC205A/ BTESC205B	Basic Electrical Engineering/ Basic Civil Engineering	2	-	-	30	70	100	2
BTHSMC 206	Advanced English	2	-	-	30	70	100	2
PRACTICALS/ VIVA VOCE		No. of Teaching Hours			Sessional	Practical	Total	Credits
BTBSC 207	Engineering Chemistry Lab	-	-	2	30	20	50	1
BTHSMC 208	Human Values Activities	-	-	2	30	20	50	1
BTESC 209	Manufacturing Practices Workshop	-	-	2	30	20	50	1
BTESC210A/ BTESC 210B	Basic Electrical Engineering Lab/ Basic Civil Engineering Lab	-	-	2	30	20	50	1
BTESC 211	Computer Aided Machine Drawing	-	-	2	30	20	50	1
BTSODECA212	Social Outreach, Discipline & Extra Curricular Activities	-	-	-	-	-	50	1
	Total	**14**	**2**	**12**	**330**	**520**	**900**	**22**

Semester -III

THEORY PAPERS		**No. of Teaching Hours**			**Marks Allocation**			
Code	**Subject/Paper**	**L**	**T**	**P**	**IA**	**EA**	**Total**	**Credits**
BTCEBSC 301	Advance Engineering Mathematics–I	3	-	-	30	70	100	3
BTCEHSMC 302	Technical Communication /Managerial Economics & Financial Accounting	3	-	-	30	70	100	3
BTCEESC 303	Engineering Mechanics	3	-	-	30	70	100	3
BTCEPCC 304	Surveying	3	-	-	30	70	100	3
BTCEPCC 305	Fluid Mechanics	3	-	-	30	70	100	3
BTCEPCC 306	Building Materials and Construction	3	-	-	30	70	100	3
BTCEPCC 307	Engineering Geology	3	-	-	30	70	100	3
PRACTICALS/VIVA VOCE		**No. of Teaching Hours**			**Sessional**	**Practical**	**Total**	**Credits**
BTCEPCC 308	Surveying Lab	-		2	30	20	50	1
BTCEPCC 309	Fluid Mechanics Lab	-		2	30	20	50	1
BTCEPCC 310	Computer Aided Civil Engineering Drawing	-		2	30	20	50	1
BTCEPCC 311	Civil Engineering Materials Lab	-		2	30	20	50	1
BTCEPCC 312	Geology Lab	-		2	30	20	50	1
BTCEPSIT 313	Industrial Training	-		1	30	20	50	1
BTCESODECA 314	Social Outreach, Discipline & Extra Curricular Activities	-		-	-	-	50	1
	TOTAL	**21**	**0**	**11**	**390**	**610**	**1050**	**28**

Semester – IV

Theory Papers		No. Of Teaching Hours			Marks Allocation			
Code	**Subject/Paper**	**L**	**T**	**P**	**IA**	**EA**	**Total**	**Credits**
BTCEBSC401	Advance Engineering Mathematics-II	3	-	-	30	70	100	3
BTCEHSMC402	Managerial Economics & Financial Accounting/ Technical Communication	3	-	-	30	70	100	3
BTCEESC403	Basic Electronics for Civil Engineering Applications	3	-	-	30	70	100	3
BTCEPCC404	Strength Of Materials	3	-	-	30	70	100	3
BTCEPCC405	Hydraulics Engineering	3	-	-	30	70	100	3
BTCEPCC406	Building Planning	3	-	-	30	70	100	3
BTCEPCC407	Concrete Technology	3	-	-	30	70	100	3
PRACTICALS/VIVA-VOCE		**No. of Teaching Hours**			**Sessional**	**Practical**	**Total**	**Credits**
BTCEPCC 408	Material Testing Lab	-	-	2	30	20	50	1
BTCEPCC 409	Hydraulics Engineering Lab	-	-	2	30	20	50	1
BTCEPCC 410	Building Drawing	-	-	2	30	20	50	1
BTCEPCC 411	Advanced Surveying Lab	-	-	2	30	20	50	1
BTCEPCC 412	Concrete Lab	-	-	2	30	20	50	1
BTCESODECA 413	Social Outreach, Discipline & Extra Curricular Activities	-	-	-	-	-	50	1
TOTAL		**21**	**0**	**10**	**360**	**590**	**1000**	**27**

Semester – V

THEORY PAPERS		No. of Teaching Hours			Marks Allocation			
Code	**Subject/Paper**	**L**	**T**	**P**	**IA**	**EA**	**Total**	**Credits**
BTCEESC 501	Construction Technology and Equipment	3	-	-	30	70	100	3
BTCEPCC 502	Structure Analysis-I	3	-	-	30	70	100	3
BTCEPCC 503	Design of Concrete Structures	3	-	-	30	70	100	3
BTCEPCC 504	Geotechnical Engineering	3	-	-	30	70	100	3
BTCEPCC 505	Water Resource Engineering	3	-	-	30	70	100	3
ELECTIVE –I(Choose any one)								
BTCEPEC 506A	Air & Noise Pollution and Control	3	-	-	30	70	100	3
BTCEPEC 506B	Disaster Management	3	-	-	30	70	100	3
BTCEPEC 506C	Town Planning	3	-	-	30	70	100	3
ELECTIVE –II(Choose Any One)								
BTCEPEC 507A	Repair and Rehabilitation of Structures	3	-	-	30	70	100	3
BTCEPEC 507B	Ground Improvement Techniques	3	-	-	30	70	100	3
BTCEPEC 507C	Energy Science and Engineering	3	-	-	30	70	100	3
	Practical's/Viva Voce	**No. of Teaching Hours**				**Practical**	**Total**	**Credits**
BTCEPCC 508	Concrete Structures Design Lab	-	-	2	-	20	50	1
BTCEPCC509	Geotechnical Engineering Lab	-	-	2	-	20	50	1
BTCEPCC 510	Water Resources Engineering Design Lab	-	-	2	30	-	50	1
BTCEPSIT 511	Industrial Training	-	-	2	30	-	50	1
BTCESODECA 512	Social Outreach, Discipline & Extra Curricular Activities	-	-	-	-	-	50	1
	Total	**21**	**-**	**8**	**330**	**570**	**950**	**26**

Semester – VI

THEORY PAPERS		No. of Teaching Hours			Marks Allocation			
Code	**Subject/Paper**	**L**	**T**	**P**	**IA**	**EA**	**Total**	**Credits**
BTCEESC 601	Wind & Seismic Analysis	3	-	-	30	70	100	3
BTCEPCC 602	Structural Analysis-II	3	-	-	30	70	100	3
BTCEPCC 603	Environmental Engineering	3	-	-	30	70	100	3
BTCEPCC 604	Design of Steel Structures	3	-	-	30	70	100	3
BTCEPCC 605	Estimating & Costing	3	-	-	30	70	100	3
ELECTIVE –III(Choose any one)								
BTCEPEC 606A	Pre-Stressed Concrete	3	-	-	30	70	100	3
BTCEPEC 606B	Solid and Hazardous Waste Management	3	-	-	30	70	100	3
BTCEPEC 606C	Traffic Engineering and Management	3	-	-	30	70	100	3
ELECTIVE –IV(Choose Any One)								
BTCEPEC 607A	Bridge Engineering	3	-	-	30	70	100	3
BTCEPEC 607B	Rock Engineering	3	-	-	30	70	100	3
BTCEPEC 607C	Geographic Information System & Remote Sensing	3	-	-	30	70	100	3
Practicals/Viva Voce		**No. Of Teaching Hours**			**Sessional**	**Practical**	**Total**	**Credits**
BTCEPCC 608	Environmental Engineering Design and Lab	-	-	2	30	20	50	1
BTCEPCC 609	Steel Structure Design Lab	-	-	2	30	20	50	1
BTCEPCC 610	Quantity Surveying and Valuation Lab	-	-	2	30	20	50	1
BTCEPCC 611	Water and Earth Retaining Structures Design Lab	-	-	2	30	20	50	1
BTCEPCC 612	Foundation Design Lab	-	-	2	30	20	50	1
BTCESODECA 613	Social Outreach, Discipline & Extra Curricular Activities	-	-	-	-	-	50	1
	Total	**21**	**-**	**10**	**360**	**590**	**1000**	**27**

Semester – VII

THEORY PAPERS		**No. of Teaching Hours**			**Marks Allocation**			
Code	**Subject/Paper**	**L**	**T**	**P**	**IA**	**EA**	**Total**	**Credits**
BTCEPCC701	Transportation Engineering	3	0	0	30	70	100	3
Open Elective (Choose any one)								
BTCEPEC702A	Human Engineering and Safety	3	0	0	30	70	100	3
BTCEPEC702B	Environmental Engineering and Disaster Management	3	0	0	30	70	100	3
BTCEPEC702C	Non Destructive Testing	3	0	0	30	70	100	3
	PRACTICALS/VIVA VOCE	**No. of Teaching Hours**			**Sessional**	**Practical**	**Total**	**Credits**
BTCEPCC703	Road Material Testing Lab	0	0	2	30	20	50	1
BTCEPCC704	Professional Practices & Field Engineering Lab	0	0	2	30	20	50	1
BTCEPCC705	Soft Skill Lab	0	0	2	30	20	50	1
BTCEPCC706	Environmental Monitoring And Design Lab	0	0	2	30	20	50	1
BTCEPSIT707	Practical Training	1	0	0	60	40	100	2
BTCEPCC708	Seminar	2	0	0	60	40	100	2
BTCESODECA709	Social Outreach, Discipline & Extra Curricular Activities	0	0	0	0	50	50	1
	Total	**8**	**0**	**8**	**240**	**310**	**550**	**15**

Semester - VIII

THEORY PAPERS		No. of Teaching Hours			Marks Allocation			
Code	**Subject/Paper**	**L**	**T**	**P**	**IA**	**EA**	**Total**	**Credits**
BTCEPCC801	Project Planning and Construction Management	3	0	0	30	70	100	3
Open Elective								
BTCEPEC802A	Energy Management	3	0	0	30	70	100	3
BTCEPEC802B	Waste And By Product Utilization	3	0	0	30	70	100	3
BTCEPEC802C	Disaster Management	3	0	0	30	70	100	3
PRACTICALS/VIVA VOCE		**No. of Teaching Hours**			**Sessional**	**Practical**	**Total**	**Credits**
BTCEPCC803	Project Planning and Construction Management lab	0	0	2	30	20	50	1
BTCEPCC804	Pavement Design	0	0	2	30	20	50	1
BTCEPSIT805	Project	3	0	0	210	140	350	7
BTCESODECA806	Social Outreach, Discipline & Extra Curricular Activities	0	0	0	0	50	50	1
	Total	**9**	**0**	**4**	**330**	**370**	**700**	**16**

BACHELOR OF TECHNOLOGY

Semester - I

THEORY PAPERS		**No. of Teaching Hours**			**Marks Allocation**			
Code	**Subject/Paper**	L	T	P	IA	EA	Total	**Credits**
BTBSC 101	Engineering Mathematics-I	3	1	-	30	70	100	4
BTBSC 102	Engineering Physics	3	1	-	30	70	100	4
BTHSMC 103	Communication Skills	2	-	-	30	70	100	2
BTESC 104	Programming for Problem Solving	2	-	-	30	70	100	2
BTESC 105A/ BTESC 105B	Basic Electrical Engineering/ Basic Civil Engineering	2	-	-	30	70	100	2
PRACTICALS/ VIVA VOCE		**No. of Teaching Hours**			**Sessional**	**Practical**	**Total**	**Credits**
BTBSC 106	Engineering Physics Lab	-	-	2	30	20	50	1
BTHSMC 107	Language Lab	-	-	2	30	20	50	1
BTESC 108	Computer Programming Lab	-	-	2	30	20	50	1
BTESC109A/ BTESC109B	Basic Electrical Engineering Lab/ Basic Civil Engineering Lab	-	-	2	30	20	50	1
BTESC 110	Computer Aided Engineering Graphics	-	-	2	30	20	50	1
BTSODECA111	Social Outreach, Discipline & Extra Curricular Activities	-	-	-	-	-	50	1
	Total	**12**	**2**	**10**	**300**	**450**	**800**	**20**

BTBSC101: Engineering Mathematics-I

Unit I: Calculus:

Improper integrals (Beta and Gamma functions) and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.

Unit II: Sequences and Series:

Convergence of sequence and series, tests for convergence; Power series, Taylor's series, series for exponential, trigonometric and logarithm functions.

Unit III: Fourier Series:

Periodic functions, Fourier series, Euler's formula, Change of intervals, Half range sine and cosine series, Parseval's theorem.

Unit IV: Multivariable Calculus (Differentiation):

Limit, continuity and partial derivatives, directional derivatives, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, curl and divergence.

Unit V: Multivariable Calculus (Integration):

Multiple Integration: Double integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to), Applications: areas and volumes, Centre of mass and Gravity constant and variable densities); Triple integrals (Cartesian), Simple applications involving cubes, sphere and rectangular parallelepipeds; Scalar line integrals, vector line integrals, scalar surface integrals, surface integrals, Theorems of Green, Gauss and Stokes.

Textbooks/References:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edit ion, John Wiley & Sons, 2006. F201
3. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
5. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
6. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
7. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36 Edition, 2010.

BTBSC102: Engineering Physics

Unit I: Wave Optics

Newton's Rings, Michelson's Interferometer, Fraunhofer Diffraction from a Single Slit. Diffraction grating: Construction, theory and spectrum, Resolving power and Rayleigh criterion for limit of resolution, Resolving power of diffraction grating, X-Ray diffraction and Bragg's Law.

Unit II: Quantum Mechanics

Introduction to quantum Mechanics, Wave-particle duality, Matter waves, Wave function and basic postulates, Time dependent and time independent Schrodinger's Wave Equation, Physical interpretation of wave function and its properties, Applications of the Schrodinger's Equation: Particle in one dimensional and three dimensional boxes.

Unit III: Coherence and Optical Fibers

Spatial and temporal coherence: Coherence length; Coherence time and 'Q' factor for light, Visibility as a measure of Coherence and spectral purity, Optical fiber as optical wave guide, Numerical aperture; Maximum angle of acceptance and applications of optical fiber.

Unit IV: Laser

Einstein's Theory of laser action; Einstein's coefficients; Properties of Laser beam, Amplification of light by population inversion, Components of laser, Construction and working of He-Ne and semiconductor lasers, Applications of Lasers in Science, engineering and medicine.

Unit V: Material Science & Semiconductor Physics

Bonding in solids: covalent and metallic bonding, Energy bands in solids: Classification of solids as Insulators, Semiconductors and Conductors, Intrinsic and extrinsic semiconductors, Fermi dirac distribution function and Fermi energy, Conductivity in semiconductors, Hall Effect: Theory, Hall Coefficient and applications.

References:

1. J. Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw-Hill Inc. (1995).
2. B. E. A. Saleh and M. C. Teich, Fundamentals of Photonics, John Wiley & Sons, Inc., (2007).
3. S. M. Sze, Semiconductor Devices: Physics and Technology, Wiley (2008).
4. A. Yariv and P. Yeh, Photonics: Optical Electronics in Modern Communications, Oxford University Press, New York (2007).
5. P. Bhattacharya, Semiconductor Optoelectronic Devices, Prentice Hall of India (1997).
6. Online course: "Semiconductor Optoelectronics" by M R Shenoy on NPTEL

7. Online course: "Optoelectronic Materials and Devices" by Monica Katiyar and Deepak Guptaon NPTEL

BTHSMC103: Communication Skills

Detailed contents :

Unit I: Communication

Meaning, Importance and Cycle of Communication. Media and Typesof Communication. Verbal and Non-Verbal Communication.Barriers to communication. Formal and Informal Channels ofCommunication (Corporate Communication). Divisions of HumanCommunication and Methods to improve InterpersonalCommunication. Qualities of good communication.

Unit II: Grammar

Passive Voice. Reported Speech. Conditional Sentences. Modal Verbs. Linking Words (Conjunctions)

Unit III: Composition

Job Application and Curriculum-Vitae Writing. Business LetterWriting. Paragraph Writing. Report Writing.

Unit IV: Short Stories

"Luncheon" by Somerset Maugham."How Much Land Does a ManNeed?" by Count Leo Tolstoy. "The Night Train at Deoli" by RuskinBond.

Unit V: Poems

"No Men are Foreign" by James Kirkup. "If" by Rudyard Kipling."Where the Mind is without Fear" by Rabindranath Tagore.

Text / Reference Books Suggested Readings:

(i) Practical English Usage. Michael Swan. OUP. 1995.

(ii) Remedial English Grammar. F.T. Wood. Macmillan.2007

(iii) On Writing Well. William Zinsser. Harper Resource Book. 2001

(iv) Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.

(v) Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.

(vi) Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

BTESC104: Programming for Problem Solving

Syllabus

UNIT I:Fundamentals of Computer:

Stored program architecture of computers, Storage device- Primarymemory, and Secondary storage, Random, Direct, Sequential access methods.

UNIT II:

Concepts of High-level, Assembly and Low-level languages, Representing algorithms through flowchart and pseudo code.

UNIT III: Number system:

Data representations, Concepts of radix and representation ofnumbers in radix r with special cases of r=2, 8, 10 and 16 with conversion from radix r1 to r2, r's and (r-1)'s complement, Binary addition, Binary subtraction, Representation of alphabets.

UNIT IV:C Programming:

Problem specification, flow chart, data types, assignment statements,input output statements, developing simple C programs, If statement, for loops, while loops, do-while loops, switch statement,break statement, continue statement.

UNIT V:Development of C programs using

Arrays, functions, parameter passing,recursion, Programming in C using these statements, Structures,files, pointers and multi file handling.

Text / Reference Books

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
2. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill
3. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India

BTESC 105A: Basic Electrical Engineering

Detailed contents

UNIT I:DC Circuits:

Electrical circuit elements (R, L and C), voltage and current sources,Kirchhoff current and voltage laws, Series-Parallel circuits, Nodevoltage method, Mesh current method, Superposition, Thevenin's,Norton's and Maximum power transfer theorems.

UNIT II:AC Circuits:

Representation of sinusoidal waveforms, peak and r.m.s values,phasor representation, real power, reactive power, apparent power,power factor. Analysis of single-phase AC circuits consisting of R, L,C, RL, RC and RLC combinations (series and parallel), resonance.Three phase balanced circuits, voltage and current relations in starand delta connections.

UNIT III:Transformers:

Ideal and practical transformer, EMF equation, equivalent circuit,losses in transformers, regulation and efficiency.

UNIT IV:Electrical Machines:

Generation of rotating magnetic fields, Construction and working ofa three-phase induction motor, Significance of torque-slipcharacteristic. Starting and speed control of induction motor, singlephaseinduction motor. Construction, working, torque-speedcharacteristic and speed control of separately excited DC motor.Construction and working of synchronous generators.

UNIT V:Power Converters:

Semiconductor PN junction diode and transistor (BJT).Characteristics of SCR, power transistor and IGBT. Basic circuits ofsingle phase rectifier with R load, Single phase Inverter, DC-DCconverter.

Suggested Text / Reference Books

1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill,2010.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
3. L. S. Bobrow, " Fundamentals of Electrical Engineering", Oxford University Press, 2011.
4. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
5. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

BTESC105B: Basic Civil Engineering

Detailed contents:

Unit I: Introduction to objective, scope and outcome the subject

Unit II: Introduction

Scope and Specialization of Civil Engineering, Role of civil Engineer in Society, Impact of infrastructural development on economy of country.

Unit III: Surveying Object, Principles & Types of Surveying; Site Plans, Plans& Maps; Scales & Unit of different Measurements. Linear Measurements: Instruments used. Linear Measurement by Tape, Ranging out Survey Lines and overcoming Obstructions; Measurements on sloping ground; Tape corrections, conventional symbols. Angular Measurements: Instruments used; Introduction to Compass Surveying,Bearings and Longitude & Latitude of a Line, Introduction to total station. Levelling: Instrument used, Object of leveling, Methods of leveling in brief, and Contour maps.

Unit IV: Buildings

Selection of site for Buildings, Layout of Building Plan, Types of buildings, Plinth area, carpet area, floor space index, Introduction to building byelaws, concept of sun light and ventilation. Components of Buildings & their functions, Basic concept of R.C.C., Introduction to types of foundation.

Unit V: Transportation

Introduction to Transportation Engineering; Traffic and Road Safety: Types and Characteristics of Various Modes of Transportation; Various Road Traffic Signs, Causes of Accidents and Road Safety Measures.

TEXTBOOKS:

1. Gopi, S., Basic Civil Engineering, Pearson Publishers
2. Kandya, A. A., Elements of Civil Engineering, Charotar Publishing house
3. Rangwala, S. C., Essentials of Civil Engineering, Charotar Publishing House
4. Rangwala, S. C. and Dalal, K. B., Engineering Materials, Charotar Publishing house

References Books:

1. Chudley, R., Construction Technology, Vol. I to IV, Longman Group, England
2. Chudley, R. and Greeno, R., Building Construction Handbook, Addison Wesley, Longman Group, England
3. McKay, W. B. and McKay, J. K., Building Construction Volumes 1 to 4, Pearson India Education Services
4. Minu, S., Basic Civil Engineering, Karunya Publications

BTBSC106: Engineering Physics Lab

LIST OF EXPERIMENTS :

1. To determine the wave length of monochromatic light with the help of Michelson's interferometer.
2. To determine the wave length of sodium light by Newton's Ring.
3. To determine the wave length of prominent lines of mercury by plane diffraction grating with the help of spectrometer.
4. Determination of band gap using a P-N junction diode.
5. To determine the height of given object with the help of sextant.
6. To determine the dispersive power of material of a prism with the help of spectrometer.
7. To study the charge and discharge of a condenser and hence determine the same constant both current and voltage graphs are to be plotted.
8. To determine the coherence length and coherence time of laser using He – Ne laser.
9. To measure the numerical aperture of an optical fibre.
10. To study the Hall Effect and determine the Hall Voltage and Hall coefficients.

BTHSMC107: Language Lab

Detailed Syllabus

1. Phonetic Symbols and Transcriptions.
2. Extempore.
3. Group Discussion.
4. Dialogue Writing.
5. Listening comprehension.

BTESC 108: Computer Programming Lab

LIST OF EXPERIMENTS :

1. To learn about the C Library, Preprocessor directive, Input-outputstatement.
2. Programs to learn data type, variables, If-else statement
3. Programs to understand nested if-else statement and switch statement
4. Programs to learn iterative statements like while and do-while loops
5. Programs to understand for loops for iterative statements
6. Programs to learn about array and string operations
7. Programs to understand sorting and searching using array
8. Programs to learn functions and recursive functions
9. Programs to understand Structure and Union operation
10. Programs to learn Pointer operations
11. Programs to understand File handling operations
12. Programs to input data through Command line argument

BTESC 109A: Basic Electrical Engineering Lab

List of Experiments

1. Basic safety precautions. Introduction and use of measuring instruments –voltmeter, ammeter, multi-meter, oscilloscope. Real-life resistors, capacitors and inductors.
2. Transformers: Observation of the no-load current waveform on anoscilloscope. Loading of a transformer: measurement of primary andsecondary voltages and currents, and power.
3. Three-phase transformers: Star and Delta connections. Voltage and Currentrelationships (line-line voltage, phase-to-neutral voltage, line and phasecurrents).Phase-shifts between the primary and secondary side.
4. Demonstration of cut-out sections of machines: dc machine (commutate or brush arrangement), induction machine (squirrel cage rotor), synchronous(field winging - slip ring arrangement) and single-phase induction
5. Torque Speed Characteristic of separately excited dc motor.
6. Demonstration of (a) dc-dc converters (b) dc-ac converters – PWM waveform (c) the use of dc-ac converter for speed control of an induction motor and (d)Components of LT switchgear.

BTESC109B: Basic Civil Engineering Lab

LIST OF EXPERIMENTS:

1. Linear Measurement by Tape:
   a) Ranging and Fixing of Survey Station along straight line and across obstacles.
   b) Laying perpendicular offset along the survey line
2. Compass Survey: Measurement of bearing of linesusing Surveyor's and Prismatic compass
3. Levelling: Using Tilting/ Dumpy/ Automatic Level
   a) To determine the reduced levels in closed circuit.
   b) To carry out profile levelling and plot longitudinal and cross sections for road by Height of Instrument and Rise & Fall Method.
4. To study and take measurements using various electronic surveying instruments like EDM, Total Station etc.
5. To determine pH, hardness and turbidity of the given sample of water.
6. To study various water supply Fittings.
7. To determine the pH and total solids of the given sample of sewage.
8. To study various Sanitary Fittings.

BTESC110: Computer Aided Engineering Graphics

Introduction: Principles of drawing, lines, type of lines, usage of Drawinginstruments, lettering, Conic sections including parabola, hyperbola, RectangularHyperbola (General method only); Scales-Plain, Diagonal and Vernier Scales.

Projections of Point & Lines: Position of Point, Notation System, SystematicApproach for projections of points, front view & Top view of point, Position ofstraight lines, line parallel to Both the RPs, Line perpendicular to either of the RPs,Line inclined to one RP and parallel to the other, Line inclined to Both the RPs,Traces of a line (One drawing sheet, one assignment in sketch book).

Projection of Planes: Positions of planes, Terms used in projections of planes,plane parallel to RP, plane inclined to one RP and perpendicular to the other RP,plane perpendicular to Both the RPs, plane Inclined to Both the RPs, True shape ofthe plane, Distance of a point from plane, Angle between two planes.

Projections of Regular Solids: frustum and truncated solids, those inclined toboth the Planes-Auxiliary Views.

Section of Solids: Theory of sectioning, section of prisms and cubes, section ofpyramids and Tetrahedron section of Cylinders, section of cones, section ofspheres (One drawing sheet, one assignment in sketch book)

Overview of Computer Graphics : Covering theory of CAD software [such as: Themenu System, Toolbars (standard, Object Properties, Draw, Modify andDimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialogboxes and windows, Shortcut menus (Button Bars), Command Line (whereapplicable), The Status Bar, Different methods of zoom as used in CAD, Select anderase objects.: Isometric Views of lines, Planes, Simple and compound Solids.

BTSODECA111: Social Outreach, Discipline & Extra Curricular Activities

SECOND SEMESTER

THEORY PAPERS		No. of Teaching Hours			Marks Allocation			
Code	**Subject/Paper**	L	T	P	IA	EA	Total	**Credits**
BTBSC 201	Engineering Mathematics-II	3	1	-	30	70	100	4
BTBSC 202	Engineering Chemistry	3	1	-	30	70	100	4
BTHSMC 203	Human Values	2	-	-	30	70	100	2
BTESC 204	Basic Mechanical Engineering	2	-	-	30	70	100	2
BTESC205A/ BTESC205B	Basic Electrical Engineering/ Basic Civil Engineering	2	-	-	30	70	100	2
BTHSMC 206	Advanced English	2	-	-	30	70	100	2
PRACTICALS/ VIVA VOCE		No. of Teaching Hours			Sessional	Practical	Total	Credits
BTBSC 207	Engineering Chemistry Lab	-	-	2	30	20	50	1
BTHSMC 208	Human Values Activities	-	-	2	30	20	50	1
BTESC 209	Manufacturing Practices Workshop	-	-	2	30	20	50	1
BTESC210A/ BTESC 210B	Basic Electrical Engineering Lab/ Basic Civil Engineering Lab	-	-	2	30	20	50	1
BTESC 211	Computer Aided Machine Drawing	-	-	2	30	20	50	1
BTSODECA212	Social Outreach, Discipline & Extra Curricular Activities	-	-	-	-	-	50	1
	Total	**14**	**2**	**12**	**330**	**520**	**900**	**22**

BTBSC201: Engineering Mathematics-II

Unit I: Matrices:

Rank of a matrix, rank-nullity theorem; System of linear equations; Symmetric, skew-symmetric and orthogonal matrices; Eigenvalues and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem, and Orthogonal transformation.

Unit II: First order ordinary differential equations:

Linear and Bernoulli's equations, Exact equations, Equations not of first degree: equations solvable for *p*, equations solvable for *y*, equations solvable for *x* and Clairaut's type.

Unit III: Ordinary differential equations of higher orders:

Linear Differential Equations of Higher order with constant coefficients, Simultaneous Linear Differential Equations, Second order linear differential equations with variable coefficients: Homogenous and Exact forms, one part of CF is known, Change of dependent and independent variables, method of variation of parameters, Cauchy- Euler equation; Power series solutions including Legendre differential equation and Bessel differential equations.

Unit IV: Partial Differential Equations – First order: Order and Degree, Formation; Linear Partial differential equations ofFirst order, Lagrange's Form, Non Linear Partial Differential equationsof first order, Charpit's method, Standard forms.

Unit V: Partial Differential Equations– Higher order : Classification of Second order partial differential equations, Separation of variables method to simple problems in Cartesian coordinates including two dimensional Laplace, one dimensional Heat and one dimensional Wave equations.

Textbooks/References:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition, Pearson, Reprint, 2002.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9thEdit ion, John Wiley & Sons, 2006.
3. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint, 2010.
5. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
6. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
7. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36 Edition, 2010.

BTBSC202: Engineering Chemistry

Detailed contents:

Unit I: Water

Common impurities, hardness, determination of hardness by complexometric (EDTA method), Degree of hardness, Units of hardness Municipal water supply: Requisite of drinking water, Purification of water; sedimentation, filtration, disinfection, breakpoint chlorination. Boiler troubles: Scale and Sludge formation, Internal treatment methods, Priming and Foaming, Boiler corrosion and Caustic embrittlement Water softening; Lime-Soda process, Zeolite (Permutit) process, Demineralization process. Numerical problems based on Hardness, EDTA, Lime-Soda and Zeolite process.

Unit II: Organic Fuels

Solid fuels: Coal, Classification of Coal, Proximate and Ultimate analyses of coal and its significance, Gross and Net Calorific value, Determination of Calorific value of coal by Bomb Calorimeter. Metallurgical coke, Carbonization processes; Otto-Hoffmann byproduct oven method. Liquid fuels : Advantages of liquid fuels, Mining, Refining and Composition of petroleum, Cracking, Synthetic petrol, Reforming, Knocking, Octane number, Anti-knocking agents, Cetane number Gaseous fuels; Advantages, manufacturing, composition and Calorific value of coal gas and oil gas, Determination of calorific value of gaseous fuels by Junker's calorimeter Numerical problems based on determination of calorific value (bomb calorimeter/Junkers calorimeter/Dulongs formula, proximate analysis & ultimate and combustion of fuel.

Unit III: Corrosion and its control

Definition and significance of corrosion, Mechanism of chemical (dry) and electrochemical (wet) corrosion, galvanic corrosion, concentration corrosion and pitting corrosion. Protection from corrosion; protective coatings-galvanization and tinning, cathodic protection, sacrificial anode and modifications in design.

Unit IV: Engineering Materials

Portland Cement; Definition, Manufacturing by Rotary kiln. Chemistry of setting and hardening of cement. Role of Gypsum. Glass: Definition, Manufacturing by tank furnace, significance of annealing, Types and properties of soft glass, hard glass, borosilicate glass, glass wool, safety glass Lubricants: Classification, Mechanism, Properties; Viscosity and viscosity index, flash and fire point, cloud and pour point. Emulsification and steam emulsion number.

Unit V: Organic reaction mechanism and introduction of drugs

Organic reaction mechanism: Substitution; SN1, SN2, Elecrophilic aromatic substitution in benzene, free radical halogenations of alkanes, Elimination; elimination in alkyl halides, dehydration of alcohols, Addition: electrophilic and free radical addition in alkenes, nucleophilic addition in aldehyde and ketones, Rearrangement; Carbocation and free radical rearrangements Drugs : Introduction, Synthesis, properties and uses of Aspirin, Paracetamol

Suggested Text / Reference Books

1. Morrison R.T & Boyn R. N ; Organic Chemistry; Prentice Hall of India 1999
2. Lee J. D. ; Inorganic Chemistry ;Blackwell Science
3. Gopalan R., Venkappayya D., Nagarajan S. "Engineering Chemistry" Vikas Publishing House Pvt Ltd 2000.
4. Jain & Jain " Engineering Chemistry" Dhanpat Rai publishing company
5. Dara S. S. , " A Text Book of Engineering Chemistry" S. Chand and Company Ltd, 2008
6. Keeler J and Wolhess P, Why Chemical Reaction Happen Oxford Press.

BTHSMC203: Human Values

Detailed contents:

Unit I: Course Introduction - Need, Basic Guidelines, Content andProcess for Value Education

Understanding the need, basic guidelines, Self Exploration – itscontent and process; 'Natural Acceptance' and Experiential Validation,Continuous Happiness and Prosperity- Human Aspirations, Rightunderstanding, Relationship and Physical Facilities,UnderstandingHappiness and Prosperity correctly- A critical appraisal of the currentscenario.Method to fulfill the above human aspirations: understanding andliving in harmony at various levels

Unit II: Understanding Harmony in the Human Being - Harmony in Myself

Understanding human being as a co-existence of the sentient 'I' andthe material 'Body'Understanding the needs of Self ('I') and 'Body' - Sukh and SuvidhaUnderstanding the Body as an instrument of 'I',Understanding thecharacteristics and activities of 'I' and harmony in 'I' Understandingthe harmony of I with the Body: Sanyam and Swasthya; correctappraisal of Physical needs, meaning of Prosperity in detail, Programsto ensure Sanyam and Swasthya.

Unit III: Understanding Harmony in the Family and Society- Harmony inHuman-Human Relationship

Understanding harmony in the Family, Understanding values inhuman-human relationship; meaning of Nyaya and program for itsfulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect(Samman) , meaning of Vishwas; Difference between intention and competence, meaning of Samman, Difference between respect and differentiation; the other salient values in relationship, harmony in the society , Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals ,Visualizing a universal harmonious order in society- Undivided Society (AkhandSamaj), Universal Order (SarvabhaumVyawastha)- from family to world family.

Unit IV: Understanding Harmony in the Nature and Existence – Whole existence as Coexistence

Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature. Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in allpervasive Space. Holistic perception of harmony at all levels of existence

Unit V: Implications of the above Holistic Understanding of Harmony on Professional Ethics. Natural acceptance of human values

Definitiveness of Ethical Human Conduct. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in Professional Ethics: a) Ability to utilize the professional competence for augmenting universal human order, b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems, technologies and management

models. Strategy for transition from the present state to Universal Human Order: At the level of individual: as socially and ecologically responsible engineers, technologists and managers. Case studies related to values in professional life and individual life.

Suggested Text / Reference Books

1. Gaur R.R., Sangal R. and. Bagaria, G.P: ”A Foundation Course in Human Values Professional Ethics,” Excel Books, 2010.
2. Sadri S & Sadri, J Business Excellence Through Ethics & Governance, 2ndedition, 2015.
3. Mathur, U C CorporateGovernance and business ethics,MacMillan India Ltd, 2009.
4. Baxi, C V: CorporateGovernance, Excel Books, 2009
5. Sadri S, Sinha A K and Bonnerjee, P: Business Ethics: concepts and cases, TMH, 1998.

BTESC 204: Basic Mechanical Engineering

Unit I: Fundamentals:

Introduction to mechanical engineering, concepts of thermalengineering, mechanical machine design, industrial engineering andmanufacturing technology.Steam Boilers classification and types of steam boilers and steamturbines. Introduction and Classification of power plants.

Unit II: Pumps and IC Engines:

Applications and working of Reciprocating and Centrifugal pumps.Introduction, Classification of IC Engines, Main Components of ICEngines, Working of IC Engines and its components.

Unit III: Refrigeration and Air Conditioning:

Introduction, classification and types of refrigeration systems andair-conditioning. Applications of refrigeration and Air-conditioning.

Unit IV: Transmission of Power:

Introduction and types of Belt and Rope Drives, Gears.

Unit V:

Primary Manufacturing Processes:Metal Casting Process: Introduction to Casting Process, Patterns,Molding, Furnaces. Metal Forming Processes: Introduction toForging, Rolling, Extrusion, Drawing. Metal Joining Processes:Introduction to various types of Welding, Gas Cutting, Brazing, andSoldering.

BTESC205A : Basic Electrical Engineering

Detailed contents

UNIT I:DC Circuits:

Electrical circuit elements (R, L and C), voltage and current sources,Kirchhoff current and voltage laws, Series-Parallel circuits, Nodevoltage method, Mesh current method, Superposition, Thevenin's,Norton's and Maximum power transfer theorems.

UNIT II:AC Circuits:

Representation of sinusoidal waveforms, peak and r.m.s values,phasor representation, real power, reactive power, apparent power,power factor. Analysis of single-phase AC circuits consisting of R, L,C, RL, RC and RLC combinations (series and parallel), resonance.Three phase balanced circuits, voltage and current relations in starand delta connections.

UNIT III:Transformers:

Ideal and practical transformer, EMF equation, equivalent circuit,losses in transformers, regulation and efficiency.

UNIT IV:Electrical Machines:

Generation of rotating magnetic fields, Construction and working ofa three-phase induction motor, Significance of torque-slipcharacteristic. Starting and speed control of induction motor, singlephaseinduction motor. Construction, working, torque-speedcharacteristic and speed control of separately excited DC motor.Construction and working of synchronous generators.

UNIT V:Power Converters:

Semiconductor PN junction diode and transistor (BJT).Characteristics of SCR, power transistor and IGBT. Basic circuits ofsingle phase rectifier with R load, Single phase Inverter, DC-DCconverter.

Suggested Text / Reference Books

4. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill,2010.
5. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
6. L. S. Bobrow, " Fundamentals of Electrical Engineering", Oxford University Press, 2011.
4. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
5. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

BTESC 205B : Basic Civil Engineering

Detailed contents:

Unit I: Introduction to objective, scope and outcome the subject

Unit II: Introduction

Scope and Specialization of Civil Engineering, Role of civil Engineer in Society, Impact of infrastructural development on economy of country.

Unit III: Surveying Object, Principles & Types of Surveying; Site Plans, Plans& Maps; Scales & Unit of different Measurements. Linear Measurements: Instruments used. Linear Measurement by Tape, Ranging out Survey Lines and overcoming Obstructions; Measurements on sloping ground; Tape corrections, conventional symbols. Angular Measurements: Instruments used; Introduction to Compass Surveying,Bearings and Longitude & Latitude of a Line, Introduction to total station. Levelling: Instrument used, Object of leveling, Methods of leveling in brief, and Contour maps.

Unit IV: Buildings

Selection of site for Buildings, Layout of Building Plan, Types of buildings, Plinth area, carpet area, floor space index, Introduction to building byelaws, concept of sun light and ventilation. Components of Buildings & their functions, Basic concept of R.C.C., Introduction to types of foundation.

Unit V: Transportation

Introduction to Transportation Engineering; Traffic and Road Safety: Types and Characteristics of Various Modes of Transportation; Various Road Traffic Signs, Causes of Accidents and Road Safety Measures.

TEXTBOOKS:

5. Gopi, S., Basic Civil Engineering, Pearson Publishers
6. Kandya, A. A., Elements of Civil Engineering, Charotar Publishing house
7. Rangwala, S. C., Essentials of Civil Engineering, Charotar Publishing House
8. Rangwala, S. C. and Dalal, K. B., Engineering Materials, Charotar Publishing house

References Books:

5. Chudley, R., Construction Technology, Vol. I to IV, Longman Group, England
6. Chudley, R. and Greeno, R., Building Construction Handbook, Addison Wesley, Longman Group, England
7. McKay, W. B. and McKay, J. K., Building Construction Volumes 1 to 4, Pearson India Education Services
8. Minu, S., Basic Civil Engineering, Karunya Publications

BTHSMC206: Advanced English

Detailed contents

Unit-I (Grammar)

1. Modal
2. Preposition
3. Conjunction

Unit-II (Composition)

1. Resume writing
2. Report writing
3. Advertisement

Unit-III (Personality)

1. Define Personality
2. Types of Personality
3. How to develop one's personality

Unit-IV (Elements of Communication)

1. Meaning
2. Barriers to communication
3. Functions / Objectives of Communication

Unit-V (Poems)

1. 'No men are foreign' – by James Kirk up
2. 'Death, Be not Proud' – by John Donne

BTBSC 207: Engineering Chemistry Lab

List of Experiments:

1. Determination the hardness of water by EDTA method
2. Determination of residual chlorine in water
3. Determination of dissolved oxygen in water
4. Determination of the strength of Ferrous Ammonium sulphate solution with the help of K2Cr2O7 solution by using diphenyl amine indicator
5. Determination of the strength of CuSO4 solution iodometrically by using hypo solution
6. Determination of the strength of NaOH and Na2CO3 in a given alkali mixture
7. Proximate analysis of Coal
8. Determination of the flash & fire point and cloud & pour point of lubricating oil
9. Determination of the kinematic viscosity of lubricating oil by Redwood viscometer no. 1 at different temperature
10. Synthesis of Aspirin/ Paracetamol

BTHSM208 : Human Values Activities

Detailed contents

PS 1:

Introduce yourself in detail. What are the goals in your life? How do you set your goals in your life? How do you differentiate between right and wrong? What have been your salient achievements and shortcomings in your life? Observe and analyze them.

PS 2:

Now-a-days, there is a lot of talk about many technogenic maladies such as energy and material resource depletion, environmental pollution, global warming, ozone depletion, deforestation, soil degradation, etc. - all these seem to be manmadeproblems, threatening the survival of life Earth - What is the root cause of these maladies & what is the way out in opinion? On the other hand, there is rapidly growing danger because of nuclear proliferation, arms race, terrorism, breakdown of relationships, generation gap, depression & suicidal attempts etc. - what do you think, is the root cause of these threats to human happiness and peace - what could be the way out in your opinion?

PS 3:

1. Observe that each of us has the faculty of 'Natural Acceptance', based on which one can verify what is right or not right for him. (As such we are not properly trained to listen to our 'Natural Acceptance' and may a time it is also clouded by our strong per-conditioning and sensory attractions). Explore the following:

(i) What is Naturally Acceptable' to you in relationship the feeling of respect or disrespect for yourself and for others?

(ii) What is 'naturally Acceptable' to you - to nurture or to exploit others? Is your living in accordance with your natural acceptance or different from it?

2. Out of the three basic requirements for fulfillment of your aspirations – right understanding, relationship and physical facilities - observe how the problems in your family are related to each. Also observe how much time & effort you devote for each in your daily routine.

PS 4:

List down all your important desires. Observe whether the desire is related to Self (I) the Body. If it appears to be related to both, visualize which part of it is related to Self (I) and which part is related to Body.

PS 5:

1. a. Observe that any physical facility you use, follows the given sequence with time: Necessary and tasteful - unnecessary but still tasteful - unnecessary and tasteless - intolerable

   b. In contrast, observe that any feeling in you is either naturally acceptable or not acceptable at all. If not acceptable, you want it continuously and if not acceptable, you do not want it any moment!

2. List down all your important activities. Observe whether the activity is of 'I' or of Body or with the participation of both or with the participation of both 'I' and Body.

3. Observe the activities within 'i'. Identify the object of your attention for different moments (over a period of sy 5 to 10 minutes) and draw a line diagram connecting these points. Try observe the link between any two nodes.

PS 6:

1. Chalk out some programs towards ensuring your harmony with the body – in terms of nurturing, protection and right utilization of the body.
2. Find out the plants and shrubs growing in and around your campus, which can be useful in curing common diseases.

PS 7:

Form small groups in the class and make them carry out a dialogue focusing on the following eight questions related to 'TRUST';

1a. Do I want to make myself happy?

2a. Do I want to make the other happy?

3a. Does the other want to make himself/herself happy?

4a. Does the other want to make me happy?

What is the answer?

Intention (Natural Acceptance)

1b. Am I able to always make myself happy?

2b. Am I able to always make the other happy?

3b. Is the other able to always make himself/herself happy?

What is the answer?

Let each student answer the questions for himself and everyone else. Discuss the difference between intention and competence. Observe whether you evaluate yourself and others on the basis of intention/competence.

PS 8:

1. Observe, on how many occasions, you are able to respect your related ones (by doing the right evaluation) and on how many occasions you are disrespecting by way of under-evaluation, over-evaluation or otherwise evaluation.
2. Also, observe whether your feeling of respect is based on treating the other as you would treat yourself or on differentiations based on body, physical facilities or belieds.

PS 9:

1. Write a narration in the form of a story, poem, skit or essay to clarify a salient Human Value to the children.
2. Recollect and narrate an incident in your life where you were able to exhibit willful adherence to values in a difficult situation.

PS 10:

List down some common units (things) of Nature which you come across in your daily life and classify them in the four orders of Nature. Analysis and explain the aspect of mutual fulfillment of each unit with other orders.

PS 11:

Make a chart to show the whole existence as co-existence. With the help of this chart try to identify the role and the scope of some of the courses of your study. Also indicate the areas which are being either over-emphasized or ignored in the present context.

PS 12:

Identify any two important problems being faced by the society today and analyze the root cause of these problems. Can these be solved on the basic of natural acceptance of human values. If so, how should one proceed in this direction from the present situation?

PS 13:

1. Suggest ways in which you can use your knowledge of Science/Technology/Management etc. for moving towards a universal human order.
2. Propose a broad outline for humanistic Constitution at the level of Nation.

PS 14:

The course is going to be over now. It is time to evaluate what difference in your thinking it has made. Summarize the core massage of this course grasped by you. How has this affected you in terms of;

a. Thought

b. Behavior

c. Work and

d. Relization

What practical steps are you able to visualize for the transition of the society from its present state.

Project:

Every student required to take-up a social project e.g. educating children in needy/weaker section, services in hospitals, NGO's and other such work i.e. social work at villages adopted by respective institute/ college.

BTESC 209: Manufacturing Practices Workshop

Carpentry Shop

1. T – Lap joint
2. Bridle joint

Foundry Shop

3. Mould of any pattern
4. Casting of any simple pattern

Welding Shop

5. Lap joint by gas welding
6. Butt joint by arc welding
7. Lap joint by arc welding
8. Demonstration of brazing, soldering & gas cutting

Machine Shop Practice

9. Job on lathe with one step turning and chamfering operations

Fitting and Sheet Metal Shop

10. Finishing of two sides of a square piece by filing
11. Making mechanical joint and soldering of joint on sheet metal
12. To cut a square notch using hacksaw and to drill a hole and tapping

BTESC210A Basic Electrical Engineering Lab

List of Experiments

1. Basic safety precautions. Introduction and use of measuring instruments –voltmeter, ammeter, multi-meter, oscilloscope. Real-life resistors, capacitorsand inductors.
2. Transformers: Observation of the no-load current waveform on anoscilloscope. Loading of a transformer: measurement of primary andsecondary voltages and currents, and power.
3. Three-phase transformers: Star and Delta connections. Voltage and Currentrelationships (line-line voltage, phase-to-neutral voltage, line and phasecurrents).Phase-shifts between the primary and secondary side.
4. Demonstration of cut-out sections of machines: dc machine (commutate orbrusharrangement), induction machine (squirrel cage rotor), synchronous(field winging - slip ring arrangement) and single-phase induction
5. Torque Speed Characteristic of separately excited dc motor.
6. Demonstration of (a) dc-dc converters (b) dc-ac converters – PWM waveform (c) the use of dc-ac converter for speed control of an induction motor and (d)Components of LT switchgear.

BTESC 210B: Basic Civil Engineering Lab

LIST OF EXPERIMENTS:

1. Linear Measurement by Tape:
   a) Ranging and Fixing of Survey Station along straight line and across obstacles.
   b) Laying perpendicular offset along the survey line
2. Compass Survey: Measurement of bearing of linesusing Surveyor's and Prismatic compass
3. Levelling: Using Tilting/ Dumpy/ Automatic Level
   a) To determine the reduced levels in closed circuit.
   b) To carry out profile levelling and plot longitudinal and cross sections for road by Height of Instrument and Rise & Fall Method.
4. To study and take measurements using various electronic surveying instruments like EDM, Total Station etc.
5. To determine pH, hardness and turbidity of the given sample of water.
6. To study various water supply Fittings.
7. To determine the pH and total solids of the given sample of sewage.
8. To study various Sanitary Fittings.

BTESC 211: Computer Aided Machine Drawing

Syllabus

Introduction: Principles of drawing, conventional representation of machine components and materials, lines, types of lines, dimensioning types, rules ofdimensioning.

Conversion of pictorial views into orthographic views: (1 drawing sheet)Introduction to orthographic prdcojection, concept of first angle and third angleprojection, drawing of simple machine elements in first angle projection, missingview problems covering Principles of Orthographic Projections.

Sectional views of mechanical components: (1 drawing sheet) Introduction,cutting plane line, type of sectional views-full section, half section, partial orbroken section, revolved section, removed section, offset section, sectioningconventions-spokes, web rib, shaft, pipes, different types of holes, conventions ofsection lines for different metals and materials.

Fasteners and other mechanical components: (Free hand sketch) Temporaryand permanent fasteners, thread nomenclature and forms, thread series,designation, representation of threads, bolted joints, locking arrangement of nuts,screws, washers, foundation bolts etc., keys, types of keys, cotter and knucklejoints. Riveted joints, rivets and riveting, type of rivets, types of riveted joints etc.Bearing: Ball, roller, needle, foot step bearing. Coupling: Protected type, flange, andpin type flexible coupling. Other components: Welded joints, belts and pulleys,pipes and pipe joints, valves etc.

Overview of Computer Graphics: (2 drawing sheets) Covering theory of CADsoftware such as: The menu System, Toolbars (Standard, Object Properties, Draw,Modify and Dimension), Drawing Area (Background, Crosshairs, CoordinateSystem), Dialog boxes and windows, Shortcut menus (Button Bars), CommandLine (Where applicable), The Status Bar, Different methods of zoom as used inCAD, Select and erase objects.: Isometric Views of Lines, Planes, Simple andcompound Solids.

BTSODECA212: Social Outreach, Discipline & Extra Curricular Activities

Semester -III

THEORY PAPERS		**No. of Teaching Hours**			**Marks Allocation**			
Code	**Subject/Paper**	**L**	**T**	**P**	**IA**	**EA**	**Total**	**Credits**
BTCEBSC 301	Advance Engineering Mathematics–I	3	-	-	30	70	100	3
BTCEHSMC 302	Technical Communication /Managerial Economics & Financial Accounting	3	-	-	30	70	100	3
BTCEESC 303	Engineering Mechanics	3	-	-	30	70	100	3
BTCEPCC 304	Surveying	3	-	-	30	70	100	3
BTCEPCC 305	Fluid Mechanics	3	-	-	30	70	100	3
BTCEPCC 306	Building Materials and Construction	3	-	-	30	70	100	3
BTCEPCC 307	Engineering Geology	3	-	-	30	70	100	3
PRACTICALS/VIVA VOCE		**No. of Teaching Hours**			**Sessional**	**Practical**	**Total**	**Credits**
BTCEPCC 308	Surveying Lab	-		2	30	20	50	1
BTCEPCC 309	Fluid Mechanics Lab	-		2	30	20	50	1
BTCEPCC 310	Computer Aided Civil Engineering Drawing	-		2	30	20	50	1
BTCEPCC 311	Civil Engineering Materials Lab	-		2	30	20	50	1
BTCEPCC 312	Geology Lab	-		2	30	20	50	1
BTCEPSIT 313	Industrial Training	-		1	30	20	50	1
BTCESODECA 314	Social Outreach, Discipline & Extra Curricular Activities	-		-	-	-	50	1
	TOTAL	**21**	**0**	**11**	**390**	**610**	**1050**	**28**

BTCEBSC301: Advance Engineering Mathematics-I

Syllabus

UNIT 1:**Numerical Methods – 1:** Finite differences, Relation between operators,Interpolation using Newton's forward and backward difference formulae. Gauss's forward and backward interpolation formulae. Stirling's Formulae. Interpolation with unequal intervals: Newton's divided difference and Lagrange'sformulae. Numerical Differentiation, Numerical integration: Trapezoidal rule and Simpson's 1/3rd and 3/8 rules.

UNIT 2: **Numerical Methods – 2:** Numerical solution of ordinary differential equations: Taylor's series, Euler and modified Euler's methods. Runge- Kutta method of fourth order for solving first and second order equations. Milne's and Adam's predicator-corrector methods. Solution of polynomial and transcendental equations-Bisection method, Newton-Raphson method and Regula-Falsi method

UNIT3: **Laplace Transform:** Definition and existence of Laplace transform, Properties of Laplace Transform and formulae, Unit Step function, Dirac Delta function, Heaviside function, Laplace transform of periodic functions. Finding inverse Laplace transform by different methods, convolution theorem. Evaluation of integrals by Laplace transform, solving ODEs by Laplace transforms method.

UNIT 4: **Fourier Transform:** Fourier Complex, Sine and Cosine transform, properties and formulae, inverse Fourier transforms, Convolution theorem, application of Fourier transforms to partial ordinary differential equation (One dimensional heat and wave equations only).

UNIT 5: **Z-Transform:** Definition, properties and formulae, Convolution theorem, inverse Z-transform, application of Z-transform to difference equation.

TEXTBOOKS:

1. Murray R. Spiegel, (1981), "Vector Analysis" Schaum Publishing Co.
2. Grewal B.S. (2006) "Higher Engg. Mathematics", Khanna Publishers, 39th Edition.

References Books:

1. Erwin Kre yszig (2006) "AdvanCEd Engg. Mathematics", Wiley Eastern Ltd. 8th Edition
2.Mayar Paul L., (1980), "Introductory Probability and Statistical applications", Addison - Wesley Publishing Company
3. E. G. Nawy, Fundamentals of High-Performance Concrete, John Wiley & Sons Inc., 2nd Ed., 2001.

BTCEHSMC302: Managerial Economics and Financial Accounting

Syllabus

UNIT -1

Basic economic concepts-Meaning, nature and scope of economics,deductive vs inductive methods, static and dynamics, Economicproblems: scarcity and choice, circular flow of economic activity, nationalincome-concepts and measurement.

UNIT -2

Demand and Supply analysis-Demand-types of demand, determinants of demand, demand function, elasticity of demand, demand forecasting – purpose, determinants and methods, Supply-determinants of supply, supply function, elasticity of supply.

UNIT- 3

Production and Cost analysis-Theory of production- production function, law of variable proportions, laws of returns to scale, production optimization, least cost combination of inputs, isoquants. Cost concepts explicit and implicit cost, fixed and variable cost, opportunity cost, sunk costs, cost function, cost curves, cost and output decisions, cost estimation

UNIT -4

Market structure and pricing theory-Perfect competition, Monopoly, Monopolistic competition, Oligopoly.

UNIT- 5

Financial statement analysis-Balance sheet and related concepts, profit and loss statement and related concepts, financial ratio analysis, cash flow analysis, funds-flow analysis, comparative financial statement, analysis and interpretation of financial statements, capital budgeting techniques.

Text Books

1. Managerial Economics and Financial Accounting, M. KASI REDDY, S. SARASWATHI, PHI Learning Pvt. Ltd

2. Managerial Economics and Financial Accounting, Prof. B.K. Garg,Dr. Surabhi Garg, Dr.Kusumlata Bhardwaj , Ashirwad Publication, ISBN- 9788193796207

Reference Books:

1. Managerial Economics, R.L.Varshney & K.L Maheswari",. 5th Edition, S.Chand Publishers,
2. Managerial Economics And Financial Analysis, Kumar, P. Vijaya & Rao

BTCEHSMC302: Technical Communication

Detailed Contents

UNIT1

Introduction to Technical Communication- Definition of technical communication, Aspects of technical communication, forms of technical communication, importance of technical communication, technical communication skills (Listening, speaking, writing, reading writing), linguistic ability, style in technical communication.

UNIT 2

Comprehension of Technical Materials/Texts and Information Design & development- Reading of technical texts, Reading andcomprehending instructions and technical manuals, Interpreting andsummarizing technical texts, Note-making. Introduction of differentkinds of technical documents, Information collection, factors affectinginformation and document design, Strategies for organization,Information design and writing for print and online media.

UNIT 3

Technical Writing, Grammar and Editing- Technical writing process, forms of technical discourse, Writing, drafts and revising, Basics of grammar, common error in writing and speaking, Study of advanced grammar, Editing strategies to achieve appropriate technical style, Introduction to advanced technical communication. Planning, drafting and writing Official Notes, Letters, E-mail, Resume, Job Application, Minutes of Meetings.

UNIT4

Technical Reports, types of technical reports, Characteristics and formats and structure of technical reports. Technical Project Proposals, types of technical proposals,

UNIT 5

Advanced Technical Writing- Characteristics and formats and structure of technical proposals. Technical Articles, types of technical articles, Writing strategies, structure and formats of technical articles.

Text/Reference Books:

1. David F. Beer and David McMurrey, Guide to writing as an Engineer, John Willey. New York, M004

2. M. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, M003. (ISBN 031M406843)

3. Shiv Khera, You Can Win, Macmillan Books, New York, M003.

4. Raman Sharma, Technical Communications, Oxford Publication, London, M004.

5. Dale Jungk, Applied Writing for Technicians, McGraw Hill, New York, M004. (ISBN: 078M8357-4)

6. Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi M00M.

7. Xebec, Presentation Book, TMH New Delhi, M000. (ISBN 040MM13)

BTCEESC 303: Engineering Mechanics

Syllabus

UNIT 1: Statics of particles and rigid bodies: Fundamental laws of mechanics,Principle of transmissibility, System of forces (conservative and non conservative),Resultant force, Resolution of force, Moment and Couples,Resolution of a force into a force and a couple, Free body diagram,Equilibrium, Conditions for equilibrium, Lami's theorem

UNIT 2: **Plane trusses:** Types of structures, Trusses, Support Conditions, Types of Loadings, Classification of trusses, Determinacy of trusses, Basic assumptions of truss analysis (zero force member, tension or compression member), Method of joints, Method of sections. **Centroid & Moment of inertia (M.I.):** Location of centroid, Moment of inertia (mass and area), Parallel axis and perpendicular axis theorems, M.I of composite section, M.I. of solid bodies, Polar moment of inertia, principle axis and principle moment of inertia.

UNIT 3: **Virtual work:** Principle of Virtual Work, Active forces and active force diagram, Stability of equilibrium. **Work, Energy and Power:** Work of a force, weight and couple, Power, Efficiency, Energy, Kinetic energy of rigid body, Principle of work and energy, Conservation of energy.

UNIT 4: **Friction:** Types of Friction, Laws of friction, Angle of friction, Angle of repose, Ladder, Wedge, Belt Friction. **Springs**: Stiffness of springs, springs in series and parallel, Introduction to laminated plate springs, leaf spring, close coiled helical springs, open coiled springs.

UNIT 5: **Simple Stresses and Strains:** Concept of stress and strain in three dimensions and generalized Hooke's law; Young's modulus, Shear stress, Shear strain, Modulus of rigidity, Complementary shear stress; Poisson's ratio, Volumetric strain, Bulk modulus, relation between elastic constants, Stress and strain thin cylinder and spherical cell under internal pressure.

Text/Reference Books:

1. Irving H. Shames (M006), Engineering Mechanics, 4th Edition, Prentice Hall

M. F. P. Beer and E. R. Johnston (M011), Vector Mechanics for Engineers, Vol I - Statics,

Vol II, – Dynamics, 9th Ed, Tata McGraw Hill

3. R. C. Hibbler (M006), Engineering Mechanics: Principles of Statics and Dynamics,

Pearson Press.

4. Andy Ruina and RudraPratap (M011), Introduction to Statics and Dynamics, Oxford

University Press

5. Shanes and Rao (M006), Engineering Mechanics, Pearson Education,

6. Hibler and Gupta (M010),Engineering Mechanics (Statics, Dynamics) by Pearson

Education

7. Reddy Vijaykumar K. and K. Suresh Kumar(M010), Singer's Engineering Mechanics

8. Bansal R.K.(M010), A Text Book of Engineering Mechanics, Laxmi Publications

9. Khurmi R.S. (M010), Engineering Mechanics, S. Chand & Co.

10. Tayal A.K. (M010), Engineering Mechanics, Umesh Publications

BTCEPCC 304: Surveying

Syllabus

UNIT 1: LINEAR AND ANGULAR MEASUREMENTS Method of linear measurements, Correction to length measured with achain/tape, Ranging a survey line; direct and indirect Angularmeasurement by compass, Designation of bearing, Traversing with tape And compass, Correction to measured bearing,Angular measurement by theodolite; Temporary adjustments, Method ofhorizontal angle measurement and vertical angle, Traverse computation,plotting of traverse and determining the closing error, Balancing traverse.

UNIT 2: **LEVELLING** Measurements of elevations methods of levelling; direct/differential, Indirect/Trigonometrical, and Profile/Cross sectional levelling. Digital and Auto level, Errors in levelling, contours and contour lines; methods of contouring; direct and indirect, characteristics, uses, area and vol. measurements.

UNIT 3: **CURVE SURVEYING** Elements of simple and compound curves, Types of curves, Elements of circular, reverse, and transition curves. Method of setting out simple, circular, transition and reverse curves, Types of vertical curves, length of vertical curves, setting out vertical curves. Tangent corrections.

UNIT 4: **TACHEOMETRY AND PHOTOGRAMMETRY SURVEYING** Advantages of tacheometric surveying, different systems of tacheometric measurements, Stadia system of tacheometry, distance elevationformulae for horizontal sights. Determination of tacheometric constants,distance and elevation formulae for inclined sights with staff vertical.Introduction to basic concepts perspective geometry of aerialphotographs, relief and tilt displacements, Terrestrial Photogrammetry,flight planning

UNIT 5: **SETTING OUT WORKS & MODERN FIELD SURVEY SYSTEMS**

Instruments and methods for laying out buildings, setting out culverts, setting out sewer lines. Principle of E.D.M. (Electronic Distance Measurements), Modulation,

Types of E.D.M., Distomat, Total station, parts of total station, advantages and application.

Text/Reference Books:

1 Madhu, N, Sathikumar, R and Satheesh Gobi, Advanced Surveying: Total Station, GIS and Remote Sensing, Pearson India, M006.

2.MManoj, K. Arora and Badjatia, Geomatics Engineering, Nem Chand & Bros, M011

3 Bhavikatti, S.S., Surveying and Levelling, Vol. I and II, I.K. International, M010

4 Chandra, A.M., Higher Surveying, Third Edition, New Age International (P) Limited, M00M

BTCEPCC 305: Fluid Mechanics

Syllabus

UNIT 1: Fluids: Definition, Type of fluids, Ideal fluids, real fluids, Newtonian and non-Newtonian fluids.

Properties of Fluids: Units of measurement, Mass density, Specific weight, Specific volume, Specific Gravity, Viscosity, Surface tension and Capillarity, Compressibility and Elasticity.

UNIT 2: **Principles of Fluid Statics**: Basic equations, Pascal Law, Type of pressure:- atmospheric pressure, Gauge pressure, vacuum pressure, absolute pressure, manometers, Bourdon pressure gauge

UNIT 3: **Buoyancy**; Forces acting on immersed plane surface. Centre of pressure, forces on curved surfaces. Conditions of equilibrium for floating bodies, meta-centre and analytical determination of meta centric height.

UNIT 4: **Kinematics of Flow**: Visualisation of flow, Types of flow: Steady and unsteady, uniform and non-uniform, rotational and irrotaional flow, Laminar and turbulent flow, streamline, path line, streak line, principle of conservation of mass, equation of continuity, acceleration of fluid particles local and convective, velocity, acceleration, velocity potential and stream function, elementary treatment of flow net, vorticity, circulation, free and forced vortex. Fluid mass subject to horizontal and vertical acceleration and uniform rotation

UNIT 5: **Fluid Dynamics**: Control volume approach, Euler's equation, Bernoulli's equation and its applications, venture-meter, orificemeter, orifices & mouthpieces, time of emptying of tanks by orifices, momentum and angular momentum equations and their applications, pressure on flat plates and nozzles.

Laminar Flow through Pipes: Laminar flow through pipes, Relation between shear & pressure gradient. Flow between plates & pipes. Hagen- Poiseuille equation, Equations for velocity distribution, pressure difference velocity distribution over a flat plate and in a pipe section, Darcy-Weisbach equation, friction factor , minor losses, pipe networks

BTCEPCC 306: Building Materials and Construction

Syllabus

UNIT1: Basic Civil Engineering Materials (Properties, Types and Uses): Stone: Compressive strength, Water absorption, Durability, Impact value, Tensile strength; Bricks: Water absorption, Compressive strength, Effloresces, Dimension and Tolerance; Tiles: Water absorption, Tolerance, Impact value and Glazing; Light weight concrete blocks.

Lime: classification as per IS, properties, standard tests and uses in construction.

Fly-ash: Properties and Use in manufacturing of bricks & cement;

Miscellaneous: Gypsum, Plaster of Paris, PVC materials, Paints, Varnish and Distemper.

UNIT 2: **Timber & Steel:** Timber: Definitions of related terms, Classifications and Properties, Defects in Conversion of wood, Seasoning wood, Preservation, Fire proofing, Ply woods, Fibre boards;

Steel: Mild steel and HYSD steel, Properties and their use, common tests on steel.

Mortar and Plaster: Mortar preparation methods**:** Functions and tests & their uses in various types of pointing & plastering

UNIT 3: (A) **Brick and Stone Masonry**: Basic principle of masonry work, different types of bonds, relative merits and demerits of English, Single Flemish and Double Flemish bond. Comparison between stone and brick masonry. General principles, classification of stone masonry and their relative merits and demerits.

(B): **Building Requirements & Construction System:** Building components, their functions and requirements. Types of construction: load bearing and framed structure construction, RCC beam, column and slab construction, Precast and In-situ construction, Relative merits and demerits. Fire resistance construction, FRC.

Ground & Upper floors: Floor components and their functions, Floor types and Selection of flooring, construction details of ground and upper floors, merits and demerits.

UNIT 4(A): **Foundation & Site Preparation:** Purpose, types of foundation: like shallow, deep, pile, raft, grillage foundation and their suitability. Depth of foundation, Sequence of construction activity and co-ordination, site clearance, layout of foundation plan.

Temporary structures: Types & methods of shoring, underpinning and scaffolding.

(B) **Damp Proofing:** Causes and Effects of dampness, Methods and materials for damp proofing, Methods and materials for anti-termite treatment.

Construction and Expansion Joints: Requirements, Types material used, Construction details.

UNIT 5(A): **Arches and Lintels:** Terms used, types of arches and their construction detail, types of lintels and constructions.

Partition Wall: Types, purpose and use of partition wall.

Stairs: Terms used, requirements of good staircase, classification, construction details and suitability of different types of stairs, Lifts and Ramps.

(B): **Roof and Roof Covering:** Purposes, classification of roofs, terms used. Introduction to Solid slab, Flat slab, Shell Roofs and Pitched roofs, and their constructional features. Types of pitched roofs and Trusses, typical constructional details; Roof covering materials, types and typical constructional details.

TEXT BOOKS 1. Building Materials and construction – Arora & Bindra, Dhanpat Roy Publications. 2. B. C. Punmia, Ashok Kumar Jain, Arun Kumar Jain (2005), Building Construction, Laxmi Publications (P) ltd., New Delhi, India. 3. Building materials , construction and planning by S .MAHABOOB BASHA

REFERENCES BOOKS:

1. Building materials by Duggal, New age Internations.
2. Building construction by PC verghese PHI.
3. Construction technology –vol -1 &2 by R. chuddy, Longman UK.
4. Basics of civil Engg by Subhash chander; Jain brothers

BTCEPCC 307: Engineering Geology

Syllabus

UNIT 1

General Geology: Branches and Scope of Geology, Types of Weathering & Geological work of natural agencies like River & Wind. Geological Time Scale. Physical Properties of Minerals.

UNIT 2

Petrology: Formation, Texture, Structure and Classification of Igneous, Sedimentary and Metamorphic Rocks. Engineering Properties of Rocks for Building & Road Material. Laboratory and Field & in-situ Test for Site Construction.

UNIT 3

Structural Geology: Causes, Terminology, Classification, Recognition, Effects and Engineering consideration of Fold, Fault, Joints and Unconformities.

UNIT 4

Engineering Geology: Geophysical methods as applied to Civil Engineering for Subsurface Analysis (Electrical and Seismic methods). Terminology, Types and Geological consideration for site selection of Dam & Tunnel.

UNIT 5

Remote Sensing & GIS: Application of Remote Sensing and GIS in Various fields of Civil Engineering.

Text/Reference Books:

1. Engineering and General Geology, Parbin Singh, 8th Edition (M010), S K Kataria& Sons.

M. Text Book of Engineering Geology, N. ChennaKesavulu, Mnd Edition (M009), Macmillan Publishers India.

3. Geology for Geotechnical Engineers, J.C.Harvey, Cambridge University Press (198M).

BTCEPCC 308: Surveying Lab

LIST OF EXPERIMENTS :

1. Linear Measurement by Tape:

a. Ranging and Fixing of Survey Station.

b. Plotting Building Block by offset with the help of cross staff.

2. Compass Survey: Using Surveyor's and Prismatic compass

a. Measurement of bearing of lines

b. Adjustment of included angles of compass traverse.

3. Levelling: Using Tilting/ Dumpy/ Automatic Level

a. To determine the reduced levels in closed circuit.

b. To carry out profile levelling and plot longitudinal and cross sections for road.

4. Theodolite Survey: Using Vernier Theodolite

a. To carryout temporary adjustment of Theodolite & Measurement of horizontal and vertical angle: by method of repetition and method of Reiteration.

b. To measure and adjust the angles of a braced quadrilateral.

5. Trigonometric Levelling: To determine the Height of an object by Trigonometric levelling:

a. By using Instruments in same vertical plane.

b. By using Instruments in different vertical planes.

6. Tacheometry Survey:

a. To determine the tachometric constant.

b. To determine the horizontal and vertical distance by tachometric survey.

7. To study the various electronic surveying instruments like EDM, Total Station etc.

One-week Survey Camp for topographic/ project survey/Contouring be arranged before or after Term End Exam.

BTCEPCC 309: Fluid Mechanics Lab

LIST OF EXPERIMENTS :

1. To study the various pressure measuring devices
2. To verify the Bernoulli's theorem.
3. To calibrate the Venturi-meter.
4. To calibrate the Orifice-meter.
5. To determine Metacentric Height.
6. To determine Cc, Cv, Cd of an orifice.
7. To determine Cd of a mouthpiece.
8. To determine Cd of a V-notch.
9. To determine viscosity of a given fluid.
10. To study the velocity distribution in pipes.

BTCEPCC 310: Computer Aided Civil Engineering Drawing

LIST OF EXPERIMENTS :

1.To study and draw the labelled sketch of different Building Components on sheets with exposure to CAD:

a. Drawing of walls

b. Brick and Stone masonry

c. Cross section of external wall from foundation to parapet

d. Partition wall, cavity wall and

2. Pointing, Arches, Lintels and Floors
3. Doors and Windows
4. Stairs, Cross section of Dog legged stairs
5. Roofs: Flat and Pitched roof (Steel truss)
6. Development of Front Elevation and Sectional Elevation from a given plan
7. Development of Plan, Front Elevation and Sectional Elevation from line Diagram

BTCEPCC 311: Civil Engineering Materials Lab

LIST OF EXPERIMENTS :

1. To determine properties of following materials:

A. STONE:

a. Compressive strength,

b. Water absorption,

c. Impact value,

d. Tensile strength;

B. Bricks:

a. Water absorption,

b. Compressive strength,

c. Dimension and Tolerance;

C. Tiles:

a. Water absorption,

b. Tolerance,

c. Impact value

D. Timber: Compressive and Tensile Strength of Timber across and along the Grain

2. To Study the Properties & Utilization of Fly Ash in Construction

3. To Study the Different Aluminum and Steel Sections

4. To Study the Manufacturing and Use of Concrete Hollow Blocks

BTCEPCC 312: Geology Lab

LIST OF EXPERIMENTS :

1. Physical Properties of Minerals
2. Physical Properties of Rocks
3. Identification of Minerals in Hand Specimen
4. Identification of Rocks in Hand Specimen
5. Identification of Geological features through wooden Models

a. Structural Geological Diagrams

b. Petrological Diagrams

c. Engineering Geological Diagrams

6. Interpretation of Geological Map (10 Nos.)
7. Dip & Strike Problems (8 Nos.)

BTCEPSIT 313: Industrial Training

BTCESODECA 314: Social Outreach, Discipline & Extra Curricular Activities

Semester – IV

Theory Papers		No. Of Teaching Hours			Marks Allocation			
Code	**Subject/Paper**	**L**	**T**	**P**	**IA**	**EA**	**Total**	**Credits**
BTCEBSC401	Advance Engineering Mathematics-II	3	-	-	30	70	100	3
BTCEHSMC402	Managerial Economics & Financial Accounting/ Technical Communication	3	-	-	30	70	100	3
BTCEESC403	Basic Electronics for Civil Engineering Applications	3	-	-	30	70	100	3
BTCEPCC404	Strength Of Materials	3	-	-	30	70	100	3
BTCEPCC405	Hydraulics Engineering	3	-	-	30	70	100	3
BTCEPCC406	Building Planning	3	-	-	30	70	100	3
BTCEPCC407	Concrete Technology	3	-	-	30	70	100	3
PRACTICALS/VIVA-VOCE		**No. of Teaching Hours**			**Sessional**	**Practical**	**Total**	**Credits**
BTCEPCC 408	Material Testing Lab	-	-	2	30	20	50	1
BTCEPCC 409	Hydraulics Engineering Lab	-	-	2	30	20	50	1
BTCEPCC 410	Building Drawing	-	-	2	30	20	50	1
BTCEPCC 411	Advanced Surveying Lab	-	-	2	30	20	50	1
BTCEPCC 412	Concrete Lab	-	-	2	30	20	50	1
BTCESODECA 413	Social Outreach, Discipline & Extra Curricular Activities	-	-	-	-	-	50	1
TOTAL		**21**	**0**	**10**	**360**	**590**	**1000**	**27**

BTCEBSC 401: Advance Engineering Mathematics-II

Syllabus

UNIT1

Introduction: Objective, scope and outcome of the course **Probability:** Basic concepts of probability, conditional probability,

UNIT 2

Baye's theorem.Random variable: Discrete and Continuous random variables, Joint distribution, Marginal distribution, Probability distribution function, Conditional distribution.

UNIT 3

Mathematical Expectations: Moments,

Moment Generating Functions, variance and correlation coefficients, Chebyshev's Inequality, Skewness and Kurtosis. Binomial, Poisson and Normal distribution and their properties.

UNIT 4

Applied Statistics: Basic concept of variance, Correlation and regression – Rank correlation. Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves.

UNIT 5

Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviation

BTCEHSMC402: Technical Communication

Detailed Contents

UNIT1

Introduction to Technical Communication- Definition of technical communication, Aspects of technical communication, forms of technical communication, importance of technical communication, technical communication skills (Listening, speaking, writing, reading writing), linguistic ability, style in technical communication.

UNIT 2

Comprehension of Technical Materials/Texts and Information Design & development- Reading of technical texts, Reading andcomprehending instructions and technical manuals, Interpreting andsummarizing technical texts, Note-making. Introduction of differentkinds of technical documents, Information collection, factors affectinginformation and document design, Strategies for organization,Information design and writing for print and online media.

UNIT 3

Technical Writing, Grammar and Editing- Technical writing process, forms of technical discourse, Writing, drafts and revising, Basics of grammar, common error in writing and speaking, Study of advanced grammar, Editing strategies to achieve appropriate technical style, Introduction to advanced technical communication. Planning, drafting and writing Official Notes, Letters, E-mail, Resume, Job Application, Minutes of Meetings.

UNIT4

Technical Reports, types of technical reports, Characteristics and formats and structure of technical reports. Technical Project Proposals, types of technical proposals,

UNIT 5

Advanced Technical Writing- Characteristics and formats and structure of technical proposals. Technical Articles, types of technical articles, Writing strategies, structure and formats of technical articles.

Text/Reference Books:

1. David F. Beer and David McMurrey, Guide to writing as an Engineer, John Willey. New York, M004
2. M. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, M003. (ISBN 031M406843)
3. Shiv Khera, You Can Win, Macmillan Books, New York, M003.
4. Raman Sharma, Technical Communications, Oxford Publication, London, M004.
5. Dale Jungk, Applied Writing for Technicians, McGraw Hill, New York, M004. (ISBN: 078M8357-4)
6. Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi M00M.
7. Xebec, Presentation Book, TMH New Delhi, M000. (ISBN 040MM13)

BTCEHSMC402: Managerial Economics and Financial Accounting

Syllabus

UNIT -1

Basic economic concepts-Meaning, nature and scope of economics,deductive vs inductive methods, static and dynamics, Economicproblems: scarcity and choice, circular flow of economic activity, nationalincome-concepts and measurement.

UNIT -2

Demand and Supply analysis-Demand-types of demand, determinants of demand, demand function, elasticity of demand, demand forecasting – purpose, determinants and methods, Supply-determinants of supply, supply function, elasticity of supply.

UNIT- 3

Production and Cost analysis-Theory of production- production function, law of variable proportions, laws of returns to scale, production optimization, least cost combination of inputs, isoquants. Cost concepts explicit and implicit cost, fixed and variable cost, opportunity cost, sunk costs, cost function, cost curves, cost and output decisions, cost estimation

UNIT -4

Market structure and pricing theory-Perfect competition, Monopoly, Monopolistic competition, Oligopoly.

UNIT- 5

Financial statement analysis-Balance sheet and related concepts, profit and loss statement and related concepts, financial ratio analysis, cash flow analysis, funds-flow analysis, comparative financial statement, analysis and interpretation of financial statements, capital budgeting techniques.

Text Books

1. Managerial Economics and Financial Accounting, M. KASI REDDY, S. SARASWATHI, PHI Learning Pvt. Ltd

2**.** Managerial Economics and Financial Accounting, Prof. B.K. Garg,Dr. Surabhi Garg, Dr.Kusumlata Bhardwaj , Ashirwad Publication, ISBN- 9788193796207

Reference Books:

3. Managerial Economics, R.L.Varshney & K.L Maheswari",. 5th Edition, S.Chand Publishers,
4. Managerial Economics And Financial Analysis, Kumar, P. Vijaya & Rao

BTCEESC403: Basic Electronics for Civil Engineering Applications

Syllabus

UNIT 1

Basic Electronics: Number systems & Their conversion used in digital electronics, Demorgan's theorem, Logic Gates, half and full adder circuits, R-S flip flop, J-K flip flop.

UNIT 2

Introduction to Semiconductors, Diodes, V-I characteristics, Bipolar junction transistors (BJT) and their working, introduction to CC, CB & CE transistor configurations.

UNIT 3

Instrumentation: mechanical, electrical, electronic system and their calibration, Use of automatic and digital levels, electronic theodolites, total stations; Control surveys using GNSS, Total station and traversing methods (adjustment and computations of coordinates).

UNIT 4

Measurement errors: Gross error and systematic errors, absolute and relative errors, accuracy, precision, resolution and significant figures. Full-field measurements;

UNIT 5

Data acquisition system and data processing: analog systems, digital systems using personal computers, dynamic measurement, numerical and graphical data processing and archiving.

UNIT 6

Sensors & Transducers: various types of sensors for displacement, velocity, acceleration, pressure, loads, strains, Displacement sensors, Mass &Piezoeletric, strain gauges, Temperature sensors thermocouple, flow sensors : Ultrasonic, electromagnetic, laser and thermal

UNIT 7

Sensor types characteristics: types of resolution, FOV, IFOV, PSF; Geometric and radiometric distortions, Geo-referencing, re-sampling methods; Atmospheric errors and removal; Satellite orbits and characteristics; Applications of optical and microwave remote sensing techniques in Civil Engineering.

UNIT 8

Digital Image Processing: Digital image, introduction to digital image processing, pre-processing, enhancement, classification, accuracy assessment.

BTCEPCC404: Strength of Materials

Syllabus

UNIT-1

Simple Stresses and Strains in different members: Stresses in prismatic & non prismatic members and in composite members; Thermal stresses; Stresses in composite members, Compatibility condition.

Compound Stress: Two dimensional stress system: stress resultant, principal planes and principal stresses, state of pure shear maximum shear stress, Mohr's circle &its application. Introduction to theories of failures.

UNIT-2

Bending of Beams: Bending moment, Shear force and Axial thrust diagrams for statically determinate beams subjected to various types of loads and moments, Point of Contra-flexure, relation between load, SF and BM.

Theory of simple bending: Distribution of bending and shear stresses for simple and composite sections, Combined direct and bending stress,

UNIT-3

Torsion: Elementary concepts of torsion, shear stress in solid and hollow circular shafts, angle of twist, power transmitted by a shaft, combined bending and torsion;

UNIT- 4

Columns: Short and long columns, slenderness ratio, crushing and buckling of column, short column subjected to axial and eccentric loads; Euler's theory and its limitation, concept of effective length of columns; Rankine & Secant formulae, middle third rule, core of a section.

UNIT- 5

Deflection of Beams: Differential relation between load, shear force, bending moment, slope deflection. Slope & deflection in determinate beams using double integration method, Macaulay's method, area moment method and conjugate beam method and their application to statically determinate prismatic beams.

BTCEPCC405: Hydraulics Engineering

Syllabus

UNIT 1

Dimensional Analysis & Models: Dynamical Similarity and Dimensional Homogeneity Model experiment, geometric, Kinematic and Dynamic similarity. Reynold's, froudes, Weber's, Euler and Mach numbers. Distorted river models and undistorted models, proper choice of scale ratios. Scale effect. Principle of dimensional analysis Rayleigh method, Buckingham theorem.

UNIT 2

Turbulent flow, Reynolds equations, Prandtl's mixing length theory, Equations of velocity distribution and friction coefficient

Boundary Layer Theory: Concept of boundary layer, laminar and turbulent boundary layers, boundary layer thickness, von Karman integral equation, laminar sub-layer, hydro-dynamically smooth and rough boundaries, separation of flow and its control, cavitation.

Open channel Flow Uniform, Non-Uniform and variable flow. Resistance equations of Chezy and Manning. Section factor for uniform flow. Most Efficient rectangular, triangular and trapezoidal sections. Velocity distribution in open channels.

UNIT 3

Gradually varied flow in Prismatic channels. Specific energy of flow. Critical depth in prismatic channels. Alternate depths. Rapid, critical and sub critical Flow Mild, steep and Critical Slopes. Classification of surface curves in prismatic channels and elementary computation

Rapidly varied flow: Hydraulic jump or standing wave in rectangular channels. Conjugate or sequent depths Losses in jump, location of jump. velocity distribution in open channels. Energy correction factor. Moment correction factor

UNIT 4

Impact of free Jets: Impact of a jet on a flat or a curved vane, moving and stationary vane.

Introduction of Hydraulic machine – Type of pumps and turbine and its brief description. Draft tube and its principle

Hydrology: Definition, Hydrologic cycle, Application to Engineering problems, measurement of rainfall, rain gauge, peak flow, flood frequency method, catchment area formulae, Flood-hydrograph, Rainfall analysis, Infiltration, Run off, Unit hydrograph and its determination, Estimation of runoff.

UNIT 5

Ground Water: Aquifers and its types, Confined and unconfined aquifer, Darcy's Law, hydraulic conductivity, transmissivity, well hydraulics.

Canal Hydraulics: Types of canals, parts of canal irrigation system, channel alignment,assessment of water requirements, estimation of channel losses, design of channels,

regime andsemi theoretical approaches (Kennedy's Theory, Lacey's Theory), cross section of channels,Silt control in canals.

RECOMMENDED BOOKS

1. Chow, V.T., Open channel Hydraulics, McGraw Hill International
2. Henderson, F.M., Open Channel Flow, McGraw Hill International
3. Subramanya, K., Flow in Open Channels, Tata McGraw Hill
4. Ranga Raju, K.G., Flow through open channels, T.M.H.
5. French, R.H., Open Channel Hydraulics, McGraw Hill International
6. Graf, W.H., Hydraulics of Sediment Transport, McGraw Hill International

BTCEPCC406: Building Planning

Syllabus

UNIT1

Introduction: Types of buildings, criteria for location and site selection, site plan and its detail. **Sun Consideration :** Different methods of drawing sun chart, sunshading devices, design of louvers.

UNIT 2

Climatic and comfort Consideration: Elements of climate, global climate, climatic zones of India, thermal comfort, biclimatic chart,

Orientation: Meaning, factors affecting orientation, orientation criteriafor tropical climate.

UNIT 3

Building Bye Laws and NBC Regulations: Objective of by-laws, regulation regarding; means of access, lines of building frontages, covered area, floor area ratio, open spaces around buildings, height & sizes of rooms, plinth regulation.

Principles of Planning: Different factors affecting planning viz-aspect, prospect, furniture requirement,roominess, grouping, circulation, elegance, privacy etc.

UNIT 4

Vastu Shastra In Modern Building planning: Factors considered in Vastu, site selection, orientation, planning and design of residential buildings, school/hospital

UNIT 5

Functional Design And Accommodation Requirements Of Non

Residential Buildings: viz-school buildings, rest house, primary health centers, post office etc.

Services in Buildings

(A) Lighting and ventilation, doors and windows, lifts.

(B) Acoustics, sound insulation and noise control.

(C) Fire fighting provisions

BTCEPCC407: Concrete Technology

Syllabus

UNIT 1

Ingredients of concrete: Cement: hydration of cement and its basic compounds, structure of hydrated cement, C-S-H gel, heat of hydration, gel-space ratio etc.

Aggregates: types, physical properties and standard methods for their determination, including Grading of aggregates as per IS. Manufactured sand- properties and IS Specifications for use in concrete.

UNIT 2

Concrete: Grade of concrete, proportioning of ingredients, water content and its quality, water/cement ratio and its role, Properties of fresh concrete including workability, air content, Flow ability, Segregation, Bleeding and Viscosity etc. Factors affecting, methods of determination. Properties of hardened concrete such as strengths, permeability, creep, shrinkage,factors influencing, Standard tests on fresh and hardened concrete as per IS code. Aggregate- cement interface, its effect on properties of concrete. Concrete mix deign (IS method)- with and without water reducing admixtures

Unit 3

NDT: Introduction and their importance. Application & use of Rebound Hammer, Ultra-sonic pulse velocity meter, Rebar & Cover meter, half-cell potential meter, corrosion resistivity meter, core sampling. Interpretation of their results,

UNIT 4

Concrete Handling in Field: Batching, mixing, placing and transportation of concrete, equipments for material handling, various methods their suitability and precautions. Compaction of concrete: methods &equipments. Curing of concrete: various methods their suitability.

Durability of concrete. Causes of deterioration, Carbonation, Tests for durability assessment **Admixture in concrete:** Chemical and mineral admixtures, their types and uses: accelerator, retarders, water-proofing, plasticisers, super plasticizers-types, their suitability. Fly ash- properties for use in concrete, specifications of flyash as per IS 3812, and effect on properties of concrete. GGBFS, Microsilica and metakaolin- propertie, specifications and utility in concrete.

UNIT 5

Form work: Requirements, their types. Typical formworks and shuttering/centering for Columns, beams, slabs, walls, etc. Slip and moving formwork.

Special types of concrete: Sulphate resisting concrete, under water concreting, pumpable concrete: methods and issues in making, salient properties and applications.Concretes with tailored properties- including high performance concrete, with specific properties in fresh and hardened states, self-compacting concrete-materials, mix proportioning, test methods, use and applications with case studies.

BTCEPCC 408: Material Testing Lab

LIST OF EXPERIMENTS :

1. Tests on Mild steel and HYSD Bar –To determine compressive and tensile strength, yield strength, percentage elongation etc.
2. Tests on Cement and concrete cubes/ core to establish their strength
3. Hardness Test – Rockwell Hardness and Brinell Hardness
4. Impact Test – Izod and Charpy
5. Modulus of Rupture of Wooden Beam
6. Fatigue Test
7. Spring Test
7. Torsion Test

BTCEPCC409: Hydraulics Engineering Lab

LIST OF EXPERIMENTS :-

1. To determine the minor losses.
2. To determine the friction factor.
3. To determine Cd of Broad crested weir.
4. To verify the momentum equation.
5. To determine the discharge of venturimeter.
6. To determine Manning's & Chezy's coefficient of roughness for the bed of a given Channel.
7. To study and plot characteristics curve of hydraulic jump.
8. To study velocity distribution in open channel flow.

BTCEPCC410: Building Drawing

LIST OF EXPERIMENTS :-

1- To plan and draw working drawing of a Residential building with following detail.

(a) Site plan

(b) Foundation plan

(c) Plan

(d) Two sectional elevations

(e) Front elevation

(f) Furniture plan

(g) Water supply and sanitary plan

(h) Electric fitting plan

2- To design and draw a Primary Health Center

3- To design and draw a Primary School

4- To design and draw a Rest House

5- To design and draw a Post Office

6- To design and draw a Bank

7- To design and draw a College Library

8- To design and draw a Cinema Theatre

BTCEPCC411: Advanced Surveying Lab

LIST OF EXPERIMENTS :-

1. To measure the horizontal and vertical angles by Theodolite.

.2. To determine the Height of an object by trigonometric leveling (Instruments in same vertical plane).

3. To determine the Height of an object by trigonometric leveling (Instruments in different vertical planes).

4. Measurement of angles, length of survey line using Total Station, finding the coordinate of station

5. To measure and adjust the angles of a braced quadrilateral.

6. To prepare the map of given area by plane tabling.

7. Measurement of area of a traverse by Total Station

BTCEPCC412: Concrete Lab

LIST OF EXPERIMENTS :-

1.To determine the fineness of Cement by Blaine's air permeability test.

2. To determine the flexural strength of Concrete.
3. To determine Soundness of cement by Le-chatelier apparatus.
4. To determine the specific gravity of fine aggregate (sand) by Pycnometer.
5. To determine the bulking of fine aggregate and to draw curve between water content and bulking.
6. Sieve analysis of coarse aggregates and fine aggregates.
7. To determine the workability of given concrete mix by slump test.
   To determine the optimum dose of super plastsizers by Flow table test.
8. To design concrete mix of M-20 grade in accordance with I S 10262.
9. To design concrete mix of M-40 grade with super plasticizer in accordance with I S10262.
10. To determine the Permeability of Concrete.
11. Study of Core cutter, UPV & Rebound Hammer equipment.

BTCESODECA 413: Social Outreach, Discipline & Extra Curricular Activities

Semester – V

THEORY PAPERS		No. of Teaching Hours			Marks Allocation			
Code	**Subject/Paper**	**L**	**T**	**P**	**IA**	**EA**	**Total**	**Credits**
BTCEESC 501	Construction Technology and Equipment	3	-	-	30	70	100	3
BTCEPCC 502	Structure Analysis-I	3	-	-	30	70	100	3
BTCEPCC 503	Design of Concrete Structures	3	-	-	30	70	100	3
BTCEPCC 504	Geotechnical Engineering	3	-	-	30	70	100	3
BTCEPCC 505	Water Resource Engineering	3	-	-	30	70	100	3
ELECTIVE –I(Choose any one)								
BTCEPEC 506A	Air & Noise Pollution and Control	3	-	-	30	70	100	3
BTCEPEC 506B	Disaster Management	3	-	-	30	70	100	3
BTCEPEC 506C	Town Planning	3	-	-	30	70	100	3
ELECTIVE –II(Choose Any One)								
BTCEPEC 507A	Repair and Rehabilitation of Structures	3	-	-	30	70	100	3
BTCEPEC 507B	Ground Improvement Techniques	3	-	-	30	70	100	3
BTCEPEC 507C	Energy Science and Engineering	3	-	-	30	70	100	3
	Practical's/Viva Voce	**No. of Teaching Hours**				**Practical**	**Total**	**Credits**
BTCEPCC 508	Concrete Structures Design Lab	-	-	2	-	20	50	1
BTCEPCC509	Geotechnical Engineering Lab	-	-	2	-	20	50	1
BTCEPCC 510	Water Resources Engineering Design Lab	-	-	2	30	-	50	1
BTCEPSIT 511	Industrial Training	-	-	2	30	-	50	1
BTCESODECA 512	Social Outreach, Discipline & Extra Curricular Activities	-	-	-	-	-	50	1
	Total	**21**	**-**	**8**	**330**	**570**	**950**	**26**

BTCEESC 501: Construction Technology and Equipment

Syllabus

Unit- I

Introduction: Objective, scope and outcome of the course.

Engineering Economy: Principle of Engineering Economy, Minimum cost point analysis, Breakeven point analysis, Depreciation and depletion

Unit- II

Safety in construction: Causes, classification, cost and measurement of an accident, safety programme for construction, protective equipment, accident report,

Unit- III

Safety measure: (a) For storage and handling of building materials.(b) Construction of elements of a building (c) In demolition of buildings; Safety lacuna in Indian scenario. Fire safety provisions as per NBC.

Unit- IV

Construction Planning: Need of construction planning, Constructional Resources, construction team, stages in construction, preparation of construction schedule, Job layout, inspection and quality control;

Materials Management: Objective and functions of material management

Unit- V

Construction Equipment and Management: Earth Moving Equipment-Bull dozers tractor pulled scrapers Power shovels Draglines clamshells; cranes; Hoes, Trenching machine types Hauling Equipment; Drilling, Blasting and Tunnelling Equipment; Pile Driving Equipment

BTCEPCC 502: Structure Analysis-I

Syllabus

Unit- I

Introduction: Objective, scope and outcome of the course.

Introduction to Indeterminate structures, Degrees of freedom per node, Static and Kinematic indeterminacy (i.e. for beams, frames & portal with & without sway etc.), Releases in structures, Maxwell's reciprocal theorem and Betti's theorem.

Unit- II

Analysis of prop cantilever structures, Analysis of Indeterminate Structure (fixed and continues beams) using Area moment method.

Unit- III

Analysis of Indeterminate Structure (fixed and continues beams) using Conjugate beam method, Three moments Theorem.

Unit- IV

Analysis of Statically Indeterminate Structures using Slope deflection method and Moment distribution method applied to continuous beams and portal frames with and without inclined members

Unit- V

Vibrations: Elementary concepts of structural vibration, Mathematical models, basic elements of vibratory system. Degree of freedom. Equivalent Spring stiffness of springs in parallel and in series.

Simple Harmonic Motion: vector representation, characteristic, addition of harmonic motions, Angular oscillation.

Undamped free vibration of SDOF system: Newton's law of motion, D Almbert's principle, deriving equation of motions, solution of differential equation of motion, frequency & period of vibration, amplitude of motion; Introduction to damped and forced vibration.

BTCEPCC 503: Design of Concrete Structures

Syllabus

Unit- I

Introduction: Objective, scope and outcome of the course.

Fundamental concepts of design of RC members, assumptions. Types and function of reinforcement. Introduction to various related IS codes, Characteristic load and characteristic strength.

Working Stress Method: Working stress design philosophy. Analysis and Design of singly reinforced rectangular beam section for flexure.

Limit State Design: Limit state design philosophy. Assumptions, Analysis and design of singly reinforced, doubly reinforced rectangular beams and flanged beams for flexure using codal provisions for simply supported, cantilever, fixed and continuous beams.

Unit- II

Limit state of serviceability for deflection: control of deflection as per codal provisions of empirical coefficients.

Limit state of collapse in shear: Types of shear reinforcement and its detailing, analysis and design of shear reinforcement for prismatic sections.

Limit state of collapse in bond: concept of bond stress, anchorage length and development length. Detailing and curtailment of reinforcement as per codal provisions.

Unit- III

Slabs: Analysis and design of one way and two way slabs using LSM, Detailing of reinforcement. Check for shear and deflection.

Unit- IV

Columns: Short and long columns, their structural behaviour. Analysis and design of axially loaded short columns, using LSM. Analysis of eccentrically loaded short columns. Introduction to Pu- Mu interaction curves and their use for eccentrically loaded columns.

Unit- V

Footings: Analysis and design of Isolated column footing for axial load. Introduction to combined footing for two columns (without central beam) for axial loads using LSM.

Torsion: Analysis and Design of beams for torsion as per codal method.

BTCEPCC 504: Geotechnical Engineering

Syllabus

Unit- I

Introduction: Objective, scope and outcome of the course.

Soil and soil-mass constituents, water content, specific gravity, void ratio, porosity, degree of saturation, air void and air content, unit weights, density index etc. Inter-relationships of the above. Determination of index properties of soil: water content, specific gravity, particle size distribution, sieve and sedimentation analysis, consistency limits, void ratio and density index. Mineral structures, structures of Illite Montmorillonites and kaolinite and their characteristics. Darcy's law of permeability of soil and its determination in laboratory.

Stresses in soil mass: total, effective and neutral pressure, calculation of stresses, influence of water table on effective stress, quicksand phenomenon. Classification of soil for general engineering purposes : particle size and I.S. Classification systems.

Unit- II

Mohr's circle of stress, shearing strength of soil, parameters of shear strength, Coulomb's failure envelope, determination of shear parameters by Direct Shear Box. Tri-axial and unconfined compression test apparatuses. Principles of soil compaction, laboratory compaction tests; Proctor's test, Stresses in Soil under surface loading: Bossinesq's and Westergaard's analysis for vertical pressure and its distribution in a soil mass. Vertical stresses due to concentrated loads, Isobar diagram, Vertical stress distribution on a horizontal plane. Influence diagram, Vertical stresses at a point under circular and rectangular loaded area. Approximate methods of obtaining vertical pressure due to surface loading. Newmark's chart,

Unit- III

Compressibility and Consolidation: Introduction to consolidation, comparison of compaction and consolidation, Spring Analogy Terzaghis one dimensional consolidation theory, Degree of consolidation, consolidation test, Compressibility parameters, coefficient of consolidation. Pre-consolidation pressure and its determination. Normally, over and under consolidated soils. Methods of predicting Settlement and its rate. Total and differential Settlement.

Unit- IV

Stability of Slopes: Classifications of slopes, Stability analysis of infinite slopes. Stability of finite slopes by Swedish and Friction circle method. Stability analysis by Taylor's stability number , Taylor's stability number curves. . Bishop's method of stability analysis. Earth Pressure: Active, passive and earth pressure at rest. Rankine's and Coulomb's theories. Rebhann's and Culman's graphical methods for active earth pressure for vertical and inclined back retaining walls, horizontal and inclined cohesion less back fill.

Unit- V

Bearing Capacity of Soils: Terminology related to bearing capacity, Common types of foundations. Terzaghi and Meyehoff's theory for bearing capacity. Rankine's method for minimum depth of foundation. Skempton's method. Effect of eccentricity and water table on bearing capacity. IS code method, Plate load and penetration tests for determining bearing capacity. Introduction to pile.

Site Investigations: Methods of explorations. Planning of Investigations, Depth of exploration, Number of boreholes, Undisturbed and Disturbed samples. Types of samplers. Brief description of procedures of sampling, Transportation and Storage of samples.

BTCEPCC 505: Water Resource Engineering

Syllabus

Unit- I

Introduction: Objective, scope and outcome of the course.

Introduction: Definitions, functions and advantages of irrigation, present status of irrigation in India, classification for agriculture, soil moisture and crop water relations, Irrigation water quality. Consumptive use of water, principal Indian crop seasons and water requirements.

Unit- II

Canal Irrigation: Types of canals, design of channels, regime and semi theoretical approaches (Kennedy's Theory, Lacey's Theory) Diversion Head works: Design for surface and subsurface flows, Bligh's and Khosla's methods.

Unit- III

Embankment Dams: Suitable sites, causes of failures, stability and seepage analysis, flow net, principles of design of earth dams.

Gravity Dams: Force acting on a gravity dam, stability requirements.

Unit- IV

Well Irrigation: Open wells and tube wells, types of tube wells, duty of tube well water. Cross-Drainage Structure: Necessity of Cross drainage structures, their types and selection, comparative merits and demerits.

Unit- V

Hydrology: Definition, Hydrologic cycle, measurement of rainfall, Flood hydrograph, Rainfall analysis, Infiltration, Run off, Unit hydrograph and its determination.

BTCEPEC506A: Air & Noise Pollution and Control

Syllabus

Unit- I

Introduction: Objective, scope and outcome of the course.

Air Pollution: Air pollutants, Sources, classification, Combustion Processes and pollutant emission, Effects on Health, vegetation, materials and atmosphere, Reactions of pollutants in the atmosphere and their effects-Smoke, smog and ozone layer disturbance, Greenhouse effect.

Unit- II

Air sampling and pollution measurement methods, principles and instruments, Ambient air quality and emission standards, Air pollution indices, Air Act, legislation and regulations, control principles.

Unit- III

Removal of gaseous pollutants by adsorption, absorption, reaction and other methods. Particulate emission control, settling chambers, cyclone separation, Wet collectors, fabric filters, electrostatic precipitators and other removal methods like absorption, adsorption, precipitation etc. Biological air pollution control technologies, Indoor air quality.

Unit- IV

Noise pollution: Basics of acoustics and specification of sound; sound power, sound intensity and sound pressure levels; plane, point and line sources, multiple sources; outdoor and indoor noise propagation; psychoacoustics and noise criteria,

Unit- V

Effects of noise on health, annoyance rating schemes; special noise environments: Infrasound, ultrasound, impulsive sound and sonic boom; noise standards and limit values; noise instrumentation and monitoring procedure. Noise indices. Noise control methods.

BTCEPEC506B: Disaster Management

Syllabus

Unit- I

Introduction: Objective, scope and outcome of the course.

Introduction: Understanding the Concepts and definitions of Disaster, Hazard, Vulnerability, Risk, Natural and Manmade Disasters, Disaster and Development, and Climate Change.

Types of Disasters, their occurrence/ causes, impact and preventive measures:

Unit- II

Geological Disasters: earthquakes, landslides, tsunami, mining;

Hydro-Meteorological Disasters: floods, cyclones, lightning, thunder-storms, hail storms, avalanches, droughts, cold and heat waves.

Unit- III

Biological Disasters: epidemics, pest attacks, forest fire.;

Technological Disasters: chemical, industrial, radiological, nuclear.

Unit- IV

Manmade Disasters: building collapse, rural and urban fire, road and rail accidents.

Disaster profile of Indian continent, Mega Disasters of India and Lessons Learnt. Risk mapping.

Unit- V

Disaster Management Cycle: Disaster Management Cycle and its components: Pre disaster and post disaster, Paradigm Shift in Disaster Management. Safety tips for various types of disasters.

Disaster management system in India: Disaster Management Act 2005, National Guidelines and Plans on Disaster Management; Role of Government (local, state and national),Non-Government and Inter- Governmental Agencies.

BTCEPEC 506C: Town Planning

Syllabus

Unit- I

Introduction: Objective, scope and outcome of the course.

Introduction: Definition of town planning, Evolution of towns, Objects of town planning, Economic Justification for town planning, Principles of town planning, Necessity of town planning, Origin, Growth and patterns of town development, distribution of land use, site for ideal town, powers required to enforce T.P. scheme

Unit- II

Civic Surveys: Definition, Necessity, collection of data, Types of surveys, methods adopted to collect data, Drawings, reports.

Zoning: Definition, Use of land, Objects of zoning, Principles of zoning, Aspects, Advantages & Importance zoning, Transition zone, Zoning powers, Maps for zoning

Unit- III

Importance and Demand of housing, Classification, requirements and design of residential building, Housing agencies, Housing problems in India.

Slums: Causes, characteristics and effects of slums, Slum clearance.

Unit- IV

Industries: Classification of industry, Concentration of industry, requirements of the industry, Industrial townships.

Public Buildings: Location, classification principle of design, town center, grouping of public buildings. Town Planning, CL-SPP/CL-DDU/Nadiad, Gujarat, INDIA 4

Unit- V

Re-planning of existing towns: Objects of re-planning, defects of existing town, data required for re- planning, Urban Renewal projects, De-centralization and Re-centralized, Garden city concept overview.

BTCEPEC507A: Repair and Rehabilitation of Structures

Syllabus

Unit- I

Introduction: Objective, scope and outcome of the course.

Deterioration of Concrete Structures: Penetrability of concrete permeability, sorptivity, diffusion. Physical processes- abrasion, erosion. Chemical- carbonation, chloride and sulfate attack. Alkali – Aggregate Reaction. Corrosion- mechanism.

Unit- II

Factors affecting and Preventive measures: for all the above, including water – proofing techniques for various conditions, sacrificial anode, corrosion resistant steel, corrosion inhibitors, protective coatings etc.

Cracks in Concrete and Masonry Structures- Types, patterns, measurement and preventive measures

Unit- III

Assessment of Risk/Damage in Structures: Preliminary investigation- visual, history collection etc. Detailed Investigation: core cutting, rebar locator, corrosion meter, penetration resistance, pull out tests, half–cell potential, concrete resistivity etc. Interpretation of non destructive test data from all the above tests as well as rebound hammer number and ultra sonic pulse velocity. Destructive and chemical tests- on material samples from site.

Unit- IV

Materials for Repair: polymers and resins, self curing compounds, FRP, ferro-cement- properties, selection criterion, cement based and polymer modified mortars etc

Repair Techniques: Grouting, Jacketing, External bonded plates processes, limitations, design computations etc. including numerical problems.

Unit- V

Under Water Repair: Processes

Case Studies: related to rehabilitation of bridge piers, heritage structures, masonry structures etc.

BTCEPEC507B: Ground Improvement Techniques

Syllabus

Unit- I

Introduction: Objective, scope and outcome of the course.

Introduction: Formation of soil- Mechanical Weathering, Chemical weathering, types of soil- Residual soil, Transported soil, Regional soil Deposit in India, Difficult soils- Expansive soil, Collapsible soil, organic soil etc. Purpose and Principles of Ground Improvements.

Unit- II

Densification by Compaction Near Surface: Theory of compaction, Laboratory compaction tests; compaction in field, Effect of compaction on different soil properties, Factor affecting compaction in field, Measurement of density in field.

Densification by Deep Compaction:

(a) Vibration methods- Vibro compaction, Vibro floatation, Vibratory probes method, Blasting.

(b) Displacement methods- Sand compaction piles; Dynamic compaction.

Unit- III

Modification Using Stone Columns:

Introduction- Failure mechanism, load carrying capacity, settlement analysis, installation technique, Geo-synthetic -encased stone columns, Mechanism of encasement, field control of stone columns

Pre-Compression and Vertical Drain: Applicability and types of pre compression. Purpose and mechanism of pre-compression by pre loading. Design procedure of pre-compression by preloading.

Pre-compression by preloading with vertical drains- Principles, Advantages, and disadvantages of Vertical drains, Type of Vertical drains, Installation, Monitoring and Instrumentation of Vertical drains.

Unit- IV

Modification by Grouting: Purpose, principles and classification of grouts and their properties. Desirable characteristics of grout, Grouting methods, Planning and operation of grouting, control of grouting operations and monitoring.

Unit- V

Modification by Soil Reinforcement: Purpose of reinforced earth, Mechanism of reinforced soil, Failure mechanism of reinforced earth, Advantages of reinforced earth. Application of Reinforced Earth,

Design methods of reinforced earth wall-

(a) Check for External stability.

Check for Internal stability.

Miscellaneous Methods of Soil stabilization: Lime stabilization, cement stabilization, bituminous stabilization, chemical stabilization.

BTCEPEC 507C: Energy Science and Engineering

Syllabus

Unit- I

Introduction: Objective, scope and outcome of the course.

Introduction to Energy Science: Scientific principles and historical interpretation to place energy use in the context of pressing societal, environmental and climate issues; Introduction to energy systems and resources; Introduction to Energy, sustainability & the environment

Unit- II

Energy Sources: Overview of energy systems, sources, transformations, efficiency, and storage. Fossil fuels (coal, oil, oil bearing shale and sands, coal gasification) - past, present & future, Remedies & alternatives for fossil fuels - biomass, wind, solar, nuclear, wave, tidal and hydrogen; Sustainability and environmental trade-offs of different energy systems

Unit- III

Energy & Environment: Energy efficiency and conservation; introduction to clean energy technologies and its importance in sustainable development; Carbon footprint, energy consumption and sustainability

Unit- IV

Civil Engineering Projects connected with the Energy Sources: Coal mining technologies, Oil exploration offshore platforms, Underground and under-sea oil pipelines, solar chimney project, wave energy caissons, coastal installations for tidal power, wind mill towers; hydro power stations above-ground and underground along with associated dams, tunnels, penstocks, etc.

Unit- V

Engineering for Energy conservation: Concept of Green Building and Green Architecture; Green building concepts; LEED ratings; Identification of energy related enterprises

BTCEPCC 508: Concrete Structures Design Lab

LIST OF EXPERIMENTS

1. Revision of Typical problems of BMD and SFD
2. Analysis and Design of singly reinforced rectangular beam section for flexure, based on Working stress design philosophy.
3. Analysis and Design of singly reinforced rectangular beam section for flexure, based on Limit State design philosophy.
4. Analysis and Design of doubly reinforced rectangular beam section for flexure, based on Limit State design philosophy.
5. Analysis and Design of flanged beam section for flexure, based on Limit State design philosophy
6. Problems on Limit state of serviceability for deflection as per codal provisions of empirical coefficients.
7. Analysis and design of prismatic sections for shear using LSD.
8. Problems on limit state of collapse in bond.
9. Analysis and design of one way slabs using LSM.
10. Analysis and design of two way slabs using LSM.
11. Analysis and design of short axially loaded columns.
12. Analysis and design of footing.
13. Analysis and Design of beams for torsion as per codal method.

BTCEPCC509: Geotechnical Engineering Lab

LIST OF EXPERIMENTS

1. Grain size distribution by sieve Analysis and Hydrometer
2 .Determination of specific Gravity by Pycnometer.
3. Determination of liquid limit by Casagrande's apparatus and cone penetrometer.
4. Determination of plastic limit and shrinkage limit
5. Determination of field density by core-cutter and sand replacement method
6. Determination of compaction properties by standard Proctor Test Apparatus
7. Determination of C-Ø values by unconfined compression Test Apparatus, Direct Shear Test Apparatus and Triaxial Test.
8. To determine the differential free swell index of soil and swelling pressure of soil.
9. To determine the CBR of soil.
10. To determine the compressibility parameters of soil by consolidation test.
11. To determine the permeability of soil by constant and falling head methods. Design as per syllabus of theory.

BTCEPCC 510: Water Resources Engineering Design Lab

LIST OF EXPERIMENTS

1. To establish steady uniform flow conditions in the Laboratory flume and to determine Chezy's coefficient "C" and Manning's Coefficient "n".
2. To investigate the relationship between E & Y in a rectangular channel.
3. To study the flow characteristics over a hump/weir.
4. To study the characteristics of hydraulic jump developed in the laboratory flume.

BTCEPSIT 511: Industrial Training

BTCESODECA 512: Social Outreach, Discipline & Extra Curricular Activities

Semester – VI

THEORY PAPERS		**No. of Teaching Hours**			**Marks Allocation**			
Code	**Subject/Paper**	**L**	**T**	**P**	**IA**	**EA**	**Total**	**Credits**
BTCEESC 601	Wind & Seismic Analysis	3	-	-	30	70	100	3
BTCEPCC 602	Structural Analysis-II	3	-	-	30	70	100	3
BTCEPCC 603	Environmental Engineering	3	-	-	30	70	100	3
BTCEPCC 604	Design of Steel Structures	3	-	-	30	70	100	3
BTCEPCC 605	Estimating & Costing	3	-	-	30	70	100	3
ELECTIVE –III(Choose any one)								
BTCEPEC 606A	Pre-Stressed Concrete	3	-	-	30	70	100	3
BTCEPEC 606B	Solid and Hazardous Waste Management	3	-	-	30	70	100	3
BTCEPEC 606C	Traffic Engineering and Management	3	-	-	30	70	100	3
ELECTIVE –IV(Choose Any One)								
BTCEPEC 607A	Bridge Engineering	3	-	-	30	70	100	3
BTCEPEC 607B	Rock Engineering	3	-	-	30	70	100	3
BTCEPEC 607C	Geographic Information System & Remote Sensing	3	-	-	30	70	100	3
Practicals/Viva Voce		**No. Of Teaching Hours**			**Sessional**	**Practical**	**Total**	**Credits**
BTCEPCC 608	Environmental Engineering Design and Lab	-	-	2	30	20	50	1
BTCEPCC 609	Steel Structure Design Lab	-	-	2	30	20	50	1
BTCEPCC 610	Quantity Surveying and Valuation Lab	-	-	2	30	20	50	1
BTCEPCC 611	Water and Earth Retaining Structures Design Lab	-	-	2	30	20	50	1
BTCEPCC 612	Foundation Design Lab	-	-	2	30	20	50	1
BTCESODECA 613	Social Outreach, Discipline & Extra Curricular Activities	-	-	-	-	-	50	1
	Total	**21**	**-**	**10**	**360**	**590**	**1000**	**27**

BTCEESC 601: Wind and Seismic Analysis

Syllabus

Unit-I

Introduction: Objective, scope and outcome of the course.

Structural Systems: Types of structures and Structure's forms, Symmetry and Asymmetry in building forms, Vertical and lateral load resting elements, shear walls, framed tubes and various multistory configurations.

Unit-II

Design Loads: various types of loads and relevant codes. Design loads for different types of buildings. (IS-875 part 1 & 2) & Load Flow Concept

Unit-III

Wind Loads Analysis: Wind loads & calculation of wind load on flat roof, pitched roof and single sloped roof buildings (IS: 875-Part 3).

Unit-IV

Earthquake Load Analysis: Earthquake loads & calculations of earthquake loads on framed structures. (IS: 1893 – Part 1).

Unit-V

Earthquake Resistant Construction: Typical seismic failure of masonry and RCC structures. Earthquake resistant construction of buildings, and various provisions as per IS codes; IS 4326,IS-13827, IS-13828, IS-13920, IS-13935.

BTCEPCC 602: Structural Analysis-II

Syllabus

Unit-I

Introduction: Objective, scope and outcome of the course.

Unit load method & their applications: deflection of determinate beams and frames, analysis of determinate and redundant frames up to two degree of redundancy, lack of fit in redundant frames.

Introduction to Energy Methods: Strain energy for gradually applied, suddenly applied and impact loads, Strain energy due to axial loads, bending, shear and torsion;. Castiglione's theorems & their applications in analysis of determinate and redundant frames up to two degree of redundancy and trussed beams; Stresses due to temperature & lack of fit in redundant frames; deflection of determinate beams, frames using energy methods.

Unit-II

Influence line diagram & Rolling load: ILD for beams & frames, Muller-Breslau principle and its application for drawing ILD, Rolling load, maximum stress resultants in a member/section, absolute maximum stress resultant in a structure.

Unit-III

Arches: analysis of three hinged two hinged and fixed type parabolic arches with supports at the same level and at different levels.

Unit-IV

Unsymmetrical bending: Definition, location of NA, computation of stresses and deflection, shear centre and its location,

Unit-V

Approximate methods for lateral loads: Analysis of multistory frames by portal method, cantilever method & factor method. Analysis of determinate space trusses by tension coefficient method

BTCEPCC 603: Environmental Engineering

Syllabus

Unit-I

Introduction: Objective, scope and outcome of the course.

Water: -Sources of Water and quality issues, water quality requirement for different beneficial uses, Water quality standards, water quality indices. Water Supply systems, Need for planned water supply schemes, Water demand industrial and agricultural water requirements, Components of water supply system; Transmission of water, Distribution system, Various valves used in W/S systems, service reservoirs and design.

Unit-II

Water Treatment: aeration, sedimentation, coagulation flocculation, filtration, disinfection, advanced treatments like adsorption, ion exchange, membrane processes.

Unit-III

Sewage-Domestic and Storm water, Quantity of Sewage, Sewage flow variations. Conveyance of sewage- Sewers, shapes design parameters, operation and maintenance of sewers, Sewage pumping; Sewerage, Sewer appurtenances, Design of sewerage systems. Small bore systems, Storm Water- Quantification and design of Storm water.

Sewage characteristics: Quality parameters: BOD, COD, TOC, Solids, DO, Nitrogen, Phosphorus, Standards of disposal into natural watercourses and on land, Indian standards.

Unit-IV

Sewage and Sullage, Pollution due to improper disposal of sewage, Wastewater treatment, aerobic and anaerobic treatment systems, suspended and attached growth systems, recycling of sewage – quality requirements for various purposes.

Wastewater Disposal and Refuse: Disposal of sewage by dilution, Self purification of streams, sewage disposal by irrigation sewage farming, waste water reuse.

Unit-V

Air -Composition and properties of air, Quantification of air pollutants, Monitoring of air pollutants, Air quality standards, Control measures for Air pollution

Noise-Basic concept, measurement and various control methods

BTCEPCC 604: Design of Steel Structures

Syllabus

Unit-I

Introduction: Objective, scope and outcome of the course.

Types of Steels and their broad specifications. Structural steel forms- hot rolled, tubular, light gauge etc and their applicability. Classification of cross sections as per IS 800-2007- Plastic, compact, semi compact and slender- characteristics

Plastic analysis of steel structures, fundamentals, shape factor, static and mechanism method of analysis, bending of beams of uniform cross sections (any shape)

Connections: Types of bolts, load transfer mechanism, prying action. Design of bolted and welded connections under axial and eccentric loadings with IS provisions

Unit-II

Tension Members: Design strength in gross section yielding, net section rupture and block shear. Design of axially loaded members.

Compression Members: Types of buckling, Imperfection factor, Buckling curves for different cross sections as per IS. Design of compression members: Axially loaded members including made up of angle section: single and in pair; built up columns including design of lacings and battens as per IS.

Unit-III

Beams: Design of beams: simple and compound sections. Design of laterally supported and unsupported beams including for web buckling, web crippling, lateral torsional buckling.

Member design under combined forces: Compressive load and uniaxial moment. tension and uniaxial moment

Column Bases: Design of column bases for axial and eccentric compressive loads: Slab and gusseted base.

Unit-IV

Design of plate girder: Design of welded and bolted sections including web and flange splicing, horizontal, intermediate and bearing stiffeners. Shear strength determination by post critical and tension field action methods. End panel design options and procedure as per IS 800. Curtailment of flange plates. Connections for flange plate to flange angles and flange angles to web, etc. Design of welded connections.

Unit-V

Design of gantry girder

Design of roof trusses members for combined forces, wind loading etc. Purlin design. Introduction to Pre Engineered Buildings , characteristics and their applications.

Introduction of truss girder bridges-its members including portal and sway bracings etc. Design aspects of foot over bridges.

BTCEPCC 605: Estimating & Costing

Syllabus

UNIT I

Introduction: Purpose and importance of estimates, principles of estimating, Methods of taking out quantities of items of work, Mode of measurement, measurement sheet and abstract sheet; bill of quantities, Types of estimate, plinth area rate, cubical content rate, preliminary, original, revised and supplementary estimates for different projects.

UNIT II

Rate Analysis: Task for average artisan, various factors involved in the rate of an item, material and labor requirement for various trades; preparation for rates of important items of work, Current schedule of rates. (C.S.R.)

UNIT III

Estimates: Preparing detailed estimates of various types of buildings, R.C.C. works and earth work calculations for roads and estimating of culverts Services for building such as water supply, drainage and electrification.

UNIT IV

Cost of Works: Factors affecting cost of work, overhead charges, Contingencies and work charge establishment, various percentages for different services in building.

UNIT V

Valuation: Purposes, depreciation, sinking fund, scrap value, year's purchase, gross and net income, dual rate interest, methods of valuation, rent fixation of buildings.

Reference Books Recommended:

(1) "Estimating and Costing" by B. N. Dutta, UBS Publisher.

(2) "Estimating and Costing" by Rangwala, Charotar Publishing House.

BTCEPEC 606A: Pre-Stressed Concrete

Syllabus

Unit-I

Introduction: Objective, scope and outcome of the course.

Introduction: Basic concepts of Pre-stressing and its advantages. Materials for pre-stressed concrete. Tensioning devices. Pretensioning and post tensioning systems.

Unit-II

Analysis of Pre-stress and Bending Stresses: Assumptions, Flexural analysis of pre-stressed rectangular and unsymmetrical T section. Concept of load balancing.

Unit-III

Losses of Pre-stress: Losses due to - elastic deformation of concrete, successive tensioning of curved cable, shrinkage of concrete, creep of concrete, relaxation of stress in steel, friction and anchorage slip.

Unit-IV

Deflection of Pre-stressed Concrete Members: Effect of tendon profile and associated factors incontinuous members. Computation of deflection in pre-stressed concrete members.

Unit-V

Design of Pre-stressed Concrete Sections: Flexural Shear and Torsional strength using simplified code procedure (IS-1343-2012). Design of simply supported Pre-stressed Concrete Sections for flexure.

BTCEPEC 606B: Solid and Hazardous Waste Management

Syllabus

Unit-I

Introduction: Objective, scope and outcome of the course.

Introduction to SWM: Definition of waste and solid waste, classification solid waste, sources of solid waste, its composition, factors affecting waste generation, traditional methods of waste collection and disposal

Unit-II

Waste Collection: Components of waste collection, waste collection containers, their characteristics, types, waste collection vehicles, collection frequency, collection route, transfer stations

Unit-III

Solid Waste Characterization: Physical characteristics, chemical characteristics and biological characteristics of solid wastes

Waste Processing: Size reduction, factors affecting size reduction, size reducing equipment, volume reduction, equipment for volume reduction, waste minimization, waste hierarchy, 3 R principle

Unit-IV

Hazardous Waste: Definition, sources, classification, collection, segregation, treatment and disposal methods

Radioactive Waste, E-Waste, Biomedical Waste: Definition, sources, classification, segregation, management and disposal methods

Unit-V

Treatment and Disposal of Solid Waste: Composting, vermicomposting, biogas production, thermal treatment, incineration, pyrolysis, gasification, biological treatment, Sanitary land filling, land fill leachate and gas management

Latest Advances and Rules related to SWM, Hazardous Waste, Plastic Waste and E-Waste Management

BTCEPEC 606C: Traffic Engineering and Management

Syllabus

Unit-I

Introduction: Objective, scope and outcome of the course.

Traffic Planning and Characteristics: Road Characteristics – Road user characteristics – PIEV theory – Vehicle – Performance characteristics – Fundamentals of Traffic Flow .

Unit-II

Traffic Surveys: Traffic Surveys – Speed, journey time and delay surveys – Vehicles Volume Survey including non-motorized transports – Methods and interpretation – Origin Destination Survey – Methods and presentation – Parking Survey – Accident analyses -Methods, interpretation and presentation –Level of service – Concept, applications and significance

Unit-III

Traffic Design and Visual Aids: Intersection Design – channelization, Rotary intersection design – Signal design – Coordination of signals — Grade separation – Traffic signs including VMS and road markings – Significant roles of traffic control personnel – Networking pedestrian facilities & cycle tracks.

Unit-IV

Traffic Safety and Environment: Road accidents – Causes, effect, prevention, and cost – Street lighting – Traffic and environment hazards –

Unit-V

Traffic Management: Area Traffic Management System – Traffic System Management (TSM) with IRC standards –- Traffic Regulatory Measures-Travel Demand Management (TDM) – Direct and indirect methods – Congestion and parking pricing – All segregation methods-Coordination among different agencies – Intelligent Transport System for traffic management, enforcement and education.

BTCEPEC 607A: Bridge Engineering

Syllabus

Unit-I

Introduction: Objective, scope and outcome of the course.

Introduction: Type of bridges & classification of road & railways bridges. IRC & Railway loadings for bridges, wind load & Earthquake forces. : Expansion joints.

Unit-II

Steel bridges: Introduction to Design of through type & deck type steel bridges for IRC loading. Design of through type truss bridges for railway loadings.

Unit-III

Reinforced concrete culverts: Reinforced concrete slab culvert

Unit-IV

Reinforced concrete bridges: T-beam bridges-courbons & Hendry-Jaegar methods.

Unit-V

Bearings: Bearings for slab bridges and girder bridges. Elastomeric bearings, design concepts as per IRC 83 (Part II).

BTCEPEC 607B: Rock Engineering

Syllabus

Unit-I

Introduction: Objective, scope and outcome of the course.

Engineering Classification of Rocks: Objectives, Intact rock classification, Rock mass Classification. Terzaghi's, Rock load classification, Austrian classification, Deere's rock quality

classification, rock structure rating concept, RMR classification, Q classification. Inter relation between Q and RMR.

Unit-II

Engineering Properties and Laboratory Tests on Rocks: Porosity, Density, Moisture content, Degree of saturation, Co-efficient of permeability, Durability, Compressive strength, Tensile strength, Shear strength, elasticity, Plasticity Deformability. Sampling and Samples Preparations, Uniaxial Compressive strength, Tensile Strength – Brazilian test, Shear strength test – Direct Shear test and Punch shear test, Triaxial Test, Flexural strength.

Unit-III

In-situ Tests on Rocks: Necessity of In-situ test, Plate load test for deformability, Field Shear test

Jointed Rocks: Rocks Joint properties, Joint properties, Joint Roughness Co-efficient, Scale effects, Dilation, Orientation of Joints, Gouge, Joint Intensity, Uniaxial Compressive strength of Jointed Rocks.

Unit-IV

Strength of Rocks in Unconfined Condition: Ramamurthy Strength Criteria, Singh and Rao Strength Criteria, Kulatilake Methodology, Barton Methodology.

Unit-V

Strength of Rocks in Confined Condition: History of Hoek and Brown Failure Criterions, Parabolic Strength Criteria.

Bearing Capacity of Rocks: Bearing capacity of intact rocks, jointed rocks,IS Code methodology, Singh and Rao Method and latest methodologies.

BTCEPEC 607C: Geographic Information System & Remote Sensing

Syllabus

Unit-I

Introduction: Objective, scope and outcome of the course.

Photogrammetry: Definition of Photogrammetric Terms, Geometry of aerial and terrestrial photographs,Aerial camera and phototheodolite, Scale of a Photograph, Tilt and Height displacements, Stereoscopicvision and stereoscopes, Height determination from parallax measurements, Flight planning, Maps and Map substitutes and their uses.

Unit-II

Remote Sensing: Introduction and definition of remote sensing terms, Remote Sensing System, Electromagnetic radiation and spectrum, Spectral signature, Atmospheric windows.

Unit-III

Different types of platforms, sensors and their characteristics, Orbital parameters of a satellite, Multi concept in Remote Sensing.

Unit-IV

Image Interpretation: Principles of interpretation of aerial and satellite images, equipments and aids required for interpretation, ground truth – collection and verification, advantages of multidate and multiband images. Digital Image Processing concept.

Unit-V

Geographic Information System (GIS) : Introduction & applications of GIS in map revision, Land use, Agriculture, Forestry, Archaeology, Municipal, Geology, water resources, Soil Erosion, Land Suitability analysis, change detection.

BTCEPCC 608: Environmental Engineering Design and Lab

LIST OF EXPERIMENTS:

1. Population forecasting and water demand
2. Water Quality parameters
3. Design of Sedimentation tanks, coagulation and flocculation tanks
4. Design of rapid and slow sand filters
5. Design of disinfection units and transmission systems
6. Design of Sewer lines and storm water systems
7. Design of aerobic and anaerobic treatment units
8. Design of suspended and attached growth systems

Lab:

1. Physical Characterization of water: Turbidity, Electrical Conductivity, pH
2. Analysis of solids content of water: Dissolved, Settleable, suspended, total, volatile, inorganic etc.
3. Alkalinity and acidity, Hardness: total hardness, calcium and magnesium hardness
4. Optimum coagulant dose
5. Chemical Oxygen Demand (COD)
6. Dissolved Oxygen (D.O) and Biochemical Oxygen Demand (BOD)
7. Break point Chlorination
8. Bacteriological quality measurement: MPN.

BTCEPCC 609: Steel Structures Design Lab

LIST OF EXPERIMENTS

Analysis and design Problems as per different topics of syllabus of theory BTCE604, with latest version of IS 800 and other relevant IS codes. In addition to numerical problems, following exercises:

1. Case study of foot over bridges/truss- girder bridge in vicinity /home town of the students, preferably in groups of 8-10 students. A report including photographs marked with names and section details of different members in it (maximum limit of words :1000).

2. Case study of a structure using tubular sections or light gauge sections in vicinity /home town of the students, preferably in groups of 8-10 students. A report including photographs marked with names, size and section details of different members in it (maximum limit of words: 1000).

BTCEPCC 610: Quantity Surveying and Valuation Lab

LIST OF EXPERIMENTS

1. Preliminary Estimate (Plinth Area and Cubic Content).
2. Detailed Estimate of buildings (Long wall-Short wall and Centre line method).
3. Rate Analysis of different Items of Works (Earthwork, Concrete Work, DPC, Stone masonry, Brickwork, RCC, Roofing, Flooring, and Finishing etc.).
4. Earthwork Calculation for Roads, Irrigation Canals and Channels (cutting and filling).
5. Valuation of Buildings and Properties.

BTCEPCC 611: Water and Earth Retaining Structures Design Lab

LIST OF EXPERIMENTS

1. **Continuous Beams:** Analysis and Design of continuous beams using coefficients (IS Code), concept of moment redistribution
2. **Curved Beams:** Analysis and design of beams curved in plan.
3. **Circular Domes:** Analysis and design of Circular domes with u.d.l. & concentrated load at crown.
4. **Water Tanks and Towers:** Water Tanks and Water Towers-design of rectangular, circular and Intze type tanks, column brace type staging.
5. **Retaining walls:** Analysis and design of Cantilever Retaining Walls: Introduction to counter fort and buttress type retaining walls, their structural behaviour and stability analysis.

BTCEPCC 612: Foundation Engineering Lab

LIST OF EXPERIMENTS

1. Design of isolated shallow footings, combined footings, raft foundations.
2. Design of pile foundations.
3. Design of wells and cassions.
4. Design of machine foundation.
5. Design of retaining structures etc

BTCESODECA 613: Social Outreach, Discipline & Extra Curricular Activities

Semester – VII

THEORY PAPERS		**No. of Teaching Hours**			**Marks Allocation**			
Code	**Subject/Paper**	**L**	**T**	**P**	**IA**	**EA**	**Total**	**Credits**
BTCEPCC701	Transportation Engineering	3	0	0	30	70	100	3
Open Elective (Choose any one)								
BTCEPEC702A	Human Engineering and Safety	3	0	0	30	70	100	3
BTCEPEC702B	Environmental Engineering and Disaster Management	3	0	0	30	70	100	3
BTCEPEC702C	Non Destructive Testing	3	0	0	30	70	100	3
	PRACTICALS/VIVA VOCE	**No. of Teaching Hours**			**Sessional**	**Practical**	**Total**	**Credits**
BTCEPCC703	Road Material Testing Lab	0	0	2	30	20	50	1
BTCEPCC704	Professional Practices & Field Engineering Lab	0	0	2	30	20	50	1
BTCEPCC705	Soft Skill Lab	0	0	2	30	20	50	1
BTCEPCC706	Environmental Monitoring And Design Lab	0	0	2	30	20	50	1
BTCEPSIT707	Practical Training	1	0	0	60	40	100	2
BTCEPCC708	Seminar	2	0	0	60	40	100	2
BTCESODECA709	Social Outreach, Discipline & Extra Curricular Activities	0	0	0	0	50	50	1
	Total	**8**	**0**	**8**	**240**	**310**	**550**	**15**

BTCEPCC701: Transportation Engineering

Syllabus

Unit- I

Introduction: Objective, scope and outcome of the course Highway planning and alignment : Different modes of transportation – historical Development of road construction- Highway Development in India –Classification of roads- Road pattern – Highway planning in India- Highway alignment - Engineering Surveys for alignment – Highway Project- Important Transport/Highway related agencies in India. PMGSY project. Introduction about IRC, NRRDA

Unit- II

Geometric Design of highways: The highway crosses sectional elements- Camber-Sight Distance - Types of sight distances -Design of horizontal alignments - Super elevation, Widening of Pavements on horizontal curves- transition Curves- Design of Vertical alignments – Gradients- summit and Valley Curves- Recommendations of IRC Codes of Practice.

Highway Materials: Desirable Properties, Testing Procedures, Standards and standard values relating to Soil, Stone Aggregates, Bitumen and Tar, fly- ash/pond-ash. Role of filler in bituminous mix, materials of filler. Specifications of DLC and PQC for rigid pavement

Unit- III

Highway Construction and Equipments: Methods of constructing different types of roads viz. Earth roads, Stabilized roads, WBM, WMM roads, earthen embankments, DLC and embankments with fly ash. Bituminous roads and Concrete roads. Berms and Shoulders, Features of rural roads including those in PMGSY. Hot mix plant for Bituminous roads- components, layout, control panel, quality assurance. Highway construction of rigid and flexible pavements including types of road rollers, specifications of compaction of different layers of bituminous roads, modern pavers for CC roads. Roller compacted concrete road construction

Unit- IV

Design of flexible and rigid pavements as per IRC: IRC provisions including those of IRC 37, IRC 58

Introduction of Railway Engineering: Types and Selection of Gauges, Selection of Alignment, Ideal Permanent Ways and Cross- sections in different conditions, Drainage, Salient Features and types of Components viz. Rails, Sleepers, Ballast, Rail Fastenings

Unit- V

Introduction of Airports and Harbours: **Airport Engineering**: - Introduction: Requirements to Airport Planning, Airport Classifications, Factors in Airport Site Selection, Airport Size. Planning of Airport: Requirements of Airport- Terminal Area, Runway Length etc. Harbours:

history of water transportation, modern trends in water transportation, components of harbour, classification of harbours. Ports and docks

Text / Reference Books:

1. Highway Engineering by Khanna SK & CG Justo, Nem Chand & Brothers, Roorkee.
2. Highway Engg. By LR Kadyali, Khanna Tech Publications, Delhi.
3. Railway Engineering by Saxena SC and Arora SP, Dhanpat Rai Publishers, Delhi.
4. S C Rangwala, airport engineering, Charotar publication house. 7 Gautam H. Oza, Dock &Harbour Engineering, Charotar publication House.

BTCEPEC702A: Human Engineering and Safety

Syllabus

Unit- I

Introduction: Objective, scope and outcome of the course ,Human factors in system development – concept of systemsBasic processes in system development, performance reliability, humanperformance. Information input process

Unit- II

Visual displays, majortypes and use of displays, auditory and factual displays.

Unit- III

Measurement of energy, direct and indirect methods. Energy cost of different activities and Acceptable work load. Noise andvibration, its measurement and control.

Unit- IV

Anthropometry: arrangement and utilization of work space,atmospheric conditions, heat exchange process and performance.

Unit- V

Dangerous machine (Regulation) act, Rehabilitation andcompensation to accident victims, Safety gadgets for spraying,threshing, Chaff cutting and tractor & trailer operation etc.

BTCEPEC702B: Environmental Engineering and Disaster Management

Syllabus

Unit- I

Introduction: Objective, scope and outcome of the course.Importance of safe water supply system. Domestic water requirements for urban and rural areas

Unit- II

Sources of Water supply : Intakes and transportation of water. Drinking water quality. Indian Standards of drinking water.

Unit- III

Introduction to water treatment for safe drinking, Importance ofsanitation. Domestic waste water: quantity, characteristics, disposal in urbanand rural areas.

Unit- IV

Sewer: types, design discharge and hydraulic design. Introduction to domestic wastewater treatment. Solid waste: quantity, characteristics and disposal for urban and rural areas.

Unit- V

Introduction to air pollution.: Types of pollutants, properties and their effects on living beings. BIS standards for pollutants in air and their abetments. Introduction to variousdisaster, Importance of disaster management**.**

BTCEPEC702C: Non Destructive Testing

Syllabus

Unit- I

Introduction: Objective, scope and outcome of the course.

Overview of NDT: NDT Versus Mechanical testing, Overview of the Non DestructiveTesting Methods for the detection of manufacturing defects as wellas material characterization. Relative merits and limitations,various physical characteristics of materials and their applicationsin NDT, Visual inspection, Unaided and aided.

Unit- II

Surface Non Destructive Evaluation (NDE) Methods:Liquid Penetrant Testing, Principles, types and properties of liquidpenetrants, developers, advantages and limitations of variousmethods. Testing Procedure, Magnetic Particle Testing, Theory ofmagnetism, inspection materials. Magnetisation methods,Interpretation and evaluation, Principles and methods ofdemagnetization, Residual magnetism

Unit- III

Thermography and Eddy Current Testing (ET):Thermography, Principles, Contact and non contact inspectionmethods, Advantages and limitation, Instrumentations andmethods, applications. Eddy Current Testing, Generation of eddycurrents, Properties of eddy currents, Eddy current sensingelements, Types of arrangement, Applications, advantages,Limitations, Interpretation/Evaluation.

Unit- IV

Ultrasonic Testing (UT) and Acoustic Emission (AE):Ultrasonic Testing, Principle, Transducers, transmission andpulse-echo method, straight beam and angle beam,instrumentation, data representation, A-Scan, B-scan, C-scan.Acoustic Emission Technique, Principle, AE parameters,Applications.

Unit- V

Radiography (RT): Principle, Interaction of X-Ray with matter, imaging, film and film less techniques, Types and use of filters and screens, Geometricfactors, Inverse square, law, characteristics of films,Interpretation/ Evaluation, Fluoroscopy, Xero Radiography,Computed Radiography, Computed Tomography.

Special Techniques and Applications: Phased array ultrasonics time of flight diffractions, Automated and remote ultrasonic testing, Acoustic pulse reflectometry, Alternative current field method, Case studies on NDT techniques used in aircrafts.

BTCEPCC703: Road Material Testing Lab

Syllabus

1. Aggregate Impact Test
2. To determine the Angularity Number, Flakiness Index & Elongation Index of aggregates
3. Los Angeles Abrasion Test
4. Aggregate Crushing Value Test
5. Standard Tar Viscometer Test for given bitumen sample
6. Ductility Test for a given bitumen sample
7. To determine the softening point for given sample of bitumen.
8. Marshall Stability Test
9. Float Test
10. Preparation of Dry lean concrete mix and testing of its strength

BTCEPCC704: Professional Practices & Field Engineering Lab

Syllabus

1. Different types of Knots
2. Site plan, index plan, layout plan, plinth area, and floor area of buildings
3. Foundation plan layout infield
4. Bar bending schedule
5. Specifications- For different classes of building and Civil Engineering works
6. Specifications of building components
7. Valuation of buildings and properties
8. Work at heights – scaffolding and ladders use, type of scaffolds, safety requirements, design and load factors, defects and inspection norms, type of

ladders, upkeep, defects and good maintenance tips

BTCEPCC705: Soft Skill Lab

Syllabus

SOFT SKILLS- Introduction to Soft Skills, Aspects of Soft Skills, Identifying your Soft Skills, Negotiation skills, Importance of Soft Skills, Concept of effective Communication. SELF-DISCOVERY- Self-Assessment, Process, Identifying Strengths and limitations, SWOT Analysis Grid.

PREPARING CV/RESUME – Introduction, meaning, difference among bio-data, CV and resume, CV writing tips. Do's and don'ts of resume preparation, Vocabulary for resume, common resume mistakes, cover letters, tips for writing cover letters.

INTERVIEW SKILLS - Introduction. Types of interview, Types of question asked, Reasons for rejections, Post-interview etiquette, Telephonic interview, Dress code at interview, Mistakes during interview, Tips to crack on interview, Contextual questions in interview skills, Emotional crack an interview, Emotional intelligence and critical thinking during interview process.

DEVELOPING POSITIVE ATTITUDE – Introduction, Formation of attitude, Attitude in workplace, Power of positive attitude, Examples of positive attitudes, Negative attitudes, overcoming negative attitude and its consequences,

IMPROVING PERCEPTION- Introduction, Understanding perception, perception and its application in organizations.

CAREER PLANNING – Introduction, Tips for successful career planning, Goal

Setting immediate, short term and long term, Strategies to achieve goals, Myths

About choosing career.

TEAM BUILDING AND TEAM WORK - Introduction, Meaning, Characteristics of an effective team, Role of a Team Leader, Role of Team Members, inter group Collaboration Advantages, Difficulties faced, Group Exercises-Team Tasks and Role-Play, Importance of Group Dynamics.

TIME MANAGEMENT: The Time management matrix, apply the Pareto Principle (80/20 Rule) to time management issues, to prioritize using decision matrices, to beat the most common time wasters, how to plan ahead, how to handle interruptions , to maximize your personal effectiveness, how to say "no" to time wasters, develop your own individualized plan of action.

STRESS MANAGEMENT – Introduction, meaning, positive and negative stress, Sources of stress, Case studies, signs of stress, Stress management tips, Teenage stress. Group discussion practice on current topics, Quantitative aptitude and reasoning preparatio**n.**

Text / Reference Books:

1 Butterfield, Jeff, 'Soft Skills for Everyone', Cengage Learning, New Delhi, 2010.

2 G.S. Chauhan and Sangeeta Sharma, 'Soft Skills', Wiley, New Delhi, 2016.

3 Klaus, Peggy, Jane Rohman & Molly Hamaker, 'The Hard Truth About Soft Skills', Harper Collins E-books, London, 2007.

4 S.J. Petes, Francis, 'Soft Skills and Professional Communication', Tata McGraw Hill Education, New Delhi, 2011.

5 Dr. R. S. Aggarwal, Quantitave aptitude & reasoning, S Chand & company ltd.

6 Dr. R. S. Aggarwal, A modern approach to Verbal & Non-verbal reasoning, S Chand & company ltd.

BTCEPCC706: Environmental Monitoring and Design Lab

Syllabus

Design:

1. Sewer design and estimation of Waste/Storm water by software.
2. Design of Water Treatment Plant and Sewage Treatment Plant
3. Design of Oxidation pond, stabilization pond and aerated lagoons.
4. Design of aerobic and anaerobic digester.

Lab:

1. Demonstration of air pollution monitoring instruments namely, High volume sampler
2. Determination of SPM, PM10andPM2.5.
3. Demonstration of noise pollution monitoring equipment namely, modular precision sound levelmeter.
4. Air quality monitoring for Traffic/Residential locality and its effect on the environment.
5. Noise quality monitoring for Traffic/Residential locality and its effect on the environment.
6. Latest technology for management of municipal solid waste

Recommended Texts:

1 Manual on Sewerage and Sewage Treatment Systems – 2013, CPHEEO, New Delhi

2 Compendium of sewage treatment technologies Published by NRCD, MoEF, GOI, 2009

3 Storm Water Management Model (SWMM) and Manual, Published by US EPA

4 IS 5182-23 (2006) published by Bureau of Indian Standards

5 IS 4758: 1968 published by Bureau of Indian Standards

6 MoEF Guidelines and amendments as updated onhttp://moef.gov.in

7 CPCB Guidelines and amendments as updated onhttps://cpcb.nic.in

BTCEPSIT707: Practical Training

BTCEPSIT 708: Seminar

BTCESODECA 709: Social Outreach, Discipline & Extra Curricular Activities

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Semester - VIII

THEORY PAPERS		**No. of Teaching Hours**			**Marks Allocation**			
Code	**Subject/Paper**	**L**	**T**	**P**	**IA**	**EA**	**Total**	**Credits**
BTCEPCC801	Project Planning and Construction Management	3	0	0	30	70	100	3
Open Elective								
BTCEPEC802A	Energy Management	3	0	0	30	70	100	3
BTCEPEC802B	Waste And By Product Utilization	3	0	0	30	70	100	3
BTCEPEC802C	Disaster Management	3	0	0	30	70	100	3
PRACTICALS/VIVA VOCE		**No. of Teaching Hours**			**Sessional**	**Practical**	**Total**	**Credits**
BTCEPCC803	Project Planning and Construction Management lab	0	0	2	30	20	50	1
BTCEPCC804	Pavement Design	0	0	2	30	20	50	1
BTCEPSIT805	Project	3	0	0	210	140	350	7
BTCESODECA806	Social Outreach, Discipline & Extra Curricular Activities	0	0	0	0	50	50	1
	Total	**9**	**0**	**4**	**330**	**370**	**700**	**16**

BTCEPCC801: Project Planning and Construction Management

Syllabus

Unit-I

Introduction: Objective, scope and outcome of the course

Financial Evaluation of Projects And ProjectPlanning: Capital investment proposals, criterions to judge the worthwhile of capital projects viz. net present value, benefit cost ratio, internal rate of return, Risk cost management, main causes of project failure. Categories of construction projects, objectives, project development process, Functions of project management, Project management organization and staffing, Stages and steps involved in project planning, Plan development process, objectives of construction project management.

Unit-II

Project Scheduling: Importance of project scheduling, project work breakdown process – determining activities involved, work breakdown structure, assessing activity duration, duration estimate procedure, Project work scheduling, Sequence of construction activities, Project management techniques – CPM and PERT networks analysis, concept of precedence network analysis.

Unit-III

Project Cost and Time Control: Monitoring the time progress and cost controlling measures in a construction project, Time cost trade-off process: direct and indirect project costs, cost slope, Process of crashing of activities, determination of the optimum duration of a project, updating of project networks, resources allocation.

Unit-IV

Contract Management: Elements of tender operation, Types oftenders and contracts, Contract document, Legal aspects ofcontracts, Contract negotiation & award of work, breach of contract,determination of a contract, arbitration.

Unit-V

Safety and Other Aspects of Construction Management: Safety measures to be followed in various construction works like excavation, demolition of structures, explosive handling, hot bitumen work. Project Management Information System – Concept, frame work, benefits of computerized information system. Environmental and social aspects of various types of construction projects.

Recommended Texts:

1. Construction Planning & management By P S Gahlot& B M Dhir, New AgeInternational Limited Publishers.
2. Construction Project planning & Scheduling by Charles Patrick, Pearson,2012..
3. Construction Project Management Theory & practice --- Kumar NeerajJha, Pearson, 2012
4. Modern construction management--Harris, Wiley India.
5. Construction Management & Planning by Sengupta and Guha-TataMcGraw Hill publication.
6. Project Management – K Nagrajan – New age International Ltd.Professional Construction Institute Edition.
7. Construction Project Management Planning, Scheduling and Controlling-Chitakara- Tata McGraw Hill, New Delhi
8. Construction Planning, Equipment and Methods by R. L. Peurify.

BTCEPEC802A: Energy Management

Syllabus

Unit-I

Introduction: Objective, scope and outcome of the course.

Unit-II

Energy Basics; Energy Demand Management, Conservation & Resource Development, Energy for Sustainable Development.

Unit-III

Need for Energy Management by Sector- Industry, Buildings & Houses, Transport, Electric Power.

Unit-IV

Need for Energy Management by Sector- Agriculture, Domestic; Energy forecasting techniques; Energy Integration, Energy Matrix.

Unit-V

Energy Auditing; Energy management for cleaner production, application of renewable energy, appropriate technologies.

BTCEPEC802B: Waste and By-Product Utilization

Syllabus

Unit-I

Introduction: Objective, scope and outcome of the course.

Unit-II

Types and formation of byproducts and waste; magnitude of wastegeneration in different agro- processing industries; concept scopeand maintenance of waste management and effluent treatment,basics pf Waste Recycling & Resources Recovery System (WRRRS),Temperature, pH, Oxygen demands (BOD, COD), fat, oil andgrease content, metal content, forms of phosphorous and sulphurin waste waters, microbiology of waste, other ingredients likeinsecticide, pesticides and fungicides residues.

Unit-III

Waste utilization in various industries, furnaces and boilersrun on agricultural wastes and byproducts, briquetting ofbiomass as fuel, production of charcoal briquette, generation ofelectricity using surplus biomass, producer gas generation andutilization.

Unit-IV

Waste treatment and disposal, design, construction, operation andmanagement of institutional community and family size biogasplants, concept of vermi-composting, Pre-treatment of waste:

sedimentation, coagulation, flocculation and floatation, Secondarytreatments: Biological and chemical oxygen demand for differentfood plant waste– trickling filters, oxidation ditches, activatedsludge process, rotating biological contractors, lagoons.

Unit-V

Tertiary treatments: Advanced waste water treatment process-sand,coal and activated carbon filters, phosphorous, sulphur, nitrogenand heavy metals removal, Assessment, treatment and disposal ofsolid waste.

BTCEPEC802C: Disaster Management

Syllabus

Unit-I

Introduction: Objective, scope and outcome of the course.

Unit-II

Understanding Disasters and Hazards and related issues social and environmental. Risk and Vulnerability. Types of Disasters, their occurrence/ causes, impact and preventive measures.

Unit-III

Natural. Disasters- Hydro-meteorological Based Disasters like Flood, Flash Flood, Cloud Burst, Drought, Cyclone, Forest Fires; Geological Based Disasters like Earthquake, Tsunami, Landslides, Volcanic Eruptions.

Unit-IV

Man made Disasters: Textile Processing Industrial Hazards, Major Power Break Downs, Traffic Accidents, Fire Hazards.

Unit-V

Management roll in mitigating Disaster in Indian Textile Industries. Roll of production people in Disaster Management.

BTCEPCC803: Project Planning and Construction Management Lab

Syllabus

1. Assignments on net present value, benefit cost ratio, internal rate ofreturn.
2. Types of contracts – Tenders, tender form, submission and opening of tenders, measurement book, muster roll, piecework agreement and workorder.
3. Drafting of tender documents, special terms andconditions.
4. Drafting of tender notices for different types ofworks
5. Different models of PPP like BOT, BOOTetc.
6. Arbitration.
7. Preparation of bardiagram.
8. Network Analysis using PERT andCPM.

BTCEPCC804: Pavement Design

Syllabus

1. **Pavement Mix Analysis:** Aggregate blending, bituminous mix design – Marshall Stability approach, concrete mix design for DLC and PQC with IS codeprovisions.
2. **Pavement Basics:** Types & comparison, vehicular loading pattern, factors affecting design and performance of pavements, sub graderequirements.
3. **Design of Flexible Pavements:** Analytical approach, flexible pavement layers, ESWL, repetitions of load, techniques of design methods, wheel load analysis, traffic analysis, stress distribution in sub-grade soil, Burmister's theories, group index method, CBR approach, IRC 37 and other guidelines.
4. **Design of Concrete Pavements:** Westergaard's approach, temperature & frictional stresses, design of expansion & longitudinal joints, design of dowel & tie bars, IRC 58 and otherguidelines.
5. **Specifications for rural roads:** Important aspects of IRC SP 020, Rural Road Manual. NRRDA publications

BTCEPSIT 805: Project

BTCESODECA 806: Social Outreach, Discipline & Extra Curricular Activities

6. Teaching-Learning Process/ Methodology (TLM):

The teaching-learning process should be aimed at systematic exposition of basic concepts so as to acquire knowledge of technical program in a canonical manner. In this context, applications of technical program and linkage with the theory constitute a vital aspect of the teaching-learning process. The course offers many modes of learning and assessment methods. Students have great freedom of choice of course which they can study. The various components of teaching learning process are summarized in the following heads.

1. **Class room Lectures:** The most common method of imparting knowledge is through lectures. There are diverse modes of delivering lectures such as through blackboard, power point presentation and other technology aided means. A judicious mix of these means is a key aspect of teaching-learning process.

2. **Tutorials:** To reinforce learning, to monitor progress, and to provide a regular pattern of study, tutorials are essential requirements. During these tutorials, difficulties faced by the students in understanding the lectures, are dealt with. Tutorials are also aimed at solving problems associated with the concepts discussed during the lectures.

3. **Practical:** To provide scientific visualization and obtaining results of Technical program in practical sessions. These sessions provide vital insights into scientific concepts and drawlearner's attention towards limitations of scientific computations. During practical, scientific models arising in real life problems can also be simulated.

4. **Choice based learning/Open elective:** LOCF in this undergraduate program provides great flexibility both in terms of variety of courses and range of references in each course.

5. **Field based learning:** Students may enhance their knowledge through field based learning while understanding the practical importance.

6. **Textbooks learning:** A large number of books are included in the list of references of each course for enrichment and enhancement of knowledge.

7. **E-learning:** Learner may also access electronic resources and educational websites for better understanding and updating the concepts.

8. **Self-study materials:** Self-study material provided by the teachers is an integral part of learning. It helps in bridging the gaps in the classroom teaching. It also provides scope for teachers to give additional information beyond classroom learning.

9. **Assignment/Problem solving:** Assignments at regular intervals involving applications of theory are necessary to assimilate basic concepts of courses. Hence, it is incumbent on the part of a learner to complete open-ended projects assigned by the teacher.

10. **Internships:** The teaching-learning process needs to be further supported by other activities devoted to subject-specific and interdisciplinary skills, summer and winter internships. During these internships it is expected that a learner will interact with experts and write a report on a topic provided to the learner.

11. **Institute visits:** Institute visit by a learner is also a part of learning process. During such visits a learner has access to knowledge by attending academic activities such as seminars, colloquia, library consultation and discussion with faculty members. These activities provide guidance and direction for further study.

12. **Industrial visits:** Industrial visits offer an opportunity to observe applications of scientific concepts. These visits also give an opportunity to realize the power of mathematical ideas and their translation in problem solving.

13. **Training programs:** Training programs organized by various agencies/institutes provide an opportunity to learn various dimensions of courses.

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