

J. S. University, Shikohabad



B. Tech
3rd Semester & 4th Semester
(Civil Engineering)

Scheme
&
Syllabus

[Effective from the session 2021-22]

STUDY AND EVALUATION SCHEME FOR

B.TECH. (Civil ENGINEERING)

SEMESTER -III

S.No.	Subject Code	Name of Subject	Periods Per Week				Evaluation Scheme			
			L	T	P	Cr.	Sessi onal	End Exam	Tota l	Duratio n
THEORY SUBJECT										
1	BTAS-303	Maths-III	3	1	0	4	50	100	150	3
2	BTAS-301	Technical Commuation	2	1	0	3	50	100	150	3
3	BTCE-301	Engg. Mechanics	3	1	0	4	50	100	150	3
4	BTCE-302	Surveying and Geomatics	3	1	0	4	50	100	150	3
5	BTCE-303	Fluid Mechanics	3	0	0	3	50	100	150	3
6	BTNC-301	Computer System Security	2	0	0	0	25	50		2

PRACTICAL / PROJECT SUBJECTS

7	BTCE-351	Building Planning & Drawing Lab	0	0	2	1	25	25	50	3
8	BTCE-352	Surveying and Geomatics Lab	0	0	2	1	25	25	50	3
9	BTCE-353	Fluid Mechanics Lab	0	0	2	1	25	25	50	3
10	BTCE-354	Mini Projector Internship Assessment*	0	0	2	1	50		50	3
		MOOCs(Essential for Hons.Degree)				22	Grand Total		950	

*The Mini Project or Summer Internship (4weeks) / NPTEL Course (4-week) conducted during summer break after VI semester and same will be assessed / evaluated in the Semester-VII.

STUDY AND EVALUATION SCHEME FOR

B.TECH. (Civil ENGINEERING)

SEMESTER -IV

S.No	Subject Code	Name of Subject	Periods Per Week				Evaluation Scheme			
			L	T	P	Cr.	Sessi onal	End Exam	Total	Duration
THEORY SUBJECT										
1	BTOE-043	Energy Science & Engineering	3	1	0	4	50	100	150	3
2	BTVE-401	Universal Human Values	3	0	0	3	50	100	150	3
3	BTCE-401	Materials, Testing & construction Practices	3	0	0	3	50	100	150	3
4	BTCE-402	Introduction to solid Mechanics	3	1	0	4	50	100	150	3
5	BTCE-403	Hydraulic Engineering and machines	3	1	0	4	50	100	150	3
6	BTNC-402	Python Programming	2	0	0	0	25	50		2
PRACTICAL / PROJECT SUBJECTS										
7	BTCE-451	Materials Testing Lab	0	0	2	1	25	25	50	3
8	BTCE-452	Solid Mechanics Lab	0	0	2	1	25	25	50	3
9	BTCE-453	Hydraulic & Hydraulic Machine Lab	0	0	2	1	25	25	50	3
		MOOCs(Essential for Hons.Degree)				21	Grand Total		900	
<p>*The Mini Project or Summer Internship (4weeks) / NPTEL Course (4-week) conducted during summer break after VI semester and same will be assessed / evaluated in the Semester-VII.</p>										

B.TECH 2 YEAR (IIISem)

BTAS-303: Maths-III

Subject Code: BTAS-303		Maths-III	L T P : 3 1 0	Credits: 4
The students will be able to				
CO 1	The students will be able to get the idea of Laplace transform of functions and their application			
CO 2	The students will be able to get the idea of Fourier transform of functions and their applications			
CO 3	The students will be able to get the basic ideas of logic and Group and uses			
CO 4	The students will be able to get the idea s of sets, relation, function and counting techniques			
CO 5	The students will be able to get the idea of lattices, Boolean algebra, Tables and Karnaugh maps.			

CO-PO Mapping												
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	2	1	1	2	1	1	1	2
CO2	3	2	3	2	2	1	1	1	1	1	1	1
CO3	2	2	3	2	2	1	1	1	1	2	1	1
CO4	2	3	1	2	2	1	1	1	1	1	1	2
CO5	3	3	2	2	2	1	1	1	1	1	1	1
Course Average	2.60	2.60	2.40	2.00	2.00	1.00	1.00	1.20	1.00	1.20	1.00	1.40

Syllabus
<p>UNIT-1 Laplace Transform Laplace transform, Existence theorem, Laplace transforms of derivatives and integrals, Initial and final value theorems, Unit step function, Dirac- delta function, Laplace transform of periodic function, Inverse Laplace transform, Convolution theorem, Application to solve simple linear and simultaneous differential equations</p>
<p>UNIT-2 Integral Transforms Fourier integral, Fourier Transform , Complex Fourier transform, Inverse Transforms, Convolution Theorems, Fourier sine and cosine transform, Applications of Fourier transform to simple one dimensional heat transfer equations, wave equations and Laplace equations, Z-Transform and its application to solve difference equations.</p>

UNIT- 3

Formal Logic Group, Ring and Field: Introduction to First order logic, Proposition, Algebra of Proposition, Logical connectives, Tautologies, contradictions and contingency, Logical implication, Argument, Normal form, Rules of inferences, semi group, Monoid Group, Group, Cosets, Lagrange's theorem, Congruence relation, Cyclic and permutation groups, Properties of groups, Rings and Fields (definition, examples and standard results only)

UNIT-4

Set, Relation, function and Counting Techniques - Introduction of Sets, Relation and Function, Methods of Proof, Mathematical Induction, Strong Mathematical Induction, Discrete numeric function and Generating functions, recurrence relations and their solution, Pigeonhole principle.

UNIT-5

Lattices and Boolean Algebra: Introduction, Partially ordered sets, Hasse Diagram, Maximal and Minimal element, Upper and Lower bounds, Isomorphic ordered sets, Lattices, Bounded Lattices and Distributive Lattices. Duality, Boolean Algebras as Lattices, Minimization of Boolean Expressions, prime Implicants, Logic Gates and Circuits, Truth Table, Boolean Functions, Karnaugh Maps.

Text Book & Reference Book

1. E. Kreyszig: Advanced Engineering Mathematics; John Wiley & Sons.
2. R.K. Jain & S.R.K. Iyenger: Advanced Engineering Mathematics, Narosa Publishing House.
3. C.L. Liu: Elements of Discrete Mathematics; Tata McGraw- Hill Publishing Company Limited, New Delhi.
4. S. Lipschutz, M.L. Lipson and Varsha H. Patil: Discrete Mathematics; Tata McGraw-Hill Publishing Company Limited, New Delhi
5. B. Kolman, Robert C. Busby & S. C. Ross: Discrete Mathematical Structures' 5th Edition, Pearson Education (Singapore), Delhi, India.
6. B.S. Grewal: Higher Engineering Mathematics; Khanna Publishers, New Delhi.
7. B.V. Ramana: Higher Engineering Mathematics; Tata McGraw- Hill Publishing Company Limited, New Delhi.
8. Peter V.O' Neil. Advanced Engineering Mathematics, Thomas (Cengage) Learning.
9. Kenneth H. Rosen: Discrete Mathematics its Application, with Combinatorics and Graph Theory; Tata McGraw- Hill Publishing Company Limited, New Delhi
10. K.D. Joshi: Foundation of Discrete Mathematics; New Age International (P) Limited, Publisher, New Delhi.

BTAS-301 : Technical Communication

Subject Code: BTAS-301	Technical Communication	L T P : 2 1 0	Credits: 3
The students will be able to			
CO1	Students will be enabled to understand the nature and objective of Technical Communication relevant for the work place as Engineers.		
CO2	Students will utilize the technical writing for the purposes of Technical Communication and its exposure in various dimensions.		
CO3	Students would imbibe inputs by presentation skills to enhance confidence in face of diverse audience.		
CO4	Technical communication skills will create a vast know-how of the application of the learning to promote their technical competence.		
CO5	It would enable them to evaluate their efficacy as fluent & efficient communicators by learning the voice-dynamics.		

CO-PO Mapping												
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	2		1	2	1	1	3	3	2	1
CO2	1	2	3	3	3	2				3	2	3
CO3	1	2	3	2	3	2	1	2	3	3	2	3
CO4	2	2	3	1	3	3		1	3	3	3	3
CO5	1	1	3	1	1		3	3	3	3	1	3
Course Average	1.20	1.60	2.80	1.75	2.20	2.25	1.67	1.75	3.00	3.00	2.00	2.60

Syllabus

Unit -1 Fundamentals of Technical Communication:

Technical Communication: Features; Distinction between General and Technical Communication; Language as a tool of Communication; Dimensions of Communication: Reading & comprehension; Technical writing: sentences; Paragraph; Technical style: Definition, types & Methods; The flow of Communication: Downward; upward, Lateral or Horizontal; Barriers to Communication.

Unit - II Forms of Technical Communication:

Technical Report: Definition & importance; Thesis/Project writing: structure & importance; synopsis writing: Methods; Technical research Paper writing: Methods & style; Seminar & Conference paper writing; Expert Technical Lecture: Theme clarity; Analysis & Findings; 7 Cs of effective business writing: concreteness, completeness, clarity, conciseness, courtesy, correctness, consideration, C.V./Resume writing; Technical Proposal: Types, Structure & Draft.

Unit - III Technical Presentation: Strategies & Techniques

Presentation: Forms; interpersonal Communication; Class room presentation; style; method; Individual conferencing: essentials: Public Speaking: method; Techniques: Clarity of substance; emotion; Humour; Modes of Presentation; Overcoming Stage Fear; Audience Analysis & retention of audience interest; Methods of Presentation: Interpersonal; Impersonal; Audience Participation: Quizzes & Interjections.

Unit - IV Technical Communication Skills:

Interview skills; Group Discussion: Objective & Method; Seminar/Conferences Presentation skills: Focus; Content; Style; Argumentation skills: Devices: Analysis; Cohesion & Emphasis; Critical thinking; Nuances: Exposition narration & Description; effective business communication competence: Grammatical; Discourse competence: combination of expression & conclusion; Socio-linguistic competence: Strategic competence: Solution of communication problems with verbal and non verbal means.

Unit - V Dimensions of Oral Communication & Voice Dynamics:

Code and Content; Stimulus & Response; Encoding process; Decoding process; Pronunciation Etiquette; Syllables; Vowel sounds; Consonant sounds; Tone: Rising tone; Falling Tone; Flow in Speaking; Speaking with a purpose; Speech & personality; Professional Personality Attributes: Empathy; Considerateness; Leadership; Competence.

Text Book & Reference Book

1. Technical Communication – Principles and Practices by Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, 2007, New Delhi.
2. Personality Development and Soft Skills by Barun K. Mitra, OUP, 2012, New Delhi.
3. Spoken English- A Manual of Speech and Phonetics by R.K. Bansal & J.B. Harrison, Orient Blackswan, 2013, New Delhi.
4. Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., 2001, New Delhi.
5. Practical Communication: Process and Practice by L.U.B. Pandey; A.I.T.B.S. Publications India Ltd.; Krishan Nagar, 2014, Delhi. Modern Technical Writing by Sherman, Theodore A (et.al); Apprentice Hall; New Jersey; U.S.
6. A Text Book of Scientific and Technical Writing by S.D. Sharma; Vikas Publication, Delhi.
7. Skills for Effective Business Communication by Michael Murphy, Harvard University, U.S.
8. Business Communication for Managers by Payal Mehra, Pearson Publication, Delhi.

BTCE-301: ENGG. MECHANICS

Subject Code: BTCE-301	ENGG. MECHANICS	L T P : 3 1 0	Credits: 4
The students will be able to			
CO1	Students will be able to use scalar and vector analytical techniques for analyzing forces in statically determinate structures		
CO2	Students will be able to apply fundamental concepts of kinematics and kinetics of particles to the analysis of simple, practical problems		
CO3	Students will be able to apply basic knowledge of mathematics and physics to solve real-world problems		
CO4	Students will be able to understand basic dynamics concepts – force, momentum, work and energy		
CO5	Students will be able to understand and be able to apply Newton's laws of motion		

CO-PO Mapping												
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	2	3	2	1	1	2	1	1	1	1
CO2	2	3	2	2	2	2	1	1	1	2	1	2
CO3	2	1	2	3	2	1	1	1	1	1	1	1
CO4	3	3	3	2	2	1	2	1	1	1	1	2
CO5	2	3	3	2	2	1	1	1	1	1	1	1
Course Average	2.20	2.60	2.40	2.40	1.20	1.20	1.20	1.20	1.00	1.20	1.00	1.40

Syllabus
UNIT - I Introduction to Engineering Mechanics: Force Systems, Basic concepts, Rigid Body equilibrium; System of Forces, Coplanar Concurrent Forces, Components in Space – Resultant-Moment of Forces and its Applications; Couples and Resultant of Force System, Equilibrium of System of Forces, Free body diagrams, Equations of Equilibrium of Coplanar Systems. Friction: Types of friction, Limiting friction, Laws of Friction, Static and Dynamic Friction; Motion of Bodies, wedge friction, screw jack & differential screw jack;
UNIT- II Centroid and Centre of Gravity, Centroid of simple figures from first principle, centroid of composite sections; Centre of Gravity and its implications; Area moment of inertia- Definition, Moment of inertia of plane sections from first principles, Theorems of moment of inertia, Moment of inertia of standard sections and composite sections; Mass moment inertia of circular plate, Cylinder, Cone, Sphere, Hook.
UNIT - III Basic Structural Analysis, Equilibrium in three dimensions; Analysis of simple trusses by method of sections & method of joints, Zero force members, Simple beams and support reactions.
UNIT - IV Review of particle dynamics- Rectilinear motion; Plane curvilinear motion (rectangular,

path, and polar coordinates). Work-kinetic energy, power, potential energy. Impulse-momentum (linear, angular); Impact (Direct and oblique).

UNIT - V Introduction to Kinetics of Rigid Bodies, Basic terms, general principles in dynamics; Types of motion, Instantaneous centre of rotation in plane motion and simple problems; D'Alembert's principle and its applications in plane motion and connected bodies; Work energy principle and its application in plane motion of connected bodies; Kinetics of rigid body rotation Virtual Work and Energy Method- Virtual displacements, principle of virtual work for particle and ideal system of rigid bodies, Applications of energy method for equilibrium, Stability of equilibrium.

Text Book & Reference Book

1. Irving H. Shames (2006), Engineering Mechanics, 4th Edition, Prentice Hall
2. F. P. Beer and E. R. Johnston (2011), Vector Mechanics for Engineers, Vol I - Statics, VolII, – Dynamics, 9th Ed, Tata McGraw Hill
3. R. C. Hibbler (2006), Engineering Mechanics: Principles of Statics and Dynamics, Pearson Press.
4. Andy Ruina and Rudra Pratap (2011), Introduction to Statics and Dynamics, Oxford University Press
5. Shanes and Rao (2006), Engineering Mechanics, Pearson Education,
6. Hibler and Gupta (2010), Engineering Mechanics (Statics, Dynamics) by Pearson Education
7. Reddy Vijaykumar K. and K. Suresh Kumar(2010), Singer's Engineering Mechanics
8. Bansal R.K.(2010), A Text Book of Engineering Mechanics, Laxmi Publications
9. Khurmi R.S. (2010), Engineering Mechanics, S. Chand & Co.
10. Tayal A.K. (2010), Engineering Mechanics, Umesh Publications
11. Strength of Materials by Timoshenko and Youngs, East West Press.
12. Textbook of Applied Mechanics-Dynamics and Statics by Prasad I.B, Khanna Publications.

BTCE-302: Surveying & Geomatics

Subject Code: BTCE-302	Surveying & Geomatics	L T P : 3 1 0	Credits: 4
The students will be able to			
CO1	describe the function of surveying and work with survey instruments, take observations, and prepare plan, profile, and cross-section and perform calculations.		
CO2	Calculate, design and layout horizontal and vertical curves.		
CO3	Operate a total station and GPS to measure distance, angles, and to calculate differences in elevation Reduce data for application in a geographic information system.		
CO4	Relate and apply principles of photogrammetry for surveying.		

CO5	Apply principles of Remote Sensing and Digital Image Processing for Civil Engineering problems.	
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CO-PO Mapping												
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	1	1	2	1	1	1	1
CO2	3	3	3	2	2	2	1	1	1	1	1	2
CO3	2	3	2	2	2	1	1	1	1	1	1	1
CO4	3	3	3	2	2	2	1	1	1	1	1	1
CO5	2	2	2	2	2	1	1	1	1	1	1	1
Course Average	2.60	2.80	2.40	2.00	2.00	1.40	1.00	1.20	1.20	1.20	1.20	1.20

Syllabus

UNIT - I

Introduction to Surveying: Definition, Classification, Principles, Survey stations and Survey lines; Introduction to measurement of distance, direction and elevation; Ranging and its methods, Meridians and Bearings, Methods of leveling, Booking and reducing levels, Reciprocal leveling, distance of visible horizon, Profile leveling and cross sectioning, Errors in leveling; Introduction to methods of plane table surveying; *Contouring*: Characteristics, methods, uses, computation of areas and volumes. *Theodolite survey*: Instruments, Measurement of horizontal and vertical angle; Methods of horizontal and vertical control, *Triangulation*: Figures or systems, Signals, Satellite station, Baseline and its importance, corrections, *Trigonometric leveling*: Accessible and inaccessible objects.

UNIT - II

Curves: Elements of simple circular curves, Theory and methods of setting out simple circular curves, Transition curves- types, characteristics and equations of various transition curves; Introduction to vertical curves.

UNIT - III

Modern Field Survey Systems: Principle and types of Electronic Distance Measurement systems and instruments, Total Station- its advantages and applications; Global Positioning Systems- Segments, working principle, errors and biases. *Geographic Information System*: Concepts and data types, data models, data acquisition. GIS applications in civil engineering.

UNIT - IV

Photogrammetric Survey: basic principles, aerial camera, scale of a vertical photograph, relief displacement of a vertical photograph, height of object from relief displacement, flight planning for aerial photography, selection of altitude, interval between exposures, crab and drift, stereoscope and stereoscopic views, parallax equations. Introduction to digital photogrammetry.

UNIT - V

Remote Sensing: Concepts and physical basis of Remote Sensing, Electromagnetic spectrum, atmospheric effects, image characteristics. Remote sensing systems, spectral signatures and characteristics spectral reflectance curves. Salient features of some of Remote Sensing satellites missions. Digital image processing: Introduction, image rectification and restoration, image enhancement, image transformation, image classification. Applications of remote sensing to civil engineering.

Text Book & Reference Book

1. Madhu, N, Sathikumar, R and Satheesh Gobi, Advanced Surveying: Total Station, GIS and Remote Sensing, Pearson India, 2006.
2. Manoj, K. Arora and Badjatia, Geomatics Engineering, Nem Chand & Bros, 2011
3. Bhavikatti, S.S., Surveying and Levelling, Vol. I and II, I.K. International, 2010
4. Chandra, A.M., Higher Surveying, Third Edition, New Age International (P) Limited, 2002.
5. Anji Reddy, M., Remote sensing and Geographical information system, B.S. Publications, 2001.
6. Arora, K.R., Surveying, Vol-I, II and III, Standard Book House.
7. Punmia BC et al: Surveying Vol. I, II, Laxmi Publication
8. Chandra AM and Ghosh SK: Remote Sensing and Geographical Information System, Alpha Science
9. Ghosh SK: Digital Image Processing, Alpha Science

10. Lillesand T M et al: Remote Sensing & Image Interpretation, John Wiley & Sons
 11. Bhatta B: Remote Sensing and GIS, Oxford University Press, 2008

BTCE-303 : Fluid Mechanics

Subject Code: BTCE-303	Fluid Mechanics	L T P : 3 1 0	Credits: 3
The students will be able to			
CO1	The student will be able to understand the broad principles of fluid statics, kinematics and dynamics		
CO2	The student will be able to understand definitions of the basic terms used in fluid mechanics		
CO3	The student will be able to understand classifications of fluid flow		
CO4	The student will be able to apply the continuity, momentum and energy principles		
CO5	The student will be able to apply dimensional analysis		

CO-PO Mapping												
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	2	1	1	2	1	1	1	1
CO2	3	2	3	2	3	1	1	1	1	2	2	2
CO3	2	2	2	2	2	1	1	1	1	1	1	1
CO4	3	3	3	2	3	1	1	1	1	2	1	2
CO5	3	2	2	2	2	1	1	1	1	1	1	1
Course Average	2.80	2.40	2.60	2.00	2.40	1.00	1.00	1.20	1.00	1.40	1.20	1.40

Syllabus
UNIT I Fluid and continuum, Physical properties of fluids, Rheology of fluids. Pressure-density height relationship, manometers, pressure on plane and curved surfaces, centre of pressure, buoyancy, stability of immersed and floating bodies, fluid masses subjected to linear acceleration and uniform rotation about an axis.
UNIT II Types of fluid flows: Continuum & free molecular flows. Steady and unsteady, uniform and non-uniform, laminar and turbulent flows, rotational and irrotational flows, compressible and incompressible flows, subsonic, sonic and supersonic flows, sub-critical, critical and supercritical flows, one, two and three dimensional flows, streamlines, path lines, streak lines, stream tube, continuity equation for 1-D, 2-D and 3-D flows, circulation, stream function and velocity potential function.
UNIT III Potential Flow: source, sink, doublet and half-body. Equation of motion along a streamline and its integration, Bernoulli's equation and its applications- Pitot tube, orifice meter, venturimeter and bend meter, notches and weirs, momentum equation and its application to pipe

bends. resistance to flow, Minor losses in pipe in series and parallel, power transmission through a pipe, siphon, water hammer, three reservoir problems and pipe networks.

UNIT IV Equation of motion for laminar flow through pipes, Stokes' law, mixing length concept and velocity distribution in turbulent flow over smooth and rough surfaces, Boundary layer thickness, boundary layer over a flat plate, displacement, momentum and energy thickness. Application of momentum equation. Laminar boundary layer, turbulent boundary layer, laminar sub-layer, separation and its control. Vortex Flow: Free & Forced.

UNIT V Drag and lift, drag on a sphere, aerofoil, Magnus effect, Similarity Laws; geometric, kinematics and dynamic similarity, undistorted and distorted model studies, Dimensional analysis, Buckingham's Pi theorem, important dimensionless numbers and their significance. Introduction to Computational Fluid Dynamics (CFD).

Text Book & Reference Book

1. Hibbler, "Fluid Mechanics in SI Units" 1/e Pearson Education, Noida.
2. Fox & Donald, "Introduction to Fluid Mechanics" John Wiley & Sons Pvt Ltd,
3. Cengel & Cimbala, "Fluid Mechanics" TMH, New Delhi.
4. Katz, "Introductory Fluid Mechanics" Cambridge University Press
5. Pnueli & Gutfinger, "Fluid Mechanics" Cambridge University Press
6. Modi & Seth "Hydraulics & Fluid Mechanics" Standard Publications.
7. Gupta, "Fluid Mechanics & Hydraulic Machines" Pearson Education, Noida
8. Graebel, "Engineering Fluid Mechanics", CRC Press Taylor & Francis Group.
9. Janna, "Introduction to Fluid Mechanics" 4/e, CRC Press Taylor & Francis Group.
10. AK Jain "Fluid Mechanics" Khanna Publication.
11. White, F.M. "Fluid Mechanics" TMH, New Delhi.
12. Munson et al, "Fundamental of Fluid Mechanics" Wiley New York Ltd
13. Garde, R.J., "Fluid Mechanics", SciTech Publications Pvt. Ltd
14. I.H. Shames, "Mechanics of Fluids", McGraw Hill, Int. Student.
15. RK Bansal "Fluid Mechanics and Hydraulic Machines" Laxmi Publication
16. Jagdish Lal "Fluid Mechanics"
17. N Narayan Pillai "Principles of Fluid Mechanics & Fluid Machines" Universities Press.
18. Esposito, Fluid Power & Applications" 7/e Pearson Education, Noida.
DR Malhotra & Malhotra, "Fluid Mechanics Hydraulics & Hydraulic Machines" Satya Prakashan, New Delhi

BTNC-301 : COMPUTER SYSTEM SECURITY

Subject Code: BTNC-301	COMPUTER SYSTEM SECURITY	L T P : 2 0 0	Credits: 0
The students will be able to			
CO1	The student will be able to discover software bugs that pose cyber security threats and to explain how to fix the bugs to mitigate such threats		
CO2	The student will be able to discover cyber attack scenarios to web browsers and web servers and to explain how to mitigate such threats		
CO3	The student will be able to discover and explain mobile software bugs		

	posing cyber security threats, explain and recreate exploits, and to explain mitigation techniques.	
CO4	The student will be able to articulate the urgent need for cyber security in critical computer systems, networks, and world wide web, and to explain various threat scenarios	
CO5	The student will be able to articulate the well known cyber attack incidents, explain the attack scenarios, and explain mitigation techniques	

CO-PO Mapping												
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	3	2	2	1	2	2	1	1	1	1
CO2	2	3	3	2	2	1	1	1	1	1	1	2
CO3	2	2	2	2	2	1	2	1	1	1	2	1
CO4	3	3	3	2	2	1	1	1	1	1	1	2
CO5	2	2	2	2	2	1	1	1	1	1	1	1
Course Average	2.20	2.40	2.60	2.00	2.00	1.00	1.40	1.20	1.00	1.00	1.20	1.40

Syllabus
<p>UNIT I</p> <p>Computer System Security Introduction: Introduction, What is computer security and what to I earn? , Sample Attacks, The Marketplace for vulnerabilities, Error 404 Hacking digital India part 1 chase.</p> <p>Hijacking & Defense: Control Hijacking ,More Control Hijacking attacks integer overflow ,More Control Hijacking attacks format string vulnerabilities, Defense against Control Hijacking - Platform Defenses, Defense against Control Hijacking - Run-time Defenses, Advanced Control Hijacking attacks.</p>
<p>UNIT II</p> <p>Confidentiality Policies: Confinement Principle ,Detour Unix user IDs process IDs and privileges , More on confinement techniques ,System call interposition ,Error 404 digital Hacking in India part 2 chase , VM based isolation ,Confinement principle ,Software fault isolation , Rootkits ,Intrusion Detection Systems</p>
<p>UNIT III</p> <p>Secure architecture principles isolation and leas: Access Control Concepts, UNIX and windows access control summary, other issues in access control, Introduction to browser isolation.</p> <p>Web security landscape : Web security definitions goals and threat models , HTTP content rendering .Browser isolation .Security interface , Cookies frames and frame busting, Major web server threats ,Cross site request forgery ,Cross site scripting ,Defenses and protections against XSS , Finding vulnerabilities ,Secure development.</p>
<p>UNIT IV</p>

CO2	2											
CO3	3											
CO4												
CO5												
Course Average												

List of Praticals	
<ol style="list-style-type: none"> 1. Introduction to the tools and commands of drafting software. 2. Working in layers, blocks, x-ref, drawing layout and print setup. 3. 3D drafting and rendering 4. Planning and drafting of elevation and cross section of door and window 5. Planning and drafting of plan and cross section of Dog legged and open well staircase. 6. Planning and Drawings of Residential building of 1 room set (plan and section). 7. Planning and drawing of 3 room residential building with staircase. 8. Preparation of details general arrangement drawing of 4 room duplex house including planning and drafting 	

BTCE-352: Surveying & Geomatics Lab

Subject Code: BTCE-352		Surveying & Geomatics Lab		L T P : 0 0 20		Credits: 1		
The students will be able to								
CO1	Calculate the bearings of lines with a prismatic compass for open and closed traverses							
CO2	Determine the level differences between different stations by dumpy level and prepare contour maps							
CO3	Calculate heights and distances using trigonometric surveying							
CO4	Demonstrate the setting of simple and compound curves							
CO5	Demonstrate the Total Station and its operation							

CO-PO Mapping												
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2			1					1	2		1
CO2	2	2		2	2		2	1	2	3	2	2
CO3	2	1		1						2		
CO4	2	2	1	3	2	2	2	2	2	2	1	2
CO5	2	2		2	2				2	2	2	2

CO2	2	2	1	1			1					
CO3	2	2	2	3	1	1	1					
CO4	3	3	2	3	1	1	1					
CO5	2	2	3	2	1	1	1					
Course Average	2.00	2.17	1.67	2.00	1.00	1.00	1.00					

List of Praticals

Students will perform minimum 10 experiments from the following:

1. To verify the momentum equation using the experimental set-up on impact of jet.
2. To determine the coefficient of discharge of an orifice of a given shape. Also to determine the coefficient of velocity and the coefficient of contraction of the orifice mouth piece.
3. To calibrate an orifice meter and study the variation of the co-efficient of discharge with the Reynolds number.
4. To calibrate a Venturimeter and study the variation of the co-efficient of discharge with the Reynolds number.
5. To calibrate a bend meter and study the variation of the co-efficient of discharge with the Reynolds number.
6. Verification of Bernoulli's Theorem
7. To study the transition from laminar to turbulent flow and to determine the lower critical Reynolds number.
8. To study the velocity distribution in a pipe and also to compute the discharge by integrating the velocity profile.
9. To study the variation of friction factor, 'f' for turbulent flow in commercial pipes.
10. To study the boundary layer velocity profile over a flat plate and to determine the boundary layer thickness.
11. To determine Meta-centric height of a given ship model.
12. To determine the head loss for a sudden enlargement, sudden contraction and losses in bend.
13. Flow Visualization -Ideal Flow
14. To make studies in Wind Tunnel (Aerofoil and circular cylinder).

BTCE-354 MINI PROJECT OR INTERNSHIP

Subject Code: BTCE-354	MINI PROJECT OR INTERNSHIP	LTP: 0 0 2	Credits:1
The students will be able to			
CO1	Students will be able to identify and present the objective and the work done during training		
CO2	Students will be able to apply the learned concept through design, analysis and development of mini project		
CO3	Students will be able to design and implementation of mini project during their training.		
CO4	Students will be able to discuss the result/output and prepare a mini project		

	report	
CO5		

CO-PO Mapping												
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	1	1	1	1		1	1		1	1
CO2	2	2	1	1	1	1		1	1	1	1	1
CO3	2	3	3	2	2	1		1	2	2	3	2
CO4	1	2	1	2	1			1	2	1	1	1
Course Average	1.50	2.00	1.50	1.50	1.25	1.00		1.00	1.50	1.33	1.50	1.25

Syllabus Contents:
Students can take up small problems in the field of design engineering as mini project. It can be related to solution to an engineering problem, verification and analysis of experimental data available, conducting experiments on various engineering subjects, material characterization, studying a software tool for the solution of an engineering problem etc.

B.TECH 2 YEAR (IV Sem)

BTOE- 043: ENERGY SCIENCE AND ENGINEERING

Subject Code: BTOE-043	ENERGY SCIENCE AND ENGINEERING	L T P : 3 1 0	Credits: 4
The students will be able to			
CO1	Learn about the Indian and World Energy Scenario and world energy use resources, Energy cycle on earth etc.		
CO2	Understand the types of energy, energy storage and energy conversion systems.		
CO3	Learn the energy economy final energy consumption energy needs of growing economy		
CO4	Know about Energy conservation act its features and related policies other acts. The Integrated energy policy 2006 etc.		
CO5	Learn about the energy and environment, air pollution climate changes and its Impacts on sustainable development		

CO-PO Mapping												
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2		1	2						1	
CO2	3	2		2	2						1	
CO3	3	2		2	2						1	
CO4	3	2		1	2						1	
CO5	2	1		2	1						1	
Course Average	2.80	1.80		1.60	1.80						1.00	

Syllabus
<p>Unit-I</p> <p>Energy and its Usage: Units and scales of energy use, Mechanical energy and transport, Heat energy: Conversion between heat and mechanical energy, Electromagnetic energy: Storage, conversion, transmission and radiation, Introduction to the quantum, energy quantization, Energy in chemical systems and processes, flow of CO₂, Entropy and temperature, carnot and Stirling heat engines, Phase change energy conversion, refrigeration and heat pumps, Internal combustion engines, Steam and gas power cycles, the physics of power plants. Solid-state</p>

phenomena including photo, thermal and electrical aspects
<p>Unit-II Nuclear Energy: Fundamental forces in the universe, Quantum mechanics relevant for nuclear physics, Nuclear forces, energy scales and structure, Nuclear binding energy systematics, reactions and decays, Nuclear fusion, Nuclear fission and fission reactor physics, Nuclear fission reactor design, safety, operation and fuel cycles</p>
<p>Unit-III Solar Energy: Introduction to solar energy, fundamentals of solar radiation and its measurement aspects, Basic physics of semiconductors, Carrier transport, generation and recombination in semiconductors, Semiconductor junctions: metal-semiconductor junction & p-n junction, Essential characteristics of solar photovoltaic devices, First Generation Solar Cells, Second Generation Solar Cells, Third Generation Solar Cells</p>
<p>Unit-IV Conventional & non-conventional energy source: Biological energy sources and fossil fuels, Fluid dynamics and power in the wind, available resources, fluids, viscosity, types of fluid flow, lift, Wind turbine dynamics and design, wind farms, Geothermal power and ocean thermal energy conversion, Tidal/wave/hydro power</p>
<p>Unit-V Systems and Synthesis: Overview of World Energy Scenario, Nuclear radiation, fuel cycles, waste and proliferation, Climate change, Energy storage, Energy conservation. Engineering for Energy conservation: Concept of Green Building and Green Architecture; Green building concepts, LEED ratings; Identification of energy related enterprises that represent the breath of the industry and prioritizing these as candidates; Embodied energy analysis and use as a tool for measuring sustainability. Energy Audit of Facilities and optimization of energy consumption</p>

Text Book & Reference Book
<ol style="list-style-type: none"> 1. Energy and the Challenge of Sustainability, World Energy Assessment, UNDP, New York, (2000). 2. Perspective of Modern Physics, A. Beiser, McGraw-Hill International Editions (1968). 3. Introduction to Modern Physics, H.S. Mani and G.K.Mehta, East-West Press (1988). 4. Introduction to Electrodynamics, D. J. Griffiths, Fourth Edition, Prentice Hall (2013). 5. Introductory Nuclear Physics, R. K. Puri and V.K. Babbar, Narosa Publishing House (1996).

BTVE-401: Universal Human Values

Subject Code: BTVE-401	Universal Human Values	L T P : 3 0 0	Credits: 3
The students will be able to			

CO1	Understand the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content and process of value education, explore the meaning of happiness and prosperity and do a correct appraisal of the current scenario in the society	
CO2	Distinguish between the Self and the Body, understand the meaning of Harmony in the Self the Co-existence of Self and Body.	
CO3	Understand the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society	
CO4	Understand the harmony in nature and existence, and work out their mutually fulfilling participation in the nature.	
CO5	Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.	

CO-PO Mapping												
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1						3	3	3	2		1	2
CO2						3	2	2	2		1	1
CO3						2	3	3	2			
CO4						3	2	2	2		1	1
CO5						2	3	3	2			
Course Average						2.60	2.60	2.60	2.00		1.00	1.33

Syllabus
<p>UNIT-1</p> <p>Course Introduction - Need, Basic Guidelines, Content and Process for Value Education</p> <p>Understanding the need, basic guidelines, content and process for Value Education, Self-Exploration–what is it? - its content and process; ‘Natural Acceptance’ and Experiential Validation- as the mechanism for self-exploration, Continuous Happiness and Prosperity- A look at basic Human Aspirations, Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority, Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario, Method to fulfill the above human aspirations: understanding and living in harmony at various levels.</p>
<p>UNIT-2</p> <p>Understanding Harmony in the Human Being - Harmony in Myself</p> <p>Understanding human being as a co-existence of the sentient ‘I’ and the material ‘Body’, Understanding the needs of Self (‘I’) and ‘Body’ - Sukh and Suvidha, Understanding the Body as</p>

an instrument of 'I' (I being the doer, seer and enjoyer),

Understanding the characteristics and activities of 'I' and harmony in 'I', Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail, Programs to ensure Sanyam and Swasthya

UNIT-3

Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

Understanding harmony in the Family- the basic unit of human interaction ,Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship, Understanding the meaning of Vishwas; Difference between intention and competence, Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship, Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals, Visualizing a universal harmonious order in society- Undivided Society (AkhandSamaj), Universal Order (Sarvabhaum Vyawastha)- from family to world family!.

UNIT-4

Understanding Harmony in the Nature and Existence – Whole existence as Co-existence

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 all-pervasive space, Holistic perception of harmony at all levels of existence.

UNIT-5

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, Case studies of typical holistic technologies, management models and production systems, Strategy for transition from the present state to Universal Human Order: a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers, b) At the level of society: as mutually enriching institutions and organizations.

Text Book & Reference Book

- 1.R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
2. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and Harper Collins, USA
3. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
4. Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991
5. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.

6. A Nagraj, 1998, Jeevan Vidya Ek Parichay, Divya Path Sansthan, Amarkantak.

BTCE 401: Materials, Testing & Construction Practices

Subject Code: BTCE 401	Materials, Testing & Construction Practices	L T P : 3 0 0	Credits: 3
The students will be able to			
CO1	student will be able to- Identify various building materials and to understand their basic properties.		
CO2	student will be able to-Understand the use of non-conventional civil engineering materials		
CO3	student will be able to-Study suitable type of flooring and roofing in the construction process.		
CO4	student will be able to-Characterize the concept of plastering, pointing and various other building services		
CO5	student will be able to-Exemplify the various fire protection, sound and thermal insulation techniques, maintenance and repair of buildings		

CO-PO Mapping												
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	2		2							1
CO2	2	3	3	2	2							
CO3	2			3								1
CO4	1	3	3	2	2							1
CO5	2	2	3		2							
Course Average	1.80	2.75	2.75	2.33	2.00							1.00

Syllabus
<p>UNIT I</p> <p>Scope of Study of building Materials: building materials and their performance, economics of the building materials.</p> <p>Stones: Requirement of good building stone, characteristics of building stone sand their testing. Common building stones.</p> <p>Bricks: Manufacturing process of clay bricks, classification of clay bricks. Properties of clay bricks, testing methods for clay bricks. Problems of efflorescence & lime bursting in bricks & tiles. Different types of bricks.</p> <p>Gypsum: properties of gypsum plaster, building products made of gypsum and their uses.</p> <p>Cement: Raw materials used, Process of Manufacturing, Chemical composition, compounds formed and their effect on strength, Types of cement, Testing of cement properties, Uses of</p>

cement.

Cement Concrete: Constituent materials and their properties, Grades of concrete, Factors affecting strength, Properties of concrete at fresh and hardened stage, Testing of concrete, Methods of Curing of concrete.

Pozzolona: Chemical composition and requirements for uses, Natural and Artificial flyash, Surkhi(burnt clay pozzolona), rice husk and ash pozzolona, properties and specifications for use in construction. Timber: Classification and identification of timber, Fundamental Engineering Properties of timber, Defects in timber, Factor affecting strength of timber, Methods of seasoning and preservation of timber. Wood based products.

Asphalt: Bitumen and Tar: Terminology, specifications and uses, Bituminous materials.

UNIT II

Plastics: classification, advantages of plastics, Mechanical properties and use of plastic in construction. Paints, varnishes and distempers: Common constituents, types and desirable properties, Cement paints. Ferrous metals: Desirable characteristics of reinforcing steel. Principles of cold working. Strength, Telemechanical, physical Properties and chemical composition. Brief discussion on properties and uses of Aluminum and lead. Glass: Ingredients, properties types and use in construction. Insulating Materials: Thermal and sound insulating material, desirable properties and types.

UNIT III

Building Construction: Components of building area considerations, Construction Principle and Methods for layout, Damp proofing, anti termite treatment in buildings, Vertical circulation: stair cases and their types and planning. Different types of floors, and flooring materials. Bricks and stone masonry construction. Cavity wall & hollow block construction.

UNIT IV

Doors and Windows: Construction details, types of doors and windows and their relative advantages & disadvantages. Types of roof and roof treatments, Lintel and Chhajja, Principles of building Planning.

UNIT V

Natural Ventilation, Water Supply and Sanitary fittings (Plumbing), Electric Fittings. Heating Ventilation & Air conditioning (HVAC), Mechanical Lifts and Escalators, Fire Fighting and Fire Protection of Buildings. Acoustics. Plastering and its types, pointing, Distempering, Colour washing, Painting etc. Principles & Methods of building maintenance.

Text Book & Reference Book

1. SK Duggal, "Building Materials" New Age International
2. Purushothama Raj, "Building Construction Materials & Techniques" Pearson Edu.
3. PC Varghese, "Building Materials" PHI
4. Rangwala, "Building Materials" Charotar Publishing House.
5. Sushil Kumar, "Building Construction" Standard Publisher.
6. Domone, "Construction Materials" 4/e, CRC Press Taylor & Francis Group.
7. Adams, "Adams' Building Construction Adams" CRC Press Taylor & Francis Group.

Syllabus

UNIT I

Simple stress and strains:

Concept of stress and strain, types of stresses and strains, Hook's law, stress and strain diagram for ductile and brittle metal. Lateral strain, Poission ratio, volumetric strain, elastic moduli and relation between them. Bar of varying cross section, composite bar and temperature stress. Strain energy for gradual, sudden and impact loading.

Compound stress and strains:

Normal stress and strain, shear stress and strain, stresses on inclines sections, principal stress and strain, maximum shear stress, Mohr's stress circle, three dimensional state of stress & strain, equilibrium equations, generalized Hook's law-3D, Theories of failure and factor of safety.

UNIT II

Shear force and bending moment diagrams-Shear force (SF) and Bending moment (BM) diagrams for simply supported, cantilevers, overhanging and fixed beams. Calculation of maximum BM and SF and the point of contra flexure under concentrated loads, uniformly distributed loads over the whole span or part of span, combination of concentrated loads (two or three) and uniformly distributed loads, uniformly varying loads.

UNIT- III

Flexural Stresses-Theory of simple bending – Assumptions – Derivation of bending equation: $M/I = f/y = E/R$ - Neutral axis – Determination of bending stresses – Section modulus of rectangular and circular sections (Solid and Hollow), I,T, Angle and Channel sections –Design of simple beam sections.

Torsion- Derivation of torsion equation and its assumptions. Applications of the equation of the hollow and solid circular shafts, torsional rigidity, Combined torsion and bending of circular shafts, principal stress and maximum shear stresses under combined loading of bending and torsion.

Shear Stresses- Derivation of formula – Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections.

UNIT- IV

Deflection of Beams: Slope and deflection- Relationship between moment, slope and deflection, Moment area method, Macaulay's method. Use of these methods to calculate slope and deflection for determinant beams.Short Columns and Struts: Buckling and stability, slenderness ratio, combined bending and direct stress, middle third and middle quarter rules.

UNIT V

Helical and Leaf Springs: Deflection of springs by energy method, helical springs under axial load and under axial twist (respectively for circular and square cross sections) axial load and twisting moment acting simultaneously both for open and closed coiled springs. Thin cylinders, Thick cylinders & Spheres: Introduction, difference between thin walled and thick walled pressure vessels, thin walled spheres and cylinders, hoop and axial stresses and strain, volumetric strain. Radial, axial and circumferential stresses in thick cylinders subjected to internal or external pressures, compound cylinders.

Text Book & Reference Book

1. Mechanics of Materials by Hibbeler, Pearson.
2. Mechanics of material by Gere, Cengage Learning
3. Mechanics of Materials by Beer, Jhonston, DEwolf and Mazurek, MCGRAW HILL INDIA
4. Strength of Materials by Pytel and Singer, Harper Collins
5. Strength of Materials by Ryder, Macmillan.
6. Strength of Materials by Timoshenko and Youngs, East West Press.
7. Introduction to Solid Mechanics by Shames, Pearson
8. Mechanics of material by Pytel, Cengage Learning
9. An Introduction to Mechanics of Solids by Crandall, MCGRAW HILL INDIA
10. Strength of Materials by Jindal, Pearson Education
11. Strength of Materials by R. Subramanian, Oxford University Press, New Delhi.
12. Kazmi, S. M. A., "Solid Mechanics" TMH, Delhi, India.

BTCE-403: Hydraulic Engineering and Machines

Subject Code:		L T P : 3 1 0	Credits: 4
The students will be able to			
CO1	Apply their knowledge of fluid mechanics in addressing problems in open channel		
CO2	Solve problems in uniform, gradually and rapidly varied flows in steady state conditions		
CO3	Have knowledge in hydraulic machineries like pumps and turbines.		
CO4	On completion of this course, the students will analyse the working of turbines and evaluate various performance metrics		
CO5	On completion of this course, the students will understand and apply the working principle of pumps and their characteristic curves		

CO-PO Mapping												
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	2	2							1
CO2	2	2	2	1	2							2
CO3	2	2	3	2	1							1
CO4	2	3	3	3	1							1
CO5	2	2		2	2							1
Course Average	2.00	2.40	2.75	2.00	1.60							1.20

Syllabus
UNIT I

Introduction : Basic concepts of free surface flows, velocity and pressure distribution, Mass, energy and momentum principle for prismatic and non-prismatic channels critical, sub- critical and super-critical type of flows. Critical depth, concepts of specific energy and specific force. Chezy's and Manning's equations for uniform flow in open channel, Velocity distribution, most efficient channel section, compound sections.

UNIT II Energy-Depth relationship: Application of specific energy principle for interpretation of open channel phenomena, flow through vertical and horizontal contractions. Equation of gradually varied flow and its limitations, flow classification and surface profiles, integration of varied flow equation by analytical, graphical and numerical methods. Measurements of discharge & velocity – Venturi flume, Standing wave flume, Parshall flume, Broad crested weir, Current meter and Floats.

UNIT III Rapidly varied flow: Hydraulic jump; Evaluation of the jump elements in rectangular channels on horizontal and sloping beds, energy dissipater, open channel surge, celerity of the gravity wave, deep and shallow water waves.

UNIT IV Impulse momentum equation- Impact of Jets-plane and curved- stationary and moving plates. Pumps: Positive displacement pumps - reciprocating pumps, centrifugal pumps, operation, velocity triangles, performance curves, Cavitation, Multi staging, Selection of pumps.

UNIT V Rotodynamic Machines, Pelton Turbine, equations for jet and rotor size, efficiency, spear valve, reaction turbines, Francis and Kaplan type, Head on reaction turbine, unit quantities, similarity laws and specific speed, cavitation, characteristic curves.

Text Book & Reference Book

1. Chow, V.T. "Open Channel hydraulics" McGraw Hill Publication
2. Subramanya, K., Flow through Open Channels, TMH, New Delhi
3. Ranga Raju, K.G., Flow through open channels, T.M.H. New Delhi
4. Rajesh Srivastava, Flow through Open Channels , Oxford University Press
5. Streeter, V.L.& White E.B., "Fluid Mechanics" McGraw Hill Publication
6. Modi & Seth "Hydraulics & Fluid Mechanics" Standard Publications.
7. RK Bansal "Fluid Mechanics and Hydraulic Machines" Laxmi Publication
8. AK Jain "Fluid Mechanics" Khanna Publication.
9. Houghtalen, "Fundamentals of Hydraulics Engineering Systems" 4/e Pearson Education, Noida

BTNC-402: PYTHON PROGRAMMING

Subject Code:		L T P : 2 0 0	Credits: 0
The students will be able to			
CO1	Students will be able to describe the numbers, math functions, strings, list, tuples and dictionaries in python		
CO2	Students will be able to acquire the skills to apply different decision-making statements and functions in python		
CO3	Students will be able to interpret object-oriented programming in python		
CO4	Students will be able to develop skill to understand and summarize different		

	filehandling operations	
CO5	Students will be able to demonstrate the ability to design GUI applications inpython and evaluate different database operations	

CO-PO Mapping												
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	3	3	2	3				3	3
CO2	3	2	3	3	2	3	2				3	3
CO3	3	2	3	2	3	3	3				3	2
CO4	3	2	3	2	2	2	2				2	3
CO5	3	2	3		3	3	2				2	3
Course Average	3.00	2.00	2.80	2.50	2.60	2.60	2.40				2.60	2.80

Syllabus
<p>UNIT-I</p> <p>Introduction: The Programming Cycle for Python , Python IDE, Interacting with Python Programs , Elements of Python, Type Conversion. Basics: Expressions, Assignment Statement, Arithmetic Operators, Operator Precedence, Boolean Expression.</p>
<p>UNIT-II</p> <p>Conditionals: Conditional statement in Python (if-else statement, its working and execution), Nested-if statement and Elif statement in Python, Expression Evaluation & Float Representation.</p> <p>Loops: Purpose and working of loops, While loop including its working, For Loop, Nested Loops, Break and Continue.</p>
<p>UNIT-III</p> <p>Function: Parts of A Function, Execution of A Function, Keyword and Default Arguments, Scope Rules.</p> <p>Strings: Length of the string and perform Concatenation and Repeat operations in it. Indexing and Slicing of Strings.</p> <p>Python Data Structure : Tuples , Unpacking Sequences , Lists , Mutable Sequences , List Comprehension , Sets , Dictionaries</p> <p>Higher Order Functions: Treat functions as first class Objects , Lambda Expressions</p>
<p>UNIT-IV</p> <p>Sieve of Eratosthenes: generate prime numbers with the help of an algorithm given by the Greek Mathematician named Eratosthenes, whose algorithm is known as Sieve of Eratosthenes.</p> <p>File I/O : File input and output operations in Python Programming</p> <p>Exceptions and Assertions</p> <p>Abstract Data Types: Abstract data types and ADT interface in Python Programming.</p>

Classes : Class definition and other operations in the classes , Special Methods (such as `_init_`, `_str_`, comparison methods and Arithmetic methods etc.) , Class Example , Inheritance , Inheritance and OOP.

UNIT-V

Iterators & Recursion: Recursive Fibonacci , Tower Of Hanoi

Search: Simple Search and Estimating Search Time , Binary Search and Estimating Binary Search Time

Sorting & Merging: Selection Sort , Merge List , Merge Sort , Higher Order Sort

Text Book & Reference Book

1. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist``, 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016 (<http://greenteapress.com/wp/thinkpython/>)
 2. Guido van Rossum and Fred L. Drake Jr, —An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.
 3. John V Guttag, —Introduction to Computation and Programming Using Python``, Revised and expanded Edition, MIT Press , 2013
 4. Robert Sedgewick, Kevin Wayne, Robert Dondero, —Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.
- Timothy A. Budd, —Exploring Python, Mc-Graw Hill Education (India) Private Ltd., 2015.

BTCE-451: Material Testing Lab

Subject Code: BTCE-451	Material Testing Lab	L T P : 0 0 2	Credits: 1
The students will be able to			
CO1	Develop knowledge of material science and behaviour of various building materials used in construction		
CO2	Identify the construction materials required for the assigned work		
CO3	Provide procedural knowledge of the simple testing methods of cement, lime and concrete etc.		
CO4	Identify, formulate and solve engineering problems of structural elements subjected to flexure.		
CO5	Evaluate the impact of engineering solutions on the society and also will be aware of contemporary issues regarding failure of structures due to unsuitable materials.		

CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	2	1	2							1
CO2	2	2	3	2	2							
CO3	2	1	1	3								1
CO4	1	3	3	2	2							1

CO5	2	2	3	1	2							1
Course Average	1.80	2.20	2.40	1.80								1.00

List of Material												
I. Cement												
1. Normal Consistency of cement.												
2. Initial & final setting time of cement												
3. Compressive strength of cement												
4. Fineness of cement by air permeability and Le-chatalier's apparatus.												
5. Soundness of cement.												
6. Tensile strength												
II. Coarse Aggregate												
1. Water absorption of aggregate												
2. Sieve Analysis of Aggregate												
3. Specific gravity & bulk density												
4. Grading of aggregates.												
III Fine Aggregate:												
1. Sieve analysis of sand												
2. Silt content of sand												
3. Bulking of sand												
IV Bricks:												
1. Water absorption.												
2. Dimension Tolerances												
3. Compressive strength												
4. Efflorescence												

BTCE-452: Solid Mechanics Lab

Subject Code: BTCE-452		Solid Mechanics Lab		L T P : 0 0 2		Credits: 1	
The students will be able to							
CO1	Analyze and correlate stress, strain and elastic deformation of an engineering material.						
CO2	Predict the engineering property and behavior of material under different loading and support conditions under static loading conditions.						
CO3	Analyze and predict the engineering property and behavior of material under impact loading conditions						
CO4	Analyze and correlate the elastic constants and deformation under flexural loading and torsion.						

CO5	To determine the Impact test (Charpy and IZOD)	
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CO-PO Mapping												
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	2							
CO2	2			3								2
CO3	2	1	3	3	3							1
CO4	2	2	3	2	2							
CO5	2	2	2	3	1							1
Course Average	2.10	2.00	2.75	2.60	2.00							1.34

List of Pratical
<ol style="list-style-type: none"> 1. Tension test on Mild Steel 2. Bending tests on simply supported beam and Cantilever beam. 3. Determination of torsion and deflection, 4. Measurement of forces on supports in statically determinate beam, 5. Determination of shear forces in beams, 6. Determination of bending moments in beams, 7. Measurement of deflections in statically determinate beam. 8. To determine Flexural Rigidity (EI) of a given beam 9. To find deflection of curved members. 10. To find Critical load in Struts with different end conditions. 11. Hardness Test (Brinell's and Rockwell) 12. Impact test (Charpy and IZOD)

BTCE-453: Hydraulic Engineering and Machines Lab

Subject Code: BTCE-453	Hydraulic Engineering	L T P : 0 0 2	Credits: 1
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		and Machines Lab	
The students will be able to			
CO1	To identify the behaviour of analytical models introduced in lecture to the actual behaviour of real fluid flows.		
CO2	To explain the standard measurement techniques of fluid mechanics and their applications.		
CO3	To illustrate the students with the components and working principles of Pumps.		
CO4	To illustrate the students with the components and working principles of of Turbines, Pumps, and other miscellaneous hydraulics machines.		
CO5	To analyze the laboratory measurements and to document the results in an appropriate format.		

CO-PO Mapping												
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	2	2							1
CO2	1	2	2	1	2							2
CO3	2	2	3	2	1							1
CO4	2	3	3	3	1							1
CO5	3	2		2	2							1
Course Average	2.00	2.40	2.75	2.00	1.60							1.20

List of Pratical
<ol style="list-style-type: none"> 1. To determine the Manning's coefficient of roughness 'n' for the bed of a given flume. 2. To study the velocity distribution in an open channel and to determine the energy and momentum correction factors. 3. To study the flow characteristics over a hump placed in an open channel. 4. To study the flow through a horizontal contraction in a rectangular channel. 5. To calibrate a broad-crested weir. 6. To study the characteristics of free hydraulic jump. 7. To study centrifugal pump and their characteristics 8. To study characteristics of Pelton Turbine. 9. To study characteristics Francis Turbine. 10. To study characteristics of Kaplan Turbine. 11. To study the free over-fall phenomenon in an open channel and to determine the end depth 12. To determine coefficient of discharge for given rectangular notch.