



Ordinances, Scheme and Syllabus
B.TECH Civil Engineering
2022



(U/S 2(f) and 12B of the UGC Act1956, NAAC Accredited)

DESH BHAGAT UNIVERSITY, MANDI GOBINDGARH

Faculty of Engineering and Applied Science

Department of Civil Engineering

Program: B. Tech Civil Engineering

Semester I

Sr. No.	Course Code	Course Name	Category	Internal	External	Total	L	T	P	C
1.	BTCE-101	Building Construction	Theory	40	60	100	3	0	0	3
2.	BTCE-102	Integrated Project- I	Practical	40	60	100	0	0	4	Q/NQ
3.	BTEM-103	Engineering Mathematics	Theory	40	60	100	3	0	0	3
4.	BTIT-104	Fundamentals of Information Technology	Theory	40	60	100	3	0	0	3
5.	BTEP-105	Engineering Physics	Theory	40	60	100	3	0	0	3
6.	BTED-106	Engineering Drawing	Theory	40	60	100	3	0	0	3
7.	DBEF-101	Employability Skills Foundation	Theory	40	60	100	3	0	0	3
Language (Select any one)										
8.	DBLH-101	Hindi	Theory	40	60	100	3	0	0	3
	DBLP-101	Punjabi	Theory	40	60	100	3	0	0	
	DBLU-101	Urdu	Theory	40	60	100	3	0	0	
Life Skill Course (Select any one)										
9.	DBNC-101	NCC	Practical	40	60	100	1	0	2	2
	DBNS-101	NSS	Practical	40	60	100	0	0	4	

L- Lecture , T- Tutorial , P- Practical , C- Credit

Course Code: BTCE-101

Title of the Course: Building Construction

L	T	P	Credits
3	0	0	3

Course Outcomes:

CO1: Apply knowledge and skills learned related to material

CO2: Enhance the technical skills required for construction

CO3: Identify areas for future learning and skill development.

CO/PO Mapping												
(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation)												
CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	W	S	W	W	W	W	M	W	W	W
CO2	S	S	M	S	W	W	W	W	M	W	W	W
CO3	S	S	W	S	W	W	W	W	M	W	W	W

Course Outlines

1. Introduction:
 - 1.1 Definition of a building, classification of buildings based on occupancy
 - 1.2 Different parts of a building
2. Foundations:
 - 2.1 Concept of foundation and its purpose
 - 2.2 Types of foundation-shallow and deep
 - 2.2.1 Shallow foundation - constructional details of: Spread foundations for walls, thumb rules for depth and width of foundation and thickness of concrete block, stepped foundation, masonry pillars and concrete columns
 - 2.3 Earthwork
 - 2.3.1 Layout/setting out for surface excavation, cutting and filling

2.3.2 Excavation of foundation, trenches, shoring, timbering and dewatering

3. Walls:

3.1 Purpose of walls

3.2 Classification of walls - load bearing, non-load bearing, dwarf wall, retaining, breast walls and partition walls

3.3 Classification of walls as per materials of construction: brick, stone, reinforced brick, reinforced concrete, precast, hollow and solid concrete block and composite masonry walls

3.4 Partition walls: Constructional details, suitability and uses of brick and wooden partition walls

3.5 Mortars: types, selection of mortar and its preparation

3.6 Scaffolding, construction details and suitability of mason's brick layers and tubular scaffolding, shoring, underpinning

4. Masonry

4.1 Brick Masonry: Definition of terms like header, stretcher, queen closer, king closer, frog and quoin, course, bond, facing, backing, hearting, jambs, reveals, soffit, plinth, pillars and pilasters

4.1.1 Bond – meaning and necessity; English, flemish bond and other types of bonds

4.1.2 Construction of brick walls – methods of laying bricks in walls, precautions observed in the construction of walls, methods of bonding new brick work with old (toothing, raking, back and block bonding), Expansion and contraction joints

4.1.3 Importance towards special care during execution on: soaking of bricks, maintenance of bonds and plumb, filling of horizontal and vertical joints, masonry work, restriction height of construction on a given day, every fourth course, earthquake resistance measure, making of joints to receive finishes

4.2 Stone Masonry

4.2.1 Glossary of terms – natural bed, bedding planes, string course, corbel, cornice, block in course grouting, moulding, templates, corner stone, bond stone, throating, through stone, parapet, coping, pilasters and buttress

4.2.2 Types of stone masonry: rubble masonry - random and coursed; Ashlar masonry, principles to be observed in construction of stone masonry walls

4.2.3 Importance towards special care during execution of stone masonry work on dressing of stone, size and placing of bond and corner stones, filling joints, proper packing of internal cavities of rubble masonry wall, raking of joints to receive finishes

5. Arches and Lintels:

5.1 Meaning and use of arches and lintels:

5.2 Glossary of terms used in arches and lintels - abutment, pier, arch ring, intrados, soffit, extrados, voussoiers, springer, springing line, crown, key stone, skew back, span, rise, depth of an arch, haunch, spandril, jambs, bearing, thickness of lintel, effective span

- 5.3 Arches:
 - 5.3.1 Types of Arches - Semi circular, segmental, elliptical and parabolic, flat, inverted and relieving
 - 5.3.2 Stone arches and their construction
 - 5.3.3 Brick arches and their construction
- 5.4 Lintels
 - 5.4.1 Purpose of lintel
 - 5.4.2 Materials used for lintels
 - 5.4.3 Cast-in-situ and pre-cast lintels
 - 5.4.4 Lintel along with sun-shade or chhajja
- 6. Doors, Windows and Ventilators:
 - 6.1 Glossary of terms with neat sketches
 - 6.2 Classification based on materials i.e. wood, metal and plastic and their suitability for different situations. Different type of doors- panel door, flush door, flazed door, rolling shutter, steel door, sliding door, plastic and aluminium doors
 - 6.3 Window – Panel window, glazed windows (fixed and openable) ventilators, sky light window, Louvres shutters, plastic and aluminium windows.
 - 6.4 Door and window frames – materials and sections, door closures, hold fasts
- 7. Damp Proofing and Water Proofing
 - 7.1 Dampness and its ill effects on bricks, plaster, wooden fixtures, metal fixtures and reinforcement, damage to aesthetic appearance, damage to heat insulating materials, damage to stored articles and health, sources and causes of dampness
 - 7.2 Sources of dampness - moisture penetrating the building from outside e.g. rainwater, surface water, ground moisture. Moisture entrapped during construction i.e. moisture in concrete, masonry construction and plastering work etc. Moisture which originates in the building itself i.e. water in kitchen and bathrooms etc.
 - 7.3 Damp proofing materials and their specifications: rich concrete and mortar, bitumen, bitumen mastic, polymer coating, use of chemicals
 - 7.4 Damp proofing of : basement, ground floors, plinth and walls, special damp proofing arrangements in bathrooms, WC and kitchen, damp proofing for roofs and window sills
- 8. Floors
 - 8.1 Glossary of terms-floor finish, topping, under layer, base course, rubble filling and their purpose
 - 8.2 Types of floor finishes - cast-in-situ, concrete flooring (monolithic, bonded) Terrazzo tile flooring, stone (marble and kota) flooring, PVC flooring, Terrazzo flooring, glazed tiles flooring, Timber flooring, description with sketches. The methods of construction of concrete, terrazzo and timber floors and their BIS specifications
 - 8.3 Special emphasis on level/slope/reverse slope in bathrooms, toilets, kitchen, balcony and staircase

9. Roofs
 - 9.1 Types of roofs, concept of flat, pitched and arched roofs
 - 9.2 Glossary of terms for pitched roofs - batten, eaves, fascia board, gable, hip, lap, purlin, rafter, rag bolt, valley, ridge, rain water gutter, anchoring bolts
 - 9.3 False ceilings using gypsum, plaster boards, cellotex, fibre boards
 - 9.4 Special emphasis on maintenance of slopes, overlaps of roofing materials, applicability and problems of wind ties, size of anchoring bolts

10. Stairs
 - 10.1 Glossary of terms: Staircase, winders, landing, stringer, newel, baluster, riser, tread, width of staircase, hand-rail, nosing
 - 10.2 Classification of staircase on the basis of material – RCC, timber, steel, Aluminium
 - 10.3 Planning and layout of staircase: Relations between rise and tread, determination of width of stair, landing etc
 - 10.4 Various types of layout - straight flight, dog legged, open well, quarter turn, half turn (newel and geometrical stairs), bifurcated stair, spiral stair

11. Surface Finishes
 - 11.1 Plastering - classification according to use and finishes like plain plaster, grit finish, rough cast, pebble dashed, concrete and stone cladding etc., dubbing, proportion of mortars used for different plasters, techniques of plastering and curing
 - 11.2 Pointing - different types of pointing and their methods
 - 11.3 Painting - preparation of surface, primer coat and application of paints on wooden, steel and plastered wall surfaces
 - 11.4 Application of white washing, colour washing and distempering, polishing, application of cement and plastic paints
 - 11.5 Selection of appropriate paints/finishes for interior and exterior surfaces
 - 11.6 Importance of preparation of surfaces such as hacking, grooving etc before application of surface finishes

12. Anti Termite Measures (As per IS 6313 –I – III)
 - 12.1 Introduction, site preparation and chemicals used in anti-termite treatment
 - 12.2 Treatment of masonry foundation
 - 12.3 Treatment of RCC foundation
 - 12.4 Treatment of top surface of earth filling
 - 12.5 Treatment of junction of walls and floors
 - 12.6 Treatment along external perimeter of building
 - 12.7 Treatment and selection of timber
 - 12.8 Treatment in existing buildings

13. Building Planning
 - 13.1 Site selection: Factors to be considered for selection of site for residential, commercial, industrial and public building
 - 13.2 Basic principles of building planning, arrangement of doors, windows, cupboards etc for residential building
 - 13.3 Orientation of building as per IS: 7662 in relation to sun and wind direction, rains, internal circulation and placement of rooms within the available area, concept of Vastu-Shastra

- 13.4 Planning of building services
- 13.5 Introduction to National Building code.

RECOMMENDED BOOKS

1. Gupta, Sushil Kumar, Singla, DR, and Juneja BM; "A Text Book of Building Construction"; Ludhiana, Katson Publishing House.
2. Deshpande, RS and Vartak, GV; "A Text Book of Building Construction"; Poona, United Book Corporation.
3. Rangwala, SC: "Building Construction"; Anand, Charotar Book Stall
4. Kulkarni, GJ; "A Text Book of Building Construction"; Ahmedabad Book Depot
5. Arora, SP and Bindra, SP; "A Text Book of Building Construction"; New Delhi Dhanpt Rai and Sons.
6. Sharma,SK and Kaul, BK; "A Text Book of Building Construction"; Delhi, S Chand and Co.
7. Sushil Kumar; "Building Construction"; Standard Publishers Distributors, Delhi
8. Moorthy, NKR; "A Text Book of Building Construction"; Poona, Engineering Book Publishing Co.
9. SP – 62 Hand Book of BIS
10. B.I.S. – 6313 Part 1, 2, 3
11. National Building Code
12. Handbook of Civil Engineering by PN Khanna

Course Code: BTCE-102

Title of the Course: Integrated Project -I

L	T	P	Credits
0	0	4	-

Course Outcomes:

CO1: Apply knowledge and skills learned in the labs to solve real life problems.

CO2: Enhance the technical skills required for the industry.

CO3: Identify areas for future learning and skill development.

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation)

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	W	S	W	W	W	W	M	W	W	W
CO2	S	S	M	S	W	W	W	W	M	W	W	W
CO3	S	S	W	S	W	W	W	W	M	W	W	W

Course Code: BTEM-103

Title of the Course: Engineering Mathematics

L	T	P	Credits
3	0	0	3

Course Outcomes:

CO1: Apply the knowledge of calculus to plot graphs of functions and solve the problem of maxima and minima.

CO2: Determine the convergence/divergence of infinite series, approximation of functions using power and Taylor's series expansion and error estimation.

CO3: Evaluate multiple integrals and their applications to engineering problems.

CO4: Examine functions of several variables, define and compute partial derivatives, directional derivatives and their use in finding maxima and minima.

CO/PO Mapping (S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	M	S	W	W	M	M	W	M	M
CO2	S	S	M	S	M	M	M	M	S	M	W	M
CO3	S	S	S	M	M	W	W	S	M	M	M	W
CO4	S	S	S	S	M	M	W	M	M	M	W	M

Unit	Course Outlines	Hour(s)
1	Linear Algebra: Algebra of matrices; Inverse and rank of a matrix; System of linear equations; Symmetric, skew-symmetric and orthogonal matrices; Determinants; Eigenvalues and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem	9
2	Calculus: Functions of single variable: Limit, continuity and differentiability; Mean value theorems, Maxima and minima; Taylor's theorem; Fundamental theorem and mean value-theorems of integral calculus. Sequence and Series: Convergence of sequence and series; Tests for convergence; Power series; Taylor's series; Fourier Series; Half range sine and cosine series	9
3	Vector Calculus: Scalar and vector fields, differentiation of vectors, velocity and acceleration. Vector differential operators: Del, Gradient, Divergence and Curl, their physical interpretations. Line, surface and volume integrals. Flux, Solenoidal and Irrotational vectors. Gauss Divergence theorem.	9

	Green's theorem in plane, Stoke's theorem.	
4	Complex Variables Analytic functions; Cauchy-Riemann equations; Line integral, Cauchy's integral theorem and integral formula; Taylor's series and Laurent series; Residue theorem and its applications Probability and Statistics Axioms of probability; Conditional probability; Bayes' Theorem; Discrete and continuous random variables: Binomial, Poisson and normal distributions; Correlation and linear regression.	9

Total- 36

Recommended Books:

1. Thomes, G.B, Finney, R.L. Calculus and Analytic Gemetry, Ninth Edition,Peason Education.
2. Kreyszig, E., Advanced Engineering Mathematics, Eighth edition, John wiley.
3. Peter. V. O" Nil, Advanced Engineering Mathematics, Wordsworth PublishingCompany.
4. Bindra,.J.S., Applied Mathematics, Volume-I, Kataria Publications.
5. Jain, R.K and Lyengar, S.R.K., Advanced Engineering Mathematics, Narosa Publishing Company.
6. Grewal, B.S., Higher Engineering Mathematics, Khanna Publishers, New Delhi

E-Book Links:

<https://soaneemrana.org/onewebmedia/ADVANCED%20ENGINEERING%20MATHEMATICS%20BY%20ERWIN%20ERESZIG1.pdf>

Course Code: BTIT-104

Title of the Course: Fundamentals of Information Technology

L	T	P	Credits
3	0	0	3

Course Outcomes:

- CO1:** To understand the basic building blocks of general purpose digital computer system like computer hardware/software, memory and peripheral devices, internet applications and services.
- CO2:** To understand the program development life cycle using various tools like flowcharts and algorithms and pseudo-code.
- CO3:** To classify operators, expressions, character set, data types and control structures.
- CO4:** To understand the concept of modular programming and code reusability using library functions.

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	W	W	W	S	W	M	W	S	M	S	S
CO2	S	M	M	S	S	W	M	W	S	M	M	S
CO3	S	M	M	S	S	W	M	W	S	M	M	S
CO4	S	M	M	S	S	W	M	W	S	M	M	S

Unit	Course Outlines	Hour(s)
1	Introduction to Computers Define a Computer System, Block diagram of a Computer System and its Working, Memories, RAM, ROM, Secondary storage Devices, Computer Software and Hardware, Input and Output Devices. Introduction to the operating system, its functions and types, working Introduction to word processors And its features, creating, editing, printing and saving documents, spell check, Mail merge, Introduction of Power point presentations, Spreadsheets and Simple graphs, evolution of Internet and its applications and services.	9
2	Overview of C++ Language Introduction to C++ language, Structure of a C++ program, Concepts of Compiling and linking, IDE and its features; Basic terminology - Character set, Tokens, identifiers, keywords, fundamental data types, literal and symbolic Constants, declaring variables, initializing	9

	variables, type modifiers. Operators.	
3	Control Structures Decision making statements: if, nested if, if – else. Else if ladder, switch, Loops and iteration: while loop, for loop, do – while loop, nesting of loops, Break statement, continue statement, goto statement, use of control structures Through illustrative programming examples.	9
4	Arrays and Strings Declaration of arrays, initialization of array, accessing elements of array, I/O Of arrays. String as array of characters, initializing string variables, I/O of strings, string Manipulation functions (strlen, strcat, strcpy, strcmp), passing strings to a Function. Classes and Objects Defining classes and declaring objects, public and private keywords, Constructors and destructors, defining member functions inside and outside of a class, accessing members of a class, friend function.	9

Total- 36

Recommended Books:

1. E. Balagurusamy, Object-Oriented Programming with C++, Tata McGraw Hill.
2. P. K. Sinha and PritiSinha, Computer Fundamentals, BPB Publications.
3. Lafore R., Object Oriented Programming in C++, Waite Group.
4. BjarneStroustrup, The C++ Programming Language, Addison Wesley.
5. Lippman F. B, C++ Primer, Addison Wesley.
6. R. S. Salaria, Computer Concepts and Programming in C++, Salaria Publishing House.
7. Gurvinder Singh, KrishanSaluja, Fundamentals of Computer Programming & IT, Kalyani Publishers.
8. R. S. Salaria, Fundamentals of Computers, Salaria Publishing House.

Course Code: BTEP-105

Title of the Course: Engineering Physics

L	T	P	Credits
3	0	0	3

Course Outcomes:

CO1: Gain a knowledge and understanding of fundamental physical concepts in the areas covered in this class.

CO2: Apply an understanding of Superconducting and magnetic materials.

CO3: Acquire problem solving skills and the ability to synthesize in quantum mechanics.

CO4: Explain how physics applies to the concepts of Lasers.

CO5: Recognize how and when physics methods and principles can help address problems in their surroundings and then apply those methods and principles to solve real world problems.

CO/PO Mapping (S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	M	M	S	M	W	W	S	S	M
CO2	S	M	S	M	M	M	M	W	M	M	M	M
CO3	M	S	S	M	S	W	M	M	M	M	W	W
CO4	S	S	M	S	M	M	W	W	W	S	M	W
CO5	M	M	S	M	M	S	M	S	W	M	S	W

Unit	Course Outlines	Hour(s)
1	<p>Semiconductor Devices and their Materials: Classification of Semiconductors, PN junction diode and V-I characteristics. Properties of superconductors, Zero resistance, Meisner effect, BCS theory, Types of Superconductors: Type-I and Type-II. Applications of superconductivity.</p> <p>Practicals:</p> <ul style="list-style-type: none"> • Characteristics of PN junction Diode • Determination of Fermi energy for a conductor 	9
2	<p>Magnetic Materials: Classification of Dia, Para and Ferro Magnetic Materials, Hysteresis Curve on the basis of Domain Theory of Ferro Magnetism, Soft and Hard Magnetic Materials, Ferrites and their Applications.</p> <p>Practicals:</p> <ul style="list-style-type: none"> • Study B-H curve using CRO • Magnetic field of a circular coil carrying current 	9

3	<p>Quantum Mechanics: Wave-Particle duality, Phase velocity, group velocity and particle velocity, De-Broglie wavelength, Heisenberg's uncertainty principle, Wave function and its Physical significance, Eigen functions and Eigen values, Schrodinger's wave equation (Time-independent and time dependent), Normalized wave function.</p> <p>Practicals:</p> <ul style="list-style-type: none"> • Verification of Stefan's law 	9
4	<p>Lasers: Spontaneous & Stimulated emissions, Einstein's Coefficients, Population Inversion, Pumping Mechanisms, Three & four level laser systems; Ruby, He-Ne Laser. Applications.</p> <p>Practicals:</p> <ul style="list-style-type: none"> • Wavelength of Laser source • Characteristics of Laser 	9

Total- 36

Text Book(s):

1. Engineering Physics – Wiley precise textbook series, Wiley India Pvt. Ltd, New Delhi.
2. R. K. Gaur, S. L. Gupta ; Engineering Physics – DhanpatRai Publications; 2011 Edition
3. Hitendra K Malik, A K Singh; Engineering Physics – Tata McGraw Hill Education; 2017

Reference Book(s):

1. S. O. Pillai: Solid State Physics, (New Revised Sixth Edition) – New Age International (P) Limited, Publishers, New Delhi, 2009.
2. N. H. Ayachit, P. K. Mittal: Engineering Physics – I. K. International Publishing House Pvt. Ltd. New Delhi, 2011.
3. M. N. Avadhanulu and P.G. Kshirsagar: Engineering Physics – S Chand & Company Ltd., Ram Nagar, New Delhi, 2010.
4. D. Halliday, R. Resnick, and J. Walker: Fundamentals of Physics - Wiley publications, 2017.
5. Leonard. I. Schiff, "Quantum Mechanics", Third Edition, Tata McGraw Hill, 2010
6. Practical Physics, C.L. Arora, S. Chand & Co.
7. Practical Physics, R.S. Sirohi, Wiley Eastern

Video Lecture:

1. <https://nptel.ac.in/courses/122103010/>
2. <https://nptel.ac.in/courses/122107035/>
3. <https://nptel.ac.in/courses/122103011/>

Course Code: BTED-106

Title of the Course: Engineering Drawing

L	T	P	Credits
3	0	0	3

Course Outcomes:

CO1:Comprehend general projection theory, with an emphasis on the use of orthographic projection to represent three-dimensional objects in two-dimensional views

CO2: Apply the principles of orthographic projections of points in all quadrants, lines and planes in first quadrant.

CO3: Sketch the projections of simple solids like prisms, pyramids, cylinder and cone and obtain the traces of plane figures.

CO4:To interpret Orthographic, Isometric and Perspective views of objects

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	M	M	W	W	M	M	W	M	M
CO2	S	S	S	S	M	M	W	W	S	W	W	M
CO3	S	S	S	S	M	W	W	W	M	M	M	S
CO4	S	S	S	M	M	W	W	M	M	W	W	M

Unit	Course Outline	Hour(s)
1	Introduction- Engineering drawing, dimensioning, points, lines, planes. Types of projections, concept of solid as 3dimensional object, lines and planes, first and third angle practices. Projections of lines, planes and simple geometrical solids, placed in simple positions with single rotation of the face, edge or axis of solid with respect to one of the principal planes of projection15	16
2	Sectioning: Section of simple geometrical solids, types of sectional planes, true shape of section	4
3	Isometric Projection Classification of pictorial views, Basic Principle of Isometric projection, Difference between isometric projection and isometric drawing.Isometric projection of solids such as cube, prism, pyramid and cylinder, and assignments on isometric projection of simple machine parts.	8
4	Orthographic Projection Review of principle of Orthographic Projection, Sketch/drawing of blocks, and of simplemachine parts.	8

Recommended Books

1. Narayana K L and Kanaiah P, “Engineering Graphics”, Tata McGraw Hill Publishing Company Limited, New Delhi,2018
2. Gill P S, “Engineering Graphics and Drafting”, Katria and Sons, Delhi,2013
3. Bhat N D, “Elementary Engineering Drawing-Plane and solid Geometry”, Chartotar Publishing House, Anand,2010
5. Luzzadde Warren J, “Fundamentals of Engineering Drawing”, Prentice Hall of India Private Limited, New Delhi,1976
6. <https://www.swayamprabha.gov.in/>
7. <https://nptel.ac.in/course.html>
8. www.pdfdrive.net
9. www.sciencebookonline.info
10. www.digitallibraries.Com

Course Code: DBEF-101

Title of the Course: Employability Skills Foundation

L	T	P	Credits
3	0	0	3

Course Outcomes:

The course is designed to achieve superior outcomes of placement, retention and progression of students through 21' century employability skills' training and assessment.

Skills development network shall provide Vocational curricula and e-content for high quality employability and work skills training through an online learning platform

Course Code: DBLH-101

Title of the Course: Hindi

L	T	P	Credits
3	0	0	3

संस्कृत

1. संस्कृतस्य विशेषताः ; (संस्कृतस्य विशेषताः)

(1) संस्कृतस्य विशेषताः

(2) संस्कृतस्य विशेषताः

(3) संस्कृतस्य

विशेषताः , विशेषताः, विशेषताः , विशेषताः ,
विशेषताः , विशेषताः

(4) संस्कृतस्य

विशेषताः , विशेषताः , विशेषताः , विशेषताः ,
विशेषताः , विशेषताः

2. संस्कृतस्य

(संस्कृतस्य विशेषताः)

विशेषताः,

विशेषताः,

विशेषताः,

विशेषताः,

विशेषता-विशेषता

संस्कृतस्य विशेषताः:

1. संस्कृतस्य विशेषताः: विशेषताः, विशेषताः, विशेषताः

2. संस्कृतस्य विशेषताः विशेषताः

Course Code: DBLP-101

Title of the Course: Punjabi

L	T	P	Credits
3	0	0	3

ਭਾਗ-ੳ

ਕਥਾ ਰੰਗ, ਸੰਪਾ. ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ ਅਤੇ ਡਾ. ਬਲਦੇਵ ਸਿੰਘ ਚੀਮਾ
ਨਿਬੰਧ ਰਚਨਾ : ਸਮਾਜਿਕ, ਵਾਤਾਵਰਨ ਅਤੇ ਸਭਿਆਚਾਰ ਵਿਸ਼ਾ

ਭਾਗ-ਅ

ਵਿਆਕਰਨਕ ਇਕਾਈਆਂ ਅਤੇ ਪੰਜਾਬੀ ਧੁਨੀ-ਵਿਉਂਤ, ਸਵਰ, ਵਿਅੰਜਨ,
ਸ਼ਬਦ-ਸ਼੍ਰੇਣੀਆਂ ਅਤੇ ਰੂਪਾਂਤਰਨ : ਨਾਂਵ, ਪੜਨਾਂਵ, ਵਿਸ਼ੇਸ਼ਣ, ਕਿਰਿਆ, ਕਿਰਿਆ ਵਿਸ਼ੇਸ਼ਣ, ਸੰਬੰਧਕ, ਯੋਜਕ ਅਤੇ ਪ੍ਰਸ਼ਨ
ਸੂਚਕ ਸ਼ਬਦ

Course Code: DBLU-101

Title of the Course: Urdu

L	T	P	Credits
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3	0	0	3
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Unit	Course Outline	Hour(s)
1	Introduction: Introduction to Urdu Literature and Language Development of Urdu language: Social and Cultural Background Linguistic relation of Urdu with Hindi and Punjabi.	9
2	Urdu Literature: Contribution of Fort William College to Urdu Contribution of : Sir Syed, Mohd Husain Azad, Shibli	9
3	Urdu Novel: Development of Urdu Novel, Short introduction for Aazmaishbt Prof. Mohd. Mujeeb, Umrao Jan by MirzaHadiRuswa, Aagka Darya by Quratul-AinHaider	9
4	Urdu Short Stories: Namakka Darogha: Prem Chand I.C.S. : Ali Abbas Husaini Apnedukhmujhe de do: Rajinder Singh Bedi	9

Total-36

Course Code: DBNC-101

Title of the Course: NCC

L	T	P	Credits
1	0	2	2

Course Outcomes:

CO1: Define thinking, reasoning, critical thinking and creative thinking

CO2: To think critically about different life related issues.

CO3: Think divergently and will try to break functional fixedness

CO4: Creatively in their real-life problems.

CO/PO mapping												
(S/M/W indicates strength of correlation) S- Strong , M-Medium , W- Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	M	M	M	W	M	M	M	S
CO2	M	S	M	S	W	M	W	W	M	W	S	M
CO3	S	W	W	M	S	S	S	W	S	W	S	S
CO4	S	W	W	W	M	M	M	W	S	M	M	S

Subject	Course Outline	Hour(s)
NCC General	Introduction of NCC, History, Aims, Objective of NCC & NCC as Organization, Incentives of NCC, Duties of NCC Cadet. NCC Camps: Types & Conduct.	6
National Integration and Awareness	National Integration: Importance & Necessity, Factors Affecting National Integration, Unity in Diversity & Role of NCC in Nation Building, Threats to National Security.	4
Personality Development	Intra & Interpersonal skills - Self-Awareness & Analysis, Empathy, Critical & creative thinking, Decision making and problem solving.	2
Social Service and Community Development	Basics of social service and its need, Types of social service activities, Objectives of rural development programs and its importance, NGO's and their contribution in social welfare, contribution of youth and NCC in Social welfare.	3
Drill	Foot Drill- Drill ki AamHidayaten, Word ki Command, Savdhan, Vishram, Aram Se, Murdna, Kadvar Sizing, Teen Line Banana, Khuli Line, Nikat Line, KhadeKhade Salute Karna Parade Par, Visarjan, Line Tod, TejChal, ThamaurDhireChal, Tham.	12

Field Craft and Battle Craft	Introduction of Field Craft & Battle craft, Judging Distance, Method of Judging Distance.	3
Map Reading	Definition of Map, Conventional signs, Scale and Grid System, Topographical forms and technical terms, Relief, Contours and gradients, Cardinal points and types of North, Magnetic Variation and Grid Convergence.	3
Weapon Training	Introduction & Characteristics of .22 rifle, Handling of .22 rifle.	5
Social Service and Community Development	Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, BetiBachao Beti Padhao etc.	7

Total- 45

Text Book(s):

1. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Army)
:
Common Subjects: 2019
2. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Army)
:
Specialized Subject: 2019
3. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Air Force) :Specialized Subject: 2019
4. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Navy) :
Specialized Subject: 2019

Course Code: DBNS-101

Title of the Course: NSS

L	T	P	Credits
0	0	4	2

Course Outcomes:

CO1: Orientation: history, objectives, principles, symbol and badge.

CO2: NSS programs and activities

CO3: Community mobilization, Understanding youth

CO4: Volunteerism and Shramdan

CO/PO Mapping (S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
COs	Programme Outcomes (POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	S	M	S	M	M	S	S	M	M
CO2	S	S	M	S	M	S	M	M	S	S	M	M
CO3	S	S	M	S	M	S	M	M	S	S	M	M
CO4	S	S	M	S	M	S	M	M	S	S	M	M

Unit	Course outlines	Hour(s)
I	Introduction and Basic Concepts of NSS : <ul style="list-style-type: none"> • Definition of NSS : Aims & Objectives of NSS, • Roles and responsibilities of various NSS functionaries, • Emblem ,flag, Motto, Song, Badge, NSS day etc, • Organizational structure (from national to regional level). 	10
	NSS Programmes and Activities : <ul style="list-style-type: none"> • Concept of regular activities(one day camp), special seven day conduction camping, day and night camps and relevance of celebration of important days recognized by united nations, Centre, State Govt. & University • Basis of adoption of village/slums, methodology of conduction survey • Coordination with different agencies • Maintenance of the diary 	8

II	<p>Community Mobilization</p> <ul style="list-style-type: none"> • Functioning of community stakeholders • Designing the message in the context of the problem and the culture of the community • Identifying methods of mobilization • Youth-Adult partnership • Concept of Community development 	9
	<p>Volunteerism and Shramdan</p> <ul style="list-style-type: none"> • Indian tradition of volunteerism • Value system of volunteerism • Motivation and constraints of volunteerism • Shramdanasa part of volunteerism, Role of NSs volunteers in Swatch Bharat Abhiyan • Role of NSS volunteers in Digital India 	8
III	<p>Project Work/Practical:</p> <p>Conducting surveys/activities on special themes as follows</p> <ul style="list-style-type: none"> • Social Harmony and National Integration • Indian Constitution and Social Justice • Concept of Society and Social Issues in India • Health, Hygiene and Sanitation Programmes • Citizens duties, Human Rights consumer Rights 	10

Total: 45

(U/S 2(f) and 12B of the UGC Act1956, NAAC Accredited)



DESH BHAGAT UNIVERSITY, MANDI GOBINDGARH

Faculty of Engineering and Applied Science

Department of Civil Engineering

Program: B. Tech Civil Engineering

Sr. No.	Course Code	Course Name	Category	Internal	External	Total	L	T	P	C
1.	BTCE-201	Building Materials	Theory	40	60	100	3	0	0	3
2.	BTCE-202	Integrated Project- II	Practical	40	60	100	0	0	4	Q/NQ
3.	BTEC-203	Engineering Chemistry	Theory	40	60	100	3	0	0	3
4.	DBAC-101	Arts and Creative Expressions	Theory	40	60	100	3	0	0	3
5.	DBSC-101	Sociology	Theory	40	60	100	3	0	0	3
6.	DBLE-101	English Language 1	Theory	40	60	100	3	0	0	3
7.	DBUI-101	Understanding India	Theory	40	60	100	3	0	0	3
Life Skill Course (Select any one)										
8	DBNC-102	NCC	Practical	40	60	100	1	0	2	2
	DBNS-102	NSS	Practical	40	60	100	0	0	4	

L- Lecture , T- Tutorial , P- Practical , C- Credit

Course Code: BTCE-201

Title of the Course: Building Material

L	T	P	Credits
3	0	0	3

Course Outcomes:

CO1: Apply knowledge and skills learned related to construction material

CO2: Enhance the technical skills required for practical aspects

CO3: Identify areas for future learning and skill development.

CO/PO Mapping												
(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation)												
CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	W	S	W	W	W	W	M	W	W	W
CO2	S	S	M	S	W	W	W	W	M	W	W	W
CO3	S	S	W	S	W	W	W	W	M	W	W	W

Course outlines:

1. Building Stones:
 - 1.1 Classification of Rocks: (General Review)
 - 1.1.1 Geological classification: Igneous, sedimentary and metamorphic rocks
 - 1.1.2 Chemical classification; Calcareous, argillaceous and siliceous rocks
 - 1.1.3 Physical classification: Unstratified , stratified and foliated rocks
 - 1.2 General characteristics of stones – Marble, Kota stone, Granite, Sand, Trap, Basalt stone, Lime stone and Slate
 - 1.3 Requirements of good building stones

- 1.4 Identification of common building stones
 - 1.5 Various uses of stones in construction
 - 1.6 Quarrying of stones by blasting and its effect on environment
2. Bricks and Tiles:
 - 2.1 Introduction to bricks
 - 2.2 Raw materials for brick manufacturing and properties of good brick making earth
 - 2.3 Manufacturing of bricks
 - 2.3.1 Preparation of clay (manual/mechanically)
 - 2.3.2 Moulding: hand moulding and machine moulding brick table; drying of bricks, burning of bricks, types of kilns (Bull's Trench Kiln and Hoffman's Kiln), process of burning, size and weight of standard brick; traditional brick, refractory brick, clay-flyash bricks, sun dried bricks, only line diagram of kilns
 - 2.4 Classification and specifications of bricks as per BIS: 1077
 - 2.5 Testing of common building bricks as per BIS: 3495
Compressive strength, water absorption – hot and cold water test, efflorescence, Dimensional tolerance, soundness
 - 2.6 Tiles
 - 2.6.1 Building tiles; Types of tiles-wall, ceiling, roofing and flooring tiles
 - 2.6.2 Ceramic, terrazo and PVC tiles, cement tiles: their properties and uses
 - 2.7 Stacking of bricks and tiles at site
 3. Cement:
 - 3.1 Introduction, raw materials, flow diagram of manufacturing of cement by wet process
 - 3.2 Various types of Cements, their uses and testing: Ordinary portland cement, rapid hardening cement, low heat cement, high alumina cement, blast furnace slag cement, white and coloured cement, portland pozzolana cement, super sulphate cement, Test of cement – fineness, soundness, initial and final setting time etc.
 - 3.3 Properties of cement
 4. Lime:
 - 4.1 Introduction: Lime as one of the cementing materials
 - 4.2 Classification and types of lime as per BIS Code
 - 4.2 Calcination and slaking of lime
 - 4.3 Manufacture of lime
 - 4.4 Process of setting and harding action of lime
 5. Timber and Wood Based Products:
 - 5.1 Identification and uses of different types of timber: Teak, Deodar, Shisham Sal, Mango, Kail, Chir,.Fur, Willow
 - 5.2 Market forms of converted timber as per BIS Code
 - 5.3 Seasoning of timber: Purpose, methods of seasoning as per BIS Code
 - 5.4 Properties of timber and specifications of structural timber
 - 5.5 Defects in timber, decay in timber
 - 5.6 Preservation of timber and methods of treatment as per BIS
 - 5.7 Other wood based products, their brief description of manufacture and uses: laminated board, block board, fibre board, hard board, sunmica, plywood, veneers, nu-wood and study of the brand name and cost of the wood based products available in the market.
 6. Paints and Varnishes:
 - 6.1 Introduction, purpose and use of paints
 - 6.2 Types, ingredients, properties and uses of oil paints, water paints and cement paints
 - 6.3 Covering capacity of various paints
 - 6.4 Types, properties and uses of varnishes
 - 6.5 Trade name of different products.

7. Metals:
 - 7.1 Ferrous metals: Composition, properties and uses of cast iron, mild steel, HYSD steel, high tension steel as per BIS.
 - 7.2 Commercial forms of ferrous, metals.

8. Miscellaneous Materials: (10hrs)
 - 8.1 Plastics – Introduction and uses of various plastic products in buildings such as doors, water tanks and PVC pipes
 - 8.2 Asbestos – Introduction, specification and uses of asbestos in roofing sheets, pipes and tanks. The difference of merits and demerits between galvanized iron sheets and asbestos cement sheets
 - 8.3 Types and uses of insulating materials for sound and thermal insulation
 - 8.4 Construction chemicals like water proofing compound, epoxies, polymers
 - 8.5 Water proofing, termite proofing and fire resistance materials – types and uses
 - 8.6 Materials used in interior decoration works like POP, methods of doing POP

RECOMMENDED BOOKS

- 1) Sharma, SK; and Mathur, GC; "Engineering Materials;" Delhi-Jalandhar, S. Chand and Co.
- 2) Surendra Singh; "Engineering Materials;" New Delhi, Vikas Publishing House Pvt. Ltd.
- 3) Chowdhuri, N; "Engineering Materials;" Calcutta, Technical Publishers of India.
- 4) Bahl, SK; "Engineering Materials;" Delhi, Rainbow Book Co.
- 5) TTTI, Chandigarh "Civil Engineering Materials:" New Delhi Tata McGraw Hill Publication
- 6) Kulkarni, GJ; "Engineering Materials;" Ahmedabad, Ahmedabad Book Depot.
- 7) Shahane; "Engineering Materials"; Poona, Allied Book Stall.
- 8) Gurcharan Singh; "Engineering materials", Delhi Standard Publishers Distributors
- 9) SC Rangawala, "Construction Materials", Charotar Publishers
- 10) Alam Singh, "Construction Materials"
- 11) Dr. Hemant Sood "Lab Manual in Testing of Engineering Materials", New Age International (P) Ltd., New Delhi
- 12) Handbook of Civil Engineering by PN Khanna.

Course Code: BTCE-202

Title of the Course: Integrated Project -II

L	T	P	Credits
0	0	4	-

Course Outcomes:

CO1: Apply knowledge and skills learned in the labs to solve real life problems.

CO2: Enhance the technical skills required for the industry.

CO3: Identify areas for future learning and skill development.

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation)

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	W	S	W	W	W	W	M	W	W	W
CO2	S	S	M	S	W	W	W	W	M	W	W	W
CO3	S	S	W	S	W	W	W	W	M	W	W	W

Course Code: BTEC-203

Title of the Course: Engineering Chemistry

L	T	P	Credits
3	0	0	3

Course Outcomes:

CO1: Students will be skilled in problem solving, critical thinking and analytical reasoning as applied to scientific problems.

CO2: Students will be able to clearly communicate the results of scientific work in oral, written and electronic formats to both scientists and the public at large.

CO3: Students will be able to explore new areas of research in both chemistry and allied fields of science and technology.

CO4: Students will be able to explain why chemistry is an integral activity for addressing social, economic, and environmental problems.

CO/PO mapping												
(S/M/W indicates strength of correlation) S- Strong , M-Medium , W- Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	W	S	S	W	W	S	W	S	M
CO2	S	S	M	M	S	W	M	W	W	W	M	S
CO3	S	M	S	M	S	W	S	W	S	W	S	S
CO4	S	S	S	M	S	S	M	S	M	W	S	S

Unit	Course Outlines	Hour(s)
1	<p>Electrochemistry: Introduction, EMF of cell, Free Energy, Single electrode potential-Derivation of Nernst equation, Numerical problems based on Nernst Equation (E, E_o& E cell). Reference Electrodes: Introduction, construction, working and applications of calomel electrode, ion selective electrodes: Introduction, construction, working and applications of Glass electrode, determination of pH using Glass electrode.</p> <p>Practicals:</p> <ul style="list-style-type: none">• Determination of pK_a value of weak acid using glass electrode.• To determine the acid value of given oil.• To Determine the strength of HCl by pH meter	9

2	<p>Engineering Materials: Glass, ceramics, refractory, composites, magnetic materials, Polymers & structure property relationship. Thermoplastic & thermosetting plastics. Preparation, properties & applications of some commodity and engineering polymers.</p> <p>Practicals:</p> <ul style="list-style-type: none"> To Determine the strength of HCl by conductometer. 	9
3	<p>Analytical aspects of water: Sources, conservation of water, impurities in water and their effects. WHO guideline and BIS guideline for drinking water. Chemistry involved in sedimentation, coagulation and sterilization. Softening of water, lime-soda, ion-exchange process and numerical problem. Boiler troubles, causes and effects, methods of prevention.</p> <p>Practicals:</p> <ul style="list-style-type: none"> To Determine the total hardness of water by EDTA method. To Determine the amount of dissolved oxygen in water. 	9
4	<p>Green fuel: Hydrogen-production (Photo electro catalytic and photo catalytic water splitting) and applications in hydrogen fuel cells. Construction, working and applications of Methanol-Oxygen fuel cell (H₂SO₄ as electrolyte)</p> <p>Spectroscopic techniques and Applications: Elementary idea and simple applications of Rotational, Vibrational, Ultraviolet & Visible and Raman spectroscopy.</p> <p>Practicals:</p> <ul style="list-style-type: none"> To determine the concentration of a given unknown solution by using UV/Vis spectroscopy. Synthesis of gold nanoparticles and their characteristics by UV/Vis spectroscopy. 	9

Total-36

Recommended Books

1. Uppal M.M, Jain and Jain, Engineering Chemistry, Khanna Publishers, 35th Edition, 2013.
2. PC Jain and Monica Jain, A test Book of Engineering Chemistry, DhanpatRai Publications, New Delhi, 12th Edition, 2012.
3. SS Dara& Dr. SS Umare, -A Text book of Engineering Chemistry, S Chand & Company Ltd., 12th Edition, 2011.
4. RV Gadag and NitthyanandaShetty, A Text Book of Engineering Chemistry, IK International Publishing house, 2nd Edition, 2016.
5. B.S. Jai Prakash, R. Venugopal, Sivakumaraiah&PushpaIyengar,- Chemistry for Engineering Students”, Subash Publications, Bangalore.5th Edition, 2014
6. Kuriacose, J.C, Rajaram, J.; Chemistry in Engineering and Technology (Vol. 1&2); McGraw Hill, 1984.
7. Vogel A-I, Quantitative Inorganic and Organic Analysis, Oxford ELBS.

Course Code: DBAC -101

Title of the Course: Art & Creative Expressions

L	T	P	Credits
3	0	0	3

Course Outcomes:

CO1: Understanding Elements and Principles of Fine Art

CO2: Creates capacity to combine elements and principles of art to create experiment and alter Fine Art.

CO3: Creating products or Fine Art based on the principles and elements of art.

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
CO's	Programme Outcomes (POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	S	M	S	S	S	M	M	S
CO2	S	S	S	S	S	M	S	S	S	M	M	S
CO3	S	S	S	S	S	M	S	S	S	M	M	S

Unit	Course Outlines	Hour(s)
1	<ul style="list-style-type: none"> • Definition of Fine Art • Definition of Fine Art and Scope • Classification of Colours 	12
2	<ul style="list-style-type: none"> • Elements of Art • Form , Colours • Space , Texture 	12
3	<ul style="list-style-type: none"> • Principal of Art • Ryhthem • Harmony 	12

Recommended Books

1. The Transformation of Nature in Art, Year 1934 Paperback – January 1, 1934 by Ananda K. Coomaraswamy
2. Color Indian Art (World Culture Coloring) Paperback – Illustrated, July 24, 2014 by Mr. MrinalMitra (Author), Ms. SwarnaMitra (Editor), Mrs. MalikaMitra (Editor)

Course Code: DBSC-101

Title of the Course: Sociology

L	T	P	Credits
3	0	0	3

Unit	Course Outlines	Hour(s)
1	Sociology: Nature, Scope and Significance Relationship with History, Economics, Political Science, and Psychology.	9
2	Basic Concepts: Society, Community, Social Structure Gender, Patriarchy, Matriarchy, Gender Roles	9
3	Social Groups & Processes: Definition, Nature and types of Groups- Primary Secondary & Reference Group; Processes- Co-operation, Conflict and Accommodation.	9
4	Social Institutions: Marriage, Family- Their Functions and Types Kinship; Features and function	9

Course Code: DBLE-101

Title of the Course: English Language 1

L	T	P	Credits
3	0	0	3

Course Outcomes:

CO1: To acquaint the learners with ideas related to the art of creative writing.

CO2: To help learners understand the principles of creative writing.

CO3: To hone the creative and critical faculties of the learners.

CO4: To give practice to the learners of the various forms of creative writing.

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
CO's	Programme Outcomes (POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	S	M	S	S	S	M	M	S
CO2	S	S	S	S	S	M	S	S	S	M	M	S
CO3	S	S	S	S	S	M	S	S	S	M	M	S

Unit	Course Outlines	Hour(s)
1	Fundamentals of Creative Writing 1. Meaning and significance of creative writing. 2. Genres of creative writing.	9
2	Elements of Creative Writing 1. Plot, Setting, Character, Dialogue, Point of view 2. Literary Devices and Figurative Language 3. Elements of Style 4. Grammar and the Structure of Language 5. Proof reading and Editing	9
3	Traditional Forms of Creative Writing 1. Fiction, Short story, Novella, Novel 2. Poetry, Drama, Essay, Fable 3. Biography, Memoire, and Autobiography 4. Travelogues, Diaries, Self-narrative writing	9

4	New Trends in Creative Writing <ol style="list-style-type: none">1. Web Content Writing and Blog Writing2. Script Writing3. Journalistic Writing4. Copywriting5. Graphic Novel6. Flash Fiction	9
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Recommended Books

1. Abrams, M.H. *Glossary of Literary Terms*. Wadsworth Publishing Company, 2005.
2. Bell, James Scott. *How to Write Dazzling Dialogue*. Compendium Press, 2014.
3. Bell, Julia and Magrs, Paul. *The Creative Writing Course- Book*, Macmillan, 2001.

Course Code: DBUI-101

Title of the Course: Understanding India

L	T	P	Credits
3	0	0	3

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
CO's	Programme Outcomes (POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	S	M	S	S	S	M	M	S
CO2	S	S	S	S	S	M	S	S	S	M	M	S
CO3	S	S	S	S	S	M	S	S	S	M	M	S

Unit	Course Outlines	Hour(s)
1	<p>Indus Valley Civilization: Extent, Period and Downfall</p> <p>Rig Vedic Period: Social, Religious, Economic and Political Life of the People.</p> <p>Caste system: Origin and Growth</p> <p>Gupta Period: Foundation, Development of Literature, Art, Science & Technology</p> <p>Foundation of Turks Empire: Invasions of MehmudGazni and Mohammad Gouri</p>	18
2	<p>Advent of the Mughals: Foundation of Mughal Empire, Development of Art & Architecture.</p> <p>Establishment & Expansion of British Empire Battle of Plassey&Buxar</p> <p>Administrative Reforms: Cornwallis, William Bentick and Dalhousie</p> <p>Uprising of 1857: Political, Social, Religious, Economic and immediate causes, failure & Results.</p> <p>Indian National Movement: Role of Revolutionaries, Role of Mahatma Gandhi, Independence & Partition</p>	18

Recommended Books

1. R.S. Tripathi : Prachin Bharat kaIthas
2. V.C. Pandey: Political and Cultural History of India
3. R. N. Mookherji: Ancient India
4. N. N. Ghosh: Early India
5. R.C. Majumdar: An Advanced History Of India
6. A.L. Srivastava: The Delhi Sultnate
7. S.R. Sharma: Mughal Empire in India
8. IshwariParsad: A History of Modern India
9. P.E. Roberts: History of British India
10. J.S. Grewal: Cambridge History of India

Course Code: DBNC-102

Title of the Course: NCC

L	T	P	Credits
1	0	2	2

Course Outcomes:

CO 1: Perform foot drill gracefully.

CO 2: Give and follow the different word of command.

CO 3: Fire a weapon effectively with fair degree of marksmanship.

CO 4: Do the social service and feel connected with social problems.

CO/PO mapping												
(S/M/W indicates strength of correlation) S- Strong , M-Medium , W- Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	M	M	M	W	M	M	M	S
CO2	M	S	M	S	W	M	W	W	M	W	S	M
CO3	S	W	W	M	S	S	S	W	S	W	S	S
CO4	S	W	W	W	M	M	M	W	S	M	M	S

Subject	Course Outline	Hours
Personality Development	(i) Thinking- Meaning and Concept of thinking, Reasoning, Process of thinking. (ii) Critical Thinking- Meaning & concept of critical thinking, Features of critical thinking, Process of critical thinking. (iii) Creative thinking- Meaning & concept of creative thinking, Features of creative thinking, Process of creative thinking, levels of Creativity, Characteristics of creative person.	5
Leadership	(i) Leadership capsule. (ii) Important Leadership traits, Indicators of leadership and evaluation. (iii) Motivation- Meaning & concept, Types of motivation. Factors affecting motivation. (iv) Ethics and Honor codes.	5
Social Service and Community	(i) Protection of Children & Women Safety. (ii) Road/Rail Safety.	5

Development	(iii) New Government Initiatives. (iv) Cyber and mobile Security Awareness.	
Drill	(i) Foot Drill Dahine, Baen, AageaurPicheKadam Lena. (ii) TejChal se Murdna, TejChal se Salute Karna, TejKadamTaaurTham, Tej KadamTaal se KadamBadalna. (iii) Teeno Teen se Ek File aurek file se Teeno Teen Banana	12
Field Craft and Battle Craft	(i) Indications of landmarks and Targets. (ii) Intro, Definitions, Types of Ground, Indication of Landmarks, Methods of iden of targets, difficult targets.	4
Map Reading	(i) Protractor Bearing and its conversion methods. (ii) Service protractor and its uses. (iii) Prismatic compass and its uses and GPS. (iv) Navigation by compass and GPS.	5
Weapon Training	(i) Range procedure & Theory of group. (ii) Short Range firing.	4
Social Service and Community Development	Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan JeevanHariyali Abhiyan, BetiBachaoBetiPadhao etc. as per the requirement and similar announced days- National and state level.	5

Total- 45

Text Books:

1. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Army) : Common Subjects: 2019
2. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Army) : Specialized Subject: 2019
3. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Air Force) :Specialized Subject: 2019
4. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Navy) : Specialized Subject: 2019

Course Code: DBNS-102

Title of the Course: NSS

L	T	P	Credits
0	0	4	2

Course Outcomes:

CO1: Orientation: history, objectives, principles, symbol and badge.

CO2: NSS programs and activities

CO3: Community mobilization, Understanding youth

CO4: Volunteerism and Shramdan

CO/PO Mapping (S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
COs	Programme Outcomes (POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	S	M	S	M	M	S	S	M	M
CO2	S	S	M	S	M	S	M	M	S	S	M	M
CO3	S	S	M	S	M	S	M	M	S	S	M	M
CO4	S	S	M	S	M	S	M	M	S	S	M	M

Unit	Course outlines	Hour(s)
Unit-I	Introduction and Basic Concepts of NSS : <ul style="list-style-type: none"> • Definition of NSS : Aims & Objectives of NSS, • Roles and responsibilities of various NSS functionaries, • Emblem ,flag, Motto, Song, Badge, NSS day etc, • Organizational structure (from national to regional level). 	10
	NSS Programmes and Activities : <ul style="list-style-type: none"> • Concept of regular activities(one day camp), special seven day conduction camping, day and night camps and relevance of celebration of important days recognized by united nations, Centre, State Govt. & University • Basis of adoption of village/slums, methodology of conduction survey • Coordination with different agencies • Maintenance of the diary 	8
Unit-II	Community Mobilization <ul style="list-style-type: none"> • Functioning of community stakeholders • Designing the message in the context of the problem and the 	9

	<p>culture of the community</p> <ul style="list-style-type: none"> • Identifying methods of mobilization • Youth-Adult partnership • Concept of Community development 	
	<p>Volunteerism and Shramdan</p> <ul style="list-style-type: none"> • Indian tradition of volunteerism • Value system of volunteerism • Motivation and constraints of volunteerism • Shramdanasa part of volunteerism, Role of NSs volunteers in Swatch Bharat Abhiyan • Role of NSS volunteers in Digital India 	8
Unit-III	<p>Project Work/Practical:</p> <p>Conducting surveys/activities on special themes as follows</p> <ul style="list-style-type: none"> • Social Harmony and National Integration • Indian Constitution and Social Justice • Concept of Society and Social Issues in India • Health, Hygiene and Sanitation Programmes • Citizens duties, Human Rights consumer Rights 	10

Total- 45



(U/S 2(f) and 12B of the UGC Act1956, NAAC Accredited)

DESH BHAGAT UNIVERSITY, MANDI GOBINDGARH

Faculty of Engineering and Applied Sciences

Department of Civil Engineering

Program: B.Tech Civil Engineering

Semester III

Sr. No.	Course Code	Course Name	Category	Internal	External	Total	L	T	P	C
1.	BTCE-301	Strength of Materials	Theory	40	60	100	3	0	0	3
2.	BTCE-302	Strength of Materials Laboratory	Practical	40	60	100	0	0	2	1
3.	BTCE-303	Fluid Mechanics	Theory	40	60	100	3	0	0	3
4.	BTCE-304	Fluid Mechanics Laboratory	Practical	40	60	100	0	0	2	1
5.	BTCE-305	Irrigation Engineering I	Theory	40	60	100	3	0	0	3
6.	BTCE-306	Surveying -I	Theory	40	60	100	2	0	0	2
7.	BTCE -307	Integrated Project- III	Practical	40	60	100	0	0	4	Q/NQ
8.	DBES-101	Environmental Science	Theory	40	60	100	3	0	0	3
9.	DBEI-301	Employability Skills Intermediate	Theory	40	60	100	3	0	0	3
Life Skill Course (Select any one)										
10.	DBNC-103	NCC	Practical	40	60	100	1	0	2	2
	DBNS-103	NSS	Practical	40	60	100	0	0	4	

4-Week Training during summer vacations after 2nd Semester

L- Lecture , T- Tutorial , P- Practical , C- Credit

Course Code: BTCE- 301

Title of Course: Strength of Material

L	T	P	Credits
3	0	0	3

Course Outcomes: After completion of the course, students should be able to:

CO1 Interpret the concepts of stress and strain at a point as well as the stress strain relationships for homogenous, isotropic materials

CO2 Analyze the stresses and strains associated with thin-wall spherical and cylindrical pressure vessels.

CO3 Demonstrate the capability to conduct experiments, as well as to analyse and interpret data

CO4 Ability to classify a component to meet desired needs within realistic constraints of safety

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	W	W	W	W	W	M	W	M
CO2	S	S	S	M	W	W	W	W	W	M	W	S
CO3	M	S	S	S	W	W	M	W	W	W	W	M
CO4	S	S	S	S	W	W	M	W	W	W	W	M

Course Content:

Unit-I

Simple Stresses and Strains: Introduction, stress-strain curves for elastic materials, different types of stresses and strains, elastic limit, Hooke's Law, Young's modulus of elasticity, Bulk modulus, modulus of rigidity, Lateral strain, Elongation due to self-weight bars of tapering sections, bars of varying sections, equivalent area of composite sections, temperature stresses, relation between elastic constants. Volumetric strain.

Complex Stress: Introduction, rectangular block Title of Courseed to normal stresses along and across two planes, combination of normal and tangential stresses, pure shear, principal stresses and Principal planes, Mohr's Circle, Principal strains, Computation of Principal stresses from Principal strains.

Unit-II

Bending moment & shear force diagrams: Introduction, Types of beams, supports and loading, sign conventions for bending moments and shear forces, Shear force and Bending moment diagrams for simply supported, cantilever and overhanging beams for different types of loading. Relationship between Bending moment, Shear Force and loading Graphical method of plotting Bending Moment & Shear Force Diagrams.

Bending and Shear Stresses: Introduction, Assumption made in theory of simple bending, derivation of basic equation, determination of stresses in simple sections, built up sections and composite sections. (flitched Beams), Introduction to theory of unsymmetrical bending beams of uniform strength, variation of shear stress across depth of various beam sections.

Unit-III

Torsion: Introduction, torsion of shafts and springs, derivation of basic torsion equation, Power transmitted, sections Title of Course to combined bending and torsion, Principal stresses, equivalent Bending Moment & Torque, Helical spring, analysis of closed Coil helical spring.

Strain Energy: Introduction, Strain Energy due to axial Loads, Bending shear and Torsional stress, Impact load, strain energy due to Principal stress & strains, theories of failure.

Unit-IV

Deflection of Beams: Derivation of basic equation of elastic curve, deflection in beams with different end conditions and different loadings by double integration method, Macaulay's method.

Columns and Struts: Introduction, Euler's buckling loads for columns with different end conditions, limitations of Euler's formula, column carrying eccentric loads, laterally loaded columns, empirical formula.

Recommended Books

1. Ferdinand P. Beer, E. Russell Johnston Jr., John T. Dewolf and David F. Mazurek, 'Mechanics of Materials (In SI Units)'.
2. D.K. Singh, 'Mechanics of Solids', Pearson Education, 2002.
3. Stephen H. Crandall, Norman C. Dahl and Thomas J. Lardner, 'An Introduction to the Mechanics of Solids', McGraw-Hill International Editions.
4. Egor P. Popov, 'Engineering Mechanics of Solids', Prentice-Hall of India.

EBook

<https://www.eduinformer.com/strength-of-materials-timoshenko-part-1-2-ebook/>

Online Learning

<https://nptel.ac.in/courses/105105108/>

www.swayam.gov.in

Course Code: BTCE -302

Title of Course: Strength of Material Laboratory

L	T	P	Credits
0	0	2	1

Course Outcome: After completion of the course, students should be able to:

CO1 Understand and apply the concepts of law of elasticity with respect to stress and strain

CO2 To understand the properties of different materials

CO3 Able to perform different tests i.e. tensile, compression, torsion, hardness, bending and impact test

CO4 Understand the concept of deflection in beams

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	M	S	S	W	S	W	M	S
CO2	S	S	M	S	M	M	S	W	S	W	M	S
CO3	S	M	M	S	M	M	S	W	S	W	M	S
CO4	S	S	M	S	M	M	S	W	S	W	M	S

LaboratoryDetails :

Experiments on **Material Behaviour:** Tests for Impact, Hardness, Torsion, Stiffness, Tensile Strength, Bending and Compression tests, Columns & Struts.

1. To determine Tensile Strength of Mild Steel.
2. To determine Torsional Strength of Mild Steel and Cast Iron.
3. To determine Impact Strength of Mild Steel – Izod's and Charpyb tests.
4. To determine Brinell and Vicker's Hardness numbers of Mild Steel.
5. To determine the Rockwell Hardness number of metals.
6. To determine the Fatigue Strength of Mild Steel.
7. To determine experimentally the value of modulus of elasticity of the beam material using deflections formula for simply supported and cantilever beams.
8. To study the behavior of the given material on UTM.
9. Study of behavior of columns and struts with different end conditions.

Recommended Books

1. Timoshenko and D.H. Young, 'Elements of Strength of Materials', Van Nostrand Reinhold Company, New York.
2. Seely and Sindh, 'Advanced Mechanics of Materials'.
3. S. Ramamarutham, 'Strength of Materials', Dhanpat Rai and Sons.
4. IS: 1608-1972-Method for Testing of Steel Products.
5. IS: 1521-1972-Method for Tensile Testing of Steel Wire.

6. IS: 1717-1971-Method for Simple Torsion Testing of Steel Wire.
7. IS: 524-1969-Method of Test for determining Shear Strength of Mild Steel.
8. IS: 1598-1960-Izod Impact Test for Steel.
9. IS: 1499-1959-Method for Charpy Impact Test (U-Notch) for Steel.
10. IS: 1500-1968-Method for Brinell hardness Test for Steel.
11. IS: 1586-1968-Method for Rockwell Hardness Test for Steel.
12. IS: 1599-1960-Method for Bend Test for Steel Products other than Sheet, Strip, Wire and Tube.
13. IS: 5619-1970-Indian Standard Recommendations for Fatigue Testing of Metals.
14. Manual on Fatigue Testing, A.S.T.M. Special Technical Publication No.91.
15. IS: 5069-1969- Indian Standard on Glossary of terms relating to methods of mechanical testing of metals.

Course Code: BTCE-303
Title of Course: Fluid Mechanics

L	T	P	Credits
3	0	0	3

Course Outcomes: After completion of the course, students should be able to:
 CO1 Apply conservation laws to derive governing equations of fluid flows
 CO2 Compute hydrostatic and hydrodynamic forces
 CO3 Analyze and design simple pipe systems
 CO4 Apply principles of dimensional analysis to design experiments

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	S	M	M	M	W	M	W	S	S
CO2	S	S	S	S	M	M	M	W	M	W	S	M
CO3	S	S	M	S	M	M	M	W	M	W	S	S
CO4	S	S	S	S	M	M	M	W	M	W	S	M

Course Content:

UNIT-I

Fluid and their Properties: Ideal and real fluids, Continuum concept of fluid: density, specific weight and relative density, viscosity and its dependence on temperature, surface tension and capillarity, vapour pressure and cavitation, compressibility and bulk modulus, Newtonian and non-Newtonian fluids.

Fluid Statics: Concept of pressure, Pascal’s law, Action of fluid pressure on plane (horizontal, vertical and inclined) submerged surface, resultant force and centre of pressure, force on a curved surface due to hydrostatic pressure, Buoyancy and flotation, stability of floating and submerged bodies, Metacentric height and its determination.

UNIT-II

Fluid Kinematics: Classification of fluid flows, velocity and acceleration of fluid particle, local and convective acceleration, normal & tangential acceleration streamline, path line and streak line, flow rate and discharge mean velocity continuity equation in Cartesian co-ordinates, stream & velocity potential functions.

Fluid Dynamics: Euler’s equation, Bernoulli’s equation and steady flow energy equation, kinetic energy and momentum correction factors, flow along a curved streamline, free and forced vortex motions.

UNIT-III

Dimensional Analysis and Similitude: Fundamental and derived units and dimensions, dimensional homogeneity, Rayleigh’s and Buckingham’s Pi method for dimensional analysis, dimensionless number and their significance, geometric, kinematic and dynamic similarity, model

studies, Flow Measurement in Manometers, Pitot tubes, Venturimeter and orifice meters, orifices, mouthpieces, notches (**Rectangular and V-notches**) and weirs (**Sharp crested Weirs**).

Laminar & Turbulent Flow: Flow through circular section pipe, flow between parallel plates, Stokes law, Transition from laminar to turbulent, Critical velocity and critical Reynolds Number, Turbulent flows and flow losses in pipes, Darcy equation, minor head losses in pipe fittings, hydraulic and energy gradient lines, Effects of turbulent flow in pipes.

UNIT-IV

Uniform flow in open Channels: Flow classifications, basic resistance equation for open channel flow, Chezy, Manning, Bazin and Kutter formulae, Variation of roughness coefficient, conveyance and normal depth, Velocity Distribution, Most efficient flow sections, rectangular, trapezoidal and circular.

Energy principles and critical flow: Energy and specific energy in an open channel, critical depth for rectangular and trapezoidal channels, Alternate depths, applications of specific energy to transitions and Broad crested weirs, Momentum and specific force in open channel flow, sequent depths.

Recommended Books

1. P.N. Modi and S.M. Seth, 'Hydraulics & Fluid Mechanics', Standard Publication.
2. S. Subraminayam, 'Flow in Open Channels', Tata McGrawHill.
3. Robert N. Fox & Alan T. Macnold, 'Introduction to Fluid Mechanics'.
4. R.K. Bansal, 'Fluid Mechanics', Laxmi Publications.
5. Jagdish Lal, 'Fluid Mechanics', Metropolitan Book Co. (P)Ltd.

EBook:

<https://www.engineeringbookspdf.com/strength-of-material-by-r-k-bansal/>

Online Learning

<https://nptel.ac.in/courses/112105171/>

<https://nptel.ac.in/courses/112105171/www.swayam.gov.in>

Course Code: BTCE-304

Title of Course: Fluid Mechanics Laboratory

L	T	P	Credits
0	0	2	1

Course Outcomes: After completion of the course, students should be able to:

CO1 Predict the metacentric height of floating vessel and utility in vessel design

CO2 Calibrate various flow measuring devices (venturimeter, orifice meter and notches)

CO3 Authenticate the Bernoulli's theorem experimentally

CO4 Compute various losses and velocity in pipe flow in field

CO/PO mapping

(S/M/W indicates strength of correlation) S- Strong , M-Medium , W- Weak

CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
CO1	S	S	S	S	M	M	W	W	S	S	M	S
CO2	S	S	S	S	M	M	W	W	S	S	M	S
CO3	S	S	S	S	M	M	W	W	S	S	M	S
CO4	S	S	S	S	M	M	W	W	S	S	M	S

Laboratory Details:

1. To determine the meta-centric height of a floating vessel under loaded and unloaded conditions.
2. To study the flow through a variable area duct and verify Bernoulli's energy equation.
3. To determine the coefficient of discharge for an obstruction flow meter (venturimeter /orifice meter)
4. To determine the discharge coefficient for a Vee notch or rectangular notch.
5. To determine the coefficient of discharge for Broad crested weir.
6. To determine the hydraulic coefficients for flow through an orifice.
7. To determine the friction coefficient for pipes of different diameter.

8. To determine the head loss in a pipe line due to sudden expansion/sudden contraction/bend.
9. To determine the velocity distribution for pipe line flow with a pitot static probe.

Recommended Books

1. John J. Bloomer, 'Practical Fluid Mechanics for Engineering Applications (Mechanical Engineering), Marcel Dekker.
2. S. Sarabjit Singh, 'Fluid Mechanics Practical Manual'.
3. Baljit Kapoor, 'Fluid Mechanics Manual'.

Course Code: BTCE-305

Title of Course: Irrigation Engineering- I

L	T	P	Credits
3	0	0	3

Course Outcomes: After completion of the course, students should be able to:

CO1 Knowledge about methods of irrigation

CO2 Able to know various terms and aspects related to water requirement of crops.

CO3 To design canal and studied losses in canals

CO4 Able to Illustrate various irrigation projects

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	W	W	M	S	M	S	W	M	W	S	S	S
CO2	W	W	M	S	M	S	W	M	W	S	S	S
CO3	S	S	S	S	M	M	S	W	M	W	S	S
CO4	S	S	S	S	M	M	S	W	M	W	S	S

Course Content:

Unit-I

INTRODUCTION: Importance of Irrigation Engineering, purposes of Irrigation, objectives of Irrigation, Benefits of Irrigation, Advantages of various techniques of irrigation- - Furrow Irrigation, Boarder strip Irrigation, Basin Irrigation, Sprinkler Irrigation, Drip Irrigation.

METHODS OF IRRIGATION: Advantages and disadvantages of irrigation, water requirements of crops, factors affecting water requirement, consumptive use of water, water depth or delta, Duty of water, Base Period, relation between delta, duty and base period, Soil crop relation-ship and soil fertility.

Unit-II

CANAL IRRIGATION: Classifications of canals, canal alignment, Inundation canals, Bandhara irrigation, advantages and disadvantages, Silt Theories-Kennedy's theory, Lacey's theory, Drawbacks in Kennedy's & Lacey's theories, comparison of Lacey's and Kennedy's theories, Design of unlined canals based on Kennedy & Lacey's theories.

LINED CANALS: Types of lining, selection of type of lining, Economics of lining, maintenance of lined canals, silt removal, strengthening of channel banks, measurement of discharge in channels, design of lined canals, methods of providing drainage behind lining

Unit-III

LOSSES IN CANALS, WATER LOGGING AND DRAINAGE: Losses in canals Evaporation and seepage, water logging, causes and ill effects of water logging anti water logging measures. Drainage of land, classification of drains - surface and subsurface drains, Design considerations for surface drains, Advantages and maintenance of tile drains.

INVESTIGATION AND PREPARATION OF IRRIGATION PROJECTS: Classification project, Project preparation-investigations, Design of works and drawings, concept of multi - purpose projects, Major, Medium and minor projects, planning of an irrigation project, Economics & financing of irrigation works. Documentation of project report.

Unit-IV

TUBE - WELL IRRIGATION: Types of tube wells - strainer type, cavity type and slotted type. Type of strainers, Aquifer, porosity, uniformity coefficient, specific yield & specific retention, coefficients of permeability, transmissibility and storage. Yield or discharge of a tube well, Assumptions, Theim's & Dupuit's formulae, Limitations of Theim's and Dupuit's formulae. Interference of tube wells with canal or adjoining tube-wells, causes of failure of tubewells, optimum capacity, Duty and delta of a tube well. Rehabilitation of tubewell.

RIVER TRAINING WORKS: Objectives, classification of river-training works, Design of Guide Banks. Groyne or spurs - Their design and classification ISI. Recommendations of Approach embankments and afflux embankments, pitched Islands, Natural cut-offs and Artificial cut-offs and design Considerations.

Recommended Books

1. S.K. Sharma, 'Principles & Practice of Irrigation Engg.', S. Chand, Ltd.
2. B.C. Punmia, Pande B.B. Lal, 'Irrigation & Water Power Engg.', Laxmi Publications (P)Ltd.
3. Bharat Singh, 'Fundamentals of Irrigation Engg.', Nem Chand & Bros.
4. S.R. Sahasrabudhe, 'Irrigation Engg. & Hydraulic Structure', S.K. Kataria & Sons.
5. Varshney, Gupta & Gupta, 'Irrigation Engg. & Hydraulic Structure', Nem Chand and Brothers.
6. Santosh Kumar Garg, 'Irrigation Engg. & Hydraulic Structure', Khanna Publishers.

EBook

<http://www.freeengineeringbooks.com/Civil/Irrigation-Engineering-and-Hydrology-Books.php>

Online Learning

<https://nptel.ac.in/content/storage2/courses/105105110/pdf/m3101.pdf>
www.swayam.gov.in

Course Code: BTCE-306

Title of Course: Surveying-I

L	T	P	Credits
2	0	0	2

Course Outcomes: After completion of the course, students should be able to

CO1 Knowledge about surveying techniques

CO2 Understand to work with different instruments, Prismatic Compass & Plane table

CO3 Able to perform Leveling operations; and draw & interpret a Contour map

CO4 Understand the Tacheometric measurements and able to apply those on field

CO5 knowledge of Modern Electronic instruments for applications of Surveying

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	M	S	W	W	W	S	S	S	S
CO2	S	S	S	M	M	M	W	W	S	M	S	M
CO3	S	S	S	M	S	W	W	W	S	S	S	S
CO4	S	S	S	S	M	M	W	W	S	M	M	M
CO5	S	S	S	S	M	W	W	W	S	M	W	M

Course Content

Unit I

Introduction: Different types of surveys.

Chain Surveying: Principal of chain surveying, description of different equipment, Methods of chaining & booking, selection of base line and stations, obstacles in chaining. Location of inaccessible points by chain, tape & ranging rods.

UNIT II

Prismatic compass survey: Description of Prismatic & surveyors compass methods of traversing, local attraction and its elimination adjustment of closing error by graphical method.

Plane Table Survey: Description of different equipment, different methods of plane tabling, Strength of Fix, Two point and three point problems and their solutions.

UNIT III

Leveling: Description of Dumpy and Tilting levels & leveling staves, methods of leveling sensitivity of bubble tube, setting out grade lines permanent adjustment of above mentioned leveling instruments.

UNIT IV

Contouring: Setting out contour gradient, different methods of contouring. Simple earth work calculations of areas and volumes.

Minor Instruments: Box sextant, hand level, Abney level, Planimeter, ghat tracer, tangent clinometer etc.

Books Recommended:

1. Surveying and Leveling: T.P. Kanetkar
2. Surveying and Leveling : Dr. N. Singh
3. Surveying : Dr. P.B. Sahiwny
4. Surveying: C.L.Kocher
5. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, 'Surveying', Vol. I, II, Laxmi Publications, **2005**.
6. R. Agor, 'Surveying', Khanna Publishers,**1982**.
7. S.S. Bhavikatti, 'Surveying & Levelling', Vol. I, II,**2009**.
8. Narinder Singh, 'Surveying', Tata McGraw Hill.
9. N.N. Basak, 'Surveying and Leveling', Tata McGraw Hill, New Delhi,**2000**.

EBook

file:///C:/Users/RBSK/Downloads/ENGINEERING%20SURVEYING.pdf

Online Learning

<https://nptel.ac.in/courses/105103176/>

www.swayam.gov.in

Course Code: BTCE-307

Title of the Course: Integrated Project -III

L	T	P	Credits
0	0	4	-

Course Outcomes:

CO1: Apply knowledge and skills learned in the labs to solve real life problems.

CO2: Enhance the technical skills required for the industry.

CO3: Identify areas for future learning and skill development.

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation)

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	W	S	W	W	W	W	M	W	W	W
CO2	S	S	M	S	W	W	W	W	M	W	W	W
CO3	S	S	W	S	W	W	W	W	M	W	W	W

Course Code: DBES-101

Title of the Course: Environmental Science

L	T	P	Credits
3	0	0	3

Course Outcomes:

After undergoing this course student will be able to:

CO1: Articulate the interdisciplinary context of environmental issues.

CO2: Identify and justify key stakeholders in humanities and social sciences that need to be a part of sustainable solutions.

CO3: Formulate an action plan for sustainable alternatives that integrate science, humanist, and social perspectives.

CO4: Students will be able to explain why chemistry is an integral activity for addressing social, economic, and environmental problems.

CO/PO mapping												
(S/M/W indicates strength of correlation) S- Strong , M-Medium , W- Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	W	S	S	W	W	S	M	S	M
CO2	S	S	M	M	S	M	M	W	W	S	M	S
CO3	S	M	S	M	S	W	S	M	S	W	S	S
CO4	S	S	M	W	S	S	W	W	S	M	S	M

UNIT	COURSE OUTLINE	HOURL(S)
I	<p>The Multidisciplinary Nature of Environmental Studies Definition, scope and importance Need for public awareness.</p> <p>Natural Resources Renewable and Non-renewable Resources:</p> <ul style="list-style-type: none"> • Natural resources and associated problems. <ul style="list-style-type: none"> (a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people. (b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. (c) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case 	8

	<p>studies.</p> <p>(d) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.</p> <ul style="list-style-type: none"> • Role of an individual in conservation of natural resources. • Equitable use of resources for sustainable lifestyles. 	
II	<p>Ecosystems</p> <ul style="list-style-type: none"> • Concept of an ecosystem. • Structure and function of an ecosystem. • Producers, consumers and decomposers. • Energy flow in the ecosystem. • Ecological succession. • Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the ecosystem <p>Biodiversity and Its Conservation</p> <ul style="list-style-type: none"> • Introduction, definition: genetic, species and ecosystem diversity. • Biodiversity at global, National and local levels. 	10
III	<p>Environmental Pollution</p> <ul style="list-style-type: none"> • Definition • Causes, effects and control measures of <p>(a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards</p> <ul style="list-style-type: none"> • Solid waste management: Causes, effects and control measures of urban and industrial wastes. • Role of an individual in prevention of pollution. <p>Social Issues and the Environment</p> <ul style="list-style-type: none"> • From unsustainable to sustainable development. • Water conservation, rain water harvesting, watershed management. • Environmental ethics: Issues and possible solutions. • Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies. • Consumerism and waste products. • Environment Protection Act. • Air (Prevention and Control of Pollution) Act. • Water (Prevention and Control of Pollution) Act. • Wildlife Protection Act. • Forest Conservation Act. 	10
IV	<p>Human Population and the Environment</p> <ul style="list-style-type: none"> • Population growth, variation among nations. • Population explosion—Family Welfare Programme. • Environment and human health. • Human rights. 	15

	<ul style="list-style-type: none"> • Value education. • HIV/AIDS. • Women and Child Welfare. • Role of Information Technology in environment and human health. • Case Studies. <p>Field Work</p> <ul style="list-style-type: none"> • Visit to a local area to document environmental assets—river/forest/grassland/hill/mountain. • Visit to a local polluted site—Urban/Rural/Industrial/Agricultural. • Study of common plants, insects, birds. • Study of simple ecosystems—pond, river, hill slopes, etc. • (Field work equal to 5 lecture hours) 	
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Total- 36

Reference Books –

1. “ Environmental Science” by Miller T G.
2. “ Introduction to Environmental Engineering and Science” by Gilbert M Masters.
3. “ The Biodiversity of India” by Bharucha Erach.
4. “ Essentials of Ecology” by Townsend C and Michael Begon.
5. <https://nptel.ac.in/courses/122102006/>
6. https://swayam.gov.in/nd2_cec19_bt03/preview
7. <https://www.pdfdrive.com/environmental-science-e12033451.html>

Course Code: DBEI-301

Title of the Course: Employability Skills Intermediate

L	T	P	Credits
3	0	0	3

Course Outcomes:

The course is designed to achieve superior outcomes of placement, retention and progression of students through 21' century employability skills' training and assessment.

Skills development network shall provide Vocational curricula and e-content for high quality employability and work skills training through an online learning platform

Course Code: DBNC-103

Title of the Course: NCC

L	T	P	Credits
1	0	2	2

Course Outcomes

CO1: Admire and get inspired from the accomplishments of leaders from various walks of life.

CO2: Develop public speaking skills.

CO3: Appreciate the need & requirement for disaster management and his role in disaster management activities.

CO4: Know the history & geographical peculiarity of our borders & coastal regions

CO/PO Mapping (S-Strong Correlation, M- Medium Correlation, W-Weak Correlation)												
CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	M	M	M	W	M	M	M	S
CO2	M	S	M	S	W	M	W	W	M	W	S	M
CO3	S	W	W	M	S	S	S	W	S	W	S	S
CO4	S	W	W	W	M	M	M	W	S	M	M	S

Subject	Course Outline	Hours
Personality Development	(i) Group Discussions - Change your Mindset (ii) Public Speaking.	5
Leadership	Case Studies – APJ Abdul Kalam, Deepa Malik, MaharanaPratap, N Narayan Murthy	4
Disaster Management	(i) Disaster Management Capsule. (ii) Organisation. (iii) Types of Disasters. (iv) Essential Services. (v) Assistance. (vi) Civil Defense Organisation.	3
Adventure	(i) Trekking including selection of route and administration planning (ii) Cycle expedition including selection of route and administration planning (iii) Rock climbing	1
Border and	History, Geography & Topography of Border/	2

Coastal Areas	Coastal Areas.	
Drill	(i) Arm Drill. (ii) Rifle kesaath Savdhan, Vishram aur Aram se. (iii) Rifle kesaath Parade Par aur Saj, Rifle kesaath Visarjan, Line Tod. (iv) Bhumi Shastra aur Uthao Shastra, Bagal Shastra aur Baju Shastra.	8
Field Craft and Battle Craft	(i) Observation. (ii) Camouflage. (iii) Concealment	4
Map Reading	(i) Setting of Map. (ii) Findings North and Own Position	4
Weapon Training	Short Range firing	4
Social Service and Community Development	Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc as per the requirement and similar announced days- National and State level.	5
Obstacle Training	(i) Obstacle training - Introduction, Safety measures, Benefits. (ii) Obstacle Course- Straight balance, Clear Jump, Gate Vault, Zig- Zag Balance, High Wall.	5

Total- 45

Text Book(s):

1. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Army) :
Common Subjects: 2019
2. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Army) :
Specialized Subject: 2019
3. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Air Force)
:Specialized Subject: 2019
4. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Navy) :
Specialized Subject: 2019

Course Code: DBNS-103

Title of the Course: NSS

L	T	P	Credits
0	0	4	2

Course Outcomes

CO1: Orientation: history, objectives, principles, symbol and badge.

CO2: NSS programs and activities

CO3: Community mobilization, Understanding youth

CO4: Volunteerism and Shramdan

CO/PO Mapping (S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
COs	Programme Outcomes (POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	S	M	S	M	M	S	S	M	M
CO2	S	S	M	S	M	S	M	M	S	S	M	M
CO3	S	S	M	S	M	S	M	M	S	S	M	M
CO4	S	S	M	S	M	S	M	M	S	S	M	M

Unit	Course outlines	Hour(s)
I	Introduction and Basic Concepts of NSS : <ul style="list-style-type: none"> • Definition of NSS : Aims & Objectives of NSS, • Roles and responsibilities of various NSS functionaries, • Emblem ,flag, Motto, Song, Badge, NSS day etc, • Organizational structure (from national to regional level). 	10
	NSS Programmes and Activities : <ul style="list-style-type: none"> • Concept of regular activities(one day camp), special seven day conduction camping, day and night camps and relevance of celebration of important days recognized by united nations, Centre, State Govt. & University 	8
II	Community Mobilization <ul style="list-style-type: none"> • Functioning of community stakeholders • Designing the message in the context of the problem and the culture of the community 	9

	<ul style="list-style-type: none"> • Identifying methods of mobilization • Youth-Adult partnership • Concept of Community development 	
	<p>Volunteerism and Shramdan</p> <ul style="list-style-type: none"> • Indian tradition of volunteerism • Value system of volunteerism • Motivation and constraints of volunteerism • Shramdanasa part of volunteerism, Role of NSS volunteers in Swatch Bharat Abhiyan • Role of NSS volunteers in Digital India 	8
III	<p>Project Work/Practical:</p> <p>Conducting surveys/activities on special themes as follows</p> <ul style="list-style-type: none"> • Social Harmony and National Integration • Indian Constitution and Social Justice • Concept of Society and Social Issues in India • Health, Hygiene and Sanitation Programmes • Citizens duties, Human Rights consumer Rights 	10

Total- 45



(U/S 2(f) and 12B of the UGC Act1956, NAAC Accredited)

DESH BHAGAT UNIVERSITY, MANDI GOBINDGARH

Faculty of Engineering and Applied Sciences

Department of Civil Engineering

Program: B.Tech Civil Engineering

Semester IV

Sr. No.	Course Code	Course Name	Category	Internal	External	Total	L	T	P	C
1.	BTCE-401	Design of Concrete Structures-I	Theory	40	60	100	3	0	0	3
2.	BTCE-402	Concrete Technology Laboratory	Practical	40	60	100	0	0	2	1
3.	BTCE-403	Structural Analysis-I	Theory	40	60	100	3	0	0	3
4.	BTCE-404	Structural Analysis Laboratory	Practical	40	60	100	0	0	2	1
5.	BTCE-405	Surveying-II	Theory	40	60	100	2	0	0	2
6.	BTCE-406	Surveying Laboratory	Practical	40	60	100	0	0	2	1
7.	BTCE-407	Environmental Engineering-I	Theory	40	60	100	3	0	0	3
8.	BTCE-408	Integrated Project- IV	Practical	40	60	100	0	0	4	Q/NQ
9.	DBAI-101	Artificial Intelligence	Theory	40	60	100	4	0	0	4
10.	DBHY-101	Health and Wellness- Yoga	Theory	40	60	100	1	0	2	2
Life Skill Course (Select any one)										
11.	DBNC-104	NCC	Practical	40	60	100	1	0	2	2
	DBNS-104	NSS	Practical	40	60	100	0	0	4	

L- Lecture , T- Tutorial , P- Practical , C- Credit

Course Code: BTCE-401

Title of Course: Design of Concrete Structure-I

L	T	P	Credits
3	0	0	3

Course Outcomes: After completion of the course, students should be able to:
CO1 Design the Reinforced Concrete beams using limit state and working stress
CO2 Design Reinforced Concrete laboratories
CO3 Design the Reinforced Concrete Columns
CO4 Design structures for serviceability

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	W	W	M	M	S	W	M	M
CO2	S	S	S	S	S	W	M	M	S	W	S	M
CO3	S	S	S	S	W	W	M	M	S	W	M	M
CO4	S	S	S	S	S	W	M	M	S	W	S	M

Course Content:

- Note: 1. IS 456, Indian Standard. Plain and Reinforced Concrete -Code of practice is permitted in examination.**
2. Examiner requested to provide requisite data for Mix Design Problems; if any.

Unit-I

Concrete Mix Design: Introduction, Selection of mix proportions, Durability of concrete, Quality Control of concrete, Introduction of various mix proportion methods, Proportioning of concrete mixes by BIS method of mix design.

Unit-II

RCC Design Philosophies: Introduction, Objectives & methods of analysis & Design, Properties of Concrete and Steel. Philosophies of Working Stress Methods (WSM) & Limit State Method (LSM) in RCC design.

Shear, Torsion & Bond (Only Theory/Concept): Types of shear & torsion, importance in RCC Design Structures, IS Provisions for Shear & Torsion, Bond-types of bonds, Anchorage Bond, Development length & its determination.

Unit-III

RCC Beams: Types of beams, Behaviour in Flexure-Singly reinforced beam, Doubly reinforced beam, Flanged beam, Cantilever beam, Neutral Axis, Neutral Axis Depth, Moment of Resistance, Design of beams- Singly reinforced beam, Doubly reinforced beam, Flanged beam, Cantileverbeam.
RCC Slaboratorys: Types of slaboratory systems, Guidelines for Design, Design of One Way and Two Way Slaboratory.

Unit-IV

Columns: Classifications (According to Shape, Length and Loading Conditions), Assumptions, Behaviour and Design of Axially Loaded Columns.

Recommended Books

1. M.S. Shetty, 'Concrete Technology', S. Chand & Co.
2. A.M. Neville, 'Properties of Concrete', Prentice Hall.
3. M.L. Gambhir, 'Concrete Technology', Tata McGraw Hill Publishers, New Delhi.
4. Pillai & Menon, 'Reinforced Concrete Design', Tata McGraw Hill Education.
5. N. Krishna Raju, 'Advanced Design of Structures'.

EBook:

<https://www.kopykitab.com/Design-of-Concrete-Structure-I-By-Er-Shobhit-Sharma-eBook#snapshot>

Online Learning

<https://nptel.ac.in/courses/105105105/>
www.swayam.gov.in

Course Code: BTCE-402

Title of Course: Concrete Technology Laboratory

L	T	P	Credits
0	0	2	1

Course outcomes: After completion of the course, students should be able to

CO1 Able to collect field data.

CO2 To prepare plan or map of the area

CO3 To analyze field parameters

CO4 To evaluate field parameters at the site for further engineering works

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	W	W	M	M	S	W	M	M
CO2	S	S	S	S	S	W	M	M	S	W	S	M
CO3	S	S	S	S	W	W	M	M	S	W	M	M
CO4	S	S	S	S	S	W	M	M	S	W	S	M

List of Experiments

1. To Determine the Specific Gravity and Soundness of cement.
2. To Determine the Standard Consistency, Setting Time (Initial and Final Setting Time) of Cement.
3. To Determine the Compressive Strength of Cement.
4. To Determine the Fineness Modulus, Bulk Density, Water Absorption and Specific gravity of Fine and Coarse Aggregates.
5. To Determine the workability of Concrete using:
6. (i) Slump Cone Method, (ii) Compaction Factor and (iii) Vee-Bee Time of Concrete.
7. Mix Design of Concrete by IS methods.
8. To Determine the Compressive Strength of Concrete by Cube and Cylinder.
9. To carry out the Split Tensile strength of Concrete.
10. To carry out the Flexural strength of Concrete.
11. To Determine the Compressive strength of Bricks and Tiles as IS standard.

Recommended Books/Manuals

1. M.L. Gambhir, 'Concrete Manual', Dhanpat Rai & Sons Delhi.
2. 'Concrete Laboratory. Manual', TTTI Chandigarh.
3. M.S. Shetty, 'Concrete Technology, Theory and Practice', S. Chand & Company.

Course Code: BTCE-403

Title of Course: Structure Analysis I

L	T	P	Credits
3	0	0	3

Course Outcomes: After completion of the course, students should be able to:

CO1 Identify determinacy and indeterminacy of structure

CO2 Different procedures to calculate slope and deflection for determinate structure.

CO3 Define strain energy and its application

CO4 Interpret Influence line diagram and its detail application

CO5 Analyze three hinged Arch and cable suspension bridge.

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	M	M	S	M	S	M	S	M	S
CO2	S	S	M	M	M	S	M	S	M	S	M	S
CO3	S	S	S	S	W	M	S	M	S	M	S	M
CO4	S	S	M	M	M	S	M	S	M	S	M	S
CO5	S	S	M	M	M	M	M	M	M	M	M	M

Course Content:

Unit-I

Deflection of Beams: Review of Double Integration Method and Macaulay's Method, Moment Area Method, Conjugate Beam Method, Unit Load Method, Energy Methods, Maxwell's reciprocal theorem.

Thin Cylinders and Spheres: Introduction, stresses and strains in thin cylinders and spherical shell, volumetric change, wire wound thin cylinders, thin vessels Title of Course to internal pressure.

Unit-II

Analysis of Determinate Trusses: Introduction, determination of forces in member of trusses by method of joints, method of sections, Tension Coefficient Method, Deflection of Joints of plane frames by Castiglioni's first theorem and unit load method, Effect of Lack of Fit & Temperature Change.

Analysis of Dams, Chimneys and Retaining Walls: Introduction, limit of eccentricity for no tension in the section, core of the section, middle third rule, wind pressure on chimneys.

Unit-III

Simple Cable & Arch Structures: Introduction, shape of a loaded cable, cable carrying point loads and UDL, cables with ends at different level, cable Title of Course to temperature

stresses, Analysis of Cables, Analysis of three hinged (Parabolic and Circular) Arches for Horizontal Thrust, Bending Moment, Normal Thrust, and Radial Shear.

Suspension Bridges: Introduction, Analysis of suspension bridges with two hinged and three hinged stiffening girders, Temperature Stresses in Three Hinged and Two Hinged Stiffening Girders.

Unit-IV

Rolling Loads: Introduction to rolling loads and influence lines, Determination of shear force, bending moment at a section and absolute shear force and bending moment due to single point load, uniformly distributed load, several point loads etc.

Influence Lines: Construction of Influence lines for reaction, shear forces and bending moment for beams, influence lines for girders with floor beams, Influence lines for forces in members of frames. Influence lines for Three Hinged Arches & Stiffening Girders.

Book Recommended

1. C.S. Reddy, 'Basic Structural Analysis'.
2. Vazirani & Ratwani, 'Analysis of Structures', Vol- I,-II.
3. C.K. Wang, 'Intermediate Structural Analysis'.

EBook

<https://www.kopykitab.com/Engineering-Geology-And-Rock-Mechanics-Fourth-Edition-by-Dr-B-P-Verma#snapshot>

<https://nptel.ac.in/courses/105101085/>, www.swayam.gov.in

Course Code : BTCE-404

Title of Course: Structural Analysis Laboratory

L	T	P	Credits
0	0	2	1

Course outcomes: After completion of the course, students should be able to

CO1 To study the concepts of loads, supports and displacements.

CO2 To understand the concepts and theorems of structures for analysis.

CO3 Analyze structural systems

CO4 Select a suitable technique for determination of structural displacement and force resultants

CO5 Study the effect of loads, rolling loads and support displacements on the structural

CO6 To study the Concept of influence lines for deciding the critical forces and sections while designing

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	W	W	M	M	S	W	M	M
CO2	S	S	S	S	S	W	M	M	S	W	S	M
CO3	S	S	S	S	W	W	M	M	S	W	M	M
CO4	S	S	S	S	S	W	M	M	S	W	S	M
CO5	S	M	M	M	S	W	M	M	S	W	S	M
CO6	S	M	M	M	S	W	M	M	S	W	S	M

List of Experiments:

1. Deflection of a simply supported beam and verification of Clark-Maxwell's theorem.
2. To determine the Flexural Rigidity of a given beam.
3. To verify the Moment- area theorem for slope and deflection of a given beam.
4. To determine the Carry Over Factor of a prismatic beam with far end fixed.
5. Experiment on three-hinged arch.
6. Experiment on two-hinged arch.
7. Deflection of a statically determinate pin jointed truss.
8. Forces in members of a redundant frame.
9. Experiment on curved beams.
10. Unsymmetrical bending of a cantilever beam.

Course Code: BTCE-405
Title of Course: Surveying-II

L	T	P	Credits
2	0	0	2

Course Outcomes: After completion of the course, students should be able to
 CO1 Knowledge about surveying techniques
 CO2 Understand to work with different instruments, Prismatic Compass & Plane table
 CO3 Able to perform Leveling operations; and draw & interpret a Contour map
 CO4 Understand the Tacheometric measurements and able to apply those on field
 CO5 knowledge of Modern Electronic instruments for applications of Surveying

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	M	S	W	W	W	S	S	S	S
CO2	S	S	S	M	M	M	W	W	S	M	S	M
CO3	S	S	S	M	S	W	W	W	S	S	S	S
CO4	S	S	S	S	M	M	W	W	S	M	M	M
CO5	S	S	S	S	M	W	W	W	S	M	W	M

Course Content

Unit I

Theodolite: Different types of Theodolites, temporary & permanent adjustment, traversing with a Theodolite, adjustment of closing error by Bowditch & transit rules.

Unit II

Curves: Different types of curves, their degree and calculation of ordinates, and angles, their layout, obstacles in curves.

Unit III

Tachometric Survey: Different types of tachometer, calculation of vertical and horizontal distances, substance bar, Tachometric leveling with both angle of depression and elevation, errors due to curvature & refraction.

Unit IV

Triangulation: Measurement of baseline, corrections for the baseline, selection of stations.

Trigonometric Leveling: Height & distance of inaccessible objects.

Books Recommended:

1. Surveying and Leveling: T.P. Kanetkar
2. Surveying and Leveling : Dr. N. Singh
3. Surveying : Dr. P.B. Sahiwney
4. Surveying: C.L.Kocher
5. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, 'Surveying', Vol. I, II, Laxmi Publications, **2005**.
6. R. Agor, 'Surveying', Khanna Publishers,**1982**.
7. S.S. Bhavikatti, 'Surveying & Levelling', Vol. I, II,**2009**.
8. Narinder Singh, 'Surveying', Tata McGraw Hill.
9. N.N. Basak, 'Surveying and Leveling', Tata McGraw Hill, New Delhi,**2000**.

EBook

file:///C:/Users/RBSK/Downloads/ENGINEERING%20SURVEYING.pdf

Online Learning

<https://nptel.ac.in/courses/105103176/>

www.swayam.gov.in

Course Code: BTCE - 406

Title of Course: Surveying Laboratory

L	T	P	Credits
0	0	2	1

Course outcomes: After completion of the course, students should be able to

CO1 Able to collect field data.

CO2 To prepare plan or map of the area

CO3 To analyze field parameters

CO4 To evaluate field parameters at the site for further engineering works

CO/PO Mapping (S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	W	W	M	M	S	W	M	M
CO2	S	S	S	S	S	W	M	M	S	W	S	M
CO3	S	S	S	S	W	W	M	M	S	W	M	M
CO4	S	S	S	S	S	W	M	M	S	W	S	M

List of Experiments

1. Measurement of distance, ranging aline.
2. Measurement of bearing and angles with compass, adjustment of traverse by graphical method.
3. method.
4. Different methods of leveling, height of instrument, rise & fall methods.
5. Measurement of horizontal and vertical angle by theodolite.
6. Determination of tachometric constants and determination of reduced levels by tachometric observations.
7. Plane table survey, different methods of plotting, two point & three-point problem.
8. Determination of height of an inaccessible object.
9. Setting out a transition curve. Setting out of circular curves in the field using different methods.
10. methods.
11. Introduction of Total Station.

Course Code: BTCE-407

Title of Course: Environmental Engineering-I

L	T	P	Credits
3	0	0	3

Course Outcomes: After completion of the course, students should be able to

CO1 Understand the Physical, chemical and biological characteristics of sewage and design of sewer

CO2 Capable to design secondary treatment units such as Activated sludge process, trickling filter, etc.

CO3 Understand theory and design of anaerobic treatment units

CO4 Know the waste water treatment flow sheet for various industries

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	S	M	S	W	S	S	W	M	S	M	M
CO2	S	M	S	W	M	S	S	M	M	S	M	M
CO3	M	S	M	S	W	S	S	W	M	S	M	M
CO4	S	M	S	W	M	S	S	M	M	S	M	M

Course Content:

Unit - I

Introduction: Beneficial uses of water, water demand, per capita demand, variations in demand, water demand for firefighting, population forecasting and water demand estimation.

Water Sources and Development: Surface and ground water sources; Selection and development of sources; Assessment of potential; Flow measurement in closed pipes, intakes and transmission systems.

Unit - II

Pumps and Pumping Stations: Types of pumps and their characteristics and efficiencies; Pump operating curves and selection of pumps; pumping stations.

Quality and Examination of Water: Impurities in water, sampling of water, physical, chemical and bacteriological water quality parameters, drinking water quality standards and criteria.

Unit - III

Water Treatment: Water treatment schemes; Basic principles of water treatment; Design of

Plain sedimentation, coagulation and flocculation, filtration – slow, rapid and pressure; Disinfection units; Fundamentals of water softening, fluoridation and defluoridation, and water desalination and demineralization, taste and odour removal.

Unit - IV

Water Supply Systems: Pipes for transporting water and their design, water distribution systems and appurtenances; Water supply network design and design of balancing and service reservoirs; operation and maintenance of water supply systems.

Rural Water Supply: Principles, selection of source, rain water harvesting, quantitative requirements, low cost treatment techniques.

Recommended Books

1. B.C. Punmia, Ashok Jain, Arun Jain, 'Water Supply Engineering- Environmental Engg.', Vol.-I, Laxmi Publications, New Delhi.
2. Arcadio P. Sincero and Gregoria P. Sincero, 'Environmental Engg.- A Design Approach', Prentice Hall of India, New Delhi.
3. Howard S. Peavy, Donald R. Rowe & George Tchobanoglous, 'Environmental Engg.' International Edition, McGraw Hill.
4. S.K. Garg, 'Water Supply Engineering- Environmental Engg.', Vol.-I, Khanna Publishers, Delhi.
5. E.W. Steel, McGhee, J. Terence, 'Water Supply and Sewerage', McGraw Hill.

EBook

http://site.iugaza.edu.ps/afoul/files/2010/02/Environmental_book.pdf

Online Learning

<https://nptel.ac.in/courses/103107084/>

www.swayam.gov.in

Course Code: BTCE-407

Title of the Course: Integrated Project -IV

L	T	P	Credits
0	0	4	-

Course Outcomes:

CO1: Apply knowledge and skills learned in the labs to solve real life problems.

CO2: Enhance the technical skills required for the industry.

CO3: Identify areas for future learning and skill development.

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation)

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	W	S	W	W	W	W	M	W	W	W
CO2	S	S	M	S	W	W	W	W	M	W	W	W
CO3	S	S	W	S	W	W	W	W	M	W	W	W

Course Code : DBAI-101

Title of the Course: Artificial Intelligence

L	T	P	Credits
4	0	0	4

Course Outcomes:

CO1: Understand and implement Natural versus Artificial Intelligence

CO2: Apply Reasoning under certainty and AI Language.

CO3: Implement Artificial Intelligence techniques. Clarification in the Concepts of Non-Monotonic reasoning: Truth Maintenance Systems

CO4: Manage projects in multidisciplinary environments for the society.

CO/PO Mapping												
(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation)												
CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	M	S	M	W	M	W	W	M	M	S
CO2	W	S	S	M	S	W	W	W	S	W	M	S
CO3	S	M	M	S	M	W	M	W	W	M	M	S
CO4	W	S	S	M	S	W	W	W	S	W	M	S

Unit	Course Outlines	Hour(s)
1	Introduction to AI: Definitions, Basic Elements of AI, Application Areas Natural versus Artificial Intelligence, Turing test for the systems. Problem Formulation: Defining problem as a state space search, Problem reduction, problem characteristics, Production Systems. Blind Search Techniques: Depth First Search & Breadth First Search Heuristic Search Techniques: Hill climbing, Best First Search & Optimal A* search	12
2	Reasoning under certainty: Introduction to Monotonic Reasoning, Logics: Syntax & Semantics of Propositional logic, Syntax & Semantics of First Order Predicate Logic (FOPL) Well Formed Formulae (Wffs), Conversion to Clausal Form, Substitution, Unification & its algorithm, Resolution.	11

3	Reasoning under uncertainty: Introduction to Non-Monotonic Reasoning, Concepts of Non-Monotonic reasoning: Truth Maintenance Systems (TMS) Default Reasoning & Closed World Assumptions. Logics for non-monotonic reasoning: Modal Logics, Temporal Logics & Fuzzy Logics. Knowledge Acquisition, Knowledge Organization & Knowledge Representation Knowledge Representation Schemas: Semantic Nets	12
4	Learning in AI: Definition, types of learning. Expert System: Architecture and components of an expert system, Applications. Natural language processing: Features of natural language, Steps in Natural Language Processing	10

Recommended Books

1. E. Rich and K. Knight," Artificial Intelligence", Tata McGraw Hill Publications
2. Dan W. Patterson, "Introduction to Artificial Intelligence and Expert Systems", PHI.
3. E. Charnaik and D. McDermott," Introduction to artificial Intelligence", Addison-Wesley Publishing Company.
4. Nils J. Nilson, "Principles of Artificial Intelligence", Narosa Publishing Co.
5. M. Chandwick and J.A. Hannah, "Expert Systems for Personal Computers", Galgotia Publications Pvt.Ltd.

Course Code: DBHY-101

Title of the Course: Health and Wellness-Yoga

L	T	P	Credits
1	0	2	2

Unit	Course Outlines	Hour(s)																								
1	<p>Health: Introduction, Concept and Factors influencing health.</p> <p>Health Education: Introduction, Objectives, Importance, Scope, Principles, Practice of Health Education, Planning & Evaluation in Health Education Programmes.</p> <p>Health Services: Organisation and Administrative Set Up of Health Services in India</p> <p>Health Problem in India: Problems Related to Communicable Diseases: (HIV-AIDs, Hepatitis, Malaria, Rabies and Tetanus).</p> <p>Health instructions: Types, Role of Teacher, Health Instructions at Primary, Middle & Secondary Stage and their Methods to Imparting Health Instruction</p>	9																								
2	<p>Wellness: Concept, definition, differences between fitness and wellness</p> <p>Components of wellness: Quality of life and healthy life style approach, self-management skills to adhere to healthy life style behavior, SMART Goal evaluation fixation, stress Management, relevant fitness swallower issues.</p> <p>Disease prevention and control, Communicable disease and non-communicable disease</p>	9																								
3	<p>Yoga: Introduction, Historical background and Origin of Yoga, Meaning and Concept of Yoga and its relationship with Physical Education and Sports.</p> <p>Yoga in present global scenario: Yoga as a Science; and recent advances in Yoga.</p> <p>Pranayama: meaning, types and its importance.</p> <p>Asanas: Asanas- meaning , types,principles, Techniques of asanas and effects of asanas on various systems of the body-circulatory, respiratory and digestive system.</p> <p>Meditation: Meaning, definition, types and techniques of meditation.</p> <p>Yoga and Treatment: Therapeutic and Corrective Values of Yoga Practices special reference to disease like: Diabetes, Asthma, Constipation, Obesity, Cervical, Gastric and Acidity</p>	9																								
4	<p>Practical - Selected Games</p> <p>Surya Namaskara, Selected Yogasanas</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;">1. Kukkutasana</td> <td style="width: 33%;">2. Uttana-Kurmasana</td> <td style="width: 33%;">3. Simhasana</td> </tr> <tr> <td>4. Matsyendrasana</td> <td>5. Paschimottanasana</td> <td>6. Dhanurasana</td> </tr> <tr> <td>7. Matsyasana</td> <td>8. Baddha-Padmasana</td> <td>9. Gorakshasana</td> </tr> <tr> <td>10. Uttana-Mandukasana</td> <td>11. Garudasana</td> <td>12. Ushtasana</td> </tr> <tr> <td>13. Bhujangasana</td> <td>14. Chakrasana</td> <td>15. Sarvangasana</td> </tr> <tr> <td>16. Mayurasana</td> <td>17. Sirshasana</td> <td>18. Sankatasana</td> </tr> <tr> <td>19. Setubandhasana</td> <td>20. Konasana</td> <td>21. Trikonasana</td> </tr> <tr> <td>22. Karanpedasana</td> <td>23. Pada-angushthasana</td> <td>24. Ashwathasana</td> </tr> </table>	1. Kukkutasana	2. Uttana-Kurmasana	3. Simhasana	4. Matsyendrasana	5. Paschimottanasana	6. Dhanurasana	7. Matsyasana	8. Baddha-Padmasana	9. Gorakshasana	10. Uttana-Mandukasana	11. Garudasana	12. Ushtasana	13. Bhujangasana	14. Chakrasana	15. Sarvangasana	16. Mayurasana	17. Sirshasana	18. Sankatasana	19. Setubandhasana	20. Konasana	21. Trikonasana	22. Karanpedasana	23. Pada-angushthasana	24. Ashwathasana	14
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Recommended Books:-

1. Ashton, D: Administration of Physical Education for Women, New York: The Ronald Press Company, 1968.
2. Kamlesh, M.L. and Sangral, M.S. : History and Principles of Physical Education, Prakash Brothers, 1983.
3. Wuest and Bucher: Foundations of Physical Education and Sports, B.I. Publications Pvt. Ltd., New Delhi.
4. William , H.F. : Physical Education and Sports in Changing Society, Surjeet Publication, Delhi.
5. Warner.W. K Hoeger and Sharon.AHoeger : Fitness &Wellness.wordworth Publications
6. Debnath, Monica “Basic Core Fitness through Yoga and Naturopathy” (2006-07) Sports Publication, G-6,23/23B EMCA House, Ansari Road, Darya Ganj New Delhi
7. Yogeswar, “Text Book of Yoga”,(2004) Penguin Books.
8. Harvey, Paul “Yoga for Everybody”, (2001)TuckerSlingsby Publisher Ltd.
9. Sharma, Lalita “All You Wanted to Know About Yoga”, (1991)Sterling Publisher Pvt. Ltd.
10. Sarawati, S Satyananda “Asana, Pranayam, Mudra and Bandhas”.
11. Pandey, P.K. and Gongopadhay, S. R. “Health Education for School Children”, Friends Publication, Delhi.
12. Park, J.E. and Park, K, “Text Book of Community Health for Nurses”, (1982) Asrani Publisher, Jabalpu.
13. Park, J.E. and Park, K. “Text Book of Preventive and Social Medicine”, (1985) BnasidarBhanot, Publisher, Jabalpur.
14. Singh, Ajmer.,Bains, Jagdish., Gill, Jagtar Singh. andBrar, Rashpal Singh “Essential of physical Education” (2017). Kalyani Publisher, Ludhiana, Punjab.
15. Dr. Paramvirsingh ,Physical Education & Yoga. Publication bureau Punjabi university Patiala.

Course Code: DBNC-104

Title of the Course: NCC

L	T	P	Credits
1	0	2	2

Course Outcomes

CO 1: Acquire adequate skill sets to overcome their weakness and reshape their personality.

CO 2: Imbibe good moral values and character traits in their daily life.

CO 3: Become useful members of the society and form part of disaster response team, if need arises.

CO 4: Respect the diversity of different Indian cultures.

CO/PO Mapping (S-Strong Correlation, M- Medium Correlation, W-Weak Correlation)												
CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	W	M	M	M	M	M	M	M	S
CO2	M	S	M	S	W	M	W	W	M	W	S	M
CO3	S	W	W	M	S	S	S	W	S	W	S	S
CO4	S	W	W	W	M	M	M	W	S	M	M	S

Subject	Course Outline	Hour(s)
Personality Development	Introduction to Personality Development, Factors influencing/shaping personality, Time Management and Interview Skills.	4
Leadership	Leadership Traits, Moral Values and Character Traits.	3
Disaster Management	Assistance during natural disasters, Do's and Don'ts for NCC Cadets performing Disaster Management Duties.	10
Environmental awareness and Conservation	Adventure Environmental Awareness and Conservation.	3
General Awareness	General Awareness	4
Armed Forces	Armed Forces (Contact Hrs. 2) (Army). Army, Navy, Air Force and Central Armed Police Forces. General Service Knowledge (Contact Hrs. 2) (Air Force). Armed Forces & IAF Capsule, Modes of Entry in IAF, Civil Aviation, Aircrafts-Types, Capabilities & Role. Naval Orientation (Contact Hrs. 2) (Navy). Armed Forces & Navy Capsule, EEZ Maritime Security & ICG.	6

Drill	(i) Arm Drill. (ii) Salami Shastra. (iii) Squad Drill with Arms.	7
Field Craft and Battle Craft	(i) Fire and Move Capsule. (ii) Field signal- with hand, with Weapons, Signal with Whistle. (iii) Field signals as means of giving orders. (iv) Field signals by day, Field signals by night. (v) Section Formation.	4
Map Reading	(i) Map to Ground. (ii) Ground to Map.	4
Weapon Training	Short Range firing.	4
Social Service and Community Development	Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan JeevanHariyali Abhiyan, BetiBachaoBetiPadhaoetc as per the requirement and similar announced days- National and State level.	6
Health and Hygiene	(i) Hygiene & Sanitation (Hygiene- Personal & Camp Hygiene). (ii) First Aid in common medical emergencies. (iii) Treatment & Care of Wounds.	5

Total -60

Text Book(s)

1. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Army) : Common Subjects: 2019
2. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Army) : Specialized Subject: 2019
3. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Air Force) :Specialized Subject: 2019
4. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Navy) : Specialized Subject: 2019

ProjectWork/Practical:

Conducting surveys/activities on special themes as follows

- Social Harmony and National Integration
- Indian Constitution and Social Justice
- Concept of Society and Social Issues in India
- Health, Hygiene and Sanitation Programmes
- Citizens duties, Human Rights consumer Rights
- Special Camp and their Planning

Course Code: DBNS-104

Title of the Course: NSS

L	T	P	Credits
0	0	4	2

Course Outcomes:

CO1: Orientation: history, objectives, principles, symbol and badge.

CO2: NSS programs and activities

CO3: Community mobilization, Understanding youth

CO4: Volunteerism and Shramdan

CO/PO Mapping (S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	S	M	S	M	M	S	S	M	M
CO2	S	S	M	S	M	S	M	M	S	S	M	M
CO3	S	S	M	S	M	S	M	M	S	S	M	M
CO4	S	S	M	S	M	S	M	M	S	S	M	M

Unit	Course outlines	Lecture(s)
1	Introduction and Basic Concepts of NSS : <ul style="list-style-type: none">• Definition of NSS : Aims & Objectives of NSS,• Roles and responsibilities of various NSS functionaries,• Emblem ,flag, Motto, Song, Badge, NSS day etc,• Organizational structure (from national to regional level).	10
	NSS Programmes and Activities : <ul style="list-style-type: none">• Concept of regular activities(one day camp), special seven day conduction camping, day and night camps and relevance of celebration of important days recognized by united nations, Centre, State Govt. & University• Basis of adoption of village/slums, methodology of conduction survey• Coordination with different agencies• Maintenance of the diary	8
2	Community Mobilization <ul style="list-style-type: none">• Functioning of community stakeholders	9

	<ul style="list-style-type: none"> • Designing the message in the context of the problem and the culture of the community • Identifying methods of mobilization • Youth-Adult partnership • Concept of Community development 	
	<p>Volunteerism and Shramdan</p> <ul style="list-style-type: none"> • Indian tradition of volunteerism • Value system of volunteerism • Motivation and constraints of volunteerism • Shramdanasa part of volunteerism, Role of NSs volunteers in Swatch Bharat Abhiyan • Role of NSS volunteers in Digital India 	8
3	<p>Project Work/Practical:</p> <p>Conducting surveys/activities on special themes as follows</p> <ul style="list-style-type: none"> • Social Harmony and National Integration • Indian Constitution and Social Justice • Concept of Society and Social Issues in India • Health, Hygiene and Sanitation Programmes • Citizens duties, Human Rights consumer Rights 	10
	Total	45



(U/S 2(f) and 12B of the UGC Act1956, NAAC Accredited)

DESH BHAGAT UNIVERSITY, MANDI GOBINDGARH

Faculty of Engineering and Applied Sciences

Department of Civil Engineering

Program: B.Tech Civil Engineering

Semester V

Sr. No.	Course Code	Course Name	Category	Internal	External	Total	L	T	P	C
1.	BTCE-501	Design of Steel Structures-I	Theory	40	60	100	3	0	0	3
2.	BTCE-502	Transportation Engineering	Theory	40	60	100	3	0	0	3
3.	BTCE-503	Transportation Engineering Laboratory.	Practical	40	60	100	0	0	2	1
4.	BTCE-504	Environmental Engineering-II	Theory	40	60	100	3	0	0	3
5.	BTCE-505	Environmental Engineering Laboratory	Practical	40	60	100	0	0	2	1
6.	BTCE-506	Rock Mechanics and Geomatics Engineering	Theory	40	60	100	2	0	0	2
7.	BTCE-507	Training (Survey Camp)	Practical	40	60	100	0	0	0	2
8.	BTCE-508	Integrated Project-V	Practical	40	60	100	0	0	4	Q/NQ
9.	DBEA-501	Employability Skills Advance	Theory	40	60	100	3	0	0	3
Elective-I (Select any One)										
10.	BTCE-509	Disaster Management	Theory	40	60	100	2	0	0	2
	BTCE-510	Soil and Foundation Engineering	Theory	40	60	100	2	0	0	
	BTCE-511	Railways, Bridges And Tunnels	Theory	40	60	100	2	0	0	

6-Week Training (Survey Camp) during summer vacations after 4th semester

L- Lecture , T- Tutorial , P- Practical , C- Credit

Course Code: BTCE-501

Title of Course: Design of Steel Structure-I

L	T	P	Credits
3	0	0	3

Course Outcomes: After completion of the course, students should be able to:

CO1 Concepts of strength and stiffness

CO2 Analyze and design the riveted and bolted connections

CO3 Design problems related to strength and serviceability concepts

CO4 Design problems related to roof trusses

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	M	S	M	W	W	S	W	S	S
CO2	S	S	S	S	M	M	W	W	S	W	M	S
CO3	S	S	M	M	S	M	W	W	S	W	S	S
CO4	S	S	S	S	M	M	W	W	S	W	M	S

Course Content:

Note: IS 800:2007, General construction in Steel-Code of practice is permitted in examination.

Unit - I

Introduction: Properties of structural steel, I.S. rolled sections, I.S. specifications.

Connections: Riveted, bolted and welded connections for axial and eccentric loads.

Unit - II

Tension Members: Design of members Title of Courseed to axial tension using bolts and welds
Compression Members: Design of axially loaded members, built-up columns, laced and battened columns including the design of lacing and battens using bolts and welds.

Unit - III

Flexural Members: Design of laterally restrained and un-restrained rolled, encased beams using bolts and welds and introduction of built up sections.

Foundation: Design of slaboratory base, gusseted base and grillage foundation using bolts and welds.

Unit-IV

Roof Truss: Design of roof truss using bolts and welds.

Books & Codes Recommended

Recommended Books:

1. S.K. Duggal, 'Limit State Design of Steel Structures', McGraw Hill.
2. N. Subramanian, 'Design of Steel Structures', Oxford Higher Education.
3. 'Design of Steel Structures', Vol. -1, Ram Chandra Standard Book House –Rajsons.
4. S S Bhavikatti, 'Design of Steel Structures' (by limit state method as per IS: 800-2007)', I.K. International Publishing House.
5. 'IS 800: 2007 (General construction in Steel-Code of practice)'.

EBook:

file:///C:/Users/RBSK/Downloads/9789382332121.pdf

Online Learning

<https://nptel.ac.in/courses/105105162/>

www.swayam.gov.in

Course Code: BTCE-502

Title of Course: Transportation Engineering-I

L	T	P	Credits
3	0	0	3

Course Outcomes: After completion of the course, students should be able to:

CO1 Knowledge about classification and planning of roads in India.

CO2 Able to know road construction materials

CO3 Geometric design of highways

CO4 Analysis and design of flexible and rigid pavements.

CO5 Mechanisms for highway maintenance, drainage, economic, and environment

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	M	M	S	S	S	S	W	S	W	M	S
CO2	M	S	M	M	S	S	M	W	S	W	M	S
CO3	S	S	S	S	S	M	M	W	S	W	M	S
CO4	S	S	S	S	S	M	M	W	S	W	M	S
CO5	M	M	M	S	S	S	S	W	S	W	M	S

Course Content:

Unit I

Introduction: Importance of Transportation, Different Modes of Transportation, Characteristics of Road Transport.

Highway Development & Planning: Principles of Highway Planning, Road Development in India, Classification of Roads, Road Patterns, Planning Surveys.

Highway Alignment: Requirements, Alignment of Hill Roads, Engineering Surveys.

Unit II

Highway Geometric Design: Cross Section Elements, Carriageway, Camber, Sight Distances, Horizontal Curves, Extra-widening, Super-elevation, Vertical Curves.

Highway Materials: Properties of Sub-grade and Pavement Component Materials, Tests on Sub-Grade Soil, Aggregates and Bituminous Materials.

Highway Construction: Earthen/Gravel Road, Water Bound Macadam, Wet Mix Macadam, Bituminous Pavements, Cement Concrete Pavements.

Unit III

Introduction to Pavements Design: Types and Introduction of pavements design.

Highway Drainage and Maintenance: Importance of drainage and maintenance, Surface Drainage and Subsoil Drainage, Construction in Water-logged areas, Pavement Failures, Pavement Evaluation, Maintenance and Strengthening Measures.

Highway Economics & Financing: Total Transportation Cost, Economic Analysis, Sources of Highway Financing.

Unit IV

Traffic Characteristics: Road User Characteristics, Driver Characteristics, Vehicular Characteristics.

Traffic Studies: Volume Studies, Speed Studies, O-D Survey, Parking Study.

Traffic Safety and Control Measures: Traffic Signs, Markings, Islands, Signals, Cause and Type of Accidents, Use of Intelligent Transport System.

Traffic Environment Interaction: Noise Pollution, Vehicular Emission, Pollution Mitigation Measures.

Recommended Books

1. S.K. Khanna and C.E.G. Justo, 'Highway Engineering', Nem Chand and Brothers, Roorkee.
2. L.R. Kadiyali, 'Principles and Practice of Highway Engineering', Khanna Publishers, New Delhi.
3. S.K. Sharma, 'Principles, Practice & Design of Highway Engineering', S. Chand & Company Ltd., New Delhi.
4. C.A.O. Flaherty, 'Highway Engineering', Vol. 2, Edward Arnold, London.
5. Mannering, 'Principles of Highway Engineering & Traffic Analysis', Wiley Publishers, New Delhi.

EBook

<https://www.studynama.com/community/threads/transportation-engineering-1-ebook-notes-pdf-download-for-civil-engineers.174/>

Online Learning

<https://nptel.ac.in/courses/105101087/>
www.swayam.gov.in

Course Code: BTCE -503

Title of Course: Transportation Engineering Laboratory

L	T	P	Credits
0	0	2	1

Course outcomes: After completion of the course, students should be able to:

CO1 Evaluate the strength of sub grade soil by CBR test

CO2 Conduct experiments to evaluate aggregate properties

CO3 Determine properties of bitumen material and mixes

CO4 Create a well-organized testing report and present the results appropriately

CO/PO mapping												
(S/M/W indicates strength of correlation) S- Strong , M-Medium , W- Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	S	M	M	W	W	S	S	M	S
CO2	S	S	M	S	M	M	W	W	S	S	M	S
CO3	S	S	M	S	M	M	W	W	S	S	M	S
CO4	S	S	M	S	M	M	W	W	S	S	M	S

Course Content:

Tests on Sub-Grade Soil

Unit-I

1. Proctor's Compaction Test
2. California Bearing Ratio Test

Tests on Road Aggregates

Unit-II

1. Crushing Value Test
2. Los Angeles Abrasion Value Test
3. Impact Value Test

4. Shape Test (Flakiness and Elongation Index)

Unit-III

Tests on Bituminous Materials

1. Penetration Test
2. Ductility Test
3. Softening Point Test
4. Flash & Fire Point Test

Laboratory Manuals

Recommended Books:

1. S.K. Khanna and C.E.G. Justo, 'Highway Material & Pavement Testing', Nem Chand and Brothers, Roorkee.

Course Code: BTCE-504

Title of Course: Environmental Engineering-II

L	T	P	Credits
3	0	0	3

Course Outcomes: After completion of the course, students should be able to

- CO1 Understand the Physical, chemical and biological characteristics of sewage and design of sewer
- CO2 Capable to design secondary treatment units such as Activated sludge process, trickling filter, etc.
- CO3 Understand theory and design of anaerobic treatment units
- CO4 Know the waste water treatment flow sheet for various industries

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	S	M	S	M	M	S	W	S	W	S	S
CO2	M	M	S	S	M	S	S	W	S	W	M	S
CO3	S	S	S	S	M	M	S	W	S	W	S	S
CO4	M	S	M	S	M	M	S	W	S	W	S	S

Course Content:

UNIT-I

Introduction: Terms & definitions, systems of sanitation and their merits and demerits, system of sewerage, choice of sewerage system and suitability to Indian conditions.

Sewerage Systems: Generation and estimation of community Sewage, flow variations, storm water flow, types of sewers. Design of sewers and storm water sewers, construction & maintenance of sewers, sewer appurtenances, sewage pumping and pumping stations.

UNIT -II

House Drainage: Principles of house drainage, traps, sanitary fittings, systems of plumbing, drainage lay out for residences.

Characteristics of Sewage: Composition of domestic and industrial sewage, sampling, physical, chemical and microbiological analysis of sewage, biological decomposition of sewage, BOD and BOD kinetics, effluent disposal limits.

UNIT -III

Treatment of Sewage: Introduction to unit operations and processes - Primary treatment; screening (theory), grit chamber (theory and design), floatation units, sedimentation tanks(theory and design), Secondary treatment units; ASP (theory and design), Sequencing batch reactors (theory and design), Trickling filters (theory and design) Anaerobic systems; Anaerobic filters (theory), UASB (theory), Anaerobic lagoons, Sludge Handling and disposal; thickening, stabilization, dewatering, drying and disposal.

UNIT -IV

Introduction to Solid Waste Management Systems: Objective, Types and sources, Functional elements, Methods of solid waste management with their limitations.

Low Cost Sanitation Systems: Imhoff tanks (theory and design), septic tank (theory and design), soakage pit/soil absorption systems; stabilization ponds (theory and design); macrophyte ponds; oxidation ponds (theory and design); and constructed wetland systems.

Recommended Books

1. B.C. Punmia, Ashok Jain, 'Waste Water Engg. (Environmental Engg.-II)', Laxmi Publications, New Delhi.
2. Arcadio P. Sincero and Gregoria P. Sincero, 'Environmental Engg. - A Design Approach', Prentice Hall of India, New Delhi.
3. Metcalf & Eddy, 'Waste Water Engineering - Treatment and Reuse', TMH, New Delhi.
4. Howard S. Peavy, Donald R. Rowe & George Tchobanoglous, 'Environmental Engg.', International Edition, McGraw Hill.
5. S.K. Garg, 'Environmental Engineering (Vol. II)', Khanna Publishers, Delhi.

EBook

<https://lecturenotes.in/Title of Course/851/environmental-engineering-ii-ee-2>

Online Learning

<https://nptel.ac.in/courses/103107084/>

www.swayam.gov.in

Course Code: BTCE-505

Title of Course: Environmental Engineering Laboratory

L	T	P	Credits
0	0	2	1

Course Outcomes: After completion of the course, students should be able to

CO1 Conduct experiments as per standard methods of wastewater sampling and analysis

CO2 Demonstrate the expertise to characterize water and wastewater samples.

CO3 Understand the importance of Laboratory analysis as a controlling factor in the treatment of water and wastewater.

CO4 Make decisions regarding dosing of different chemicals involved in water treatment processes.

CO/PO mapping

(S/M/W indicates strength of correlation)

S- Strong , M-Medium , W- Weak

CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	M	M	W	W	S	S	M	S
CO2	S	S	S	S	M	M	W	W	S	S	M	S
CO3	S	S	S	S	M	M	W	W	S	S	M	S
CO4	S	S	S	S	M	M	W	W	S	S	M	S

List of Experiments

1. To measure the pH value of a water and waste water samples.
2. To determine optimum Alum dose for Coagulation.
3. To find MPN for the bacteriological examination of water.
4. To find the turbidity of a given waste water and water samples.
5. To find B.O.D. of a given waste water sample.
6. To measure D.O. of a given sample of water.
7. Determination of Hardness of a given water sample.
8. Determination of total solids, dissolved solids, suspended solids of a given water sample.
9. To determine the concentration of sulphates in water and waste water samples.
10. To find chlorides in given samples of water and wastewater.
11. To find acidity and alkalinity of water samples.
12. To determine the COD of a waste water sample.

Recommended Books

1. Sawyer & McCarty, 'Chemistry for Environmental Engg. and Science', TMH, New Delhi.

Course Code: BTCE-506

Title of Course: Rock Mechanics and Geomatics Engineering

L	T	P	Credits
2	0	0	2

Course Outcome: After completion of the course, students should be able to:

CO1 Knowledge about Engineering properties of Rocks and Minerals

CO2 Understand the fundamental differences between the rock mass and other types of man-made construction materials

CO3 Identify various geological hazards

CO4 Use different rock mass classifications systems

CO5 Estimate various geological parameters by use of modern tools and techniques

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	W	W	M	S	M	S	W	M	W	S	S	S
CO2	W	W	M	S	M	S	W	M	W	S	S	S
CO3	S	S	S	S	M	M	S	W	M	W	S	S
CO4	S	S	S	S	M	M	S	W	M	W	S	S
CO5	W	W	M	S	M	S	W	M	W	S	S	S

Course Content:

UNIT-I

General Geology: Importance of Engineering Geology applied to Civil Engineering Practices, Weathering, Definition- types and effect, Geological works of rivers, wind, glaciers as agents of erosion, transportation and deposition.

Rocks & Minerals: Minerals, their identification, igneous, sedimentary & metamorphic rocks. Classification of rocks for engineering purposes, Rock quality designation (RQD).

UNIT-II

Structural Geology: Brief idea about stratification, apparent dip, true dip, strike and in Conformities, Folds, faults & joints: definition, classification relation to engineering operations.

Engineering Geology: Geological considerations in the Engineering Projects like tunnels, highways, foundation, dams, reservoirs. Earthquake: Definition, terminology, earthquake waves, intensity, recording of earthquake.

in situ stresses, bore hole test.

UNIT-III

Improvement in Properties of Rock Masses: Pressure grouting for dams and tunnels, rock reinforcement, rock bolting.

Photogrammetry: Introduction, Basic Principles, Photo-Theodolite, Elevation of a Point by Photographic Measurement, Aerial Camera, Vertical Photograph, Tilted Photograph, Scale, Crab and Drift, Flight Planning for Aerial Photography, Ground Control for Photogrammetry, Photomaps and Mosaics, Stereoscopic Vision, Stereoscopic parallax, Stereoscopic Plotting Instruments, its Applications.

Electromagnetic Distance Measurement (EDM): Electromagnetic Waves, Carrier Waves, Black body radiation, Laws of radiation Modulation, Types of EDM Instruments, Electro-optical, Infrared, and Microwave EDM Instruments, Effect of Atmospheric Conditions, The Geodimeter, The Tellurometer, Wild Distomats, Electronic Total Station.

Remote Sensing: Introduction, Basic Principles, Electromagnetic (EM) Energy Spectrum, EM Radiations and the Atmosphere, Interaction of EM radiations with Earth's Surface, Types of remote sensing systems, Remote Sensing Observation Platforms, Satellites and their characteristics—Geostationary and sun-synchronous, Earth Resources Satellites, Meteorological satellites, Sensors, Types and their characteristics, Across track and Along track scanning, Applications of Remote Sensing.

Recommended Books

1. Richard E. Goodman, 'Introduction to Rock Mechanics'.
2. I.W. Farmar, 'Engineering Behaviour of Rocks'.
3. C. Jaager, 'Rock Mechanics and Engineering'.
4. Jaager and Cook, 'Fundamentals of Rock Mechanics'.
5. D.S. Arora, 'Engineering Geology'.
6. Parbin Singh, 'Engineering Geology'.
7. B.P. Verma, 'Rock Mechanics for Engineering'.
8. Arora, K.R., 2007: Surveying Vol-III, Standard Book House.
9. Campbell, J.B. 2002: Introduction to Remote Sensing. Taylor Publications.
10. Chang.T.K. 2002: Geographic Information Systems, Tata McGrawHill.
11. Heywood.I, Cornelius S, CrverSteve. 2003: An Introduction to Geographical InformationSystems, Pearson Education.
12. Joseph George, 2003: Fundamentals of Remote Sensing. Universities Press.
13. Punmia, B.C., Jain A.K., 2005: Higher Surveying, Luxmi Publications
14. Sabbins, F.F., 1985: Remote Sensing Principles and Interpretation. W.H.Freeman andcompany.
15. Kaplan, E.D., Understanding GPS : Principles and Application; Artec House; 2 Edition

EBook

<https://epdf.pub/rock-mechanics-and-engineering.html>

Online Learning

<https://nptel.ac.in/courses/105106055/www.swayam.gov.in>

Course Code: BTCE -507

Title of Course: Training (Survey Camp)

L	T	P	Credits
0	0	0	2

Course Outcomes: After completion of the course, students should be able to

CO1 Knowledge about surveying techniques

CO2 Understand to work with different instruments, Prismatic Compass & Plane table

CO3 Able to perform Leveling operations; and draw & interpret a Contour map

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	M	S	M	W	W	S	W	S	S
CO2	S	S	S	S	M	M	W	W	S	W	M	S
CO3	S	S	M	M	S	M	W	W	S	W	S	S

Survey Camp up to 4 weeks' duration, out of which 1 week will be spent at site covering 2 shifts per day which will be equivalent to 2 weeks of on-site field study and training. Rest of 2 weeks will be spent at the Institute for preparation of Survey sheet including of contour map.

Course Code: BTCE-508

Title of the Course: Integrated Project -V

L	T	P	Credits
0	0	4	-

Course Outcomes:

CO1: Apply knowledge and skills learned in the labs to solve real life problems.

CO2: Enhance the technical skills required for the industry.

CO3: Identify areas for future learning and skill development.

CO/PO Mapping												
(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation)												
CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	W	S	W	W	W	W	M	W	W	W
CO2	S	S	M	S	W	W	W	W	M	W	W	W
CO3	S	S	W	S	W	W	W	W	M	W	W	W

Course Code: DBEA-501

Title of the Course: Employability Skills Advance

L	T	P	Credits
3	0	0	3

Course Outcomes:

The course is designed to achieve superior outcomes of placement, retention and progression of students through 21' century employability skills' training and assessment.

Skills development network shall provide Vocational curricula and e-content for high quality employability and work skills training through an online learning platform

Course Code:BTCE- 509

Title of Course: Disaster Management

L	T	P	Credits
2	0	0	2

Course Outcomes: After completion of the course, students should be able to

CO1 Understanding foundations of hazards, disasters and associated natural/social phenomena.

CO2 Knowledge about disaster management theory

CO3 Humanitarian Assistance before and after disaster.

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	M	S	M	W	W	S	W	S	S
CO2	S	S	S	S	M	M	W	W	S	W	M	S
CO3	S	S	M	M	S	M	W	W	S	W	S	S

Course Content:

UNIT-I

Introduction to Disaster Management: Define and describe disaster, hazard, emergency, vulnerability, risk and disaster management; Identify and describe the types of natural and non- natural disasters. Important phases of Disaster Management Cycle.

Disaster Mitigation and Preparedness: Natural Hazards: causes, distribution pattern, consequences and mitigation measures for earth quake, tsunami, cyclone, flood, landslide drought etc. Man-made hazards: causes, consequences mitigation measures for various industrial hazards/disasters, Preparedness for natural disasters in urban areas.

UNIT-II

Hazard and Risk Assessment: Assessment of capacity, vulnerability and risk, vulnerability and risk mapping, stages in disaster recovery and associated problems.

Emergency Management Systems (EMS): Emergency medical and essential public health services, response and recovery operations, reconstruction and rehabilitation.

UNIT-III

Capacity Building: Gender sensitive disaster management approach and inculcate new skills and sharpen existing skills of government officials, voluntary activists, development of professional and elected representative for effective disaster management, role of media in

effective disaster management, overview of disaster management in India, role of agencies like NDMA, SDMA and other International agencies, organizational structure, role of insurance sector, DM act and NDMA guidelines.

UNIT-IV

Application of Geoinformatics and Advanced Techniques: Use of Remote Sensing Systems (RSS) and GIS in disaster Management, early warning systems.

Case Studies: Lessons and experiences from various important disasters with specific reference to Civil Engineering.

Recommended/References Books

1. Iyengar, C.B.R.I., 'Natural Hazards in the Urban Habitat', Tata McGraw Hill Publications.
2. Jon Ingleton (Ed), 'Natural Disaster Management', Tudor Rose, Leicester.
3. R.B. Singh (Ed), 'Disaster Management', Rawat Publications.
4. ESCAP: 'Asian and the Pacific Report on Natural Hazards and Natural Disaster Reduction'.

EBook

https://www.academia.edu/23023870/Disaster_Management

Online Learning

https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/124107007/lec35.pdf

www.swayam.gov.in

Course Code: BTCE-510

Title of Course: Soil and Foundation Engineering

L	T	P	Credits
2	0	0	2

Course out comes: Upon completion of this course, students will be able to:

CO1 Find the index and engineering properties of the soil.

CO2 Analyse and compute principles of compaction and consolidation settlements of soil .

CO 3Evaluate the stresses in the soil mass.

CO4 Analyse to calculate bearing capacity, earth pressure and foundation settlement.

CO/PO mapping												
(S/M/W indicates strength of correlation)S-Strong ,M-Medium, W-Weak												
CO'S	Program Outcome(PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	M	M	M	M	W	W	W	W	W	W	M
CO2	S	M	S	M	S	S	W	W	M	W	M	S
CO3	S	S	M	S	M	W	W	W	W	W	M	S
CO4	S	S	M	S	S	S	W	W	M	W	M	S

COURSECONTENT:

1. Introduction:

1.1 Importance of soil studies in Civil Engineering

1.2 Geological origin of soils with special reference to soil profiles in India: residual and transported soil, alluvial deposits, lake deposits, local soil found in Punjab,dunes and loess, glacial deposits, black cotton soils, conditions in which aboved epositsare formed and their engineering characteristics.

1.3 Names of organizations dealing with soil engineering work in India, soil map of India

2. Physical Properties of Soils:

- 2.1 Constituents of soil and representation by a phase diagram
- 2.2 Definitions of void ratio, porosity, degree of saturation, water content, specific gravity, unit weight, bulk density/bulk unit weight, dry unit weight, saturated unit weight and submerged unit weight of soil grains and correlation between them
- 2.3 Simple numerical problems with the help of phase diagrams
3. Classification and Identification of Soils
 - 3.1. Particle size, shape and their effect on engineering properties of soil, particle size classification of soils
 - 3.2 Gradation and its influence on engineering properties
 - 3.3 Relative density and its use in describing cohesionless soils
 - 3.4 Behaviour of cohesive soils with change in water content, Atterberg's limit-definitions, use and practical significance
 - 3.5 Field identification tests for soils
 - 3.6 Soil classification system as per BIS 1498; basis, symbols, major divisions and subdivisions, groups, plasticity chart; procedure for classification of a given soil
4. Flow of Water Through Soils:
 - 4.1 Concept of permeability and its importance
 - 4.2 Darcy's law, coefficient of permeability, seepage velocity and factors affecting permeability
 - 4.3 Comparison of permeability of different soils as per BIS
 - 4.4 Measurement of permeability in the laboratory
5. Effective Stress: (Concept only)
 - 5.1 Stresses in subsoil
 - 5.2 Definition and meaning of total stress, effective stress and neutral stress
 - 5.3 Principle of effective stress
 - 5.4 Importance of effective stress in engineering problems
6. Deformation of Soils
 - 6.1 Meaning, conditions/situations of occurrence with emphasis on practical significance of:
 - a) Consolidation and settlement
 - b) Creep
 - c) Plastic flow
 - d) Heaving
 - e) Lateral movement

- f) Freeze and thaw of soil
- 6.2 Definition and practical significance of compression index, coefficient of consolidation, degree of consolidation.
- 6.3 Meaning of total settlement, uniform settlement and differential settlement; rate of settlement and their effects
- 6.4 Settlement due to construction operations and lowering of water table
- 6.5 Tolerable settlement for different structures as per BIS
- 7. Shear Strength Characteristics of Soils:
 - 7.1. Concept and Significance of shear strength
 - 7.2 Factors contributing to shear strength of cohesive and cohesionless soils, Coulomb's law
 - 7.3 Determination of shearing strength by direct shear test, unconfined compression test and vane shear test. Drainage conditions of test and their significance
 - 7.4 Stress and strain curve, peak strength and ultimate strength, their significance
 - 7.5 Examples of shear failure in soils
 - 7.6 Numerical problems
- 8. Compaction:
 - 8.1 Definition and necessity of compaction
 - 8.2 Laboratory compaction test (standard and modified proctor test as per IS) definition and importance of optimum water content, maximum dry density; moisture dry density relationship for typical soils with different compactive efforts
 - 8.3. Compaction control; Density control, measurement of field density by core cutter method and sand replacement method, moisture control, Proctor's needle and its use, thickness control, jobs of an embankment supervisor in relation to compaction
- 9. Soil Exploration:
 - 9.1 Purpose and necessity of soil exploration
 - 9.2 Reconnaissance, methods of soil exploration, Trial pits, borings (auger, wash, rotary, percussion to be briefly dealt)
 - 9.3 Sampling; undisturbed, disturbed and representative samples; selection of type of sample; thin wall and piston samples; area ratio, recovery ratio of samples and their significance, number and quantity of samples, resetting, sealing and preservation of samples.
 - 9.4 Presentation of soil investigation results
- 10 Bearing Capacity of soil

- 1 Concept of bearing capacity
 - 2 Definition and significance of ultimate bearing capacity, net safe bearing capacity and allowable bearing pressure
 - 3 Guidelines of BIS (IS 6403) for estimation of bearing capacity
 - 4 Factors affecting bearing capacity
 - 5 Concept of vertical stress distribution in soils due to foundation loads, pressure bulb
 - 6 Applications of SPT, unconfined compression test and direct shear test in estimation of bearing capacity
 - 7 Plate load test (no procedure details) and its limitations
 - 8 Improvement of bearing capacity by sand drain method, compaction, use of geo-synthetics.
11. Foundation Engineering:

Concept of shallow and deep foundation; types of shallow foundations: combined, isolated, strip, mat, and their suitability. Factors affecting the depth of shallow foundations, deep foundations, type of piles and their suitability; pile classification on the basis of material, pile group and pile cap.

Recommended Books

1. Punmia, BC, "Soil Mechanics and Foundations"; Standard Publishers, Delhi
2. Bharat Singh and Shamsheer Prakash; "Soil Mechanics and Foundations Engineering", Nem Chand and Bros, Roorkee,
3. Sehgal, SB, "A Text Book of Soil Mechanics"; CBS Publishers and Distributors, Delhi,
4. Bowles, Joseph E, "Engineering Properties of soils and their Measurement"; Tata McGraw Hill, Delhi,
5. Gulati, SK and Manoj Dutta, "Geotechnical Engineering", Tata McGraw Hill, Delhi, Khan, Iqbal H, "A Text Book of Geotechnical Engineering", Prentice Hall of India, Delhi,

Course Code: BTCE-511

Title of Course: Railways, Bridges and Tunnels

L	T	P	Credits
2	0	0	2

Course outcomes: Upon completion of this course, students will be able to:

CO1 Identify the types, components of bridge and select suitable bridge foundations.

CO2 Understand the process of railway track construction and the importance of railway track maintenance.

CO3 Understand various railway track materials, their properties and use.

CO4 Describe various components of tunnel.

CO/PO mapping												
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	M	S	M	W	W	M	W	M	S
CO2	M	S	S	S	S	M	W	W	W	W	M	S
CO3	M	S	M	S	M	W	W	W	W	W	W	S
CO4	M	M	M	M	S	W	W	W	W	W	M	S

COURSE CONTENT:

PART-I: RAILWAYS

1. Introduction to Indian Railways
2. Railway surveys: Factors influencing the railway route, brief description of various types of railway survey
3. Classification of permanent way describing its component parts
4. Rail Gauge: Definition, types, practice in India

5. Rails–typesofrails
6. RailFastenings:Railjoints,typesofrailjoints,fasteningsforrails,fi
shplates,bearingplates
7. Sleepers:Functionsofsleepers,typesofsleepers,requirementsofan idealmaterial
for
sleepers.
8. Ballast:Functionofballast, requirementsofanidealmaterialforballast
9. Crossingsandsignallings:Briefdescriptionregardingdifferen
ttypesofcrossings/signallings
10. Maintenanceoftrack:Necessity,maintenanceoftrack,inspecti
onofsoil,trackandfixtures; maintenanceandboxing
ofballastmaintenancegauges,tools
11. Earthworkanddrainage:Featuresofrailroad,bedlevel,widthofformat
ion,sideslopes,drains,methodsofconstruction,requirementofdrain
age system

PART-II: BRIDGES

12. Introduction
Bridge–itsfunctionandcomponentparts,differencebetweenabridgeandaculvert
13. ClassificationofBridges
Theirstructuralelementsandsuitability:
 - 13.1 Accordingtolife-permanentandtemporary
 - 13.2 Accordingtodeck level– Deck,throughand semi-through
 - 13.3 Accordingtomaterial–timber,masonry,steel,RCC,pre-stressed
 - 13.4 Accordingtostructuralform;
 - GradeSeperators-RailwayOverbridges(ROB),
Railwayunderbridge(RUB)
 - Beamtype–RCC,T-Beam,
steelgirderbridges,plategirder
andboxgirder,balancedcantilever,Trussedbrid
ges.
 - Archtype–openspandrelandfilled spandrelbarreland ribtype

- Suspension type – unstiffened and stiffened and table (its description with sketches)
- According to the position of highest flood levels submersible and non-submersible

13.5 IRC classification

14. Bridge Foundations: Introduction to open foundation, pile foundation, well foundation
15. Piers, Abutments and Wing walls
 - 15.1 Piers – definition, parts; types – solid (masonry and RCC), open
 - 15.2 Abutments and wing walls – definition, types of abutments (straight and tee), abutment with wing walls (straight, splayed, return and curved)
16. Bridge bearings

Purpose of bearings; types of bearings – fixed plate, rocker and roller, Elastomeric bearings.
17. Maintenance of Bridges
 - 17.1 Inspection of bridges
 - 17.2 Routine maintenance

PART- III: TUNNELS

18. Definition and necessity of tunnels
19. Typical section of tunnels for a national highway and single and double broad gauge railway track
20. Ventilation – necessity and methods of ventilation, by blowing, exhaust and combination of blowing and exhaust
21. Drainage method of draining water in tunnels
22. Lighting of tunnels

RECOMMENDED BOOKS

1. Vaswani, NK, “Railway Engineering”, Publishing House, Roorkee
2. Rangwala, SC, “Railway Engineering”, Anand, Charotar Book Stall

3. Deshpande,R,“ATextBookofRailwayEngineering”,PoonamUnited BookCorporation
4. Algia,JS“BridgeEngineering”, Anand, CharotarBookStall
5. VictorJohnson,“EssentialsOfBridgeEngineering”OxfordandIBH, Delhi
6. RangwalaS.C.,“BridgeEngineering”,Anand,CharotarBookStall
7. IRCBridgeCodes
8. MORTHdrawingsfor varioustypesofbridges
9. MORTH pocket books for bridge Engineers,
2000 (First Revision)SubhashCSaxena,
“TunnelEngineering”,
DhanpatRaiandSons,Delhi



(U/S 2(f) and 12B of the UGC Act 1956, NAAC Accredited)

DESH BHAGAT UNIVERSITY, MANDI GOBINDGARH

Faculty of Engineering and Applied Sciences

Department of Civil Engineering

Program: B.Tech Civil Engineering

Semester VI

Sr. No.	Course Code	Course Name	Category	Internal	External	Total	L	T	P	Credits
1.	BTCE-601	Design of Concrete Structures-II	Theory	40	60	100	3	0	0	3
2.	BTCE-602	Geotechnical Engineering	Theory	40	60	100	3	0	0	3
3.	BTCE-603	Geotechnical Engineering Laboratory.	Practical	40	60	100	0	0	2	1
4.	BTCE-604	Structural Analysis-II	Theory	40	60	100	3	0	0	3
5.	BTCE-605	Estimating and Costing	Theory	40	60	100	3	0	0	3
6.	BTCE-606	Research Methodology	Theory	40	60	100	3	0	0	
7.	BTCE-607	Integrated Project- VI	Practical	40	60	100	0	0	4	Q/NQ
Elective-II (Select any One)										
8.	BTCE-608	Hydrology and Dams	Theory	40	60	100	3	0	0	3
	BTCE-609	Pavement Engineering	Theory	40	60	100	3	0	0	
	BTCE-610	Advanced Structural Analysis	Theory	40	60	100	3	0	0	

L- Lecture , T- Tutorial , P- Practical , C- Credit

Course Code : BTCE-601

Title of Course: Design of Concrete Structure II

L	T	P	Credits
3	0	0	3

Course Outcomes: After completion of the course, students should be able to:

CO1 Able to understand the concepts of design of structural elements

CO2 Designing of building frames

CO3 Designing of water tanks

CO4 To introduce to codal provisions of IS:456, IS 3370

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	M	M	M	W	M	W	S	S
CO2	S	S	S	S	M	M	W	W	S	W	S	S
CO3	S	S	S	S	M	M	W	W	S	W	S	S
CO4	S	S	S	S	S	M	S	W	M	W	S	S

Course Content:

Note: Indian Standards-IS 456, IS 3370 and Design Aid SP-16 are permitted in examination.

UNIT-I

Design of Foundations – Concept, Application, Types, Components of Footing, Design of Isolated Footing (Square, Rectangular), Combined Footing (Rectangular, Trapezoidal & Strap footing) and Raft Foundation.

Design of Stairs: Introduction, Elements of Stairs-Tread, Rise, Flight, Landing, Types of Stairs, Design and Reinforcement detail of Stairs.

UNIT-II

Design of Compression Members: Classifications (According to Shape, Length and loading conditions), Assumptions, Guidelines as per Indian Standards, Behavior of Compression Members, Short Compression Members under Axial Load with Uni-axial and Bi-axial Bending, Design of Slender (Long)Columns.

UNIT-III

Design of Beams (Continuous and Curved): Definition, Behavior, Design of Continuous beams and Curved beams, Reinforcement detailing.

Design of Retaining Walls: Classification, Elements-Stem, Base, Heel, Toe, Behavior and design

of Cantilever and Counter fort type retaining wall.

UNIT-IV

Design of Domes: Types, Components, Design of Spherical and Conical Dome.

Water Tanks: Introduction, Types & uses of Underground water tanks, ground water tanks, Design of Circular and Rectangular water tanks resting on ground, Design of OHSR.

Recommended Books

1. N. Subramanian, 'Design of Reinforced Concrete Structures', Oxford University Press.
2. Pillai & Menon, 'Reinforced Concrete Design', Tata McGraw Hill Education.
3. P.C. Varghese, 'Limit State Design of Reinforced Concrete', Prentice Hall of India Pvt. Ltd.
4. Raju N. Krishna, 'Reinforced Concrete Elements'.
5. Mallick and Rangasamy, 'Reinforced Concrete', Oxford-IBH.

EBook

<http://www.a-zshiksha.com/forum/viewtopic.php?f=149&t=61475>

Online Learning

<https://nptel.ac.in/courses/105105104/>
www.swayam.gov.in

Course Code: BTCE-602

Title of Course: Geotechnical Engineering

L	T	P	Credits
3	0	0	3

Course Outcomes: After completion of the course, students should be able to

CO1 Able to perform different tests on soil to determine the properties of soil

CO2 Knowledge about different methods to determine Stress in soil

CO3 Ability to Solve of Shear Strength problems

CO4 Understand the causes of Slope Failure and preventive measures

CO/PO Mapping (S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	M	S	M	S	M	W	M	W	S	S
CO2	S	M	M	S	M	S	M	W	M	W	S	S
CO3	S	S	S	M	M	S	M	W	M	W	M	S
CO4	S	S	S	M	M	S	M	W	M	W	M	S

Course Content:

Unit-I

Basic Concepts: Definition of soil, Soil mechanics and its application in Civil Engineering, Major soil deposits in India, Weight volume relationship, Index and engineering properties of soil, Classification of soil (IS and Unified Soil Classification System).

Unit –II

Compaction: Compaction, Concept of O.M.C. and zero Air Void Line, Standard and Modified proctor test, Factors affecting compaction, Effect of compaction on engineering soil properties, Field compaction methods their comparison of performance and relative suitability, Field control of compaction by proctor needle.

Permeability of Soil: Concept of effective stress principle, Critical hydraulic gradient and quick sand condition, Capillary phenomenon in soil, Darcy's law and its validity, Co-efficient of permeability and its determination by Constant Head Permeability test and Variable Head Permeability test, Average permeability of stratified soils, Factors affecting coefficient of permeability.

Unit-III

Consolidation: Consolidation, Difference between compaction and consolidation, Concept of various consolidation characteristics, Primary and secondary consolidation, Terzaghi's theory for one-dimensional consolidation, Consolidation test, Determination of coefficient of consolidation from curve fitting methods, Normally consolidated and over consolidated clays, Importance of consolidation settlement in the design of structures, e-log P curve.

Unit -IV

Shear Strength: Shear Strength, Stress analysis of a two - dimensional stress system by Mohr circle, Revised Mohr-Coulomb's law of shear strength, Relations between principle stresses at failure, Types of shear strength tests, Skempton's pore pressure parameters. .

Stability of Slopes: Slope failure, base failure and toe failure, Swedish circle and Frictional circle methods for c- ϕ -soils, Taylor's stability number, Stability charts.

Recommended Books

1. K.R. Arora, 'Soil Mech. & Foundation Engg', Standard Publishers Distributors.
2. P. Purshotama Raj, 'Geotechnical Engineering', Tata McGraw Hill.
3. V.N.S. Murthy, 'Soil Mech. & Foundation Engg', CBS Publishers & Distributors.
4. B.M. Das, 'Principle of Geotechnical Engineering', Cengage Publisher.
5. Gopal Ranjan and A.S.R. Rao, 'Basic and Applied Soil Mechanics', New Age International Publishers.
6. Joseph E. Bowle 'Physical & Geotechnical Properties of Soil'.

EBook

<https://www.pdfdrive.com/geotechnical-engineering-e33654601.html>

Online Learning

<https://nptel.ac.in/courses/105105168/>

www.swayam.gov.in

Course Code : BTCE-603

Title of Course: Geotechnical Engineering Laboratory

L	T	P	Credits
0	0	2	1

Course Outcomes: After completion of the course, students should be able to:

CO1 knowledge about the procedures of Laboratory tests used for determination of physical, index and engineering properties of soils

CO2 Classification of soil based on test results and interpret engineering behavior based on test results

CO3 be able to evaluate the permeability and shear strength of soils

CO4 be able to evaluate compaction characteristics required for field application

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	M	S	M	S	M	W	M	W	S	S
CO2	S	M	M	S	M	S	M	W	M	W	S	S
CO3	S	S	S	M	M	S	M	W	M	W	M	S
CO4	S	S	S	M	M	S	M	W	M	W	M	S

List of Experiments

1. Determination of in-situ density by core cutter method and Sand replacement method.
2. Determination of Liquid Limit & Plastic Limit.
3. Determination of specific gravity of soil solids by Pycono- meter method.
4. Grain size analysis of sand and determination of uniformity coefficient (Cu) and coefficient of curvature(Cc).
5. Determination of coefficient of permeability by Constant Head and Variable Head methods.
6. Determination of optimum moisture content and maximum dry unit weight by standard Proctor's test and Modified Proctor's Test.
7. Unconfined Compression Test for fine grained soil.
8. Determination of cohesion intercept and angle of shearing resistance by direct shear test.
9. Determination of cohesion intercept and angle of shearing resistance by tri-axial test.
10. Determination of co-efficient of consolidation.
11. Demonstration of Standard Penetration Test(SPT).

Recommended Books

1. Shamsheer Prakash and P.K. Jain, 'Soil Testing Engineering, Manual', Nem Chand & Brother.

Course Code: BTCE-604

Title of Course: Structural Analysis II

L	T	P	Credits
3	0	0	3

Course Outcomes: After completion of the course, students should be able to:

CO1 Identify determinacy and indeterminacy of structure

CO2 Different procedures to calculate slope and deflection for determinate structure.

CO3 Interpret Influence line diagram and its detail application

CO4 Analyze three hinged Arch and cable suspension bridge

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	M	M	M	W	S	W	S	S
CO2	S	S	S	S	M	M	M	W	S	W	S	S
CO3	S	S	S	S	M	M	S	W	S	W	S	S
CO4	S	S	S	S	M	M	M	W	S	W	S	S

Course Content:

Unit-I

Analysis of Statically Indeterminate Structures: Degree of static and kinematic indeterminacies, analysis of indeterminate beams, rigid frames and trusses by method of consistent deformation, law of reciprocal deflections, method of least work, induced reactions on statically indeterminate beams & rigid frames due to yielding of supports.

Fixed & Continuous Beams: Introduction, Analysis of fixed beams by moment-area theorem and strain energy method, fixed end moments due to different types of loadings, sinking and rotation of supports, bending moment and shear force diagrams for fixed beams, slope and deflection of fixed beams, analysis of continuous beams by the Three moment equation (Clapeyron's theorem) due to different types of loadings, effect of sinking of supports, BMDs.

Unit-II

Slope-Deflection Method: Introduction, slope-deflection equations, analysis of statically indeterminate beams and rigid frames (sway and non-sway type) due to applied loads and uneven support settlements.

Moment-Distribution Method: Introduction, absolute and relative stiffness of members, stiffness and carry-over factors, distribution factors, analysis of statically indeterminate beams and rigid frames (sway and non-sway type) due to applied loads and uneven support settlements,

symmetrical beams and frames with symmetrical, skew-symmetrical and general loading.

Unit-III

Rotation Contribution Method: Introduction, basic concept, analysis of statically indeterminate beams and rigid frames (sway and non-sway type) due to applied loadings and yielding of supports, symmetrical beams and frames, general case-storey columns unequal in height and bases fixed or hinged.

Approximate Methods of Structural Analysis: Introduction, Vertical and lateral load analysis of multistory frames, portal, cantilever and substitute-frame methods and their comparison.

Unit-IV

Two Hinged Arches: Introduction, Analysis of two hinged arches for Horizontal Thrust, Bending Moment, Normal Thrust, and Radial Shear, Settlement (Foundation Yielding) and Temperature Effects, Rib Shortening and Shrinkage, Influence Lines for Two Hinged Arches.

Influence Lines for Statically Indeterminate Structures: Muller- Breslau principle for statically determinate and indeterminate beams, trusses and rigid frames, influence lines for reactions, shear force and bending moment for statically indeterminate beams, trusses and rigid frames.

Recommended Books

1. C.S. Reddy, 'Basic Structural Analysis'.
2. C.K. Wang, 'Intermediate Structural Analysis'.
3. J. Sterling Kinney, 'Indeterminate Structural Analysis'.
4. B.C. Punima, 'Theory of Structures'.

EBook

<https://www.pdfdrive.com/structural-analysis-ii-10cv53-e34880797.html>

Online Learning

<https://nptel.ac.in/courses/105105166/>
www.swayam.gov.in

Course Code: BTCE-605

Title of Course: Estimating and Costing

L	T	P	Credits
3	0	0	3

Course Outcomes: After completion of the course, students should be able to:

CO1 Prepare quantity estimates for Buildings, roads & rails and canal structures as per specifications

CO2 Draft detailed specifications and work out Rate Analysis for all works related to civil engineering projects.

CO3 Quantity of materials required for Civil engineering works as per specifications.

CO4 Cost estimate and valuation of civil engineering works.

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	M	M	M	M	W	S	W	S	S
CO2	S	S	S	S	M	M	M	W	S	W	S	S
CO3	S	S	M	S	M	M	M	W	S	W	S	S
CO4	S	S	S	S	M	M	M	W	S	W	S	S

Course Content:

Unit-I

Estimating: Different types of estimates, methods of estimating and scheduling quantities for the following works: Building, culverts, bridges, irrigation works, steel structures, road works, canal works, sanitary and water supply works, roofs, R.C.C. work.

Analysis of Rates: Schedule of rates (As per CSR Punjab-2016), Analysis of rates: earth work, brick masonry, stone masonry, cement concrete, RCC work, iron work, plastering, flooring, white washing, painting, wood work, Roadwork.

Unit-II

Specifications: Detailed specifications of the following: earth work in foundation, lean concrete in foundation, lime concrete in roof terracing, cement concrete, RCC, brick work, plastering, painting, C.C. floor, mosaic floor, white washing, distempering, varnishing, painting, doors and windows, DPC, cantering and shuttering, stone masonry, cement mortar, lime mortar, brick ballast, surkhi, cinder and sand.

Unit-III

Accounts Procedures: Regular and work charged establishment, pay bill, ACR, classifications of works, contract, tender, tender notice, earnest money, security money, arranging contract, power of accepting tender, daily laboratoryour, muster roll, classification of contracts, penalty, measurement book, account procedures of stores, issue rate, stock accounting, Introduction to forms and bills, Advance payment, hand receipt, refund of security money, cash book, imprest, deposit works, temporary advances, treasury challan, inventory, administrative approval, competent authority, building bye laws.

Unit-IV

Valuation: Gross income, net income, outgoing, scrap value, salvage value, obsolescence, annuity, capitalized value, year's purchase, sinking fund, depreciation, valuation of building, determination of depreciation, method of valuation, life of various items of works, mortgage lease, fixation of rates, plinth area required for residential building., Arbitration.

Recommended Books

1. B.N. Dutta, 'Estimating & Costing in Civil Engg.: Theory & Practice', UBS Publishers Distributors Ltd.
2. G.S. Birdie, 'Estimation and Costing in Civil Engineering', Dhanpat Rai Publishing Co.Ltd, New Delhi, 2011.
3. M. Chakraborti, 'Estimation, Costing, Specifications and Valuation in Civil Engineering', National Halftone Co. Calcutta.
4. George H. Cooper, 'Building Construction Estimating'.
5. P.L. Bhasin, 'Estimating and Costing for Building & Civil Engg. Works'.
6. 'Standard Schedule of Rates and Standard Data Book', Public Works Department.
7. I. S. 1200 (Parts I to XXV – 1974/ method of measurement of building and Civil Engineering works – B.I.S.)

EBook

<https://www.pdfdrive.com/project-estimating-and-cost-management-e3614294.html>

Online Learning

<https://nptel.ac.in/courses/105103093/>
www.swayam.gov.in

Course Code: BTCE-606

Title of the Course: Research Methodology

L	T	P	Credits
3	0	0	3

Course Outcomes:

CO1: Able to select and define appropriate research problem and Parameters.

CO2: Able to select the data from different methods.

CO3: Able to organize and conduct research in a more appropriate manner.

CO4: Able to understand and apply statistical.

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
COs	Programme Outcomes (POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	M	M	S	M	M	M	W	W	M	S	M
CO2	S	S	S	S	M	M	M	W	W	M	S	M
CO3	S	S	M	S	M	M	M	W	W	M	S	M
CO4	S	S	M	S	S	M	M	W	W	M	S	M

Unit	Course Outlines	Hour(s)
1	Motivation and objectives – Research methods vs. Methodology. Types of research – Descriptive vs. Analytical, Applied vs. Fundamental, Quantitative vs. Qualitative, Conceptual vs. Empirical, concept of applied and basic research process, criteria of good research.	9
2	Defining and formulating the research problem, selecting the problem, necessity of defining the problem, importance of literature review in defining a problem, literature review-primary and secondary sources, reviews, monograph, patents, research databases, web as a source, searching the web, critical literature review, identifying gap areas from literature and research database, development of working hypothesis	9
3	Research Design: Concept and Importance in Research – Features of a good research design – Exploratory Research Design – concept, types and uses, Descriptive Research Designs – concept, types and uses. Experimental Design: Concept of Independent & Dependent variables. Accepts of method validation	9
4	Observation and collection of data, methods of data collection, sampling methods, data processing and analysis strategies and tools, data analysis with statically package (Sigma STAT,SPSS for student t-test, ANOVA, etc.), hypothesis testing.	9

Total = 36

Recommended Books:

1. R.I. Levin and D.S. Rubin, 'Statistics for Management', 7thEdn., Pearson Education New Delhi.
2. N.K. Malhotra, 'Marketing Research–An Applied Orientation', 4thEdn., Pearson Education New Delhi.
3. Donald Cooper, 'Business Research Methods', Tata McGraw Hill, New Delhi.
4. Sadhu Singh, 'Research Methodology in Social Sciences', Himalaya Publishers.
5. Darren George & Paul Mallery, 'SPSS for Windows Step by Step', Pearson Education New Delhi.
6. C.R. Kothari, 'Research Methodology Methods & Techniques', 2ndEdn., New Age International Publishers.
7. Research Design: Qualitative, Quantitative, and Mixed Methods Approaches, 4th Edition, by John W. Creswell.

E-Books and online learning material

1. <https://www.pdfdrive.com/>
2. modares.ac.ir/uploads/Agr.Oth.Lib.17.pdf
3. <https://www.free-ebooks.net/>
4. <http://e-library.net/free-ebook.htm>

Online Courses and Video Lectures

1. <https://nptel.ac.in/courses/121/106/121106007/>
2. <https://nptel.ac.in/courses/107108011/>
3. <https://nptel.ac.in/courses/109105115/>

Course Code: BTCE-607

Title of the Course: Integrated Project –VI

L	T	P	Credits
0	0	4	-

Course Outcomes:

CO1: Apply knowledge and skills learned in the labs to solve real life problems.

CO2: Enhance the technical skills required for the industry.

CO3: Identify areas for future learning and skill development.

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation)

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	W	S	W	W	W	W	M	W	W	W
CO2	S	S	M	S	W	W	W	W	M	W	W	W
CO3	S	S	W	S	W	W	W	W	M	W	W	W

Course Code:BTCE-608

Title of Course: Hydrology and Dams

L	T	P	Credits
3	0	0	3

Course Outcomes: After completion of the course, students should be able to

CO1 To impart an understanding of the various pathways of water movement above and below the ground

CO2 To stress the conceptual and practical aspects of a wide range of approaches to field measurement of various hydrological processes

CO3 To identify and quantify the hydrological data inputs necessary for various design applications in the field of water resources

CO4 To introduce to the quantitative relationship that explains the understanding of hydrological processes

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	M	M	M	S	M	W	M	W	S	S
CO2	S	M	M	M	M	S	M	W	M	W	S	S
CO3	S	S	S	S	S	M	M	W	M	W	M	S
CO4	S	M	M	M	M	S	M	W	M	W	S	S

Course Content:

UNIT-I

Precipitation: Importance of hydrological data in water resources planning. The hydrologic cycle. Mechanics of precipitation, types and causes, measurement by rain gauges, Gauge networks, hyetograph, averaging depth of precipitation over the basin, mass-rainfall curves, intensity duration frequency curves and depth area-duration curves.

UNIT -II

Interception, Evapotranspiration and Infiltration: Factors affecting interception, evaporation from free water surfaces and from land surfaces, transpiration, Evapotranspiration. Infiltration Factors affecting infiltration, rate, Infiltration capacity and its determination.

UNIT -III

Runoff: Factors affecting runoff, run-off hydrograph, unit hydrograph theory, S-curve hydrograph, Snyder's synthetic unit hydrograph.

Peak Flows: Estimation of Peak flow-rational formula, use of unit hydrograph, frequency analysis, Gumbel's method, design flood and its hydrograph.

UNIT -IV

Gravity Dams-Non Overflow Section: Forces acting, Stability factors, stresses on the faces of dam, Design of profile by the method of zoning, elementary profile of a dam.

Arch and Buttress Dams: Classification of arch dam- constant radius, constant angle and variable radius, Cylinder theory, Expression relating central angle and Cross-Sectional area of arch. Types of buttress dams, Advantages of buttress dams.

Earth Dams: Components of earth dams and their functions, Phreatic line determination by analytical and graphical methods.

Recommended Books

1. J. Nemeec, 'Engineering Hydrology', Prentice Hall.
2. 'Engineering Hydrology', Stanley Buttler, John. Wiley.
3. TODD, 'Ground Water Hydrology', John Wiley.
4. Creager Justin & Hinds, 'Engineering for Dams', Vol. -II, -III, John Wiley.
5. S.K. Garg, 'Hydrology', Khanna Publishers.
6. H.M. Raghunath, 'Hydrology Principles, Analysis and Design', New Age Int. Publishers.

EBook

<https://www.pdfdrive.com/hydrologic-research-needs-for-dam-safety-e46715067.html>

<https://www.pdfdrive.com/hydrologic-issues-for-dams-e88393012.html>

Online Learning

<https://nptel.ac.in/courses/105107129/>

www.swayam.gov.in

Course Code: BTCE-609

Title of Course: Pavement Engineering

L	T	P	Credits
3	0	0	3

Course Outcomes: After completion of the course, students should be able to

CO1 Design geometric elements of Cross Section of various types of roads

CO2 Design geometric elements of Horizontal Alignment of Roads

CO3 Design geometric elements of Vertical Alignment of Road

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
COs	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	M	M	M	W	M	W	S	S
CO2	S	S	S	S	M	M	W	W	S	W	S	S
CO3	S	S	S	S	M	M	W	W	S	W	S	S

Course Content:

Note: Use of IRC: 37-2012 and IRC: 58-2011 shall be allowed in the examination.

UNIT-I

Introduction: Types of pavement structure. Functions of pavement components, Factors affecting pavement design, Design wheel load, Strength characteristics of pavement materials. Comparison of flexible and rigid pavements.

UNIT-II

Design of Flexible Pavements: General design considerations, Methods for design of flexible pavements – Group Index Method, Triaxial Test Method, Hveem Stabilometer Method, McLeod's Method, Indian Roads Congress Method.

Design of Bituminous Mixes: Mix Design Approaches, Marshall Method of Bituminous Mix Design, Super pave.

UNIT-III

Design of Rigid Pavements: General design considerations, Westergaard's Analysis, Methods for design of rigid pavements - PCA method, AASHTO Method, Indian Roads Congress Method, Types and design of Joints in cement concrete pavements.

UNIT-IV

Modern Design Concepts: Reinforced Concrete Pavement, Airport Pavement Design, Bituminous Pavement with Cemented Base, Interlocking Concrete Block Pavement, Full Depth Bituminous Pavement, Ultrathin White Topping, Perpetual Pavement, Pavement Overlays.

Recommended Books

1. E.J. Yoder and M.W. Witzak, 'Principals of Pavement Design', Wiley Publication.
2. S.K. Khanna and C.E.G. Justo, 'Highway Engineering', Nem Chand & Bros., Roorkee.
3. S.K. Sharma, 'Principles, Practice and Design of Highway Engineering', S. Chand & Co.
4. P. Chakraborty and A. Das, "Principles of Transportation Engineering", Prentice Hall India.

Online Learning

<https://nptel.ac.in/content/storage2/courses/105101087/downloads/Lec-29.pdf>

www.swayam.gov.in

Yang H. Huang, 'Pavement Analysis and Design', Prentice Hall.

Course Code: BTCE-610

Title of Course: Advanced Structural Analysis

L	T	P	Credits
3	0	0	3

Course Outcomes: After completion of the course, students should be able to:

CO1 To impart knowledge on the analysis of indeterminate structures like continuous beams, trusses and portal frames

CO2 Able to analyse different indeterminate structures using Matrix methods

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	M	S	M	S	M	W	M	W	S	S
CO2	S	M	M	S	M	S	M	W	M	W	S	S

Course Content:

UNIT-I

Basic Concepts of Structural Analysis: Static and kinematic indeterminacies of beams, rigid-jointed plane and space frames, pin-jointed plane and space frames and hybrid structures, actions and displacements, action and displacement equations, generalized system of coordinates, slope-deflection equations in generalized coordinates, relation between flexibility and stiffness matrices, Basic definitions and types of matrices, matrix operations, matrix inversion, solution of linear simultaneous equations, matrix partitioning.

UNIT-II

Flexibility Matrix (Physical Approach): Development of flexibility matrices for statically determinate and indeterminate beams, rigid-jointed plane frames and pin-jointed plane frames using physical approach.

Stiffness Matrix (Physical Approach): Development of stiffness matrices for statically determinate and indeterminate beams, rigid-jointed plane frames and pin-jointed plane frames using physical approach, reduced stiffness matrix, total stiffness matrix, translational or lateral stiffness matrix.

UNIT-III

Flexibility Matrix (Element Approach): Transformation of system forces to element forces through force transformation matrix, Development of flexibility matrices for statically determinate and indeterminate beams, rigid-jointed plane frames and pin-jointed plane frames using Element Approach.

Stiffness Matrix (Element Approach): Transformation of system displacements to element displacements through displacement transformation matrix, Development of stiffness matrices

for statically determinate and indeterminate beams, rigid-jointed plane frames and pin-jointed plane frames using Element Approach.

UNIT-IV

Flexibility Method of Analysis: Analysis of continuous beams, rigid-jointed plane frames and pin-jointed plane frames using the physical and element approaches, effect of support settlements, temperature stresses and lack of fit.

Stiffness Method of Analysis: Analysis of continuous beams, rigid-jointed plane frames and pin-jointed plane frames using the physical and element approaches, effect of support settlements, temperature stresses and lack of fit, comparison of flexibility and stiffness methods of analysis.

Recommended Books

1. G.S. Pandit and S.P. Gupta, 'Structural Analysis, A Matrix Approach'.
2. William Weaver, Jr. James M. Gere, 'Matrix Analysis of Framed Structures'.
3. C.S. Reddy, 'Basic Structural Analysis'.
4. C.S. Krishnamurthy, 'Finite Element Analysis'.
5. O.C. Zeinwicz, 'Finite Element Methods'.

Online Learning

<https://nptel.ac.in/courses/105106050/>
www.swayam.gov.in

DESH BHAGAT UNIVERSITY, MANDI GOBINDGARH

Faculty of Engineering and Applied Sciences

Department of Civil Engineering

Program: B.Tech Civil Engineering

Semester VII

Sr. No	Course Code	Course Name	Category	Internal	External	Total	L	T	P	C
1.	BTCE-701	Design of Steel Structures-II	CC	40	60	100	3	0	0	3
2.	BTCE-702	Foundation Engineering	CC	40	60	100	3	0	0	3
3.	BTCE-703	Irrigation Engineering-II	CC	40	60	100	3	0	0	3
4.	BTCE-704	Integrated Project- VII	Practical	40	60	100	0	0	4	Q/NQ
5.	DBWS-701	Effective Workplace Skills++	Theory	40	60	100	3	0	0	3
6.	DBST-101	Science, Technology and Society	Theory	40	60	100	2	0	2	3
7.	DBCE-101	Community Engagement	Practical	40	60	100	0	0	2	1
Elective-III (Select any one)										
8.	BTCE-705	Pre-Stressed Concrete	Theory	40	60	100	3	0	0	3
	BTCE-706	Solid Waste Management	Theory	40	60	100	3	0	0	
	BTCE-707	Ground Improvement Techniques	Theory	40	60	100	3	0	0	
Elective-IV (Select any one)										
9.	BTCE-708	Bridge Engineering	Theory	40	60	100	3	0	0	3
	BTCE-709	Earthquake Resistant Design of Structures	Theory	40	60	100	3	0	0	
	BTCE-710	Renewable Energy Sources	Theory	40	60	100	3	0	0	

8-Week In-House / Industrial Training during summer vacations after 6th semester

L- Lecture , T- Tutorial , P- Practical , C- Credit

Course Code: BTCE-701

Title of Course: Design of Steel Structure-II

L	T	P	Credits
3	0	0	3

Course Outcomes: After completion of the course, students should be able to

CO1 Interpret different type of connections

CO2 Design compression, tension and beam members

CO3 Design of elements of industrial buildings

CO4 Design plate girder, uses of stiffeners

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	S	S	M	S	M	W	M	W	M	S
CO2	S	S	S	S	S	S	M	W	M	W	M	S
CO3	S	M	S	S	W	S	M	W	S	W	S	S
CO4	S	S	S	M	M	S	M	W	M	W	M	S

Course Content:

Note: IS: 800, General construction in Steel-Code of practice is permitted in examination

Unit-I

Plastic Analysis: Introduction, Design of Beams.

Plate Girder: Elements of a plate girder, design of a plate girder, curtailment of flanges, various type of stiffeners using bolts and welds.

Unit-II

Foot Bridge: Design of steel foot bridge with welded joints.

Unit-III

Industrial Buildings: Design of elements of industrial buildings: Gantry girder, Column bracket.

Unit-IV

Railway Bridge: Design of single track Railway Bridge with lattice girders having parallel chords (for B.G.)- Stringer, Cross girder, Main girders with welded joints, Portal sway bracings, Rocker and rollers bearing.

Recommended Books & Codes

1. S.K. Duggal, 'Limit State Design of Steel Structures'.
2. N. Subramanian, 'Design of Steel Structures'.
3. Ram Chandra, 'Design of Steel Structures', Vol.2.
4. L.S. Negi, 'Design of Steel Structures'.
5. S.S. Bhavikatti, 'Design of Steel Structures (by limit state method as per IS:800-2007).
6. IS 800: 2007 (General Construction in Steel-Code of Practice)*
7. SP: 6(1) (Handbook for Structural Engineers-Structural Steel Sections)*

EBook

<https://www.pdfdrive.com/design-of-steel-structures-ii-e19647216.html>

Online Learning

<https://nptel.ac.in/courses/105105104/>

www.swayam.gov.in

Course Code: BTCE-702

Title of Course: Foundation Engineering

L	T	P	Credits
3	0	0	3

Course Outcomes: After completion of the course, students should be able to

CO1 Ability to understand bearing capacity of soil

CO2 Calculations related to load bearing capacity of different piles

CO3 Classify piles & their loading capacity for deep foundation.

CO4 Ability to understand the methods of soil exploration

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	M	M	M	W	W	W	M	S	W	M	S
CO2	M	M	W	M	W	W	W	W	M	W	W	M
CO3	M	W	W	M	S	M	W	W	M	W	M	M
CO4	W	M	W	M	M	M	W	W	M	W	M	S

Course Content:

Note: Relevant data should provide by Paper Setter with respect to design problems; if any.

Unit-I

Soil Investigation: Soil Investigation for new and existing structures. Depth of exploration for different structures, spacing of bore Holes, Methods of soil exploration and relative merits and demerits. Types of soil sample. Design features of sampler affecting sample disturbance, Essential features and application of various types of samplers, Geophysical exploration by seismic and electrical resistivity methods, Standard Penetration Test and Plate load test, Bore holelog.

Stresses in Soil: Boussinesq's equation for a point load, uniformly loaded circular and rectangular area, pressure distribution diagrams, Isobars, New mark's chart and its construction, Approximate method of load distribution, Comparison of Boussinesq's and Westergaard analysis for a point load.

Unit-II

Earth Pressure: Terms and symbols used for a retaining wall, Movement of all and the lateral earth pressure, Earth pressure at rest, Rankine states of plastic equilibrium, Coefficient of active and passive earth pressures for horizontal backfills, Rankine's theory both for active and passive earth pressure for Cohesion-less and cohesive backfill with surcharge and fully submerged case,

Coulomb's method for cohesion less backfill, Merits and demerits of Ranking and Coulomb's theories, Culmann's graphical construction (without surcharge load).

Unit-III

Shallow Foundation: Type of shallow foundations, Factors affecting choice of foundation, Definition of ultimate bearing capacity, safe bearing capacity and allowable bearing capacity, Terzaghi's analysis. Types of failures, Factors affecting bearing capacity, Skempton's equation,

B.I.S. recommendations for shape, depth, inclination factors and water table corrections, Causes of settlement of structures, Comparison of immediate and consolidation settlement, calculation of settlement by plate load Test and Static Cone penetration test data, Allowable settlement of various structures according to I.S. Code, Introduction of rafts and floating foundation.

Unit-IV

Pile Foundations: Types, Necessity and uses of piles, Classification of piles, Types of pile driving hammers & their comparison, Determination of load carrying capacity of driven piles by dynamic formulae, Cyclic Pile Load Test, Determination of point resistance and frictional resistance of a single pile by Static formulas in sand and clay, Spacing of piles in a group, Group action of piles, Calculation of settlement of friction pile group in clay, Settlement of pile groups in sand, Negative skin friction.

Caissons and Wells: Major areas of use of caissons, advantages and disadvantages of open box and pneumatic caissons, Essential part of a pneumatic caisson, Components of a well foundation, Calculation of allowable bearing pressure, Conditions for stability of a well, Forces acting on a well foundation, Computation of scour depth.

Recommended Books

1. K.R. Arora, 'Soil Mech. & Foundation Engg.', Standard Publishers Distributors.
2. V.N.S. Murthy, 'Soil Mech. & Foundation Engg.'.
3. Gopal Ranjan and A.S.R. Rao, 'Basic and Applied Soil Mechanics', New Age International.
4. Muni Budhu, 'Soil Mech. & Foundations', Wiley, John Wiley & Sons.
5. Gulhati and Datta, 'Geotechnical Engineering', Tata McGraw Hill Education.

EBook

<https://www.pdfdrive.com/geotechnical-engineering-e33654601.html>

Online Learning

<https://nptel.ac.in/courses/105101083/>

Course Code:BTCE-703

Title of Course: Irrigation Engineering-II

L	T	P	Credits
3	0	0	3

Course Outcomes:After completion of the course, students should be able to

CO1 Able to classify the canal and tube well irrigation, and applicability of various theories on it

CO2 Designing of weirs and barrages

CO3 Able to analyse the design of lined canal and its problems

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	M	M	M	M	S	M	W	M	W	M	S
CO2	M	M	M	M	M	S	M	W	M	W	M	S
CO3	S	S	S	S	S	M	M	W	M	W	S	S

Course Content:

Unit-I

Head Works: Types of head works, Functions and investigations of a diversion head work: component parts of a diversion head work and their design considerations, silt control devices.

Theories of Seepage: Seepage force and exit gradient, assumptions and salient features of Bligh's Creep theory, Limitations of Bligh's Creep theory, salient features of Lane's weighted Creep theory and Khosla's theory, Comparison of Bligh's Creep theory and Khosla's theory, Determination of uplift pressures and floor thickness.

Unit-II

Design of Weirs: Weirs versus barrage, types of weirs, main components of weir, causes of failure of weir and design considerations with respect to surface flow, hydraulic jump and seepage flow. Design of barrage or weir.

Energy Dissipation Devices: Use of hydraulic jump in energy dissipation, Factors affecting design, Types of energy dissipaters and their hydraulic design.

Unit-III

Canal Regulators: Offtake alignment, cross- regulators – their functions and design, Distributary head regulators, their design, canal escape.

Canal Falls: Necessity and location, types of falls and their description, selection of type of falls, Principles of design, Design of Sarda type, straight glacis and Inglis or baffle wall falls and level crossing.

Unit-IV

Cross-Drainage works: Definitions, choice of type, Hydraulic design consideration, Aqueducts their types and design, siphon aqueducts – their types and design considerations, super passages, canal siphons.

Canal Out-lets: Essential requirements, classifications, criteria for outlet behaviors, flexibility, proportionality, sensitivity, sensitiveness, etc. Details and design of non-modular, semi-modular and modular outlets.

Recommended Books

1. Santosh Kumar Garg, 'Irrigation Engineering & Hydraulic Structure', Khanna Publishers.
2. R.K. Sharma, 'Design of Irrigation Structures', Oxford IBH Publishers.
3. S.R. Sahasrabudhe, 'Irrigation Engineering and Hydraulics Structures', Katson Publishing.
4. K.B. Khushlani, 'Irrigation Practice and Design', Vol. I to VII, Oxford IBHPublishers.
5. P.N. Modi, 'Irrigation with Resources and with Power Engineering', Standard Book House.
6. Ivan E. Houk, 'Irrigation Engineering', Vol. I, II, John Wiley and Sons.

EBook

<https://www.pdfdrive.com/irrigation-practice-and-engineering-volume-3-irrigation-structures-and-distribution-system-e186291267.html>

<https://www.pdfdrive.com/irrigation-practice-and-engineering-volume-2-conveyance-of-water-e186290056.html>

Online Learning

<https://nptel.ac.in/content/storage2/courses/105105110/pdf/m3l01.pdf>

www.swayam.gov.in

Course Code: BTCE-704

Title of the Course: Integrated Project-VII

L	T	P	Credits
0	0	4	-

Course Outcomes:

CO1: Undertake short research projects in a team under the direction of members of the faculty

CO2: Impart skills in preparing detailed report describing the project and results.

CO/PO Mapping (S-Strong Correlation, M- Medium Correlation, W-Weak Correlation)												
CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	W	S	M	S	M	S	W	S	M	M	S
CO2	S	W	M	S	M	S	M	W	S	S	S	S

The assignment to normally include:

1. Survey and study of published literature on the assigned project
2. Working out a preliminary Approach to the Problem related to the assigned project;
3. Conducting preliminary Analysis/Modelling/Simulation/Experiment/Design/Feasibility;
4. Preparing a Written Report on the Study conducted for presentation to the Department;
5. Final Seminar, as oral Presentation before a departmental committee

Course Code: DBWS-701

Title of the Course: Effective Workplace Skills++

L	T	P	Credits
3	0	0	3

Course Outcomes:

The course is designed to achieve superior outcomes of placement, retention and progression of students through 21' century employability skills' training and assessment.

Skills development network shall provide Vocational curricula and e-content for high quality employability and work skills training through an online learning platform

Course Code: DBST-101

Title of the Course: Science, Technology and Society

L	T	P	Credits
2	0	2	3

Course Outcomes:

CO1: Understand the three basic theoretical trends that problematized production of scientific knowledge; Sociology of Scientific Knowledge (SSK), Postcolonial Studies of Science and Feminist Studies of Science.

CO2: Understand technology-society interface from a wide range of theoretical standpoints such as social shaping of technology, social constructionist and actor network theoretical perspectives.

CO3: Understand science and technology are socially and culturally embedded activities.

CO/POMapping												
g												
(S/M/W indicates strength of correlation) S–Strong, M–Medium, W–Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	M	W	S	W	M	W	S	M	S	S
CO2	S	M	M	S	S	W	M	W	S	M	M	S
CO3	S	M	M	S	S	W	M	W	S	M	M	S

Unit	Course Outlines	Hour(s)
1	<p>Sociology of Scientific Knowledge</p> <p>What is the relationship between science and the social?– Conventional view of philosophers and historians of science– Sociology of Science (Karl Manheim–Robert K. Merton)–Social Function of Science–(Joseph Bernal)–The Radical Science Movement–the Kuhnian intervention–Science as a social activity: Strong Programme–Laboratory Studies/ethnography of science– Actor Network Theory (Bruno Latour)–communicating science to peers– scientific controversies–public engagement with S&T–the changing configuration of science– mode II knowledge production</p>	12

2	<p>Feminist and Postcolonial Studies of Science</p> <p>Women in Science-Gender and Science-Has feminism changed science?-feminist epistemology-Eurocentrism-the Enlightenment-racism and science-colonial science-human body and science-Craniology and comparative anatomy in the 19th century-eugenics-caste and gender in Indian science</p>	12
3	<p>Technology – Society Interface</p> <p>i.Techno science and the Interpenetration of Science & Technology Questioning of the traditional boundary between science (knowing) and technology (doing)—how science and technology together shape the ways in which knowledge is constructed---Technological Determinism, Power and the Politics of Knowledge Production ii. Technology in Context: Perspectives in STS Studies This section examines various perspectives on Technology in STS studies A) Social Shaping of Technology B) Social Construction of Technology C) Actor Network Theory D) Transition in Socio-Technical Systems: Multi-Level Perspective E) Critical Theory of Technology iii.Gender and Technology How gender influences technologies and the social organization of scientific and technical workspaces---technologies constructed as masculine and feminine—technologies as both ‘liberating’ and ‘limiting’ women---contributions of Cynthia Cockburn & Donna Haraway iv. Public Engagement with Technology Contributions of Trench, Lewenstein, Jasanoff&Vishvanathan---governance and ethical issues in the context of emerging technologies-----constructing risk....role of State, civil society organizations and industry---regulatory dilemmas of transnational capitalism and influence of local contexts—democratisation and ‘up-stream’ public engagement with technology</p>	12

Total=36

Recommended Books

1. Anne Fausto-Sterling. 2002. “Gender, Race and Nation: The Comparative Anatomy of ‘Hottentot’ Women in Europe, 1815–17. In Kimberly Wallace-Sanders (ed.). *Skin Deep, Spirit Strong: The Black Female Body in American Culture*. Ann Arbor: The University of Michigan Press, pp. 66–95.
2. Bijker, Wiebe E. 1997. *Of Bicycles, Bakelites and Bulbs: Toward a Theory of Sociotechnical Change*. Cambridge, MA:MIT Press.
3. Bijker, Wiebe E. et al. 1989. *The Social Construction of Technological Systems*. Cambridge, MA: MIT Press. Bloor, David 1976. *Knowledge and Social Imagery*, second edition, London: Routledge and Kegan Paul.
4. Bourdieu, Pierre. 2004. *Science of Science and Reflexivity*. Cambridge: Polity Press. Bucchi, Massimiano. 1996. “When Scientists Turn to the Public: Alternative Routes in Science Communication.” *Public Understanding of Science* 05: 375–394.

Course Code: DBCE-101

Title of the Course: Community Engagement

L	T	P	Credits
0	0	2	1

Course Outcomes:

CO1: To develop an appreciation of rural culture, life-style and wisdom amongst students.

CO2: To learn about the status of various agricultural and rural development programmes.

CO3: To understand causes for rural distress and poverty and explore solutions for the same

CO4: To apply class room knowledge of courses to field realities and there by improve quality of learning.

CO/PO Mapping (S-Strong Correlation, M- Medium Correlation, W-Weak Correlation)												
CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	M	W	M	M	M	W	W	M	M	S
CO2	M	S	M	S	W	M	W	W	M	W	S	M
CO3	S	W	W	M	S	S	S	W	S	W	S	S
CO4	S	W	W	W	M	M	M	W	S	M	M	S

Module	Course Outlines	Hour(s)
Appreciation of Rural Society	Rural life style, rural society, caste and gender relations, rural values with respect to community, nature and resources, elaboration of“ soul of India lies in villages’ (Gandhi),rural infrastructure	8
Understanding rural economy & livelihood	Agriculture, farming, landownership, water management, animal husbandry, non-farm livelihoods and artisans, rural entrepreneurs, rural markets	8
Rural Institutions	Traditional rural organizations, Self-help Groups, Panchayati raj institutions (Gram Sabha, Gram Panchayat, Standing Committees),localcivil society, localadministration	8

Rural Development Programmes	History of rural development In India, current national programmes: SarvaShikshaAbhiyan, BetiBachao, BetiPadhao, Ayushman Bharat, Swachh Bharat, PMA was Yojana, Skill India, GramPanchayat Decentralized Planning, NRLM, MNREGA, etc	8
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Total-32

****Recommended** field-based practical activities:

1. Interaction with SHG women members, and study of their functions and challenges; planning for their skill building and livelihood activities
2. Visit MGNREGS projectsites, interact with beneficiaries and interview functionaries at the work site
3. Field visit to Swachh Bharat projectsites, conduct analysis and initiate problem solving measures
4. Conduct Mission Antyodaya surveys to support under Gram Panchayat Development Plan (GPDP)
5. Interactive community exercise with local leaders, Panchayat functionaries, grass-root officials and local institutions regarding village development plan preparation and resource mobilization
6. Visit Rural Schools/mid-day meal centres, study Academic and infrastructural resources and gaps
7. Participate in Gram Sabha meetings, and study community participation
8. Associate with Social audit exercises at the Gram Panchayat level, and interact with programme beneficiaries
9. Attend Parent Teacher Association meetings, and interview school drop outs
10. Visit local Anganwadi Centre and observe the services being provided
11. Visit local NGOs, civil society organizations and interact with their staff and beneficiaries,
12. Organize awareness programmes, health camps, Disability camps and cleanliness camps
13. Conducts oil health test, drinking water analysis, energy use and fuel efficiency surveys
14. Raise understanding of people impacts of climate change, building up community's disaster preparedness
15. Organise orientation programmes for farmers regarding organic cultivation, rational use of irrigation and fertilizers and promotion of traditional species of crops and plants
16. Formation of committees for common property resource management, village pond maintenance and fishing

Recommended Readings:

Books:

1. Singh, Katar, Rural Development: Principles, Policies and Management, Sage Publications, New Delhi, 2015.

2. A Handbook on Village Panchayat Administration, Rajiv Gandhi Chair for Panchayati Raj studies,2002.
3. United Nations, Sustainable Development Goals, 2015 un.org/sdgs/
4. M.P.Boraian, Best Practices in Rural Development, Shanlax Publishers,2016.

Journals:

1. Journals of Rural development,(published by NIRD & PR Hyderabad)
2. Indian Journal of Social Work,(by TISS ,Bombay)
3. Indian Journal of Extension Education (by Indian Society of Extension Education)
4. Journal of Extension Education (by Extension Education Society)
5. Kurukshetra (Ministry of Rural Development, GoI)
6. Yojana (Ministry of Information and Broadcasting GoI)

Course Code: BTCE-705

Title of Course: Pre-Stressed Concrete

L	T	P	Credits
3	0	0	3

Course Outcomes: After completion of the course, students should be able to

CO1 Understand the general mechanical behavior of prestressed concrete

CO2 Able to analyze and design prestressed concrete flexural members

CO3 Analyze and design for vertical and horizontal shear in prestressed concrete

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	S	M	S	M	M	S	W	S	W	S	S
CO2	M	M	S	S	M	S	S	W	S	W	M	S
CO3	S	S	S	S	M	M	S	W	S	W	S	S

Course Content:

Note: IS 1343 Code of Practice is permitted in the examination.

UNIT-I

Materials for Pre-stressed Concrete and Pre-stressing Systems:

High strength concrete and high tensile steel, tensioning devices, pre-tensioning systems, post tensioning systems.

UNIT-II

Analysis of Pre-stress and Bending Stresses:

Analysis of pre-stress, resultant stresses at a sector, pressure line or thrust line and internal resisting couple, concept of load balancing, losses of pre-stress, deflection of beams.

UNIT-III

Strength of Pre-Stressed Concrete Sections in Flexure, Shear and Torsion:

Types of flexural failure, strain compatibility method, IS:1343 code procedure, design for limit state of shear and torsion.

UNIT-IV

Design of Pre-Stressed Concrete Beams and Slaboratorys:

Transfer of prestress in pre tensioned and post tensioned members, design of anchorage zone reinforcement, design of simple beams, cable profiles, Design of slaboratorys.

Recommended Books

1. N. Krishna Raju, 'Pre-stressed Concrete', Tata McGraw Hill.
2. T.Y. Lin, Ned H. Burns, 'Design of Pre-Stressed Concrete Structures', John Wiley & Sons.
3. P. Dayaratnam, 'Prestressed Concrete', Oxford & IBH.
4. R. Rajagopalan, 'Pre-stressed Concrete'.
5. IS 1343 2012 Code of Practice for Pre-Stressed Concrete.

Online Learning

<https://nptel.ac.in/courses/105106117/>

www.swayam.gov.in

Course Code: BTCE-706

Title of Course: Solid Waste Management

L	T	P	Credits
3	0	0	3

Course Outcomes:After completion of the course, students should be able to

CO1 Types and composition of solid waste with methods of handling, sampling and storage of solid waste

CO2 Able to know Municipal solid waste management systems with respect to its physical properties, and associated critical considerations in view of emerging technologies

CO3 Select the appropriate method for solid waste collection, transportation, redistribution and disposal

CO4 Describe methods of disposal of hazardous solid waste.

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	M	M	M	M	S	M	W	M	W	M	S
CO2	M	M	M	M	M	S	M	W	M	W	M	S
CO3	S	S	S	S	S	M	M	W	M	W	S	S
CO4	S	S	S	S	S	M	M	W	M	W	S	S
CO5	M	M	M	M	M	S	M	W	M	W	M	S

Course Content:

UNIT-I

Sources and Composition of Municipal: Solid Waste Introduction, Sources of solid waste, Types of solid waste, Composition of solid waste and its determination, Types of materials recovered from MSW.

Properties of Municipal Solid Wastes: Physical properties of Municipal Solid Waste, Chemical properties of Municipal Solid Waste, Biological properties of Municipal Solid Waste, Transformation of Municipal Solid Waste.

UNIT-II

Solid Waste Generation and Collection: Quantities of Solid Waste, Measurements and methods to measure solid waste quantities, Solid waste generation and collection, Factors affecting solid waste generation rate, Quantities of materials recovered from MSW.

Handling, Separation and Storage of Solid Waste: Handling and separation of solid waste At site, Material separation by pick in, screens, float and separator magnets and electromechanical

separator and other latest devices for material separation, Waste handling and separation at Commercial and industrial facilities, Storage of solid waste at the sources.

UNIT-III

Processing of Solid Waste: Processing of solid waste at residence e.g. Storage, conveying, compacting, Shredding, pulping, granulating etc., Processing of solid waste at Commercial and industrial site.

Disposal of Municipal Solid Waste: Combustion and energy recovery of municipal solid waste, effects of combustion, Landfill: Classification, planning, siting, permitting, landfill processes, landfill design, landfill operation, Differentiate sanitary land fill and incineration as final disposal system for solid waste

UNIT-IV

Solid Waste Management: Municipal solid waste (management and handling) rules, hazardous waste (management and handling) rules, biomedical waste handling rules, Fly ash rules, recycled plastics usage rules, batteries (management and handling) rules.

Recommended Books

1. P.A. Vesilind, W. Worrell and D.R. Reinhart, 'Solid Waste Engineering', Thomson Books.
2. A.D. Bhide and B.B. Sundaresan, 'Solid Waste Management, Collection, Processing and Disposal', Nagpur.
3. G. Tchobanoglous, H. Theisen and S.A. Vigil, 'Integrated Solid Waste Management', McGraw Hill International Editions.
4. 'Manual on Municipal Solid Waste Management', CPHEEO, Ministry of Urban Development, Government of India.
5. 'Management and Handling Rules for: Municipal Solid Waste, Biomedical Waste, Hazardous Waste and Radioactive Wastes', Government of India Publications.

Online Learning

<https://nptel.ac.in/courses/120108005/>

www.swayam.gov.in

Course Code: BTCE-707

Title of Course: Ground Improvement Techniques

L	T	P	Credits
3	0	0	3

Course Outcomes:After completion of the course, students should be able to:

CO1Analyze the field problems related to problematic soils and solve the problems using the ground Improvement techniques

CO2 Practice ground improvement using Mechanical modification techniques .

CO3Understand the concept of consolidation of soil

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	M	S	M	W	W	S	W	S	S
CO2	S	S	S	S	M	M	W	W	S	W	M	S
CO3	S	S	M	M	S	M	W	W	S	W	S	S

Course Content:

UNIT-I

Introduction to Soil Improvement without the addition of Materials: Dynamic compaction equipment used - application to granular soils - cohesive soils - depth of improvement – environmental considerations - induced settlements - compaction using vibratory probes – vibro techniques vibro equipment - the vibro compaction and replacement process - control of verification of vibro techniques

- vibro systems and liquefaction - soil improvement by thermal treatment – preloading techniques
- surface compaction introduction to bio technical stabilization

UNIT-II

Introduction to Soil Improvement with the addition of Materials: Lime stabilization - lime column method - stabilization of soft clay or silt with lime - bearing capacity of lime treated soils – settlement of lime treated soils - improvement in slope stability - control methods - chemical grouting – commonly used chemicals - grouting systems - grouting operations - applications - compaction grouting - introduction - application and limitations - plant for preparing grouting materials - jet grouting – jet grouting process - geometry and properties of treated soils - applications - slaboratory jacking - gravel - sand - stone columns.

UNIT-III

Soil Improvement using Reinforcing Elements: Introduction to reinforced earth - load transfer mechanism and strength development - soil types and reinforced earth - anchored earth nailing reticulated micro piles - soil dowels - soil anchors - reinforced earth retaining walls.

UNIT-IV

Geotextiles: Behavior of soils on reinforcing with geotextiles - effect on strength, bearing capacity, compaction and permeability - design aspects - slopes - clay embankments - retaining walls – pavements.

Recommended Books

1. Moseley, 'Text Book on Ground Improvement', Blackie Academic Professional, Chapman & Hall.
2. R. Bowe, 'Text Book on Grouting in Engineering Practice', Applied Science Publishers Ltd.
3. R.A. Jewell, 'Text Book on Soil Reinforcement with Geotextiles', CIRIA Special Publication, Thomas Telford.
4. W.E. Van Impe, 'Text Book on Soil Improvement Technique & their Evolution', Balkema Publishers.
5. Donald. H. Gray & Robbin B. Sotir, 'Text Book On Bio Technical & Soil Engineering Slope Stabilization', John Wiley.
6. G.V. Rao & G.V.S. Rao, 'Text Book on Engineering with Geotextiles', Tata McGraw Hill.
7. Korener, 'Construction & Geotechnical Methods in Foundation Engineering', McGraw Hill.
8. S.K. Shukla and J.H. Yin, 'Fundamental of Geosynthetic Engineering', Taylor & Francis.
9. Swamisaran, 'Reinforced Soil and its Engineering Application', New Age Publication.
10. S.K. Gulati and M. Datta, 'Geotechnical Engineering', TMH.

Online Learning

<https://nptel.ac.in/courses/105108075/>

www.swayam.gov.in

CourseCode:BTCE-708

Title of Course: Bridge Engineering

L	T	P	Credits
3	0	0	3

Course Outcomes: After completion of the course, students should be able to
CO1 Knowledge about the components of bridges
CO2 Sub-surface investigations required for bridge construction.
CO3 To perform design of various laboratory type reinforced concrete bridges.
CO4 To understand standard specification for bridge design.
CO5 Knowledge of quality control and maintenance aspects of bridges

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	M	M	M	M	S	M	W	M	W	M	S
CO2	M	M	M	M	M	S	M	W	M	W	M	S
CO3	S	S	S	S	S	M	M	W	M	W	S	S
CO4	S	S	S	S	S	M	M	W	M	W	S	S
CO5	M	M	M	M	M	S	M	W	M	W	M	S

Course Content:

UNIT-I

Introduction: Definition and components of a bridge, Classification of bridges, Choice of a bridge type. Investigation for bridges, Selection of bridge site, Determination of design discharge for River Bridge, Linear waterway, Economical span, Vertical clearance, scour depth, Afflux, Traffic projection.

Standard Specifications for Road Bridges: IRC Bridge Codes, Width of carriageway, Clearances, Dead load, I.R.C. standard live loads, Impact effect, Wind load, Longitudinal forces, Centrifugal forces, Horizontal forces due to water current, Buoyancy effect, Earth pressure, Deformation stresses, Erection stresses, Temperature effects, and Seismic force.

UNIT-II

Reinforced Concrete Bridges: Types of RCC bridges; Culverts - Box Culvert, Pipe Culvert, Solid laboratory bridge, T-beam girder bridges, Hollow girder bridges, Balanced cantilever bridges, Continuous girder bridges, Rigid frame bridges, Arch bridges, Pre-stressed concrete bridges.

Steel Bridges: Types of Steel bridges; Beam bridges, Plate girder bridges, Box girder bridges, Truss bridges, Arch bridges, Cantilever bridges, Cable stayed bridges, Suspension bridges.

UNIT-III

Sub-structure and Foundation: Piers and abutments, materials for piers and abutments, Types of foundations; Shallow, Pile, and Well foundations. Relative merits of piles and well foundations, Pneumatic Caissons, Box Caissons.

Bearings, Joints & Appurtenances: Importance of Bearings, Different types of bearings- Expansion Bearings, Fixed Bearings, Elastomeric Bearings, Expansion joints, Wearing Course, Approach Slaboratory, Footpath, Handrails.

UNIT-IV

Construction and Maintenance of Bridges: Methods of construction of concrete and steel bridges. Formwork and false work for concrete bridges, Causes of Bridge failures, Inspection and maintenance, Bridge Management System.

Recommended Books

1. Johnson, Victor, 'Essentials of Bridge Engineering', Oxford University Press.
2. C.H. Khadilkar, 'A Text book of Bridge Construction', Allied Publishers.
3. S.C. Rangwala, 'Bridge Engineering', Charotar Publishing House Pvt.Ltd.
4. V.K. Raina, 'Concrete Bridges Handbook, Shroff Publishers and Distributors.
5. S. Ponnuswamy, 'Bridge Engineering', McGraw Hill Education.

EBook

<https://www.pdfdrive.com/bridge-engineering-handbook-second-edition-e18940566.html>

Online Learning

https://swayam.gov.in/nd1_noc19_ce23/preview

www.swayam.gov.in

Course Code: BTCE-709

Title of Course: Earthquake resistant design of structures

L	T	P	Credits
3	0	0	3

Course Outcomes: After completion of the course, students should be able to

CO1 To introduce nature and characteristics of various dynamics loads

CO2 To have considerable knowledge of theory of vibrations including multi-degree of freedom systems

CO3 To assess of structural failure due to earthquakes.

CO4 To analyze and design structures Title of Course to seismic loading as per IS codes

CO5 To introduce ductile detailing of structures, concept of soft story and design of shear walls as per IS code

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	S	M	M	W	M	W	M	W	W	S	S
CO2	S	S	S	S	M	M	M	W	M	W	S	S
CO3	M	S	M	M	W	M	W	M	W	W	S	S
CO4	M	S	M	M	W	M	M	M	W	W	S	S
CO5	M	S	M	M	W	M	M	M	W	W	S	S

Course Content:

Note: IS: 1893, IS: 4326 and IS: 13920 Code of practice is permitted in examination.

UNIT-I

Introduction to Structural Dynamics: – Theory of vibrations – Lumped mass and continuous mass systems – Single Degree of Freedom (SDOF) Systems – Formulation of equations of motion – Undamped and damped free vibration – Damping – Response to harmonic excitation – Concept of response spectrum. Multi-Degree of Freedom (MDOF) Systems: - Formulation of equations of motion – Free vibration – Determination of natural frequencies of vibration and mode shapes – Orthogonal properties of normal modes – Mode superposition method of obtaining response.

UNIT-II

Earthquake Analysis: - Introduction – Rigid base excitation – Formulation of equations of motion for SDOF and MDOF Systems – Earthquake response analysis of single and multistoried buildings – Use of response spectra. Codal Design Provisions: Review of the latest Indian seismic code IS:1893–2002(Part-I) provisions for buildings–Earthquake design philosophy–

Assumptions – Design by seismic coefficient and response spectrum methods – Displacements and drift requirements – Provisions for torsion.

UNIT-III

Earthquake Engineering: - Engineering Seismology – Earthquake phenomenon – Causes and effects of earthquakes – Faults – Structure of earth – Plate Tectonics – Elastic Rebound Theory – Earthquake Terminology –Source, Focus, Epicentre etc - Earthquake size – Magnitude and intensity of earthquakes – Classification of earthquakes– Seismic waves – Seismic zones – Seismic Zoning Map of India – Seismograms and Accelegrams. Codal Detailing Provisions: - Review of the latest Indian Seismic codes IS: 4326 and IS: 13920 provisions for ductile detailing of R.C buildings – Beam, column and joints

UNIT-IV

Aseismic Planning: - Plan Configurations – Torsion Irregularities – Re-entrant corners – Nonparallel systems – Diaphragm Discontinuity – Vertical Discontinuities in load path – Irregularity in strength and stiffness – Mass Irregularities – Vertical Geometric Irregularity – Proximity of Adjacent Buildings. Shear walls: Types – Design of Shear walls as per IS:13920 – Detailing of reinforcements.

Recommended Books

1. Clough & Penzien, 'Dynamics of Structures', International Edition, McGraw Hill.
2. Pankaj Agarwal & Manish Shrikhande, 'Earthquake Resistant Design of Structures', Prentice Hall of India, New Delhi.
3. A.K. Chopra, 'Dynamics of Structures', Pearson Education, Indian Branch, Delhi.
4. C.V.R. Murty, 'Earthquake Tips', I.I.T. Kanpur.
5. Mario Paaz, 'Structural Dynamics', IS Codes: IS:1893, IS:4326 and IS:13920.

EBook

<https://www.pdfdrive.com/earthquake-resistant-design-of-structures-by-e176089642.html>

Online Learning

<https://nptel.ac.in/courses/105101004/>
www.swayam.gov.in

Course Code: BTCE-710

Title of Course: Renewable Energy Sources

L	T	P	Credits
3	0	0	3

Course Outcomes: After completion of the course, students should be able to
CO 1 Knowledge about utilization of renewable energy sources and solar energy.
CO 2 Able to understand wind energy conversion and bio-mass energy conversion systems.
CO 3 Understand geothermal energy, energy from ocean and hydrogen energy sources.

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	M	S	M	S	M	M	S	M	S
CO2	S	S	M	M	S	M	S	M	M	S	M	S
CO3	S	S	M	M	M	W	S	M	M	S	M	M

Course Content:

UNIT-I

Solar Energy: Conventional energy sources and availability, Introduction to new energy techniques & renewable energy sources; Solar Energy, Solar constant, Radiation geometry, Solar energy collectors, Concentrated and flat plate, Energy balance and collector efficiency, Solar energy storage, Application to space heating, distillation, cooking and greenhouse effect.

UNIT-II

Wind and Bio-Energy: Basic principle of wind energy conversion, site selection, analysis of aerodynamic forces acting on wind mill blades and estimation of power output, Biomass conversion technology, photosynthesis, biogas plant, thermal gasification.

UNIT-III

Geothermal Energy: Sources- hydrothermal, hot dry rock, geothermal fossil system, prime movers for geothermal energy.

Energy from Ocean: Ocean thermal electric conversion, energy from tides, small-scale hydroelectric development.

UNIT-IV

Hydrogen Energy Sources: Introduction, hydrogen production methods, storage, utilization, magneto hydrodynamic power, thermionic generation, nuclear fusion energy.

Recommended Books:

1. G.D. Rai, 'Non-Conventional Energy Sources', Khanna Publishers, Delhi,2011.
2. S. Rao, B.B.Parulekar, 'Energy Technology: Non-Conventional Renewable and Conventional', Khanna Publishers,Delhi,
3. H.P. Garg and Jai Prakash, 'Solar Energy: Fundamentals and Applications', Tata McGraw Hill.



(U/S 2(f) and 12B of the UGC Act1956, NAAC Accredited)

DESH BHAGAT UNIVERSITY, MANDI GOBINDGARH

Faculty of Engineering and Applied Sciences

Department of Civil Engineering

Program: B.Tech Civil Engineering

Semester VIII

Sr. No.	Course Code	Course Name	Category	Internal	External	Total	L	T	P	C
1.	BTCE-801	Industrial Training	EEC	500	500	1000	-	-	-	18
Total				500	Total	500	500	1000	-	18

L- Lecture , T- Tutorial , P- Practical , C- Credit , EEC- Employability Enhancement Course