DAVUNIVERSITY JALANDHAR
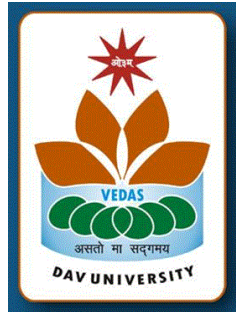
Course Scheme & Syllabus

For

B.Tech. in Civil Engineering

1st TO 8thSEMESTER

Session 2020 onwards

DAV UNIVERSITY, JALANDHAR

Scheme of Courses
B.Tech. in Civil Engineering
Semester-1

S.NO.	Paper Code	Course Title	L	T	P	Cr	Nature of Course
1	MTH151A	Engineering Mathematics-I	4	0	0	4	BSC
2	CHE151A	Chemistry	4	0	0	4	BSC
3	CSE101A	Computer Fundamentals and Programming	4	0	0	4	ESC
4	EVS100A	Environmental Studies	4	0	0	0	MC
5	MEC101A	Engineering Drawing	2	0	4	4	ESC
6	ENG151A	Basic Communication Skills	3	0	0	3	HSMC
7	CHE152	Chemistry Lab	0	0	2	1	BSC
8	CSE103	Computer Fundamentals and Programming Lab	0	0	2	1	BSC
9	ENG152	Basic Communication Skills Lab	0	0	2	1	AECC
			21		10	22	

L: Lectures   T: Tutorial   P: Practical   Cr: Credits

Scheme of Courses
B. Tech. in Civil Engineering
Semester-2

S.NO.	Paper Code	Course Title	L	T	P	Cr	Nature of Course
1	MTH152A	Engineering Mathematics-II	4	0	0	4	BSC
2	PHY151B	Engineering Physics	4	0	0	4	BSC
3	MEC103	Mechanical Engineering Fundamentals	4	0	0	4	ESC
4	ELE105	Electrical and Electronics Technology	4	0	0	4	ESC
5	SGS107B	Human Values and General Studies	4	0	0	0	MC
6	MEC104	Manufacturing Practice	0	0	4	2	ESC
7	PHY152	Engineering Physics Lab	0	0	2	1	BSC
8	ELE102	Electrical and Electronics Technology Lab	0	0	2	1	ESC
			20		8	20	

L: Lectures   T: Tutorial   P: Practical   Cr: Credits

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Scheme of Courses
B. Tech. in Civil Engineering
Semester-3

L: Lectures   T: Tutorial   P: Practical   Cr: Credits

S.NO.	Paper Code	Course Title	L	T	P	Cr	Nature of Course
1	MTH252A	Engineering Mathematics-III	4	0	0	4	Core
2	BCE 201	Introduction to Civil Engineering	2	1	0	3	Core
3	BCE 203	Surveying and Geomatics	3	0	0	3	Core
4	BCE 205	Introduction to fluid mechanics	3	0	0	3	Core
5	BCE 207	Environment Engineering-1	3	0	0	3	Core
6	BCE 209	Engineering geology	3	0	0	3	Core
7	BCE 211	Engineering Mechanics	3	1	0	4	Core
8	BCE 213	Surveying Laboratory	0	0	2	1	Core
9	BCE 215	Fluid mechanics Laboratory	0	0	2	1	Core
10	BCE 217	Engineering geology Laboratory	0	0	2	1	Core
11	BCE219	Swachh Bharat Summer Internships*	0	0	0	2	Training, D & P
			21	2	6	28	

*Swachh Bharat Summer internship of duration 100 hours in the period of 1 May to 31 Jul

Scheme of Courses
B. Tech. in Civil Engineering
Semester-4

S.NO.	Paper Code	Course Title	L	T	P	Cr	Nature of Course
1	BCE 202	Civil Engineering-Societal and Global Impact	3	0	0	3	Core
2	BCE 204	Hydraulic Engineering	3	0	0	3	Core
3	BCE 206	Introduction to solid mechanics	3	1	0	4	Core
4	BCE 208	Disaster preparedness and planning	3	0	0	3	Core
5	BCE 210	Engineering material and construction	3	0	0	3	Core
6	BCE 212	Material testing and evaluation	3	1	0	4	Core
7	BCE 214	Material testing laboratory	0	0	2	1	Core
8	BCE 216	Solid mechanics laboratory	0	0	2	1	Core
9	BCE 218	Hydraulics engineering laboratory	0	0	2	1	Core
			18	2	6	23	

L: Lectures   T: Tutorial   P: Practical   Cr: Credits

Note: At the end of the examination of 4th Semester the students will undergo compulsory survey camp to be held in hilly area for a period of 2-4 weeks duration. Every student will submit the Camp/Training Report within two weeks from the start of teaching for 5th Semester. The marks for this will be included in the 5th Semester.

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Scheme of Courses
B. Tech. in Civil Engineering
Semester-5

S.NO.	Paper Code	Course Title	L	T	P	Cr	Nature of Course
1	BCE 301	Geotechnical Engineering	3	1	0	4	Core
2	BCE 302	Structural Engineering-I	3	0	0	3	Core
3	BCE 303	Hydrology and Water Resource Engineering	3	1	0	4	Core
4	BCE 307	Engineering Economics Estimation & Costing	3	0	0	3	Core
5	BCE 309	Design of Concrete Structure-1	3	1	0	4	Core
6	BCE 311	Transportation Engineering	3	0	0	3	Core
7	BCE 313	Geotechnical Engineering Laboratory	0	0	2	1	Core
8	BCE 315	Transportation Engineering Laboratory	0	0	2	1	Core
9	BCE 317	Estimation and Costing Laboratory	0	0	2	1	Core
10	BCE 319	Survey Camp	0	0	0	2	Training, D & P
			18	3	6	26	

L: Lectures   T: Tutorial   P: Practical   Cr: Credits

Scheme of Courses
B. Tech. in Civil Engineering
Semester-6

S.NO.	Paper Code	Course Title	L	T	P	Cr	Nature of Course
1	BCE 332	Structural Engineering-II	4	0	0	4	Core
2	BCE 334	Waste Water Engineering	3	0	0	3	Core
3	BCE 306	Design of Steel Structures	3	1	0	4	Core
4	BCE 3XX	DSE- I	3	0	0	3	DSE
5	BCE 3XX	DSE- II	3	0	0	3	DSE
6	BCE 3XX	DSE- III	3	0	0	3	DSE
7	BCE 308	Structural engineering laboratory	0	0	2	1	Core
8	BCE 310	Computer Aided Concrete Drawing	0	0	2	1	Core
9	BCE 312	Environmental Engineering Laboratory	0	0	2	1	Core
			19	1	6	23	

L: Lectures   T: Tutorial   P: Practical   Cr: Credits
Note:
- *Department specific elective will be chosen from the basket of "Department Specific Electives".*
- *At the end of the examination of 6th Semester the students will undergo compulsory industrial training for a period of 6 weeks duration in reputed industries. Every student will submit the training report within two weeks from the start of teaching of 7th Semester. The marks for this will be included in the 7th semester.*

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Scheme of Courses
B. Tech. in Civil Engineering
Semester-7

S.NO.	Paper Code	Course Title	L	T	P	Cr	Nature of Course
1	BCE 304	Construction Engineering and Management	3	0	0	3	Core
2	BCE 4XX	DSE- IV	3	0	0	3	DSE
3	BCE 4XX	DSE- V	3	0	0	3	DSE
4	BCE 4XX	DSE-VI	3	0	0	3	DSE
5	ENG352	Professional Communication	3	0	0	3	Core
6	XXX	Generic Elective - I	3	0	0	3	OE*
7	BCE 425	Project-I	1	0	8	5	Training, D & P
8	BCE 427	Industrial Practical Training*	0	0	0	2	Training, D & P
9	BCE 429	Seminar	0	0	2	1	Core
			19	0	8	26	

L: Lectures   T: Tutorial   P: Practical   Cr: Credits
Note:
- *Department specific elective will be chosen from the basket of "Department Specific Electives".*
- *Generic elective - I will be chosen from the "Generic Elective Basket"*

Scheme of Courses
B. Tech. in Civil Engineering
Semester-8

S.NO.	Paper Code	Course Title	L	T	P	Cr	Nature of Course
1	XXX	Generic Elective – II*	3	0	0	3	OE*
2	BCE 4XX	DSE- VII	3	0	0	3	DSE
3	BCE 4XX	DSE- VIII	3	0	0	3	DSE
4	BCE 4XX	DSE- IX	3	0	0	3	DSE
	BCE 4XX	DSE- X	3	0	0	3	DSE
6	BCE 422	Project- II	1	0	8	5	Training, D & P
			16	0	8	20	

L: Lectures   T: Tutorial   P: Practical   Cr: Credits
Note:
- *Department specific elective will be chosen from the basket of "Department Specific Electives".*
- *Generic elective-II will be chosen from the "Generic Elective Basket"*

*Student can opt for any MOOC Course/Courses instead of Generic Elective/ Industrial Practical Training of Same credits.

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- **DSE- If any student wants to do MOOC course against any of the department specific elective, that particular MOOC course should be on similar topic with at least 75% course content similar to that of DSE. The MOOC course can only be taken with the prior approval of the department for content verification.**
- **In case the MOOC course chosen against any of the DSE course is having less credit than the DSE course, the MOOC course will be considered.**

Department Specific Elective Basket

S.NO.	Paper Code	Course Title	L	T	P	Cr	Nature of Course
1	BCE 314	**FOUNDATION ENGINEERING**	3	0	0	3	Geo-technical Engineering
2	BCE 316	**OFFSHORE ENGINEERING**	3	0	0	3	Geo-technical Engineering
3	BCE 318	**SOIL DYNAMICS**	3	0	0	3	Geo-technical Engineering
4	BCE 320	**BIOLOGICAL PROCESSES FOR CONTAMINATS REMOVAL**	3	0	0	3	Environment
5	BCE 322	**ENVIRONMENT LAWS AND POLICIES**	3	0	0	3	Environment
6	BCE 324	**ENVIRONMENT IMPACT ASSESSMENT & LIFE CYCLE ANALYSIS**	3	0	0	3	Environment
7	BCE 326	**INTELLIGENT TRANSPORTATION SYSTEMS**	3	0	0	3	Transportation
8	BCE 328	**RAILWAY AND AIRPORT ENGINEERING**	3	0	0	3	Transportation
9	BCE 330	**TRANSPORTATION ECONOMICS**	3	0	0	3	Transportation
10	BCE 403	**INDUSTRIAL STRUCTURES**	3	0	0	3	Structural Engineering
11	BCE 405	**MODELLING AND ANALYSIS OF UNCERTAINTY**	3	0	0	3	Structural Engineering
12	BCE 407	**EARTHQUAKE ENGINEERING**	3	0	0	3	Structural Engineering
13	BCE 409	**STRUCTURAL DYNAMICS**	3	0	0	3	Structural Engineering
14	BCE 411	**RELAIBILITY ANALYSIS OF STRUCTURE**	3	0	0	3	Structural Engineering
15	BCE 413	**PRE-STRESSED CONCRETE**	3	0	0	3	Structural Engineering
16	BCE 415	**DESIGN OF STRUCTURAL SYSTEM**	3	0	0	3	Structural Engineering
17	BCE 417	**MASONARY STRUCTURE**	3	0	0	3	Structural Engineering
18	BCE 419	**SUSTAINABLE CONSTRUCTION METHODS**	3	0	0	3	Construction management
19	BCE 421	**CONSTRUCTION EQUIPMENT AND AUTOMATION**	3	0	0	3	Construction management
20	BCE 423	**CONSTRUCTION COST ANALYSIS**	3	0	0	3	Construction management

21	BCE 402	**ECOLOGICAL ENGINEERING**	3	0	0	3	Environment
22	BCE 404	**AIR & NOISE POLLUTION CONTROL**	3	0	0	3	Environment
23	BCE 406	**SOLID WASTE MANAGEMENT**	3	0	0	3	Environment
24	BCE 408	**DESIGN OF CONCRETE STRUCTURE-II**	3	0	0	3	Structural Engineering
25	BCE 410	**STRUCTURAL ANALYSIS BY MATRIX METHODS**	3	0	0	3	Structural Engineering
26	BCE 412	**ENVIRONMENTAL GEOTECHNOLOGY**	3	0	0	3	Structural Engineering
27	BCE 414	**ADVANCED STRUCTURAL STEEL DESIGN**	3	0	0	3	Structural Engineering
28	BCE 416	**PORT AND HARBOUR ENGINEERING**	3	0	0	3	Transportation
29	BCE 418	**DESIGN OF HYDRAULIC STRUCTURES**	3	0	0	3	Structural Engineering
30	BCE 420	**REPAIR AND REHABLITATION OF STRUCTURES**	3	0	0	3	Structural Engineering
31	BCE 422	**MATERIAL CHARACTERIZATION**	3	0	0	3	Structural Engineering

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Generic Elective Basket

S.NO.	Paper Code	Course Title	L	T	P	Cr
1	ELE801A	Electro-Mechanical Energy Conversion	3	0	0	3
2	ELE802A	Transducers and Signal Conditioning	3	0	0	3
3	CHL801A	Industrial Pollution Control	3	0	0	3
4	CHL802A	Fuel Cell Technology	3	0	0	3
5	MEC801A	Industrial Engineering Techniques	3	0	0	3
6	MEC802A	Energy Resources	3	0	0	3
7	CSE801A	Software Engineering & Project Management	3	0	0	3
8	CSE802A	Computer Networks	3	0	0	3
9	ECE801A	Communication and Media Foundations	3	0	0	3
10	ECE802A	Electronic Displays	3	0	0	3
11	ECE803A	Everyday Electronics	3	0	0	3
12	CIV 801	Construction Materials and Techniques	3	0	0	3
13	CIV 802	Railway and Tunnel Engineering	3	0	0	3
14	CIV 803	Metro Systems and Engineering	3	0	0	3
14	MGT001A	Fundamentals of Management	3	0	0	3
15	MGT002A	Fundamentals of Advertising	3	0	0	3
16	MGT003A	Fundamentals of Stock Market	3	0	0	3
17	MGT004A	Fundamentals of Research Methods	4	0	0	3
18	XXX	Economic Policies in India	3	0	0	3
19	XXX	Soft Skills and Interpersonal Communication	3	0	0	3
20	XXX	Cyber Law and Ethics	3	0	0	3
21	XXX	Human Resource Development and Organizational Behavior	3	0	0	3

Detailed Syllabus

DAV UNIVERSITY, JALANDHAR

FIRST SEMESTER

Course Title: Engineering Mathematics-I

Paper Code: MTH151A

L	T	P	Credits
4	0	0	4

Objective: The aim of this course is to familiarize the students with the theory of matrices which are used in solving equations in mechanics and the other streams. This course also provides a comprehensive understanding of the origin and development of ideas to exhibit the techniques origin and development of ideas to exhibit the techniques of solving ordinary differential equations.

PART-A

Rank of matrices, Inverse of Matrices, Gauss Jordan Method, reduction to normal form, Consistency and solution of linear algebraic system of equations, Gauss Elimination Method, Eigen values and Eigen vectors, Diagonalisation of Matrix, Cayley Hamilton theorem. Orthogonal, Hermition and unitary matrices.

PART-B

Concept of limit and continuity of a function of two variables, Partial derivatives, Homogenous Function , Euler's Theorem, Total Derivative, Differentiation of an implicit function, chain rule, Change of variables,Jacobian, Taylor's and McLaurin'sseries. Maxima and minima of a function of two and three variables: Lagrange's method of multipliers.

PART-C

Formation of ordinary differential equations, solution of first order differential equations by separation of variables, Homogeneous equations, Reduce to Homogenous, exact differential equations, equations reducible to exact form by integrating factors, equations of the first order and higher degree, clairaut's equation.

PART-D

Solution of differential equations with constant coefficients: method of differential operators. Non – homogeneous equations of second order with constant coefficients: Solution by method of variation of parameters, Simultaneously Linear differential equation.

References:

1. Grewal, B.S. *Higher Engineering Mathematics*. New Delhi: Khanna Publication, 2009.

2. Kreyszig, Erwin. *Advanced Engineering Mathematics*. New Delhi: Wiley Eastern Ltd., 2003.

3. Jain, R K, and K Iyengar S R. *Advanced Engineering Mathematics*, New Delhi: Narosa Publishing House, 2003.

4. Thomas, George B. and Finney Ross L. *Calculus and Analytic Geometry*. New Delhi Addison Wesley, 1995.

DAV UNIVERSITY, JALANDHAR

Course Title: Chemistry

Course Code: CHE151A

L	T	P	Credits
4	0	0	4

Course Objectives:

The objective of the Engineering Chemistry is to acquaint the

student with the basic phenomenon/concepts of chemistry for the development of the right attitudes by the engineering students to cope up with the continuous flow of new technology. The student will able to understand the new developments and breakthroughs efficiently in engineering and technology.

Expected Prospective:

This course will equip students with the necessary chemical knowledge concerning the fundamentals as well as new technology in the field of chemistry.

PART- A

Spectroscopy and its Applications

General Introduction: Introduction, electromagnetic spectrum, absorption and emission spectrum, atomic and molecular spectroscopy, types of molecular spectra, experimental techniques, selection rules, width and intensities of spectral lines.

UV/Visible Spectroscopy: types of electronic Transitions,Chromophores, Auxochromes, Effect of conjugation on Chromophores, Factors affecting λmax and intensity of spectral lines, effect of solvent onλmax, isobestic point, applications.

IR Spectroscopy: Infrared region, fundamental modes of vibrations and types, theory of infrared spectra, vibrational frequency and energy levels, anharmonic oscillator, modes of vibrations of polyatomic molecules, characteristic signals of IR spectrum, finger print region, factors affecting vibrational frequency; applications.

NMR Spectroscopy: Principle and instrumentation, relaxation processes, proton magnetic resonance spectroscopy, number of signals, Chemical shift, Spin-Spin Splitting, coupling constant, applications.

PART - B

Water and its treatment

Introduction, hardness of water, degree of hardness, units of hardness, boiler feed water: specification, scales and sludge formation; priming& foaming, boiler corrosion, caustic

embrittlement, treatment of boiler feed water, internal treatment of water; softening of water by lime-soda, zeolite and ion exchange methods, desalination of water; Water for domestic use: purification of water for domestic use.

Corrosion and its Prevention

Introduction; different types of corrosion - wet and dry corrosion; mechanism of wet corrosion; comparison of dry and wet corrosion, Types of electrochemical corrosion: galvanic corrosion, concentration cell corrosion or differential aeration corrosion, waterline corrosion, pitting corrosion, crevice corrosion, stress corrosion, intergranular corrosion; other forms of corrosion: atmospheric corrosion, soil corrosion, microbiological corrosion, erosion corrosion, Filliform corrosion, stray current corrosion, passivity, galvanic series, factors influencing corrosion, various methods of corrosion control.

PART -C

Chemistry in Nanoscience and Technology

Introduction,Materials self-assembly, molecular vs. material self-assembly, hierarchical assembly, self-assembling materials, two dimensional assemblies, mesoscale self-assembly, coercing colloids, nanocrystals, supramolecular structures, nanoscale materials, future perspectives applications,nanocomposities and its applications.

PART -D

Polymers and polymerization

Introduction, monomer and repeating unit, degree of polymerization, functionality, classification of polymers: based on origin, monomers, structure, method of synthesis, tacticity or configuration, action of heat, chemical composition, ultimate form; types of polymerization, specific features of polymers, regularity and irregularity, tacticity of polymers, average molecular weights and size, determination of molecular weight by number average methods, effect of molecular weight on the properties of polymers, introduction to polymer reinforced composites.

References:

1. William Kemp, *Organic Spectroscopy*, Palgrave Foundations, 1991.

2. D. A. Skoog, F. J. Holler and A. N. Timothy, *Principle of Instrumental Analysis*, 5th Edition., Saunders College Publishing, Philadelphia, 1998.

3. C. P. Poole, Jr., F. J. Owens, *Introduction to Nanotechnology*, WileyInterscience, 2003.

4. L.E. Foster, Nanotechnology, *Science Innovation & Opportunity*, Pearson Education, 2007.

5. P. Ghosh, *Polymer Science and technology*(2nd Edition), Tata McGraw Hill, 2008.

6. Wiley *Engineering Chemistry*, Second Edition, 2013.

DAV UNIVERSITY, JALANDHAR

Course Title: Computer Fundamentals and Programming

Course Code: CSE101A

L	T	P	Credits
4	0	0	4

Course Objective: To get basic knowledge of computers (hardware and software), its components and Operating systems. To acquire programming skills in C, basic knowledge of Internet

PART -A

Introduction to Computers

Define a Computer System, Block diagram of a Computer System and its working, memories, Volatile and non-volatile memory, cache, virtual, secondary storage devices-Magnetic Tape, Hard Disk, CD-DVD, Magnetic Disk, Various input devices including keyboard, Mouse, Joystick, Scanners and Various output devices including Monitors, Printers, Plotters

Operating Systems

Computer Software and its types and Hardware, Operating Systems, their types and functions

PART -B

Working Knowledge of Computer System

Introduction to word processors and its features, creating, editing, printing and saving documents, spell check, mail merge, creating power point presentations, creating spreadsheets and simple graphs.

Fundamentals of Internet Technology

Local area networks, MAN and wide area network, Internet, WWW, E-mail, Browsing and Search engines, Internet Connectivity, Network Topology, Hub, Switches, Router, Gateway.

PART -C

Basic Constructs of C

Keywords, Identifiers, Variables, Data Types and their storage, Arithmetic Operators, Relational Operators, Logical Operators, Bitwise Operators, Increment & Decrement Operators, Expressions, Conditional Expressions, Assignment Operators and Expressions, External Variables and Scope of Variables, Structure of C Program.

Control Structures

Decision making statements: if, nested if, if – else ladder, switch, Loops and iteration: while loop, for loop, do – while loop, break statement, continue statement, goto statement.

PART -D

Functions

Advantages of functions, function prototype, declaring and defining functions, return statement, call by value and call by reference, recursion, and storage classes.

Arrays and Strings

Declaration of arrays, initialization of array, accessing elements of array, I/O of arrays, passing arrays as arguments to a function, strings, I / O of strings, string manipulation functions (strlen, strcat, strcpy, strcmp)

References:

1. V.K. Jain: "*Fundamentals of Information Technology and Computer Programming*", PHI. Latest Edition.
2. Anita Goel: "*Computers Fundamentals*", Pearson Publications
3. Brian Kernighan and Dennis M. Ritchie: "*The C Programming Language*", Prentice Hall, 2nd Edition 2007.
4. K.N.King : "*C Programming : A Modern Approach*", W.W. Norton Company 2nd edition (2008).
5. Herbert Schildt : "*C: The Complete Reference*", Tata Mcgraw Hill Publications 4th edition.
6. Gottfired : "*Programming in ANSI C, Schaum Series*", TMH publications, 2nd Edition (1996).

DAV UNIVERSITY, JALANDHAR

Course Title: Environmental Studies

Paper Code: EVS100A

L	T	P	Credits
4	0	0	0

Course Objective: This course aims at understanding the students in aspects of environmental problems, its potential impacts on global ecosystem and its inhabitants, solutions for these problems as well as environmental ethics which they should adopt to attain sustainable development.

PART - A

The multidisciplinary nature of environmental studies

Definition, scope and importance, Need for public awareness

Natural Resources: Renewable and non-renewable resources:

Natural resources and associated problems

(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) **Mineral resources:** Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

(d) **Food resources:** World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

(e) **Energy resources:** Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.

(f) **Land resources:** Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

Ecosystem:

- 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 following ecosystem:

a. Forest ecosystem

b. Grassland ecosystem

c. Desert ecosystem

d. Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries)

PART -B

Biodiversity and its conservation

- Introduction – Definition: Genetic, Species and Ecosystem Diversity
- Bio-geographical classification of India
- Value of biodiversity: Consumptive use, Productive use, Social, Ethical, Aesthetic and Option values
- Biodiversity at global, national and local levels
- India as a mega-diversity nation
- Hot-spots of biodiversity
- Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts
- Endangered and endemic species of India
- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity, global and national efforts.

Environmental Pollution

- Definition, causes, effects and control measures of:

a. Air pollution

b. Water pollution

c. Soil pollution

d. Marine pollution

e. Noise pollution

f. Thermal pollution

g. Nuclear pollution

- Solid waste management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution

- Pollution case studies
- Disaster management: floods, earthquake, cyclone and landslides

PART -C

Social Issues and the Environment

- Population growth, variation among nations, Population explosion – Family Welfare Programmes.
- Environment and human health,
- From unsustainable to sustainable development
- Urban problems and related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns. Case studies.
- Environmental ethics: Issues and possible solutions
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation
- Consumerism and waste products
- Environmental Laws: The Environment Protection Act, 1986; The Air (Prevention and Control of Pollution) Act, 1981; The Water (Prevention and control of Pollution) Act 1974; The Wildlife Protection Act, 1972; Forest Conservation Act, 1980.
- Issues involved in enforcement of environmental legislation
- Public Awareness

PART -D

Human Population and Environment

- Population Growth and Variations among Nations
- Population Explosion
- Human Rights
- Value Education
- HIV / AIDS
- Women and Child Welfare
- Role of Information Technology in Environment and Human Health
- Case Studies

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Field Work

- 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)

Suggested Readings:

1. Odum, EP. *Basic Ecology*. Japan: Halt Saundurs, 1983.

2. Botkin, DB, and Kodler EA. *Environmental Studies: The Earth as a living planet.* New York: John Wiley and Sons Inc., 2000.

3. Singh, JS, Singh, SP, and Gupta SR. Ecology, *Environment and Resource Conservation.* New Delhi: Anamaya Publishers, 2006.

4. De, AK. *Environmental Chemistry*. New Delhi: Wiley Eastern Ltd., 1990.

5. Sharma, PD. *Ecology and Environment*. Meerut Rastogi Publications, 2004

DAV UNIVERSITY, JALANDHAR

Course Title: Engineering Drawing

Course Code: MEC101A

L	T	P	Credits
2	0	4	4

Course Objectives: Students will be able to use the techniques to interpret the drawings and to use it in the field work of engineering. They will learn various lines, planes, solids and their sectioning and to develop their lateral surfaces. Concepts of orthographic and isometric projections

PART -A

Drawing Techniques

Introduction to drawing instruments, various types of lines and their convention, principles of dimensioning, Engineering symbols, Gothic lettering in single stroke as per SP-46 code (Vertical and inclined)

Scales

Concept of scaling, construction of plane and diagonal scales

PART -B

Projection of Points

Concept of plane of projections (Principle planes), First and third angle projections; projection of points in all four quadrants, shortest distance problems

Projection of Lines and Planes

Projection of line parallel to both planes, perpendicular to one plane, inclined to one and both the reference planes and their traces. Plane perpendicular to one plane inclined to one and both the reference planes and their traces. Concept of profile plane and auxiliary planes, To find the true length, α, β, θ and Φ.

PART -C

Projection of Solids

Right and oblique solids; solids of revolution and polyhedrons, projection of solid with axis perpendicular to one plane and parallel to one or both reference planes. Projection of solid with axis inclined to one or both reference planes.

DAV UNIVERSITY, JALANDHAR

Sectioning of Solids

Theory of sectioning, types of section planes, their practice on projection of solids, Sectioning by auxiliary planes,to find true section of truncated solids.

PART -D

Development of Surfaces

Method of Development, Development of surfaces: Parallel line and Radial line method. Development of oblique solids, Development of curved surfaces.

Orthographic and Isometric Views

Draw orthographic views from isometric view or vice-a-versa, Missing line and missing view

References:

1. Jolhe, A.J., "*Engineering Drawing*", Tata McGraw-Hill, New Delhi.
2. Gill, P.S., *"Engineering Drawing",* S.K. Kataria and Sons, Ludhiana
3. French T.E. and Vierck, C.J., *"Graphic Science"*, McGraw-Hill, New York
4. Zozzora F., *"Engineering Drawing",* McGraw Hill, New York

DAV UNIVERSITY, JALANDHAR

Course Title: Basic Communication Skills

Course Code: ENG151A

L	T	P	Credits
3	0	0	3

Course Objective:

- To enhance students' vocabulary and comprehensive skills through prescribed texts.
- To hone students' writing skills.

Learning Outcomes: Students will be able to improve their writing skills as well as will enrich their word power.

PART – A

Applied Grammar (Socio-Cultural Context)

1. Parts of Speech: Noun, Pronoun, Adjective, Verb, Adverb, Preposition, Conjunction, Interjection
2. Tenses (Rules and Usages in Socio-cultural contexts)
3. Modals: Can, Could, May, Might, Will, Would, Shall, Should, Must, Ought to
4. Passive/Active
5. Reported/Reporting Speech

PART – B

Reading (Communicative Approach to be followed)

1. J M Synge: Riders to the Sea   (One Act Play)
2. Anton Chekhov : Joy   (Short Story)
3. Swami Vivekanand : The Secret of Work (Prose)

PART – C

Writing

1. Essay Writing and Letter Writing
2. Report Writing
3. Group Discussion & Facing an Interview

References:

a. Books

1. Kumar, Sanjay and PushpLata. *Communication Skills.* India: OUP, 2012. Print.

2. Vandana, R. Singh. *The Written Word* by. New Delhi: Oxford University Press, 2008. Print.

b. Websites

1. www.youtube.com (to download videos for panel discussions). Web.
2. www.letterwritingguide.com. Web.
3. www.teach-nology.com.Web.
4. www.englishforeveryone.org.Web.
5. www.dailywritingtips.com.Web.
6. www.englishwsheets.com.Web.
7. www.mindtools.com.Web.

DAV UNIVERSITY, JALANDHAR

Course Title: Chemistry Lab

Course Code: CHE152

L	T	P	Credits
0	0	2	1

Course Objectives:

This course is intended to learn the basic concepts of Engineering Chemistry Laboratory. The present syllabus has been framed as per the recent research trends in the subject. The various experiments have been designed to enhance laboratory skills of the undergraduate students.

Expected Prospective:

The students will be able to understand the basic objective of experiments in Engineering chemistry, properly carry out the experiments, and appropriately record and analyze the results through effective writing and oral communication skills. They will know and follow the proper procedures and regulations for safe handling and use of chemicals.

List of Practicals:

1. Verify Lambert Beer's law using spectrophotometer and $CoCl_2$ or $K_2Cr_2O_7$ solution.
2. Determine the strength of HCl solution by titrating against NaOHsolutionconductometerically.
3. Determination of the strength of HCl solution by titrating against NaOH using pH meter.
4. Determination of total hardness of water (tap) using standard EDTA solution and Eriochrome black T indicator.
5. Determination of alkalinity of water.
6. Determination of surface tension of given liquid by using Stalagmometer.
7. Determination of residual chlorine in a water sample.
8. Determination of Flash & Fire point of given a given lubricating oil by Pensky-Marten's apparatus.
9. Determination of the viscosity of given lubricating oil by using Redwood Viscometer.
10. Preparation of a polymer phenol/urea formaldehyde resin.
11. Determination of moisture, volatile matter and ash content in a given sample of coal by proximate analysis.
12. Determination of dissolved oxygen present in given sample of water.

References:

1. Levitt, B.P. Findlay's Practical Physical Chemistry, 9th edition, Longman Group Ltd., 1973.

2. Yadav, J.B. Advanced Practical Physical Chemistry.

3. Vogel, A. I. A textbook of Quantitative Inorganic Analysis, Longman Gp. Ltd, 4th edition (2000).

DAV UNIVERSITY, JALANDHAR

Course Title: Computer Fundamentals and Programming Lab
Course Code: CSE103

L	T	P	Credits
0	0	2	1

Instruction for Students: The students will be attending a laboratory session of 2 hours weekly and they have to perform the practical related to the following list.

1. Practical know-how of various internal and external Hardware components of a computer (including basic working of peripheral devices).
2. Introduction to Operating Systems; installing Windows; basics of windows.
3. Working knowledge of Internet.
4. Introduction to word processor and mail merge.
5. Introduction to MS-Excel.
6. Working on MS-PowerPoint.
7. Introduction to basic structure of C program, utility of header and library files.
8. Implementation of program related to the basic constructs in C
9. Programs using different data types in C
10. Programs using Loops and Conditional Statements in C
11. Programs using functions by passing values using call by value method.
12. Programs using functions by passing values using call by reference method.
13. Programs using arrays single dimension in C.
14. Program to implement array using pointers
15. Programs related to string handling in C

DAV UNIVERSITY, JALANDHAR

Course Title: Basic Communication Skills Lab

Course Code: ENG152

L	T	P	Credits
0	0	2	1

Course Objective:

- To improve fluency in speaking English.
- To promote interactive skills through Group Discussions and role plays.

Learning Outcome: Students will get exposure to speaking through the above mentioned interactive exercises. In addition, they will develop a technical understanding of language learning software, which will further improve their communicative skills.

Unit – A Speaking/Listening

1. Movie-Clippings	(10 Hrs)
2. Role Plays	(10 Hrs)
3. Group Discussions	(10 Hrs)

References:

1. Gangal, J. K. *A Practical Course in Spoken English.* India: Phi Private Limited, 2012. Print.
2. Kumar, Sanjay and PushpLata. *Communication Skills*. India: OUP, 2012. Print.

Websites

1. www.youtube.com (to download videos for panel discussions).Web.
2. www.englishforeveryone.org.Web.
3. www.talkenglish.com.Web.
4. www.mindtools.com.Web.

DAV UNIVERSITY, JALANDHAR

SECOND SEMESTER

Course Title: Engineering Mathematics-II

Course Code: MTH152A

L	T	P	Credits
4	0	0	4

Objective:

The objective of the course is to equip the students with the knowledge of concepts of vectors and geometry and their applications. A flavour of pure mathematics is also given to the readers.

PART -A

Functions of Complex Variables: Complex Numbers and elementary functions of complex variable De-Moivre's theorem and its applications. Real and imaginary parts of exponential, logarithmic, circular, inverse circular, hyperbolic, inverse hyperbolic functions of complex variables.Summation of trigonometric series. (C+iS method).

PART -B

Integral Calculus: Rectification of standard curves; Areas bounded by standard curves; Volumes and surfaces of revolution of curves;

Multiple Integrals: Double and triple integral and their evaluation, change of order of integration, change of variable, Application of double and triple integration to find areas and volumes. Centre of gravity and Moment of inertia

PART -C

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.

Application of Vector Calculus: Flux, Solenoidal and Irrotational vectors. Gauss Divergence theorem.Green's theorem in plane, Stoke's theorem (without proofs) and their applications

PART -D

Infinite Series: Convergence and divergence of series, Tests of convergence (without proofs): Comparison test, Integral test, Ratio test, Raabe's test, Logarithmic test, Cauchy's root test and Gauss test. Convergence and absolute convergence of alternating series, Uniform Convergence and Power Series

References:

1. Grewal, B.S., *Higher Engineering Mathematics*. New Delhi: Khanna Publication, 2009

2. Kreyszig, Erwin, *Advanced Engineering Mathematics*. New Delhi: Wiley Eastern Ltd., 2003.

3. Jain, R K, and K Iyengar S R., *Advanced Engineering Mathematics*, New Delhi: Narosa Publishing House, 2003.

4. Thomas, George B. and Finney Ross L., *Calculus and Analytic Geometry*. New Delhi Addison Wesley, 1995

DAV UNIVERSITY, JALANDHAR

Course Title: Engineering Physics

Course Code: PHY151B

L	T	P	Credits
4	0	0	4

Total Lecture: 60

Course Objective: The aim of this course on physics is to make the student of engineering understand the basic concepts of physics which will form the basis of certain concept in their respective fields.

PART -A

PHYSICAL OPTICS: (14)

Interference: Division of wave front, Fresnel's biprism, division of amplitude, Newton's rings and applications.

Diffraction:Difference between Fraunhofer and Fresnel diffraction, Fraunhofer diffraction through a slit, plane transmission diffraction grating, its dispersive and resolving power.

Polarization: Polarized and unpolarized light, double refraction,Nicol prism, quarter and half wave plates..

PART -B

LASER: (15)

Spontaneous and stimulated emission, Laser action,Characteristics of laser beam, concept of coherence, He-Ne laser, Semiconductor laser, Ruby laser and applications, Holography.

FIBRE OPTICS:Propagation of light in fibres, numerical aperture, single mode and multimode fibres, applications

PART C

DIELECTRICS: (13)

Molecular Theory, polarization, displacement, susceptibility, dielectric coefficient, permittivity, relations between electric vectors, Gauss's law in the presence of a dielectric, energy stored in an electric field, Behavior of dielectric in alternating field and clausius-Mossotti equation.

PART -D

QUANTUM MECHANICS: (18)

Difficulties with Classical physics, Introduction to quantum mechanics simple concepts, Black Body radiation, Planck's Lawof radiation and its limitations, Group velocity and phase velocity, Schrodinger's wave equations and their applications.

NANOPHYSICS: Introduction to Nanoscience and Nanotechnology, Electron confinement, Nanomaterials, Nanoparticles, Quantum structure, CNT, Synthesis of Nanomaterials and Application of Nanomaterials .

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SUPER CONDUCTIVITY:

Introduction (experimental survey), Meissner effect, Type I and type II superconductors, London equation, Elements of BCS theory, Applications of superconductors.

Reference Books:

1. Sear, F.W. *Electricity and Magnetism.* London: Addison-Wesley, 1962.
2. Resnick and Halliday. *Physics.* New York: Wiley, 2002.
3. Lal,B. and Subramanyam, N. *A Text Book of Optics.* New Delhi: S. Chand and Company Limited, 1982.
4. Jenkins, and White. *Fundamental of Physical Optics.* New York: Tata McGraw-Hill, 1937.
5. Griffiths,D. *Introduction to Electrodynamics,* New Delhi: Prentice Hall, 1998.
6. Beiser, A. *Perspective of Modern Physics.* New Delhi: McGraw Hill Ltd., 2002.
7. Verma, N.K Physics for Engineers. New Delhi: Prentice Hall., 2014.

DAV UNIVERSITY, JALANDHAR

Course Title: **Mechanical Engineering Fundamentals**

Course Code: MEC103

L	T	P	Credits
4	0	0	4

Course Objectives:

To impart the basic knowledge of thermodynamic principles, design principles, power transmission devices, power producing and power absorbing devices.

PART -A

Fundamental Concepts of Thermodynamics

Introduction, Thermodynamic System and its types, Boundary and its types, Surroundings, Thermodynamic properties, State, Path, process and cycles, Thermodynamic Equilibrium, Working Substance, Microscopic and Macroscopic Analysis, Units and Dimensions, Quasi Static Process, Reversible and Irreversible processes, Point Function and Path Function, Mechanical and Thermodynamic work, P-dv Work (Displacement Work), Work is a Path Function, Equations for work done in various processes

Laws of Thermodynamics

Zeroth law of Thermodynamics, Temperature, Thermometry (Measurement of temperature), Temperature Scales, Energy, Potential and Kinetic Energies at Micro and Macro Level, Internal Energy, Law of conservation of energy, Joule's Experiment, First law of thermodynamics (Open and Closed System), Energy – A property of system, Enthalpy, Entropy, Heat, Heat vs Temperature, specific heat, Heat Capacity, Specific heat at constant volume, Specific heat at constant pressure, Adiabatic Index, Limitations of first law of thermodynamics

PART -B

Pressure

Pressure Concept and Definition, Pressure conversion Table, Atmospheric pressure, Standard Atmospheric Pressure, Gauge Pressure, Vacuum Pressure, Absolute pressure, Properties of fluid, Pressure head of a Liquid, Pascal's Law, Pressure measurement: Mechanical Gauges and Manometers, Mechanical Gauges: (Bourdon tube pressure gauge, Diaphragm pressure gauge, Dead weight), Manometers: (Principle/Advantage/Limitation/ Classification), Piezometer, Single U tube manometer (Numerical for Vacuum and Gauge pressure), [Simple problems on above topics]

Heat Transfer

Introduction, Heat Transfer vs Thermodynamics, Applications, Thermal Conductivity, Thermal Resistance, Modes of heat transfer, Spectrum of electromagnetic radiation, Surface emission

properties, Absorptivity, Reflectivity and Transmissivity, Fourier law, Newton's law of cooling, Stefan Boltzmann's Law, Heat Exchangers (Applications, Selection, Classification), Thermal Insulation (Properties of insulation, Types of Insulations, Thermal Insulating Materials)

Power Absorbing Devices

Power Absorbing Devices, Difference between Hydraulic pump, Air compressor, Fan, Blower, Pump (Function, Selection, Applications), Classification of Pump, Positive displacement and Dynamic Pumps, Reciprocating Pumps and its types, Rotary Pumps and its types, Centrifugal Pump, Axial Pump

PART -C

Power Producing Devices Boiler

States of matter, Changing State of Matter, Sublimation, Effect of temperature during change of Phase, Steam boiler, Application, Classification of boilers, Types of boilers (Brief Description), Essentials of a good boiler, Advantages of superheating the steam, Comparison between Water tube and Fire tube boilers, Function of boiler Mountings and Accessories

Turbines

Turbine, Classification based on working fluid, Classification of hydraulic turbines, Selection of hydraulic turbines, Impulse Turbines (Pelton Wheel/ Turgo/ Cross Flow), Reaction Turbines (Francis/ Kaplan/ Propeller)

Internal Combustion Engines

Heat Engine, Types of Heat Engine, Advantages, Disadvantages and Applications, Classification of IC Engine, Engine Components (Location, Function and Material), Basic Terminology used in IC engine, Four stroke Cycle Engines (SI and CI), Two stroke Cycle Engines (SI and CI)

PART -D

Principles of Design

Need of design, Product Life Cycle, Material properties and selection, Factors affecting material selection, Stress and Strain and its types, Hooke's law, Modulus of Elasticity, Longitudinal and Lateral Strain, Poisson's ratio, Stress- Strain Curve for ductile material and brittle material, Factor of Safety, Centre of Gravity, Centroid, Centroid of areas of plain, Figures (Without Derivation), Centroid of areas of composite sections (Without Derivation), Moment of Inertia, Radius of gyration, Theorem of perpendicular axis, Theorem of parallel axis, MI of L, I and T sections, [Simple problems on above topics]

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Power Transmission Devices and Machine Elements

Individual and group drive system (advantages and Disadvantages), Belt drive (Types: V and Flat Belts and their Applications, Advantages and Disadvantages), Ropes drive (Types: Fiber and Wire Ropes and their Applications, Advantages and Disadvantages), Chain drive (Applications, advantages and Disadvantages, Sprockets), Gear drive (Types of Gears), Power transmission shafts, Types of shafts, Application of shafts, Axle, Keys (Function, Classification), Coupling (Function, Classification: Rigid and Flexible), Flanged coupling, Oldham's coupling, Universal coupling, Bearings and their types, Flywheel construction and types

References:

1. Rajan T.S. *Basic Mechanical Engineering*, New Delhi: New Age Publishers.
2. Singh Sadhu *Principles of Mechanical Engineering*, New Delhi: S Chand Publishers.
3. Shankar V.P., *Basic Mechanical Engineering*, New Delhi: Laxmi Publishers.
4. Phthak G. K., *Basic Mechanical Engineering*, New Delhi: Rajsons Publications.
5. Kumar Parveen, *Basic Mechanical Engineering*, New Delhi: Pearson Education

DAV UNIVERSITY, JALANDHAR

Course Title: Electrical and Electronics Technology

Course Code: ELE105

L	T	P	Credits
4	0	0	4

PART -A

D.C Circuit Analysis:

Voltage source, current source, dependent and independent sources, analysis of D.C circuit by KCL and KVL , Nodal and Mesh analysis, The venin theorem , Norton theorem, superposition theorem, Maximum Power Transfer Theorem

PART B

A.C Circuit Analysis:

Review of single phase A.C. circuit under sinusoidal steady state, solution of R.L.C. Series circuit, the j operator, complex representation of impedance, solution of series and parallel circuit, series and parallel resonance, 3 phase A.C. Circuit, star and delta connections, line and phase quantities solution of 3 phase circuits, balance supply voltage and balanced supply voltage and balance load, phasor diagram, measurement of power and power factor by two wattmeter method.

PART -C

Magnetic Circuit:

Review of laws of electromagnetism, Flux, MMF and their relation. Comparison of electrical and magnetic circuit, B-H Curve, saturation leakage and fringing.Analysis of series and parallel magnetic circuit, AC Excitation in magnetic circuits, Hysteresis and eddy currents.

Transformers:

Single phase transformer, basic concepts constructional detail, type, voltage current and impedance Transformation, phasor diagram, equivalent circuit, voltage regulation, oc/sc test, losses and efficiency concept of All day efficiency , autotransformer.

PART D

Rotating Electrical Machines:

Basic concepts, working principle and general construction of DC machines (motor/generators), torque and EMF expression

Basic Electronics:

P-Type and N-Type semiconductor, concept of diode, transistor and their application, introduction to OPAMP, application of op amp as a subtractor , summer, differentiator, integrator, logic gates AND ,OR, NOT, NOR, NAND etc.

References:

1. M.S. Sukhija, T.K. Nagsarkar, "Basic Electrical and Electronics Engineering", Oxford University Press, 2012.

2. Ashfaq Husain, HarsoonAshfaq, " Fundamentals of Electrical Engineering, 4th Edition, Dhanpat Rai and Co., 2013

3. V.N. Mittle, "Basic Electrical Engineering", 2nd Edition, Tata McGraw Hill Publication.

4. B.L. Theraja, A.K. Theraja, " A Text Book of Electrical Technology, Volume-1, S. Chand Publication

5. Debashisha Jena, "Basic Electrical Engineering", 1st edition, Wiley India Publication, 2012.

6. B.L. Theraja, R.S. Sedha, " Principles of Electric Devices and Circuits", S. Chand Publication, 1st edition, 2006

DAV UNIVERSITY, JALANDHAR

Course Title: Human Values and General Studies

Course Code: SGS107B

L	T	P	Credits
4	0	0	0

Course Objectives

a) To sensitize students about the role and importance of human values and ethics in personal, social and professional life.

b) To enable students to understand and appreciate ethical concerns relevant to modern lives.

c) To prepare a foundation for appearing in various competitive examinations

d) To sensitize the students about the current issues and events of national and international importance

e) To provide opportunity to the students to study inter disciplinary subjects like Geography, Science, Economy, Polity, History, International Relations etc.

PART -A

Human Values

1. **Concept of Human Values:** Meaning, Types and Importance of Values.
2. **Value Education :** Basic guidelines for value education
3. **Value crisis and its redressal**

Being Good and Responsible

1. Self Exploration and Self Evaluation

2. Acquiring Core Values for Self Development

3. Living in Harmony with Self, Family and Society

4. Values enshrined in the Constitution: Liberty, Equality

5. Fraternity and Fundamental Duties.

PART -B

Value – based living

1. Vedic values of life

2. *Karma Yoga* and *Jnana Yoga*

3. *AshtaMarga* and *Tri-Ratna*

Ethical Living:

1. Personal Ethics

2. Professional Ethics

3. Ethics in Education

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PART C

General Geography

World Geography

The Universe, The Solar System, The Earth, Atmosphere, The World we live in, Countries rich in Minerals, Wonders of the World, Biggest and Smallest.

Indian Geography

Location, Area and Dimensions, Physical Presence, Indian States and Union Territories, Important sites and Monuments, Largest-Longest and Highest in India.

General History

Glimpses of India History, Ancient Indian, Medieval India, Modern India, Various Phases of Indian National Movement, Prominent Personalities, Glimpses of Punjab history with special reference to period of Sikh Gurus

Glimpses of World History

Important Events of World History, Revolutions and Wars of Independence, Political Philosophies like Nazism, Fascism, Communism, Capitalism, Liberalism etc.

Indian Polity: Constitution of India

Important Provisions, Basic Structure, Union Government, Union Legislature and Executive, State Government: State Legislature and Executive, Indian Judiciary, The Election Commission, Panachayati Raj System, RTI etc.

General Economy

The process of liberalization, privatization, globalization and Major World Issues, Indian Economy, Indian Financial System, Major Economic Issues, Economic Terminology.

PART -D

General Science

General appreciation and understandings of science including the matters of everyday observation and experience, Inventions and Discoveries

Sports and Recreation

The World of Sports and recreation, Who's Who is sports, Major Events, Awards and Honours. Famous personalities, Festivals, Arts and Artists

Current Affairs

National and International Issues and Events in News, Governments Schemes and Policy Decisions

DAV UNIVERSITY, JALANDHAR

Miscellaneous Information

Who is who

Books and Authors, Persons in News, Awards and Honours, Abbreviations and Sports

References:

1. Human Values, A N Tripathi, New Age International Publishers, New Delhi, Third Edition, 2009

2. Professional Ethics, R. Surbiramanian, Oxford University Press, New Delhi, 2013.

3. Human Values and Professional Ethics, RishabhAnand, SatyaPrakashan, New Delhi, 2012

4. Human Values and Professional Ethics, Sanjeev Bhalla, SatyaPrakashan, New Delhi, 2012.

5. Human Values and Professional Ethics, RituSoryan Dhanpat Rai & Co. Pvt. Ltd., First Edition, 2010.

6. Human Values and Professional Ethics by Suresh Jayshree, Raghavan B S, S Chand & Co. Ltd. , 2007.

7. Human Values and Professional Ethics, Yogendra Singh, AnkurGarg, Aitbs publishers, 2011.

8. Human Values and Professional Ethics, Vrinder Kumar, Kalyani Publishers, Ludhiana, 2013.

9. Human Values and Professional Ethics, R R Gaur, R. Sangal, GP Bagaria, Excel Books, New Delhi 2010.

10. Values and Ethics, Dr.BramwellOsula, Dr.SarojUpadhyay, Asian Books Pvt. Ltd., 2011.

11. Indian Philosophy, S. Radhakrishnan, George Allen &Unwin Ltd., New York: Humanities Press INC, 1929.

12. Essentials of Hinduism, Jainism and Buddhism, A N Dwivedi, Books Today, New Delhi – 1979

13. Dayanand : His life and work, SurajBhan, DAVCMC, New Delhi – 2001.

14. Esence of Vedas, KapilDevDwivedi, Katyayan Vedic SahityaPrakashan, Hoshiarpur, 1990.

15. Vedic Concepts, Prof. B BChaubey, Katyayan Vedic SahityaPrakashan, Hoshiarpur, 1990.

16. Advance Objective General Knowledge, R. S. Aggarwal, S. Chand Publisher (2013)

17. Concise General Knowledge Manual 2013, S. Sen, Unique Publishers,2013

18. Encyclopedia of General Knowledge and General Awareness by R P Verma, Penguin Books Ltd (2010)

19. General Knowledge Manual 2013-14, Edgar Thorpe and Showick Thorpe, The Pearson, Delhi.

20. General Knowledge Manual 2013-14, MuktikantaMohanty, Macmillan Publishers India Ltd., Delhi.

21. India 2013, Government of India (Ministry of Information Broadcasting), Publication Division, 2013.

22. Manorama Year Book 2013-14, MammenMethew, Malayalam Manorama Publishers, Kottayam, 2013.

23. Spectrum's Handbook of General Studies – 2013-14, Spectrum Books (P) Ltd., New Delhi

CURRENT AFFAIRS

Magazines

Economic and Political Weekly, Yojna, the Week, India Today, Frontline, Spectrum.

Competition Success Review, Competition Master, Civil Services Chronicle, Current Affairs, World Atlas Book

Newspapers

The Hindu, Times of India, The Hindustan Times, The Tribune

DAV UNIVERSITY, JALANDHAR

Course Title: **Manufacturing Practice**

Course Code: MEC104

L	T	P	Credits
0	0	4	2

Course Objective:

1. Know basic workshop processes, Read and interpret job drawing.

2. Identify, select and use various marking, measuring, holding, striking and cutting tools & equipment's

3. Operate and control different machines and equipment's.

CARPENTRY SHOP

a) Preparation of half lap joint

b) Preparation of Mortise and Tenon Joint

c) Preparation of a Dove & Tail joint

d) To prepare a White board duster

Welding Shop:

a) Preparation of Joint by Arc Welding

b) Preparation of Joint by using Gas Welding

c) Preparation of Joint by MIG/ TIG Welding

d) Preparation of Joint by Spot/ Seam Welding

Smithy Shop

a) To Forge the L – Hook

b) To Forge a Chisel

c) To Forge a Cube from a M.S Round

d) To forge a screw driver

Fitting Shop

a) Filing a dimensioned rectangular or square piece and prepare a sq. fitting

b) Preparation of T fitting male part

c) Preparation of U fitting Female part

d) Internal thread Cutting in Square piece and external thread cutting on a rod and assembling as a paper weight

Foundry Shop:

a) To make a Mould of solid pattern

b) To prepare a mould of sleeve fitting using gating system

c) To make a Mould of Split Pattern using Cope & Drag

d) To check the Hardness of the Mould

To check the Moisture Content in the Molding Sand

To check the Compressive Strength of Molding Sand

Sheet-Metal Shop

a) Preparation of a funnel from G.I. sheet

b) Preparation of a book rack stand from G.I. Sheet

c) Preparation of a leak proof tray with inclined edges from G.I. Sheet

d) Preparation of a square pen stand from G.I. Sheet with riveting at corners

Machine Shop

a) To make a job using step turning and grooving

b) To make a job using knurling and threading

c) To make a multi operation job on a Lathe machine

d) To make V – slot by using shaper machine

Electrical Shop

a) Layout of electrical tube light wiring

b) Layout of stair case wiring using two way switch

c) Testing and rectification of simulated faults in electrical appliances such as 'Electric Iron' Ceiling Fan. Electric kettle

d) To fabricate a circuit for the electrical wiring of, Fan with regulator and Bulb through a main switch and its testing using a series lamp

References:

1. Johl K. C., "Mechanical Workshop Practice", Prentice Hall India, 1st Edition.
2. Bawa H.S., "Workshop Technology", Tata McGraw Hill, 7th Edition.

DAV UNIVERSITY, JALANDHAR

Course Title: Engineering Physics Lab

Course Code: PHY152

L	T	P	Credits
0	0	2	1

Objective: The laboratory exercises have been so designed that the students learn to verify some of the concepts learnt in the theory courses. They are trained in carrying out precise measurements and handling sensitive equipments.

 Note:

- Students are expected to perform at least eight-ten experiments out of following list. The experiments performed in first semester cannot be repeated in second Semester.
- The examination for both the courses will be of 3 hours duration

List of Experiments:

Experimental skills: General Precautions for measurements and handling of equipment, representation of measurements, Fitting of given data to a straight line, and Error analysis, Significant figures and interpretation of results.

1. To determine the Refractive Index of the Material of a given Prism using Sodium Light.
2. To determine the Dispersive Power and resolving power of the Material of a given Prism using Mercury Light.
2. To determine wavelength of sodium light using Fresnel Biprism.
3. To determine wavelength of sodium light using Newton's Rings.
4. To determination Wavelength of Sodium Light using Michelson's Interferometer.
5. To determine the wavelength of Laser light using Diffraction of Single Slit.
6. To determine the wavelength of (1) Sodium and (2) Mercury Light using Plane Diffraction Grating.
7. To determine the (1) Wavelength and (2) Angular Spread of HeNe Laser using Plane Diffraction Grating.
8. To study the wavelength of spectral lines of sodium light using plane transmission grating.
9. To study the specific rotation of sugar solution Laurent's half shade polarimeter method
10. To study the numerical aperture and propagation losses using HeNe laser Optical fibre set up.
11. To compare the focal length of two lenses by Nodal slide method.
12. To find the unknown low resistance by Carey Foster bridge.

13. To determine the beam divergence of the HeNe laser.

14. To study the Meissner's effect in superconducting sample.

15. To study the Faraday law of electromagnetic induction.

16. To study the capacitance by flashing/quenching of Neon bulb kit

17. To compare the two unknown capacitances of two capacitors by using DeSauty's bridge.

18. To find our out the unknown inductance by using the Anderson's bridge method.

19. To study the numerical aperture and propagation losses for He-Ne laser by using the optical fibre set up for

20. To study the Planck's constant by using photoelectric cell method.

DAV UNIVERSITY, JALANDHAR

Course Title: Electrical and Electronics Technology Lab
Course Code: ELE106

L	T	P	Credits
0	0	2	1

Course Objective: This course provides a practical aspect of Circuit Analysis using Ohm's law, Kirchhoff's laws and network theorems, to understand the constructional detail of Electrical machines

List of Experiments

1. To verify Ohm's Law, Kirchhoff's Current Law and Kirchhoff's Voltage Law.
2. To verify Thevenin's and Norton's theorems.
3. To verify Superposition theorem.
4. To verify Maximum Power Transfer theorem.
5. To study frequency response of a series R-L-C circuit and determine resonant frequency and Q-factor for various values of R, L and C
6. To study frequency response of a parallel R-L-C circuit and determine resonant frequency and Q-factor for various values of R, L and C.
7. To perform direct load test of a transformer and plot efficiency versus load characteristics.
8. To perform open circuit and short circuit test on transformer.
9. To perform speed control of DC motor.
10. Measurement of power in a three phase system by two wattmeter method.
11. To plot the V-I characteristics of PN-junction diode.
12. To verify the truth table of logic gates.
13. Basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope. Real-life resistors, capacitors and inductors.
14. Demonstration of cut-out sections of machines: dc machine (commutator-brush arrangement), induction machine (squirrel cage rotor)

DAV UNIVERSITY, JALANDHAR

Course Title: Swachh Bharat Summer Internships

Course Code: BCE219

L	T	P	Credits
0	0	0	2

Swachh Bharat Summer internship of duration 100 hours in the period of 1st may to 31 July. In this internship student will enrol for promoting swachhta in nearby villages of the institute. Student will select the village of their choice and work with the village community for building lasting system for improving the overall sanitation and hygiene in village.

DAV UNIVERSITY, JALANDHAR

THIRD SEMESTER

Course Title: ENGINEERING MATHEMATICS-III

Course Code: MTH 252A

L	T	P	Credits
4	0	0	4

Course Objective:

The objective of the course is to enable the students to understand the basic concepts related to Laplace transforms, Fourier series, ordinary differential and partial differential equations and their applications.

PART-A

Laplace Transforms

Laplace transforms of various standard functions, Linear property of Laplace transforms, Shifting property and change of scale, inverse Laplace transforms, transform of derivatives and integrals, Laplace transform of unit step function, impulse function, periodic functions, applications to solution of ordinary linear differential equations with constant coefficients, and simultaneous differential equations. **[14]**

PART-B

Fourier series

Periodic functions, Euler's formula. Dirichlet's conditions.Fourier series of discontinuous functions. Fourier series of Even and Odd functions, half range expansions, Fourier series of different wave forms, Complex form of Fourier series. Fourier Transformation. **[14]**

PART-C

Partial Differential Equations

Formulation of partial differential equations, Linear partial differential equations, homogeneous partial differential equations with constant coefficients.Wave equation and Heat conduction equation in one dimension.Two dimensional Laplace equation and their applications, solution by the method of separation of variables.

[14]

PART-D

Functions of Complex Variable

Limits, continuity and derivative of the function of complex variable, Analytic function, Cauchy-Riemann equations, conjugate functions, and harmonic functions.

Conformal Mapping

Definition, standard transformations, translation, rotation, inversion, bilinear.

Complex Integration

Line integrals in the complex plane, Cauchy's theorem, Cauchy's integral formula and derivatives of analytic function.Taylor's and Laurent's expansions (without proofs), singular points, poles, residue, Integration of function of complex variables using the method of residues.   **[14]**

REFERENCES:-

1. Kreyzig E.: "Advanced Engineering Mathematics", New Delhi:John Wiley and Sons, 2008

2. Ponnusamy S.: "Foundations of Complex Analysis", Narosa Publishers, 2002.

3. Sneedon I.N.: "Elements of Partial Differential Equations", McGraw-Hill, 2005

4. Grewal B.S. "Higher Engineering Mathematics", Khanna Publishers, 2007.

DAV UNIVERSITY, JALANDHAR

Course Title: INTRODUCTION TO CIVIL ENGINEERING
Course Code: BCE 201

L	T	P	Credits
2	1	0	3

Course Objectives: When the students enter the college to pursue a degree in Civil Engineering they need to understand the breadth and depth available in this field for possible engagement. This course is designed to address the following:

•To give an understanding to the students of the vast breadth and numerous areas of engagement available in the overall field of Civil Engineering

•To motivate the student to pursue a career in one of the many areas of Civil Engineering with deep interest and keenness.

•To expose the students to the various avenues available for doing creative and innovative work in this field by showcasing the many monuments and inspiring projects of public utility.

Part A

Basics of Engineering and Civil Engineering; Broad disciplines of Civil Engineering; Importance of Civil Engineering, Possible scopes for a career. History of Civil Engineering Early constructions and developments over time; Ancient monuments & Modern marvels; Development of various materials of construction and methods of construction; Works of Eminent civil engineers

Part B

Overview of National Planning for Construction and Infrastructure Development Position of construction industry vis-à-vis other industries, five-year plan outlays for construction; current budgets for infrastructure works; Fundamentals of Architecture & Town Planning Aesthetics in Civil Engineering, Examples of great architecture, fundamentals of architectural design & town planning; Building Systems (HVAC, Acoustics, Lighting, etc.); LEED ratings; Development of Smart cities

Fundamentals of Building Materials Stones, bricks, mortars, Plain,

Part C

Basics of Construction Management & Contracts Management Temporary Structures in Construction; Construction Methods for various types of Structures; Major Construction equipment; Automation & Robotics in Construction; Modern Project management Systems; Advent of Lean Construction; Importance of Contracts Management Environmental

Engineering & Sustainability Water treatment systems; Effluent treatment systems; various types of foundations; basics of rock mechanics & tunneling.

Part D

Power Plant Structures Chimneys, Natural & Induced Draught Colling towers, coal handling systems, ash handling systems; nuclear containment structures; hydro power projects Structural Engineering Types of buildings; tall structures; various types of bridges; Water retaining structures; Other structural systems; Experimental Stress Analysis; Transportation Engineering Investments in transport infrastructure development in India for different modes of transport; Developments and challenges in integrated transport development in India: road, rail, port and harbour and airport sector; PPP in transport sector; Intelligent Transport Systems; Urban Public and Freight Transportation; Road Safety under heterogeneous traffic; Sustainable and resilient pavement materials, design, construction and management; Case studies and examples. Repairs & Rehabilitation of Structures: Basics of corrosion phenomena and other structural distress mechanisms; some simple systems of rehabilitation of structures;

Text/Reference Books:

1. Patil, B.S.(1974), Legal Aspects of Building and Engineering Contract

2. The National Building Code, BIS, (2017)

3.RERA Act, (2017)

4.Meena Rao (2006), Fundamental concepts in Law of Contract, 3rd Edn. Professional Offset

5.Chandiramani, Neelima (2000), The Law of Contract: An Outline, 2nd Edn. Avinash Publications Mumbai

6.Avtarsingh (2002), Law of Contract, Eastern Book Co.

7.Dutt (1994), Indian Contract Act, Eastern Law House

8.Anson W.R.(1979), Law of Contract, Oxford University Press

9.Kwatra G.K.(2005), The Arbitration & Conciliation of Law in India with case law on UNCITRAL Model Law on Arbitration, Indian Council of Arbitration

DAV UNIVERSITY, JALANDHAR

Course Title SURVEYING AND GEOMATICS

Paper Code: BCE203

L	T	P	Credits
3	0	0	3

Course Objective: With the successful completion of the course, the student should have the capability to:

- have a good understanding of the various surveying techniques.
- Effectively communicate with team members during field activities; identify appropriate safety procedures for personal protection; properly handle and use measurement instruments.

Learning Outcomes: The course will enable the students to:

- Apply the knowledge, techniques, skills, and applicable tools of the discipline to engineering and surveying activities.
- Translate the knowledge gained for the implementation of Civil infrastructure facilities.
- Relate the knowledge on Surveying to the new frontiers of science like Hydrographic surveying, Electronic Distance Measurement, Global Positioning System, Photogrammetry and Remote Sensing.

Part-A

Introduction to Surveying: Principles, Linear, angular and graphical methods, Survey stations, Survey lines- ranging, Bearing of survey lines, traversing with compass   [4]

Plane table surveying methods of plane table survey, two and three point problems, Lehmann's Rules, errors.

[4]

Part-B

Leveling: Principles of leveling- booking and reducing levels; differential, reciprocal leveling, profile leveling and cross sectioning. Digital and Auto Level, Errors in levelling; contouring: Characteristics, methods, uses; areas and volumes.   [5]

Theodolite survey: Instruments, Measurement of horizontal and vertical angle; Horizontal and vertical control - methods -triangulation - network- Signals. Baseline - choices - instruments and accessories - extension of base lines -corrections - Satellite station - reduction to centre – Intervisibility of height and distances - Trigonometric leveling - Axis single corrections.   [5]

Part-C

Curves: Elements of simple and compound curves – Method of setting out– Elements of Reverse curve - Transition curve – length of curve – Elements of transition curve - Vertical curves [5]

Modern Field Survey Systems: Principle of Electronic Distance Measurement, Modulation, Types of EDM instruments, Distomat, Total Station – Parts of a Total Station – Accessories – Advantages and Applications Field Procedure for total station survey, Errors in Total Station Survey; Global Positioning Systems- Segments, GPS measurements, errors and biases, Surveying with GPS, Co-ordinate transformation, accuracy considerations.

[7]

Part-D

Photogrammetry Surveying: Introduction, Basic concepts, perspective geometry of aerial photograph, relief and tilt displacements, terrestrial photogrammetry, flight planning; Stereoscopy, ground control extension for photographic mapping- aerial triangulation, radial triangulation, methods; photographic mapping- mapping using paper prints, mapping using stereoplotting instruments. [7]

Remote Sensing: Introduction –Electromagnetic Spectrum, interaction of electromagnetic radiation with the atmosphere and earth surface, remote sensing data acquisition: platforms and sensors; visual image interpretation; digital image processing.

[6]

REFERENCE:

1. Punmia B C "*Surveying*" Vol.1 & 2 Laxmi Publications Pvt. Ltd., New Delhi, 2002.

2. Madhu, N, Sathikumar, R and Satheesh Gobi, Advanced Surveying: Total Station, GIS and Remote Sensing, Pearson India, 2006.

3. Manoj, K. Arora and Badjatia, Geomatics Engineering, Nem Chand & Bros, 2011

4. Bhavikatti, S.S., Surveying and Levelling, Vol. I and II, I.K. International, 2010

5. Chandra, A.M., Higher Surveying, Third Edition, New Age International (P) Limited,2002.

6. Anji Reddy, M., Remote sensing and Geographical information system, B.S.Publications, 2001.

7. Arora, K.R., Surveying, Vol-I, II and III, Standard Book House, 2015.

8. Kanetkar T P and Kulkarni S V "*Surveying and leveling*" Vol. I & II PVG Prakashan, Pune, 1994.

9. Basak N N "*Surveying and leveling*" Tata McGraw Hill, New Delhi, 2000.

10. Duggal, S.K., "*Surveying*"Vol I & II, Tata McGraw Hill 2007.

11. Narinder Singh, "*Surveying*", Tata McGraw Hill 1994.

DAV UNIVERSITY, JALANDHAR

Course Title: INTRODUCTION TO FLUID MECHANICS

Paper Code: BCE 205A

L	T	P	Credits
3	0	0	3

Course Objective: This course offers a good understanding of the various properties of fluid like dynamic and kinematic properties.

Learning Outcomes: After the completion of this course the participants would gain the knowledge about various types of flow, fluid properties like Fluid Kinematics and fluid dynamics.

Part-A

Fluid and their properties: Concept of fluid, difference between solids, liquids and gases; ideal and real fluids; Continuum concept of fluid: density, specific weight and relative density; viscosity and its dependence on temperature; surface tension and capillarity, vapor pressure and cavitation's, compressibility band bulk modulus; Newtonian and non-Newtonian fluids

Fluid Statics: Concept of pressure, Pascal's law and its engineering hydrostatic paradox. 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, Meta centric height and its determination.

Part-B

Fluid Kinematics: Classification of fluid flows, velocity and acceleration of fluid particle, local and convective acceleration, normal & tangential acceleration streamline, pathline and streakline, flow rate and discharge mean velocity continuity equation in Cartesian co-ordinates. Rotational flows- Rotational velocity and circulation, stream & velocity potential function .

Part-C

Fluid Dynamics: Euler's equation, Bernoulli's equation and steady flow energy equation; representation of energy changes in fluid system, impulse momentum equation, kinetic energy and momentum correction factors, flow along a curved streamline, free and forced vortex motion

Part-D

Dimensional Analysis and Similitude: Fundamental and derived units and dimensions, dimensional homogeneity, Rayleigh's and Buckingham's Pi method for dimensional analysis, dimension less number and their significance, geometric, kinematic and dynamic similarity, model studies**.**

Flow Past immersed bodies: Drag and lift deformation Drag and pressure drag. Drag on a sphere, cylinder and Air foil: lift-Magnus Effect and circulation lift on a circular cylinder.

Flow Measurement: - Manometers, Pitot tubes, venture meter and orifice meters, orifices, mouthpieces, notches (Rectangular and V-notches) and weirs (Sharp crested Weirs).

REFERENCES:

1. Bansal R.K., "*Fluid Mechanics & Hydraulic Machines*" Laxmi Publications Ltd. 2005.

2. ModiP.N. &Seth S.M., "Hydraulic and Fluid Mechanic". Standard Book House, New Delhi, 1991.

3. GardeR.J. &MirajgaokerA.G., "Engineering Fluid Mechanics" Nem Chand Publishers, Roorkee,1965.

4. Munson Young okiishi, "Fundamentals of fluid mechanics", by Wiley Publisher 1997.

5. VL & Wylie EB, "Fluid Mechanics: Streetes", Mcgraw Hill book company 2003

6. Chow, "Fluid Mechanics", IBH publisher 2001.

7. Subramanean, "Open Channel flow", Mcgraw Hill book company, 1997.

DAV UNIVERSITY, JALANDHAR

Course Title: ENVIRONMENT ENGINEERING-1

Paper Code: BCE 207

L	T	P	Credits
3	0	0	3

Course Objective: - To understand the basic environmental pollutants

Learning Outcomes: - students will be able toidentify and value the effect of the pollutants on the environment:

Part A

Water: -Sources of water, beneficial uses of water, Water demand, water quality standards, water safety plans, water Supply systems, need for planned water supply schemes, components of water supply system, Distribution system, various valves used in W/S systems, water treatment: aeration, sedimentation, coagulation flocculation, filtration, disinfection, advanced treatments like adsorption, ion exchange, plumbing fixtures, Government authorities and their roles in water supply

Part B

Sewage: - Introduction to wastewater Engineering, basic terms related to sewerage systems, estimation of sewage flow, storm water, conveyance of sewage, different materials used for conveyance of sewage, Sewers, shapes design parameters, operation and maintenance of sewers, Sewage pumping; Sewerage, Sewer appurtenances, Design of sewerage systems, Efficient sewage disposal, Sludge Treatment, National River cleaning plans, basic sewage treatment, general effluent discharge standards.

Part C

Air: -Composition and properties of air, Quantification of air pollutants, Monitoring of air pollutants, Air pollution- Occupational hazards, Urban air pollution automobile pollution, Air quality standards, Control measures for Air pollution, construction and limitations

Noise: -Introduction to noise pollution, measurement and various control methods, Noise pollution standards

Part D

Solid waste Management: -Introduction to solid waste, different types of solid waste, basic terminologies, Characteristics of solid waste, management: Segregation, collection, transportation and disposal of solid waste Municipal solid waste, Composition and various chemical and physical parameters of MSW, 3 R's of solid waste management. Solid waste norms in India, Hazardous waste management

REFERENCES:

1. Peavy, H.s, Rowe, D.R, Tchobanoglous, G. *Environmental Engineering*, Mc-Graw -Hill International Editions, New York 1985
2. Introduction to Environmental Engineering and Science by Gilbert Masters, Prentice
3. Hall, New Jersey
4. MetCalf and Eddy. *Wastewater Engineering, Treatment, Disposal and Reuse*, Tata
5. McGraw-Hill, New Delhi.
6. Integrated Solid Waste Management, Tchobanoglous, Theissen& Vigil. McGraw Hill
7. Publication

DAV UNIVERSITY, JALANDHAR

Course Title: ENGINEERING GEOLOGY

Paper Code: BCE 209

L	T	P	Credits
3	0	0	3

Course Objective: The objective of this Course is to focus on the core activities of engineering geologists – site characterization and geologic hazard identification and mitigation. Through lectures, labs, and case study examination student will learn to couple geologic expertise with the engineering properties of rock and unconsolidated materials in the characterization of geologic sites for civil work projects and the quantification of processes such as rock slides, soil-slope stability, settlement, and liquefaction

Learning Outcomes: After the completion of this course the participants would gain the knowledge of the assessment and mitigation of geologic hazards such earthquakes, landslides, flooding; the assessment of timber harvesting impacts; and groundwater remediation and resource evaluation. Engineering geologists are applied geoscientists with an awareness of engineering principles.

Part-A

Introduction-Branches of geology useful to civil engineering, scope of geological studies in various civil engineering projects. Department dealing with this subject in India and their scope of work-GSI, Granite Dimension Stone Cell, NIRM. Mineralogy-Mineral, Origin and composition. Physical properties of minerals, susceptibility of minerals to alteration, basic of optical mineralogy, SEM, XRD., Rock forming minerals, megascopic identification of common primary & secondary minerals.

Petrology-Rock forming processes. Specific gravity of rocks. Ternary diagram. Igneous petrology-Volcanic Phenomenon and different materials ejected by volcanoes. Characteristics of different types of magma. Division of rock on the basis of depth of formation, and their characteristics. Chemical and Mineralogical Composition. Texture and its types. Various forms of rocks. IUGS Classification of phaneritic and volcanic rock. Field Classification chart. Structures. Classification of Igneous rocks on the basis of Chemical composition. Detailed study of Acidic Igneous rocks, Sedimentary petrology- mode of formation, Mineralogical Composition. Texture and its types, Structures, Gradation of Clastic rocks. Classification of sedimentary rocks and their characteristics.

Metamorphic petrology- Agents and types of metamorphism, metamorphic grades, Mineralogical composition, structures & textures in metamorphic rocks. Important Distinguishing features of rocks as Rock cleavage, Schistosity, Foliation. Classification.

Part-B

Physical Geology- Weathering. Erosion and Denudation. Factors affecting weathering and product of weathering. Engineering consideration. Superficial deposits and its geotechnical importance: Water fall and Gorges, River meandering, Alluvium, Glacial deposits, Laterite (engineering aspects), Desert Landform, Loess, Residual deposits of Clay with flints, Soil flocculation deposits, mudflows, Coastal deposits.

Strength Behavior of Rocks- Stress and Strain in rocks. Concept of Rock Deformation & Tectonics. Dip and Strike. Outcrop and width of outcrop. Inliers and Outliers. Main types of discontinuities according to size. Fold- Types and nomenclature, Criteria for their recognition in field. Faults: Classification, recognition in field, effects on outcrops. Joints & Unconformity; Types, Stresses responsible, geotechnical importance. Importance of structural elements in engineering operations. Consequences of failure as land sliding, Earthquake and Subsidence. Strength of Igneous rock structures.

Part-C

DAV UNIVERSITY, JALANDHAR

Geological Hazards- Rock Instability and Slope movement: Concept of sliding blocks. Different controlling factors. Instability in vertical rock structures and measures to prevent collapse. . Types of landslide. Prevention by surface drainage, slope reinforcement by Rock bolting and Rock anchoring, retaining wall, Slope treatment. Case study on black clay. Ground water: Factors controlling water bearing capacity of rock. Pervious & impervious rocks and ground water. Lowering of water table and Subsidence. Earthquake: Magnitude and intensity of earthquake. Seismic sea waves. Revelation from Seismic Records of structure of earth.

Part-D

Rock masses as construction material: Definition of Rock masses. Main features constituting rock mass. Main features that affects the quality of rock engineering and design. Basic element and structures of rock those are relevant in civil engineering areas. Main types of works connected to rocks and rock masses. Important variables influencing rock properties and behavior such as Fresh rock Influence from some minerals. Effect of alteration and weathering. Measurement of velocity of sound in rock. Classification of Rock material strength. Core logging. Rock Quality Designation. Rock mass description.

Rock Mechanics- Sub surface investigations in rocks and engineering characteristics or rocks masses; Structural geology of rocks. Classification of rocks, Field &laboratory tests on rocks, Stress deformation of rocks, Failure theories and sheer strength of rocks, Bearing capacity of rocks.

REFERENCE:

1. Engineering and General Geology, Parbin Singh, 8th Edition (2010), S K Kataria & Sons.
2. Text Book of Engineering Geology, N. Chenna Kesavulu, 2nd Edition (2009), Macmillan Publishers India.
3. Geology for Geotechnical Engineers, J.C.Harvey, Cambridge University Press (1982).

DAV UNIVERSITY, JALANDHAR

Course Title: ENGINEERING MECHANICS

Paper Code: BCE 211

L	T	P	Credits
3	1	0	4

Course Objective: The objective of this Course is to provide an introductory treatment of Engineering Mechanics to all the students of engineering, with a view to prepare a good foundation for taking up advanced courses in the area in the subsequent semesters.

Learning Outcomes: After the completion of this course the participants would confidently tackle equilibrium equations, moments and inertia problems, Master calculator/computing basic skills to use to advantage in solving mechanics problems and Gain a firm foundation in engineering Mechanics for furthering the career in Engineering.

Part-A

Introduction to Engineering Mechanics covering, Force Systems Basic concepts, Particle equilibrium in 2-D & 3-D; Rigid Body equilibrium; System of Forces, Coplanar Concurrent Forces, Components in Space – Resultant- Moment of Forces and its Application; Couples and Resultant of Force System, Equilibrium of System of Forces, Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial Systems; Static Indeterminacy

Part-B

Basic Structural Analysis covering, Equilibrium in three dimensions; Method of Sections; Method of Joints; How to determine if a member is in tension or compression; Simple Trusses; Zero force members; Beams & types of beams; Frames & Machines Centroid and Centre of Gravity covering, Centroid of simple figures from first principle, centroid of composite sections; Centre of Gravity and its implications; moment of inertia- Definition, Moment of inertia of plane sections from first principles Moment of inertia of standard sections and composite sections

Part-C

Mechanical Vibrations covering, Basic terminology, free and forced vibrations, resonance and its effects; Degree of freedom; Derivation for frequency and amplitude of free vibrations without damping and single degree of freedom system, simple problems, types of pendulum, use of simple, compound and torsion pendulums

Part-D

Introduction to Kinetics of Rigid Bodies covering, Basic terms, general principles in dynamics; Types of motion, Instantaneous center of rotation in plane motion and simple problems; D'Alembert's principle and its applications in plane motion and connected bodies; Work energy principle and its application in plane motion of connected bodies; Kinetics of rigid body

rotation

REFERENCES

1. Irving H. Shames (2006), Engineering Mechanics, 4th Edition, Prentice Hall

2. F. P. Beer and E. R. Johnston (2011), Vector Mechanics for Engineers, Vol I - Statics, Vol II, – Dynamics, 9th Ed, Tata McGraw Hill

3. R. C. Hibbler (2006), Engineering Mechanics: Principles of Statics and Dynamics, Pearson Press.

4. Andy Ruina and RudraPratap (2011), Introduction to Statics and Dynamics, Oxford University Press

5. Shanes and Rao (2006), Engineering Mechanics, Pearson Education,

6. Hibler and Gupta (2010), Engineering Mechanics (Statics, Dynamics) by Pearson Education

7. Reddy Vijaykumar K. and K. Suresh Kumar(2010), Singer's Engineering Mechanics

8. Bansal R.K.(2010), A Text Book of Engineering Mechanics, Laxmi Publications

9. Khurmi R.S. (2010), Engineering Mechanics, S. Chand & Co.

10. Tayal A.K. (2010), Engineering Mechanics, Umesh Publications

DAV UNIVERSITY, JALANDHAR

Course Title: SURVEYING LABORATORY

Paper Code: BCE 213

L	T	P	Credits
0	0	2	1

List of experiments:

1. Setting up of survey lines between survey stations, their measurements and ranging.
2. Measurement of bearing and angles with compass.
3. Levelling Exercises, height of instrument and rise & fall methods.
4. Measurement of horizontal and vertical angle by theodolite.
5. Determination of tachometric constants and determination of reduced levels by tacheometric observations.
6. Plane table survey, different methods of plotting.
7. Two point & three-point problem.
8. Determination of height of an inaccessible object with tacheometer.
9. Setting out a transition curve in the field.
10. Surveying with Total Station (Detailed layout of a Traverse).

DAV UNIVERSITY, JALANDHAR

Course Title: FLUID MECHANICS LABORATORY

Paper Code: BCE 215

L	T	P	Credits
0	0	2	1

List of experiments:

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)

4. To determine the discharge coefficient for a Vee notch or rectangular notch.

5. To determine the hydraulic coefficients for flow through an orifice.

6. To determine the friction coefficient for pipes of different diameter.

7. To determine the head loss in a pipe line due to sudden expansion / sudden contraction/ bend.

8. To determine the velocity distribution for pipe line flow with a pitot static probe.

REFERENCE:

1. Bloomer John J. "Practical Fluid Mechanics for Engineering Applications (Mechanical Engineering) Marcel Dekker Inc. New York, 1999.

2. Singh Sarabjit "Fluid Mechanics Practical Manual"PHI Learning Pvt. Ltd.New Delhi, 2009.

DAV UNIVERSITY, JALANDHAR

Course Title: ENGINEERING GEOLOGY LABORATORY

Paper Code: BCE 217

L	T	P	Credits
0	0	2	1

List of experiments:

1. Study of Physical properties of minerals
2. Identification of rocks forming silicate and ore minerals
3. Recognition of rocks
4. Use of clinometers compass and Burton compass for measurement dip and strike of formations
5. Interpretation and drawing of sections for geological maps showing tilted beds, faults, uniformities etc.,
6. Simple structural geology problems
7. Study of models of geological structures and out crops patterns of different types of rocks and land forms

DAV UNIVERSITY, JALANDHAR

FOURTH SEMESTER

Course Title: CIVIL ENGINEERING-SOCIETAL AND GLOBAL IMPACT

Course Code: BCE 202

Course Objective:

L	T	P	Credits
3	0	0	3

- Awareness of the importance of Civil Engineering and the impact it has on the Society and at global levels
- Awareness of the impact of Civil Engineering for the various specific fields of human endeavor.
- Need to think innovatively to ensure Sustainability

Part A

Understanding the past to look into the future: Pre-industrial revolution days, Agricultural revolution, first and second industrial revolutions, IT revolution; Recent major Civil Engineering breakthroughs and innovations; Present day world and future projections Human Development Index and Ecological Footprint of India Vs other countries and analysis; Understanding the importance of Civil Engineering in shaping and impacting the world; The ancient and modern Marvels and Wonders in the field of Civil Engineering; Future Vision for Civil Engineering

Part B

Infrastructure - Habitats, Megacities, Smart Cities, futuristic visions; Transportation (Roads, Railways & Metros, Airports, Seaports, River ways, Sea canals, Tunnels (below ground, under water); Futuristic systems (ex, Hyper Loop)); Energy generation (Hydro, Solar (Photovoltaic, Solar Chimney), Wind, Wave, Tidal, Geothermal, Thermal energy); Water provisioning; Telecommunication needs (towers, above-ground and underground cabling); Awareness of various Codes & Standards governing Infrastructure development; Innovations and methodologies for ensuring Sustainability; Sustainability measures; Innovations and methodologies for ensuring Sustainability.

Part C

Built environment – Facilities management, Climate control; Energy efficient built environments and LEED ratings, Recycling, Temperature/ Sound control in built environment, Security systems; Intelligent/ Smart Buildings; Aesthetics of built environment, Role of Urban Arts Commissions; Conservation, Repairs & Rehabilitation of Structures & Heritage structures; Innovations and methodologies for ensuring Sustainability

Part D

Civil Engineering Projects – Environmental Impact Analysis procedures; Waste (materials, manpower, equipment) avoidance/ Efficiency increase; Advanced construction Techniques for better sustainability; Techniques for reduction of Green House Gas emissions in various aspects of Civil Engineering Projects; New Project Management paradigms & Systems (Ex. Lean Construction), contribution of Civil Engineering to GDP, Contribution to employment (projects, facilities management), Quality of products, Health & Safety aspects for stakeholders; Innovations and methodologies for ensuring Sustainability during Project development;

Text/Reference Books:

1. ŽigaTurk (2014), Global Challenges and the Role of Civil Engineering, Chapter 3 in: Fischinger M. (eds) Performance-Based Seismic Engineering: Vision for an Earthquake Resilient Society. Geotechnical, Geological and Earthquake Engineering, Vol. 32. Springer, Dordrecht

2. Brito, Ciampi, Vasconcelos, Amarol, Barros (2013) Engineering impacting Social, Economical and Working Environment, 120 ASEE Annual Conference and Exposition

3. NAE Grand Challenges for Engineering (2006), Engineering for the Developing World, The Bridge, Vol 34, No.2, Summer 2004.

4. Allen M. (2008) Cleansing the city. Ohio University Press. Athens Ohio.

5. Ashley R., Stovin V., Moore S., Hurley L., Lewis L., Saul A. (2010). London Tideway Tunnels Programme – Thames Tunnel Project Needs Report – Potential source control and SUDS applications: Land use and retrofit options

6. http://www.thamestunnelconsultation.co.uk/consultation-documents.aspx

7. Ashley R M., Nowell R., Gersonius B., Walker L. (2011). Surface Water Management and Urban Green Infrastructure. Review of Current Knowledge. Foundation for Water Research FR/R0014

8. Barry M. (2003) Corporate social responsibility – unworkable paradox or sustainable paradigm? Proc ICE Engineering Sustainability 156. Sept Issue ES3 paper.

DAV UNIVERSITY, JALANDHAR

Course Title: HYDRAULIC ENGINEERING

Paper Code: BCE 204

L	T	P	Credits
3	0	0	3

Course Objective: To familiarize the students with different types of flows, channels and their properties in fluid flow.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of open channel flow and to solve problems in uniform, gradually and rapidly varied flows in steady state conditions.

Part-A

Laminar Flow: Navier-stokes equations in Cartesian coordinates (no derivation), meaning of terms, Flow through circular section pipe, flow between parallel plates, stokes law. Transition from laminar to turbulent, Stoke's law, Measurement of viscosity.   [6]

Turbulent Flow: Turbulent flows and flow losses in pipes, Darcy equation minor head   losses in pipe fittings, hydraulic and energy gradient lines. Definition of turbulence, scale and intensity, Effects of turbulent flow in pipes. Equation for velocity distribution in smooth and rough pipes (no derivation). Resistance diagram.

[6]

Part-B

Boundary Layer Analysis: Assumption and concept of boundary layer theory. Boundary-layer thickness, displacement, momentum & energy thickness, laminar and turbulent boundary layers on a flat plate; laminar sub-layer, smooth and rough boundaries. Local and average friction coefficients. Separation and Control.   [6]

Part-C

Uniform flow in open Channels: Flow classifications, basic resistance Equation for open channel flow. Chezy's, Manning's, Bazin's and Kutter's formulae. Variation of roughness coefficient, conveyance and normal depth. Velocity Distribution. Most efficient flow sections; rectangular, trapezoidal and circular   [4]

Non-Uniform Flow: Specific energy, Specific energy curve, critical flow, discharge curve Specific force Specific depth, and Critical depth. Channel Transitions. Measurement of Discharge and Velocity – Venturi Flume, Standing Wave Flume, Broad Crested Weir. Measurement of Velocity- Current meter, Floats. Gradually Varied Flow-Different Equation of water surface profile; limitation, properties and classification of water and surface profiles with examples, computation of water surface profile by graphical, numerical and analytical

approaches.   [8]

Part-D

Hydraulic Jump and Surges: Theory of Jump, Elements of jump in a rectangular Channel, length and height of jump, location of jump, Energy dissipation and other uses, Positive and negative surges   [6]

Flow through Pipes: Loss of head through pipes, Darcy-Wiesbatch equation, total energy equation, hydraulic gradient line, Pipes in series, equivalent pipes, pipes in parallel, flow through laterals, flows in dead end pipes, siphon, power transmission through pipes, nozzles. Water hammer in pipes and control measures.   [6]

REFERENCES:

Modi P.N. & Seth S.M., "Hydraulic and Fluid Mechanic". Standard Book House, New Delhi, 1991.

SubraminayamS., "Flow in Open Channels", TataMacGraw Hill, 2000.

Robert N.Fox& Alan T.Macnold, "Introduction to Fluid Mechanics", McGraw Hill, 2003

Bansal R. K. "Fluid Mechanics", Laxmi Publications 2007.

JagdishLal"Fluid Mechanics", Metropolitan Book Co. (p) Ltd. 2002.

K. Subramanya, "Theory and Applications of Fluid Mechanics", Tata McGraw Hill.

K. Subramanya, "Open channel Flow", Tata McGraw Hill.

VenTe Chow, "Open Channel Hydraulics", Tata McGraw Hill.

DAV UNIVERSITY, JALANDHAR

Course Title: INTRODUCTION TO SOLID MECHANICS

Paper Code: BCE 206

L	T	P	Credits
3	1	0	4

Course Objective: The objective of this Course is to introduce to continuum mechanics and material modelling of engineering materials based on first energy principles: deformation and strain; momentum balance, stress and stress states; elasticity and elasticity bounds.

Learning Outcomes: On completion of the course, the student will be able to describe the concepts and principles understand the theory of elasticity including strain/displacement and Hooke's law relationships; and perform calculations, relative to the strength and stability of structures and mechanical components. Also student would gain the knowledge to calculate the deflection at any point on a beam subjected to a combination of loads; solve for stresses and deflections of beams under unsymmetrical loading.

Part-A

Simple Stresses and Strains- Concept of stress and strain, St. Venant's principle, stress and strain diagram, Elasticity and plasticity – Types of stresses and strains, Hooke's law – stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them – Bars of varying section – composite bars – Temperature stresses. Strain Energy – Resilience – Gradual, sudden, impact and shock loadings – simple applications.

Compound Stresses and Strains- Two dimensional system, stress at a point on a plane, principal stresses and principal planes, Mohr circle of stress, ellipse of stress and their applications. Two dimensional stress-strain system, principal strains and principal axis of strain, circle of strain and ellipse of strain. Relationship between elastic constants.

Part-B

Bending moment and Shear Force Diagrams- Bending moment (BM) and shear force (SF) diagrams.BM and SF diagrams for cantilevers simply supported and fixed beams with or without overhangs. Calculation of maximum BM and SF and the point of contra flexure under concentrated loads, uniformly distributed loads over the whole span or part of span, combination of concentrated loads (two or three) and uniformly distributed loads, uniformly varying loads, application of moments.

Part-C

Flexural Stresses-Theory of simple bending – Assumptions – Derivation of bending equation: $M/I = f/y = E/R$ - Neutral axis – Determination of bending stresses – Section modulus of

rectangular and circular sections (Solid and Hollow), I, T, Angle and Channel sections, Slope and deflection- Relationship between moment, slope and deflection, Moment area method, Macaulay's method and Conjugate Beam. Use of these methods to calculate slope and deflection for determinant beams.

Part-D

Deformation and Strain covering description of finite deformation, Infinitesimal deformation; Analysis of statically determinate trusses; Stability of dams, retaining walls and chimneys; Force-deformation Relationships and Static Indeterminacy, Uniaxial Loading and Material Properties, Trusses and Their Deformations, Statically Determinate and Indeterminate trusses, Multiaxial Stress and Strain, Multiaxial Strain and Multiaxial Stress-strain Relationships

Torsion- Derivation of torsion equation and its assumptions.

REFERENCES

1 Timoshenko, S. and Young, D. H., "Elements of Strength of Materials", DVNC, New York, USA.

2. Kazmi, S. M. A., "Solid Mechanics" TMH, Delhi, India.

3. Hibbeler, R. C. Mechanics of Materials. 6th ed. East Rutherford, NJ: Pearson Prentice Hall, 2004

4. Crandall, S. H., N. C. Dahl, and T. J. Lardner. An Introduction to the Mechanics of Solids.2nd edition. New York, NY: McGraw Hill, 1979

5. Laboratory Manual of Testing Materials - William Kendrick Hall

6. Mechanics of Materials - Ferdinand P. Beer, E. Russel Jhonston Jr., John T. DEwolf
– TMH 2002.

7. Strength of Materials by R. Subramanian, Oxford University Press, New Delhi.

DAV UNIVERSITY, JALANDHAR

Course Title: DISASTER PREPAREDNESS AND PLANNING

Paper Code: BCE 208

L	T	P	Credits
3	0	0	3

Course Objective: This course should provide the students with good understanding in various disaster managing steps.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of disaster reduction and various direct and indirect damages due to disaster

Part-A

Introduction - Concepts and definitions: disaster, hazard, vulnerability, risk, capacity, impact, prevention, mitigation). Disasters- Disasters classification; natural disasters (floods, draught, cyclones, volcanoes, earthquakes, tsunami, landslides, coastal erosion, soil erosion, forest fires etc.); manmade disasters (industrial pollution, artificial flooding in urban areas, nuclear radiation, chemical spills etc); hazard and vulnerability profile of India, mountain and coastal areas, ecological fragility.

Part-B

Disaster Impacts - Disaster impacts (environmental, physical, social, ecological, economical, political, etc.); health, psycho-social issues; demographic aspects (gender, age, special needs); hazard locations; global and national disaster trends; climate change and urban disasters

Part-C

Disaster Risk Reduction (DRR)- Disaster management cycle – its phases; prevention, mitigation, preparedness, relief and recovery; structural and non structural measures; risk analysis, vulnerability and capacity assessment; early warning systems, Post-disaster environmental response (water, sanitation, food safety, waste management, disease control); Roles and responsibilities of government, community, local institutions, NGOs and other stakeholders; Policies and legislation for disaster risk reduction, DRR programmes in India and the activities of National Disaster Management Authority.

Part-D

Disaster Management Environment and Development- Factors affecting vulnerability such as impact of developmental projects and environmental modifications (including of dams, land-use changes, urbanization etc.), sustainable and environmental friendly recovery; reconstruction and development methods.

REFERENCE:

1. http://ndma.gov.in/ (Home page of National Disaster Management Authority).

2. http://www.ndmindia.nic.in/ (National Disaster management in India, Ministry of Home Affairs).

3. SahniPardeep, "Disaster Risk Reduction in South Asia", Prentice Hall, 2004.

4. Singh B.K., "Handbook of Disaster Management: techniques & Guidelines", Rajat Publication, 2008.

5. Ghosh G.K., " Disaster Management", APH Publishing Corporation, 2006

DAV UNIVERSITY, JALANDHAR

Course Title: ENGINEERING MATERIAL AND CONSTRUCTION

Paper Code: BCE 210

L	T	P	Credits
3	0	0	3

Course Course Objective: This course offers a good understanding and study of different materials and material properties in civil engineering.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of various materials used in construction, their properties, uses and type of construction work for which they can be used.

Part-A

Building Stones: General, Uses of stones, natural bed of stones, qualities of a good building stone, deterioration of stones, preservation of stones, artificial stones, common building stones of India and their uses

Bricks: General, Composition of good brick earth, Harmful ingredients in brick earth, qualities of good bricks, tests for bricks, classification of bricks.

Timber: Definition, classification of trees, structure of a tree, felling of trees, seasoning of timber, storage of timber, market forms of timber.

Part-B

Lime: General, some definitions calcination, Hydraulicity, setting, slacking, sources of lime, classification of limes, uses of lime, tests for limestones.

Cement: Constituents of Cement, Manufacture of Portland cement

Aggregates: Fine aggregate: Natural and manufactured: Sieve analysis, zoning, specify gravity, bulking, moisture content, deleterious materials. Coarse aggregate: Natural and manufactured: Importance of size, shape and texture. Grading of aggregates, Sieve analysis, specific gravity, Flakiness and elongation index, crushing, impact and abrasion tests.

Concrete : Introduction, Constituents of concrete, Batching of materials, Manufacturing process of cement concrete, workability and factors affecting it, Methods to determine workability, segregation and bleeding of concrete, Strength of concrete and factors affecting it.

Miscellaneous materials: Paints, Distempering, Glass, Plastics

Part-C

Foundation and Walls: Definition, types of foundations, Types of walls and thickness considerations.

Brick and stone masonry: Terms used, Types of bonds & their merits and demerits, rubble and ashlars joints in stone masonry, cement concrete hollow blocks and their advantages and disadvantage.

Lintels and Arches: Definition, function and classification of lintels, Balconies, chejja and canopy. Arches; Elements and Stability of an Arch.

Part-D

Damp Proofing: Sources, causes and bad effects of dampness, preventive measures for dampness in buildings

Roofs & Floors: Terms used, Classification of roofs and roof trusses, Different roof covering material. General, Types of floors used in building & and their suitability, factors for selecting suitable floor for building.

Plastering and pointing: Objects, Methods of plastering, Materials and types, Defects in plastering, special material for plastered surface, Distempering white washing and colour washing.

REFERENCE:

1. Rangwala S.C. "EngineeringMaterials" Charotar Publishing House Anand India, 1989.
2. Bindra SP, Arora KR "Building construction" DhanpatRai Publications, Delhi 1970.
3. ShettyMS , "Concrete Technology" S. Chand & Co. N. Delhi, 2005
4. Punmia BC, "Building construction" Laxmi Publications Pvt. Ltd. 2008.
5. KumarSushil , "Building Construction" Standard Publishers Distributors, 2006
6. Fundamentals of Building Construction: Materials and Methods by Edward Allen and Joseph Iano
7. Materials for Civil and Construction Engineers by Michael S. Mamlouk , John P. Zaniewski
8. Building Construction: Principles, Materials, and Systems by Madan L Mehta Ph.D. , Walter Scarborough, Diane Armpriest

DAV UNIVERSITY, JALANDHAR

Course Title: MATERIALS, TESTING AND EVALUATION	L	T	P	Credits
Paper Code: BCE 212	3	1	0	4

Course Course Objective: The objective of this Course is to deal with an experimental determination and evaluation of mechanical characteristics and advanced behavior of metallic and non-metallic structural materials. The course deals with explanation of deformation and fracture behavior of Structural materials.

Learning Outcomes: On completion of the course, the student will be Learn

- Different materials used in civil engineering applications
- Planning an experimental program, selecting the test configuration, selecting the testspecimens and collecting raw data
- Documenting the experimental program including the test procedures, collected data,method of interpretation and final results

Part-A

Introduction to Engineering Materials covering, Cements, M-Sand, Concrete (plain, reinforced and steel fibre/ glass fibre-reinforced, light-weight concrete, High Performance Concrete, Polymer Concrete) Ceramics, and Refractories, Bitumen and asphaltic materials, Acoustical material and geo-textiles, rubber and asbestos, laminates and adhesives, Graphene, Carbon composites and other engineering materials including properties and uses of these.

Concrete as a Structural material, constituent materials of concrete. Cement, testing of cement: Fineness, consistency, setting times, strength, Mechanical properties: physical Properties. Soundness of aggregate – Thermal properties – Sieve analysis – Fineness modulus. Physical Properties of Fresh Concrete: Workability: factors affecting, methods of determination of workability, Density of fresh concrete.

Part-B

Mechanical behavior and mechanical characteristics; Elasticity – principle and characteristics; Plastic deformation of metals; Tensile test – standards for different material (brittle, quasi-brittle, elastic and so on) True stress – strain interpretation of tensile test; hardness tests; Bending and torsion test; strength of ceramic; Internal friction, creep – fundaments and characteristics; Brittle fracture of steel – temperature transition approach; Background of fracture mechanics; discussion of fracture toughness testing.

Part-C

Laboratory for mechanical testing; Discussion about mechanical testing; Naming systems for various irons, steels and nonferrous metals; Discussion about elastic deformation; Plastic deformation; Impact test and transition temperatures; Fracture mechanics – background; Fracture toughness – different materials; Fatigue of material; Creep.

Part-D

Various Tests of bricks, testing of sand, Tests & testing of concrete, Tests & testing of soils, Tests & testing of bitumen & bituminous mixes, Tests & testing of polymers and polymer based Materials, Tests & testing of metals, Tests & testing of other special materials, composites and cementitious materials.

REFERENCES

1. Chudley, R., Greeno (2006), 'Building Construction Handbook' (6th ed.),R. Butterworth-Heinemann

2. Khanna, S.K., Justo, C.E.G and Veeraragavan, A, ' Highway Materials and Pavement Testing', Nem Chand& Bros, Fifth Edition

3. Various related updated & recent standards of BIS, IRC, ASTM, RILEM, AASHTO, etc. corresponding to materialsused for Civil Engineering applications

4. Kyriakos Komvopoulos (2011), Mechanical Testing of Engineering Materials, Cognella

5. E.N. Dowling (1993), Mechanical Behaviour of Materials,Prentice Hall International Edition

6. American Society for Testing and Materials (ASTM), *Annual Book of ASTM Standards* (post 2000)

7. Related papers published in international journals

DAV UNIVERSITY, JALANDHAR

Course Title: MATERIAL TESTING LABORATORY

Paper Code: BCE 214

List of Experiments

L	T	P	Credits
0	0	2	1

1. Gradation of coarse and fine aggregates
2. Compressive strength test on aggregates
3. Elastic Behavior of metals & materials
4. Concrete - Early Age Properties
5. Compression – Directionality
6. Soil Classification
7. Consolidation and Strength Tests
8. Torsion test
9. Hardness tests (Brinnel's and Rockwell)
10. Tests on closely coiled and open coiled springs
11. Bituminous Mix Design and Tests on bituminous mixes - Marshall method

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Course Title: SOLID MECHANICS LABORATORY

Paper Code: BCE 216

L	T	P	Credits
0	0	2	1

List of experiments:

1. Draw Stress Strain curve for Ductile and Brittle material in tension.

2. Draw Stress Strain curve for Ductile and Brittle material in compression.

3. Draw shear stress, shear strain curve for ductile and brittle material in torsion strength testing

4. Draw load deflection curve for spring in loading and unloading conditions.

5. To determine the fatigue strength of the material.

6. To determine the impact strength by Izod and Charpy test.

7. To test a mild steel and cast iron specimen in double shear.

8. Measurement of deflections in statically determinate beam

DAV UNIVERSITY, JALANDHAR

Course Title: HYDRAULICS ENGINEERING LABORATORY

Paper Code: BCE 218

L	T	P	Credits
0	0	2	1

List of Experiments:

1. Verification of Stoke's Law
2. To determine the type of flow from Reynold's Apparatus
3. Boundary layer development on a flat plate
4. Determination of drag on a body in a wind tunnel.
5. Determination of manning's coefficients of Rugosity.
6. Determination of elements of Hydraulic Jump.
7. Discharge and flow profile over a Broad crested weir.

REFERENCE:

Experimental Fluid Mechanics: G.L.Asawa

Open Channel Hydraulics: V.T.Chow

DAV UNIVERSITY, JALANDHAR

FIFTH SEMESTER

Course Title: GEOTECHNICAL ENGINEERING

Paper Code: BCE 301

L	T	P	Credits
3	1	0	4

Course Objective:

- To familiarize the students with concept of soil and its index properties.
- To know about how engineering properties like permeability, shear strength etc. and compaction characteristics affects soil structure.

Learning Outcomes: After the completion of this course the student must be able to:

- Understand the different types of soil based on their formation mechanism
- Classify any soils based on their particle size distribution and index properties
- Determine the compactive effort required to obtain necessary degree of compaction in-situ.
- Evaluate the stiffness of soil using shear strength parameters

Part-A

Introduction: Types of soils, their formation and deposition, Definitions: soil mechanics, soil engineering, rock mechanics, geotechnical engineering. Scope of soil engineering. Comparison and difference between soil and rock. Basic Definitions and Relationships-Soil as three-phase system in terms of weight, volume, voids ratio, and porosity. Definitions: moisture content, unit weights, degree of saturation, voids ratio, porosity, specific gravity, mass specific gravity, etc. Relationship between volume& weight, voids ratio- moisture content, unit weight- percent air voids, saturation- moisture content, moisture content- specific gravity etc. Determination of various parameters such as: Moisture content by oven dry method, pycnometer, sand bath method, torsional balance method, alcohol method and sensors. Specific gravity by density bottle method, pycnometer method, measuring flask method. Unit weight by water displacement method, submerged weight method, core-cutter method, sand-replacement method. [4]

Plasticity Characteristics of Soil: Introduction to definitions of: plasticity of soil, consistency limits-liquid limit, plastic limit, shrinkage limit, plasticity, liquidity and consistency indices, flow & toughness indices, definitions of activity and sensitivity. Determination of: liquid limit, plastic limit and shrinkage limit. Use of consistency limits. Classification of Soils-Introduction of soil classification: particle size classification, textural classification, unified soil classification

system, Indian standard soil classification system. Identification: field identification of soils, general characteristics of soil in different groups. [4]

Part-B

Permeability of Soil: Darcy's law, validity of Darcy's law. Determination of coefficient of permeability: Laboratory method: constant-head method, falling-head method. Field method: pumping- in test, pumping- out test. Permeability aspects: permeability of stratified soils, factors affecting permeability of soil. Seepage Analysis- Introduction, stream and potential functions, characteristics of flow nets, graphical method to plot flow nets. [4]

Effective Stress Principle: Introduction, effective stress principle, nature of effective stress, effect of water table. Fluctuations of effective stress, effective stress in soils saturated by capillary action, seepage pressure, quick sand condition. [4]

Compaction of Soil: Introduction, theory of compaction, laboratory determination of optimum moisture content and maximum dry density. Compaction in field, compaction specifications and field control. [4]

Part-C

Consolidation of Soil: Introduction, comparison between compaction and consolidation, initial, primary & secondary consolidation, spring analogy for primary consolidation, interpretation of consolidation test results, Terzaghi's theory of consolidation, final settlement of soil deposits, computation of consolidation settlement and secondary consolidation. [8]

Part-D

Shear Strength: Mohr circle and its characteristics, principal planes, relation between major and minor principal stresses, Mohr-Coulomb theory, types of shear tests: direct shear test, merits of direct shear test, triaxial compression tests, test behaviour of UU, CU and CD tests, pore-pressure measurement, computation of effective shear strength parameters, unconfined compression test, vane shear test. [6]

Stability of Slopes: Introduction, types of slopes and their failure mechanisms, factor of safety, analysis of finite and infinite slopes, wedge failure Swedish circle method, friction circle method, stability numbers and charts. [6]

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REFERENCE:

1. Craig R.F, " Soil Mechanics", Chapman & Hall.

2. Taylor, "Fundamentals of Soil Engineering", John Wiley & Sons

3. Holtz R.D. and Kovacs, W.D., "An Introduction to Geotechnical Engineering", Prentice Hall, NJ

4. Principles of Foundation Engineering, by Braja M. Das, Cengage Learning

5. Arora K.R., "Soil Mech. & Foundation Engg", Standard *Publishers* Distributors, 2003.

6. Purshotam Raj P., "Geotechnical Engineering", *Tata Mcgraw Hill, 2006.*

7. Murthy V.N.S., "Soil Mech. & Foundation Engg"., CBS *Publishers*& Distributors, 2001.

8. Das B.M., "Principle of Geotechnical Engineering", Cengage Publisher, 2006.

9. Ranjan Gopal & Rao A.S.R. ;"Basic and applied Soil Mechanics", New Age International Publishers, 2008.

DAV UNIVERSITY, JALANDHAR

Course Title: STRUCTURAL ENGINEERING-I

Paper Code: BCE 302

L	T	P	Credits
3	0	0	3

Course Objective: This course aims at providing students with a solid background on principles of structural engineering design. Students will be exposed to the theories and concepts of both concrete and steel design and analysis both at the element and system levels.

Learning Outcomes: On completion of the course, the student will be Learn Hands-on design experience and skills will be gained and learned through problem sets and a comprehensive design project.

Part-A

Introduction- concepts of energy principles, safety, sustainable development in performance; what makes a structure; principles of stability, equilibrium; what is a structural engineer, role of engineer, architect, user, builder; what are the functions' what do the engineers design, first principles of process of design, Planning and Design Process; Materials, Loads, and Design Safety. Need of analysis, techniques of structural idealization, basic tools of analysis, reactions in structure, notations and sign conventions, free – body diagrams, static determinacy, stability of structures, principle of superposition, loads on structures.

Part-B

Introduction to the analysis and design of structural systems. Analyses of determinate trusses, beams, and frames and design philosophies for structural engineering. Pure Bending, Moment-curvature Relationship, Beam Deflection, Symmetry, Superposition, and Statically Indeterminate Beams, Shear and Torsion, Beam in bending, shear and torsion; General energy theorems, Castigliano's theorem, Maxwell Bettie's reciprocal theorem; Virtual work and unit load method for deflection, Application to problems of beams and frames. Stability of columns, Euler's formula, end conditions and effective length factor, Columns with eccentric and lateral load.

Part-C

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: Introduction, moving loads, influence lines, influence lines for reactions, shear force and bending moment, influence lines for beams, trusses and arches, absolute maximum B. M. & S. F, Muller Breslau Principle.

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Part-D

Arches: Introduction, curved beams, arch versus a beam, three hinged arch, moment, shears and normal thrust in three hinged arches,

Introduction, shape of a loaded cable, cable carrying point loads and UDL, cables with ends at different level, suspension bridge with two hinged and three hinged stiffening girders.

REFERENCES

1 Reddy C. S. ;"Basic structural Analysis", Tata McGraw-Hill Education, 2003.

2Vazirani & Ratwani;"Analysis of Structures Vol- I and Vol.-II", Khanna Publishers, 1999.

3 Wang C. K. ;"Intermediate structural Analysis", McGraw-Hill, 1983.

4 Jain A. K. ;"Advanced Structural Analysis", Nem Chand & Bros., Roorkee, 1990.

5 Gupta S. P. & Pandit G. S.; "Theory of Structures, Vol. I", Tata McGraw Hill, New Delhi, 2008.

6 Menon Devdas; "Advanced Structural Analysis", Alpha Science International Publisher, 2009.

DAV UNIVERSITY, JALANDHAR

Course Title: HYDROLOGY AND WATER RESOURCE ENGINEERING

Paper Code: BCE 303

L	T	P	Credits
3	1	0	4

Course Objective: To Understand the basic aquifer parameters and estimate groundwater resources for different hydro-geological boundary conditions.

Learning Outcomes: - To Understand the interaction among various processes in the hydrologic cycle

Part A

Introduction- hydrologic cycle, water-budget equation, water balance, need of hydrology in engineering, Different forms of precipitation, precipitation in India, measurement of precipitation, rain gauge network, mean precipitation over an area, depth area- duration relationships, maximum intensity/depth-duration-frequency relationship

Abstractions from precipitation- evaporation process, evaporation estimation, reservoir evaporation and methods for its reduction, evapotranspiration and its measurement, potential evapotranspiration over India, actual evapotranspiration, interception, depression storage, infiltration, infiltration capacity.

Part B

Runoff- runoff volume, estimation of runoff volume, flow duration curve, flow-mass curve, hydrographs, unit hydrograph, surface and ground water resources of India

Ground water and well hydrology- forms of subsurface water, aquifer properties, geologic formations of aquifers, well hydraulics: steady state flow in wells, equilibrium equations for confined and unconfined aquifers.

Part C

Water withdrawals and uses–Different uses of water: agriculture, hydroelectric generation; flood control. Analysis of surface water supply, Water requirement of Crops, crop seasons in India, cropping pattern, duty and delta; Quality of irrigation water; Soil-water relationships, root zone soil water, frequency of irrigation; Methods of applying water to the fields: surface, sub-surface, sprinkler and trickle / drip irrigation.

Part D

Canals and Dams - canal systems, alignment of canals, canal losses, estimation of design discharge. Design of channels- rigid boundary channels, alluvial channels, Kennedy's and Lacey's theory of regime channels. Canal outlets, Water logging: causes, effects and remedial measures. Lining of canals, types of lining. Drainage of irrigated lands: necessity, methods,

different types of dams, forces acting on dam, different type of dam failures, selection of suitable dam sites.

Text/Reference Books:

1. K Subramanya, Engineering Hydrology, Mc-Graw Hill.

2. K N Muthreja, Applied Hydrology, Tata Mc-Graw Hill.

3. G L Asawa, Irrigation Engineering, Wiley Eastern

4. L W Mays, Water Resources Engineering, Wiley.

5. J D Zimmerman, Irrigation, John Wiley & Sons

6. C S P Ojha, R Berndtsson and P Bhunya, Engineering Hydrology, Oxford.

7. S k Garg Hydrology and water resource Engineering

DAV UNIVERSITY, JALANDHAR

Course Title: ENGINEERING ECONOMICS, ESTIMATION & COSTING

Paper Code: BCE 307

L	T	P	Credits
3	0	0	3

Course Objective: This course should provide the students with good understanding of various types of quantity and quality analysis of civil engineering projects.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of calculation of materials required for different projects.

Part-A

B**asic Principles and Methodology of Economics.** Demand/Supply – elasticity – Government Policies and Application. Theory of the Firm and Market Structure. Basic Macro-economic Concepts (including GDP/GNP/NI/Disposable Income). Aggregate demand and Supply (IS/LM). Price Indices (WPI/CPI), Interest rates, Direct and Indirect Taxes

Public Sector Economics: Introduction to Welfare, Externalities, Labour Market. Components of Monetary and Financial System, Central Bank

Elements of Business/Managerial Economics and forms of organizations: Cost & Cost Control –Techniques, Types of Costs, Lifecycle costs, Budgets, Break even Analysis, Capital Budgeting, Application of Linear Programming. Investment Analysis – NPV, ROI, IRR, Payback Period, Depreciation, Time value of money (present and future worth of cash flows). Business Forecasting – Elementary techniques. Statements – Cash flow, Financial. Case Study Method.

Part-B

Estimates: Types, complete set of estimate, working drawings, site plan, layout plan, index plan, plinth area administrative approval and Technical Sanction.

1. Estimate of buildings
2. Estimate of R. C.C. works
3. Estimate of sloped roof and steel structures
4. Estimate of water supply and sanitary works
5. Estimates of roads (a) Earthwork (b) Bridges and culverts c) Pavement
6. Estimate of Irrigation works.

Part-C

Analysis of Rates: For earthwork, concrete works, D. P. C., Brickwork, stone masonry, plastering, pointing, road work, carriage of materials.

Specifications- For different classes of building and Civil engineering works

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Part-D

Contracts: Types of contracts, tender, tender notice, tender form, submission and opening of tender, earnest money, security money, measurement book, muster roll, piecework agreement and work order

Accounts: Division of accounts, cash, receipts of money, cashbook, temporary advance, imprest and accounting procedure.

Arbitration: Arbitration, arbitrator, and arbitration act, powers of arbitrator, arbitration awards.

REFERENCES:

1. Datta B. N. ;"Estimating and Costing", UBSPD, New Delhi, 2008.

2. BirdiG.S. ;"Estimating and Costing", DhanpatRai Publication New Delhi, 2007.

3. ChakravortyV.N. ;"Estimating and Costing", Calcutta publisher, 2010.

4. PatilB.S. ;"Civil Engg. Contracts & Estimates", Orient-Longman Ltd., New Delhi, 2001.

5. Mankiw Gregory N. (2002), Principles of Economics, Thompson Asia

6. V. Mote, S. Paul, G. Gupta(2004), Managerial Economics, Tata McGraw Hill

7. Misra, S.K. and Puri (2009), Indian Economy, Himalaya

8. PareekSaroj (2003), Textbook of Business Economics, Sunrise Publishers

DAV UNIVERSITY, JALANDHAR

Course Title: DESIGN OF CONCRETE STRUCTURE-I

Paper Code: BCE 309

L	T	P	Credits
3	1	0	4

Course Objective: Aim of this paper is to familiarize the students with Concrete technology and design of various concrete elements like beams, columns etc.

Learning Outcomes: After the completion of this course the participants would gain the knowledge for design of various concrete elements like beams and columns

Note: Use of IS-456-2000 is allowed in the examination.

Part-A

Introduction to Limit State Design Method- Introduction to Working Stress Method and Limit State Method, Characteristic values, characteristic strength, characteristic loads, design values for materials and loads, factored loads, Determination of Neutral Axis Depth and Computation of Moment of Resistance   for both singly and doubly reinforced sections.

Part-B

Limit State of Collapse (Shear, bond and torsion) Introduction Design for shear, structural components subjected to torsion, design of rectangular beam section for torsion, development length.

Limit State of Serviceability Deflection, effective span to effective depth ratio, modification factors for singly reinforced, doubly reinforcement and flanged beams, crack formation and its control.

Part-C

Analysis and design of singly reinforced, doubly reinforced beams and flanged beams. Types of failures and assumptions. Reinforced Concrete Slabs: One way and Two way slabs.

Part-D

Compression Members: Definitions, Classifications, Guidelines and Assumptions, Design of Short Axially Loaded Compression Members, Design of Short Compression Members under Axial Load with Uniaxial and biaxial Bending, Preparation of Design Charts, Design of Slender Columns

REFERENCES:

1. Ramamrutham Design of concrete structures, Dhanpat Rai Publications,2016

2. S.S Bhavakatti Desgin of concrete structures, New Age International publishers,

3. Krishna RajuN.; "Advanced Design of Structures", New Age International Publishers, 2003.

4. Ramachandra; "Limit State Design", scientific publishers, 2007.

5. Jain A.K.; "Limit State Design", Laxmi Publications, 2007.

6. Vergese P.C.; "Limit State Design of Reinforced Concrete" PHI Learning publishers, 2008.

8. Pillai&Menon"Reinforced concrete design", Tata Mcgraw hills, 2009.

DAV UNIVERSITY, JALANDHAR

Course Title: TRANSPORTATION ENGINEERING

Paper Code: BCE 311

L	T	P	Credits
3	0	0	3

Course Objective: Aim of this paper is to familiarize the students with highway planning and its maintenance.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of highway geometric design and various materials used in highway construction

Part-A

Introduction: Importance and role of transportation systems; different modes of transportation, historical development of road construction, Highway Economics.

Highway Planning & Project Preparation: Planning surveys, Highway alignment, Highway Location surveys, soil and material surveys, Highway Projects: drawing and report.

Part-B

Highway Geometric Design: cross-sectional elements, camber, sight distance-definition analysis of stopping sight and passing sight distances, passing zones. Design of horizontal alignment-super elevation. Extra widening on curves, transition curves. Design of vertical alignment, gradients, types of vertical curves & their design

Part-C

Highway materials and construction: Desirable properties of soil, Road aggregates, bitumen, cement & cement concrete as highway materials. Various types of roads & their construction-earth roads, gravel roads, W.B.M., bituminous roads and quality control during construction

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, Introduction to soil stabilization

Part-D

Pavement Design: Design of flexible and rigid Pavements. Elementary Traffic Engineering-Traffic Engineering studies (speed, volume, O & D, parking and accident studies), traffic signs, traffic signals, road markings, road intersection, highway lighting

REFERENCES:

1. Khanna S.K., and Justo, C.E.G. "Highway Engineering", Nem Chand and Brothers, Roorkee, 1998.

2. Kadiyali, L.R. "Principles and Practice of Highway Engineering", Khanna Publishers, New Delhi, 1997.

3. Flaherty, C.A.O. "Highway Engineering", Volume 2, Edward Arnold, London, 1986.

4. Sharma, S.K. "Principles, Practice & Design of Highway Engineering", S.Chand & Company Ltd., New Delhi, 1985.

5. Mannering, "Principles of Highway Engineering & Traffic Analysis", Wiley Publishers, New Delhi, 2007.

6. Paul H. Wright and Karen K. Dixon, Highway Engineering, 7th Edition, Wiley Student Edition, 2009.

7. Srinivasa Kumar, R, Textbook of Highway Engineering, Universities Press, 2011.

DAV UNIVERSITY, JALANDHAR

Course Title: GEOTECHNICAL ENGINEERING LABORATORY

Paper Code: BCE 313

L	T	P	Credits
0	0	2	1

1. Determination of natural moisture content of soil using oven drying method.

2. Determination of specific gravity of soil solids by pycnometer method.

3. Determination of in-situ density by core cutter method and sand replacement method.

4. Grain size analysis of sand and determination of uniformity coefficient (Cu) and coefficient of curvature (Cc).

5. Determination of Atterberg's limits.

6. Compaction test of different soils.

7. Determination of coefficient of permeability of soil using Constant-head and Falling-head method.

8. Unconfined Compression Strength Test for fine grained soil.

9. Direct Shear Test.

10. Triaxial compression shear test (UU).

11. Relative density test.

Reference:

Prakash Shamsher& Jain P.K., "Soil Testing Engineering Manual" Nem Chand & Brother, 1997.

DAV UNIVERSITY, JALANDHAR

Course Title: TRANSPORTATION ENGINEERING LABORATORY

Paper Code: BCE 315

L	T	P	Credits
0	0	2	1

List of Experiments

1. To determine the impact value of aggregates.

2. To determine the crushing value of aggregates.

3. To determine the abrasion value of aggregates by Los Angeles test

4. To determine flakiness and elongation index of aggregates (shape test).

5. To determine the water absorption and specific gravity of coarse aggregates

6. To determine grade of bitumen by penetration test

7. To determine the ability of bitumen to stretch by ductility test.

8. To Determine flash and fire point of bitumen.

9. To Determine softening point of bitumen by ring and ball apparatus.

10. To determine the bitumen content in a road sample by bitumen extraction test.

11. To determine marshal stability of bituminous mixture.

12. To determine the strength of subgrade soil by CBR Test.

References:

1. Highway material and pavement testing by Khanna & Justo

2. Laboratory manual in Highway Engineering by Ajay K Duggal

DAV UNIVERSITY, JALANDHAR

Course Title: ESTIMATION AND COSTING LABORATORY

Paper Code: BCE 317

L	T	P	Credits
0	0	2	1

List of Experiments

1. Estimation of building (long wall and short wall method)
2. Estimation of building (center line method)
3. Analysis of rate for concrete work
4. Analysis of rate for brick work
5. Analysis of rate for plaster work
6. Estimate quantity of reinforcement
7. Preparation for approximate estimate for road project
8. Estimating cost of building on plinth area method

DAV UNIVERSITY, JALANDHAR

SURVEY CAMP

Code: BCE 319

L	T	P	Credits
0	0	0	2

List of Experiments

Survey Camp of 4 weeks duration will be held immediately after IVth semester at a Hilly Terrain. The students are required to prepare the Topographical Map of the area by traditional method. Students should also be exposed to modern Survey Equipment and practices, like Total Station, Automatic Level, GPS etc.

DAV UNIVERSITY, JALANDHAR

SIXTH SEMESTER

Course Title: STRUCTURAL ENGINEERING-II

Paper Code: BCE 332

L	T	P	Credits
4	0	0	4

Course Objective: Aim of this paper is to familiarize the students with different methods used in analysis of indeterminate structures.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of various types of methods used to analyse indeterminate structures.

Part-A

Statically Indeterminate Beams and Frames: Introduction, types of supports-reaction components, external redundancy, statically indeterminate beams and frames, degree of redundancy

Fixed and Continuous Beams: Bending moment diagrams for fixed beams with different loadings, effect of sinking of supports, degree of fixity at supports, advantages and disadvantages of fixed beams, continuous beams, various cases of load and geometry of continuous beams.

Part-B

Classical Methods: Methods of consistent deformation; Theorem of three moments.

Slope Deflection Method: Fundamental equations, Applications to continuous beams and portal frames, side sway in portal frames.

Moment Distribution Method: Basic propositions, stiffness of a member, distribution theorem, carry-over theorem, relative stiffness, distribution factors, applications to continuous beams, portal frames with and without side sway, analysis of multi-storeyed frames, method of substitute frame.

Part-C

Rotation Contribution method: Basic concepts, rotation factor, and application to continuous beams, portal frames and multi-storeyed frames, story shear.

Approximate methods of Structural Analysis: Portal method, Cantilever Method, substitute Frame Method.

Part-D

Influence lines for indeterminate Structures: Muller Breslau Principle, Influence lines for shear force, bending moment and reactions in continuous beams, balanced cantilevers and rigid Frame.

Introduction to the finite element method for plane stress and plane strain.

REFERENCE:

1. Reddy C S "Basic Structural Analysis" Tata McGraw Hill, New Delhi, 2003.

2. Wang C K "Intermediate Structural Analysis" McGraw Hill, 1998.

3.Punmia B C "Theory of Structures" Luxmi Publications, New Delhi, 1996.

4. Sinha N C "Advanced Theory of Structures" Dhanpat Rai Publications, New Delhi, 2000.

5.Ramamrutham S and Narayan R "Theory of Structures" Dhanpat Rai & Sons, New Delhi, 1996.

6. Devdas Menon "Advanced Structural Analysis" Alpha Science International Publisher.

DAV UNIVERSITY, JALANDHAR

Course Title: WASTE WATER ENGINEERING

Paper Code: BCE 334

L	T	P	Credits
3	0	0	3

Course Objective: This course should provide the students with good understanding of various types of sewers and drainage types Learning Outcomes: After the completion of this course the participants would gain the knowledge of characteristics and types of sewage treatment of sewage.

Part-A

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

[6]

Design of Sewers: Quantity of sanitary and storm sewage flow, forms of sewers, conditions of flow in sewers, sewers of equivalent section, self-cleansing and limiting velocity, hydraulic formulas for flow of sewage in sewers and their design.   [6]

Part-B

Construction & Maintenance of Sewers: Sewer appurtenances, Materials for sewers, laying of sewers, joints in sewers, testing of sewers pipes, Maintenance operations and precaution before entering a sewer. Excavating Trenches.

[6]

House Drainage: Principles of house drainage, traps, Inspection chamber Indian and European type W. C., Flushing Cisterns soil waste and anti-siphonage pipes, plumbing systems.

[6]

Part-C

Characteristics & Testing of Sewage: Composition of sewage, sampling, physical & chemical analysis of sewerage, biological decomposition of sewage, kinetics of organic waste stabilization. Populating equivalent & relative stability.

[6]

Treatment of Sewage: Unit processes of waste water treatment, screens, grit chambers, detritus tank, skimming tank, grease traps, sedimentation, chemical treatment, aerobic

biological treatment, trickling filter (LRTF & HRTF), activated sludge processes, anaerobic treatment, sludge digestion [6]

Part-D Low cost waste water treatment units: Oxidations Ponds, Lagoons, ditches, septic tanks and imhoff tanks, theory, design, advantages & disadvantages. [6]

Sewage Disposal: Dilution, self-purification of streams, oxygen deficiency of polluted streams, oxygen sag serve, de-oxygenation and Reoxygenation. Dilution in seawater, disposal by land treatment. Effluent irrigation and sewage farming. Sickness and its preventive measures. [4]

REFERENCES:

1. Punmia BC & Jain A.; "Waste Water Engg. (Environmental Engg.-II)", Laxmi Publications, New Delhi. 2001.

2. Arcadio P. Sincero and Gregoria P. Sincero "Environmental Engg.- A design Approach", Prentice Hall of India, New Delhi. 2009.

3. Metcalf & Eddy ;"Waste Water Engineering - Treatment and Reuse" , TMH, New Delhi, 2013.

4. Howard S. Peavy Donald R. Rowe & George Tchobanoglous; "Environmental Engg." , McGraw Hill, International Edition, 1985.

5. Garg S K; "Environmental Engineering (Vol. II)", Khanna Publishers, Delhi, 1999

DAV UNIVERSITY, JALANDHAR

Course Title: DESIGN OF STEEL STRUCTURES

Paper Code: BCE 306

L	T	P	Credits
3	1	0	4

Course Objective: Aim of this paper is to familiarize the students with design of different steel structural elements like compression members and tension members.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of various types of steel elements like Tension member, compression member and flexural member.

Note: Use of IS-800 is allowed in the examination.

Part-A

Rivets and riveting, stresses in rivets, strength & failure of riveted joints. Advantages and disadvantages of bolted connections, stresses in bolts and design of bolted connections. Types of welds & welded joints, stresses in welds, design of welded joints.

Tension Members: Types of tension members, net & gross areas, permissible stresses. Design of members subjected to axial loads, combined bending moments & axial loads, lug angles.   [6]

Part -B

Compression Members: Failure modes of columns, end conditions & effective length of columns, various empirical formulae. IS code formula, General codal provisions for design of compression members, built up compression members, lacing and battening of compression members

Part-C

Column Bases and Foundations: Types of column bases, design of slab base, Gusseted base& grillage foundations.

Design of complete industrial building with design of: Design of Gantry Girders, Design of Column bracket.

Part-D

Design of plate Girders: Components of a plate girder, basic design assumptions, stiffeners inflate girders.

Roof Trusses: Types of roof trusses loads on roof trusses, calculation of forces due to combination of different loads. Design of members and joints.

REFERENCES:

1. Chandra R "Design of Steel Structures" Standard Publishing House, 1999.

2. Limit state design of steel structures: S K Duggal, McGraw, 2009.

3. Raghupathi M "Design of Steel Structures" Tata McGraw-Hill, New Delhi,1998.

4. Arya A S and Ajmani J L "Design of Steel Structures" Nem Chand Bros. Roorkee,2000.

5. Kazimi S M A and Jindal R S "Design of Steel Structures" Prentice Hall of India, New Delhi,1999.

6. Dayaratnam P "Design of Steel Structures" Wheeler Publishers, New Delhi,1999.

7. L.S Negi, "Design of steel structure", Tata McGraw-Hill, New Delhi, 200

DAV UNIVERSITY, JALANDHAR

Course Title: STRUCTURAL ENGINEERING LABORATORY

Paper Code: BCE 308

L	T	P	Credits
0	0	2	1

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. Deflection of a fixed beam and influence line for reactions.
5. Deflection studies for a continuous beam and influence line for reactions.
6. Study of behavior of columns and struts with different end conditions.
7. Experiment on three-hinged arch and experiment on two-hinged arch.
8. Deflection of a statically determinate pin jointed truss.
9. Forces in members of redundant frames.
10. Experiment on curved beams and unsymmetrical bending of a cantilever beam

DAV UNIVERSITY, JALANDHAR

Course Title: COMPUTER AIDED CIVIL ENGINEERING DRAWING LABORATORY

Paper Code: BCE 310

L	T	P	Credits
0	0	2	1

List of Drawing Experiments:

1. STARTING WITH ADVANCED SKETCHING Drawing Arcs Drawing Rectangles Drawing Ellipses Drawing Regular Polygon Drawing Polylines Placing Points Drawing Infinite Lines Writing a Single Line Text

2. Editing Sketches Moving the Sketched Objects Copying the Sketched Objects.

3. Creating Multiline Text Text Window Text Editor Tab Editing Text.

4. Dimension styles, multileader styles, and system variable

5. Plotting Drawings Using the Plot Dialog Box Page setup Area Printer/plotter Area

6. Buildings with load bearing walls including details of doors and windows.

DAV UNIVERSITY, JALANDHAR

Course Title: ENVIRONMENTAL ENGINEERING LABORATORY

Paper Code: BCE 312

L	T	P	Credits
0	0	2	1

List of Experiments

1. To measure the pH of given water/wastewater sample.

2. To measure optimum alum dose for coagulation

3. To find turbidity of given water/wastewater sample.

4. To find DO of given water/ wastewater sample.

5. To find BOD of given water/ wastewater sample.

6. To find COD of given water/ wastewater sample.

7. To find Hardness of given water sample.

8. To find Total solids, Total Dissolved solids and Total suspend solids of given water sample.

9. To measure the concentration of sulfates in given water/ wastewater sample.

10. To find chlorides in given water/wastewater sample.

11. To find acidity of given water sample.

12. To find alkalinity of given water sample.

13. To find MPN for bacteriological examination of water.

14. To find ambient noise level by using noise level meter.

15. To find RSPM, SPM, SO_x, NO_x in air.

References:

1. Water and wastewater analysis by CPCB

2. Standard methods for examination of water and wastewater (22nd edtion): APHA

3. Water and wastewater testing by R P Mathur.

DAV UNIVERSITY, JALANDHAR

SEVENTH SEMESTER

Course Title: CONSTRUCTION ENGINEERING AND MANAGEMENT

Paper Code: BCE 304

L	T	P	Credits
3	0	0	3

Course Objective: Study of Construction Management functions including Project Management, Cost Management, Time Management, Quality Management, Contract Administration, and Safety Management. Emphasis is put on the application of each function throughout the project phases.

Learning Outcomes: Upon completing the course students will be able to: Define and describe construction processes and various engineering roles involved**;**

Part-A

Types of Organizations-Inspection. control and enforcement -Quality Management Systems and method -Responsibilities and authorities In quality assurances and quality Control- Architects, engineers, contractors, and special consultants, Quality circle.

Part-B

Quality policy -Objectives and methods In Construction Industry –Consumers satisfaction, Economics-Time of Completion -Statistical tolerance -Taguchi's concept of quality -Codes and Standards -Documents -Contract and construction programming -Inspection procedures -Processes and products -Total QA I QC programme and cost implication

Part-C

Objectives -Regularity agent, owner, design, contract and construction oriented objectives, methods -Techniques and needs of QA/QC -Different aspects of quality - Appraisals, Factors Influencing construction quality

Part-D

Critical, major failure aspects and failure mode analysis -Stability methods and tools, optimum design –Reliability testing- reliability coefficient and reliability prediction - Selection of new materials -Influence of drawings detailing, specification, standardization -Bid preparation-Reliability Based Design.

REFERENCES:

1. James, J.O Brian, "Construction Inspection Handbook -Quality Assurance and:Quality Control", Van Nostrand, New York, 2009.

2. Kwaku, A., Tenah, Jose. M. Guevara, "Fundamentals of Construction Management and Organization", Reston Publishing Co., Inc., Virginia, 2005.

3. Juran Frank, J.M. and Gryna, F.M. "Quality Planning and Analysis", Tata McGraw Hill 2002.

4. Hutchins.G, ISO 9000, Viva Books. New Delhi 2003.

5. Clarkson H. Oglesby, "Productivity Improvement in Construction", McGraw-Hill, 2009.

   John L. Ashford, "The Management of Quality in Construction", E & F.N, Spon. New York, 2009.

DAV UNIVERSITY, JALANDHAR

Course Title: PROFESSIONAL COMMUNICATION

Paper Code: ENG 352

L	T	P	Credits
3	0	0	3

Course Objective: This paper, with a practice-oriented approach, aims to hone students' skills in the major dimensions of professional communication.
Learning Outcome: Students will show adequate understanding of professional communication skills.

Unit-1
- Professional Communication: Technical Communication and Business Communication
- Verbal and Non-Verbal Communication
- Barriers to Communication

(**N.B.** As the topics are largely theoretical, teacher shall introduce the topics in classroom in the form of lectures and encourage students to read on their own from the reference books. All these topics will be supported by examples from real life situations.)

Unit-2
- Reading Skills: Active & Passive Reading, Reading strategies, and Developing a Good Reading Speed
- Listening Skills: Types of Listening & Effective Listening Strategies
- Speaking Skills: Basics in Phonetics
- Writing Skills: Topic Sentence and Paragraph (descriptive, narrative, expository, and persuasive)

(**N.B.** Teacher will encourage students to apply the theoretical knowledge while practicing the four skills. Opportunities to practice the language skills should be created for students in the classroom.)

Unit-3
- Conversation: Formal and Informal
- Panel Discussion and Group Discussion
- Oral Presentation

(**N.B.** Teacher will give supporting examples from the industry and encourage students to do relevant exercises.)

Unit-4
- C.V. and Cover Letter
- Interview Skills
- Professional Letters
- Report Writing and Memo

(**N.B.** Teacher will give supporting examples from the industry and encourage students to do relevant exercises.)

Testing: The examinations will be conducted as per the norm of the university.

References:

1. Crystal, David. *The Gift of the Gab – How Eloquence Works*. Connecticut: Yale University, 2016. Print.

2. Gangal, J. K. *A Practical Course in Spoken English*. India: Phi Private Limited, 2012. Print.

3. Hosler, Mary Margaret. *English Made Easy*. Delhi: McGraw, 2013. Print.

4. Koneru, Aruna. *Professional Communication*. Delhi: McGraw, 2008. Print.

5. Mahanand, Anand. *English for Academic and Professional Skills*. Delhi: McGraw, 2013. Print.

6. Rani, D Sudha, TVS Reddy, D Ravi, and AS Jyotsna. *A Workbook on English Grammar and Composition*. Delhi: McGraw, 2016. Print.

7. Rizvi, M. Ashraf. *Effective Technical Communication*. Delhi: McGraw, 2018. Print.

8. Sharma, R.C. and Krishna Mohan. *Business Correspondence and Report Writing*. Delhi: McGraw, 2013. Print.

9. Suzana, Roopa. *A Practical Course in English Pronunciation*. Delhi: McGraw Hill Education, 2017. Print.

10. Tyagi, Kavita and Padma Misra. *Basic Technical Communication*. Delhi: PHI Learning, 2013. Print.

a. Websites

1. www.youtube.com (to watch standard videos)

2. http://learnenglish.britishcouncil.org/en

https://owl.english.purdue.edu/

DAV UNIVERSITY, JALANDHAR

Course Title: PROJECT -I

Paper Code: BCE 425

L	T	P	Credits
1	0	8	5

Students are required to work on project in any of the areas related to Civil Engineering. The students will work with his / her supervisor(s).

Any one from following specialization:

1. Environment Engineering
2. Geo-Tech. Engineering,
3. Transportation Eng.,
4. Hydraulic Structures
5. Structural Engineering

DAV UNIVERSITY, JALANDHAR

Course Title: INDUSTRIAL PRACTICAL TRAINING

Paper Code: BCE 427

L	T	P	Credits
0	0	0	2

Field training including software that enhances professional capability in civil engineering practice.

DAV UNIVERSITY, JALANDHAR

Course Title: SEMINAR

Paper Code: BCE 429

L	T	P	Credits
0	0	2	1

The seminar is based on research oriented topic. The evaluation is based upon the contents of topic and the presentation.

DAV UNIVERSITY, JALANDHAR

EIGHTH SEMESTER

Course Title: PROJECT -II

Paper Code: BCE 422

L	T	P	Credits
1	0	8	5

Course Objectives:

Students are required to work on project in any of the areas related to Civil Engineering. The students will work with his / her supervisor(s).

Any one from following specialization:

▪ Environment Engineering

▪ Geo-Tech. Engineering,

▪ Transportation Eng.,

▪ Hydraulic Structures

▪ Structural Engineering.

DAV UNIVERSITY, JALANDHAR

DEPARTMENTAL ELECTIVES

COURSE TITLE: : FOUNDATION ENGINEERING

COURSE CODE: BCE 314

L	T	P	Credits
3	0	0	3

Course objectives: This course provides the students with soil investigation and calculation of earth pressures and stresses under different types of foundations used in civil projects.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of determination of earth pressure and bearing capacity of shallow & deep foundations.

Part-A

Soil Investigation: Object of 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. Introduction to the essential features and application of the following types of samples-Open Drive samples, Stationery piston sampler, Rotary sampler, Geophysical exploration by seismic and resistivity methods. Bore Hole log for S.P.T.   [6]

Part-B

Earth Pressure: Terms and symbols used for a retaining wall. Movement of wall and the lateral **e**arth pressure. Rankine's and Coulomb's theory for lateral earth pressure. Culmann's graphical construction and Rebhan's graphical construction.

[6]

Stresses in soils: Introduction, stresses due to point load, line load, strip load, uniformly loaded circular area, rectangular loaded area. Influence factors, Isobars, Boussinesq's equation, Newmark's Influence Chart. Contact pressure under rigid and flexible area, computation of displacements from elastic theory.   [8]

Part-C

Shallow Foundation: Types of shallow foundations, definitions Terzaghi's analysis. Types of failures. Factors affecting bearing capacity. Skemption's equation. B. I. S. recommendations for shape, depth and inclination factors. Plate Load Test and Standard Penetration Test. Contact pressure distribution. Causes of settlement of structures comparison of immediate and consolidation settlement Calculation of settlement by plate load test.   [10]

Part-D

Pile Foundation: Necessity and uses of piles, classification of piles. Merits and demerits of different types based on composition. Types of pile driving hammers & their comparison. Effect of pile driving on adjacent ground. Use of Engineering news formula and Hiley's formula for determination of allowable load. Pile Load Test, separation of skin friction and point resistance using cyclic pile load test data. Related Numerical problems. Determination of point resistance and frictional resistance of a single pile by static formula. Piles in clay, safe load on a friction and point bearing pile. Pile in sand spacing of piles in a group, factors affecting capacity of a pile group. Efficiency of pile group bearing capacity of a pile group in clay. Settlement of pile groups in clay and sand Negative skin friction.

[8]

Caissons and wells: Major area of use of caissons Advantages and disadvantages of open box and pneumatic caissons. Essential part of a pneumatic caisson. Components of a well. Calculation of allowable bearing pressure. Conditions for stability of a well. Terzaghi's analysis for Lateral stability of a well, embedded in sand. Forces acting on a well foundation. Computation of scour depth, Tilts & Shifts.

[4]

REFERENCES:

1. David F. McCarthy, "Essentials of Soil Mechanics and Foundations: Basic Geotechnics".
2. Arora K. R. ;"Soil Mech. & Foundation Engg", Standard Publishers Distributors, 2005
3. Purshotama P. "Geotechnical Engineering", Pearson education, 2008.
4. Murthy V N S ;"Soil Mech. & Foundation Engg" , Mercel Dekker, 2003.
5. Das B.M. ;"Principle of Foundation Engineering" , CL Engineering publications, 2002.
6. RanjanGopal&Rao A.S.R. ; "Basic and applied Soil Mechanics", New Age International Publishers, 2008.
7. Muni Budhu "Soil Mech. & Foundations", John Wiley & Sons, 2008.
8. Gulhati and Datta ;"Geotechnical Engineering", Tata McGraw - Hill Education, 2009.
9. Varghese P.C ;"Foundation Engineering", PHI Learning 2005
10. Verma B. P.; "Problems in Soil mechanics and Foundation Engineering", Khanna Publication, 2007.
11. Bowles J.E; "Foundation Analysis and Design", Tata McGraw - Hill Education, 2010.

DAV UNIVERSITY, JALANDHAR

Course Tile: OFFSHORE ENGINEERING

Paper Code: BCE 316

L	T	P	Credits
3	0	0	3

Course Objective: To develop student's ability to understand practical aspects of construction of offshore structures, Deep sea operations. To understand the behavior and movement of rocks under dynamic changes

Learning Outcomes

 • The student will get understanding of deep water challenges in construction process
 • Have an exposure to various investigation techniques below sea water.

PART-A

Introduction to offshore structures, Construction stages for offshore structure, Principle of constructability, codes of practice,

PART-B

Offshore project management, offshore site investigations, geophysical methods; offshore sediment sampling, Construction in deep sea, Considerations and Phenomena for Deep-Sea Operations, Properties of Materials for the Deep Sea

PART-C

In-situ testing, geological aspects; development of design stratigraphies.

PART-D

Investigation below sea/river bed – methods and equipment – interpretation of offshore exploration, Instrumentation in soil engineering - strain gauges - resistance and inductance type - load cells, earth pressure cells - settlement and heave gauges - piezometers and slope indicators -inclinometer, Field visit, data and report preparation.

References:

1. Hvorsler M. "Subsurface exploration and sampling of soil for Civil Engg. purposes.
2. Hand book of Offshore Engineering – S.K. Chakrabarti, Elsevier Publications 2005. Vol-I & II

DAV UNIVERSITY, JALANDHAR

	L	T	P	Credits
Course Title: SOIL DYNAMICS	3	0	0	3
Paper Code: BCE 318				

Course Objective: This course provides the students with good understanding in dynamic nature of soil and theory of vibrations.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of dynamic earth pressure and dynamic bearing capacity of soil.

Part-A

Introduction, Nature of Dynamic Loads, Theory of Vibrations.

Part-B

Dynamic Earth pressure and dynamic bearing capacity of shallow foundations.

Part-C

Liquefaction of Soils Wave propagation in elastic, homogeneous and isotropic medium Determining dynamic soil parameters.

Part-D

Machine foundations for reciprocating, impact type and Rotary machines. Vibration isolation and screening.

REFERENCES:

1. Barken D D "Dynamics of bases and foundations" McGraw Hill, New York, 1962.

2. Saran S "Soil Dynamics and Machine Foundations", Galogotia Publications Pvt. Ltd,New Delhi, 1999.

3. Rao N D V K "Vibration Analysis and Foundation Dynamics" Wheeler Publishing Div. of A. H. Wheeler & Co. Ltd. New Delhi, 1998.

4. Krammer S "Geotechnical Earthquake Engineering" Pearson Education Pvt. Ltd. New Delhi, 2003.

5. Prakash S "Soil Dynamics" McGraw Hill Book Company, New York, 1981.

DAV UNIVERSITY, JALANDHAR

Course Title: BIOLOGICAL PROCESSES FOR CONTAMINATS REMOVAL

Paper Code: BCE 320

L	T	P	Credits
3	0	0	3

Course Objective: To introduce the various biological process in wastewater treatment

Learning Outcomes: - This course will aid students to understand about the design principles of various biological treatment processes of wastewater

Part A

Constituents of wastewaters- sources –significant parameter - fundamentals of process kinetics, zero order, first order, second order reactions, enzyme reactions – bio reactors- types-classification – design principles.

Part B

Design of wastewater treatment systems-primary, secondary and tertiary treatments. Evaluation of bio-kinetic parameters-activated sludge and its process – modifications, biological nitrification and denitrification

Part C

Aeration -fundamentals of gas transfer - attached growth biological treatment systems trickling filters-rotating biological contactors - activated bio filters

Part D

Anaerobic processes- process fundamentals-standard, high rate and hybrid reactors, anaerobic filters-expanded/fluidized bed reactors - up flow anaerobic sludge blanket reactors, expanded granular bed reactors- two stage / phase anaerobic reactors, sludge digestion, sludge disposal.

Reference Books:

1. Process Chemistry for Water and Wastewater treatment, Benefield, L.D, Judkins, J.F and Weand, B.L Prentice-Hall, Inc. Eaglewood Cliffs, New Jersey

2. Microbiology, Pelczar, M.J., Chan E.C.S. and Krieg, N.R. Tata McGraw Hill, New Delhi

3. Arceivala, S.J., Wastewater Treatment for Pollution Control, TMH, New Delhi, Second Edition, 2000.

4. Metcalf & Eddy, INC, 'Wastewater Engineering – Treatment and Reuse, Fourth Edition, Tata Mc Graw-Hill Publishing Company Limited, New Delhi, 2003.

L	T	P	Credits

DAV UNIVERSITY, JALANDHAR

Course Title: ENVIRONMENT LAWS AND POLICIES

3	0	0	3

Paper Code: BCE 322

Course Objective: To introduce the laws and policies both at the national and international level relating to environment

Learning Outcomes: -This course will help the Students to learn different skills needed for interpreting laws, policies and judicial decisions.

Part A

An introduction to the legal system; Constitution, Acts, Rules, Regulations; Indian Judiciary, Doctrine of precedents, judicial review, Writ petitions, Judicial activism.

Introduction to environmental laws in India; Constitutional provisions, Stockholm conference; Rio conference. General principles in Environmental law: Precautionary principle; Polluter pays principle; Sustainable development.

Part B

Wildlife and Biodiversity related laws: Evolution and Jurisprudence of forest and Wildlife laws; Colonial forest policies; Forest policies after independence Statutory framework on Forests, Wildlife and Biodiversity: Biological Diversity Act, 2002; Forest Rights Act, 2006.

Part C

Air, Water and Marine Laws: National Water Policy and some state policies Laws relating to prevention of pollution, access and management of water and institutional mechanism: Water Act, 1974; Water Cess Act, 1977, EPA, 1986. Pollution Control Boards Ground water and law Judicial remedies and procedures Marine laws of India; Coastal zone regulations. Legal framework on Air pollution: Air Act,1981; EPA, 1986.

Part D

Environment (Protection) Act 1986 Genesis of the Act – delegation of powers – Role of Central Government - EIA Notification – Sitting of Industries – Coastal Zone Regulation - Responsibilities of local bodies mitigation scheme etc., for Municipal Solid Waste Management - Responsibilities of Pollution Control Boards under Hazardous Waste rules and that of occupier, authorization – Biomedical waste rules – responsibilities of generators and role of Pollution Control Boards

Reference Books:

1. Birnie P. (2009) et al., International Law and the Environment, 3rd ed., Oxford.

2. Leelakrishnan P. (2006) Environmental Law Case Book, 2nd ed, Lexis Nexis, India.

3. Sands P. (2002) Principles of International Environmental Law, 2nd ed, Cambridge

DAV UNIVERSITY, JALANDHAR

Course Title: ENVIRONMENT IMPACT ASSESSMENT AND LIFE CYCLE ANALYSIS

Paper Code: BCE 324

L	T	P	Credits
3	0	0	3

Course objectives: To learn the concept and methodology of EIA and its documentation.

Learning Outcomes: - The overall aims of the course are for students to acquire understanding of the principles, process, and the necessary techniques for environmental impact assessment, mitigation and monitoring

Part A

Definition and history of environmental impact assessment, related law necessary for EIA, Objectives of Environmental Impact Assessment, Process for EIA, Components of EIA Reports

Part B

Tools for assessment of environmental impacts: checklist, networks, matrices, overlays, baseline study, scoping & scales, network overlays, index methods. Planning of environmental Factors.

Part C

Prediction and assessment of impacts on air and noise; soil and land use; water quantity and quality; biological: terrestrial ecology-forest and wildlife, coastal habitat; human use, quality of life, socio-economic. Consideration of human values in design & execution of projects.

Part D

Mitigation and Monitoring process for environmental impact assessment. Environmental Impact Analysis-laws & statuses in India, Elements of Environmental Auditing, Impact Analysis of hydropower, thermal power projects etc. Elements of LCA – Life Cycle Costing, Eco Labelling, Design for the Environment – International Environmental Standards – ISO 14001

Reference Books:

1. Canter L.W. Environmental Impact Assessment. McGraw-Hill, Inc.

2. Eccleston, H.C. 2000. Environmental Impact Statements. John Wiley & Sons, Inc.

3. Lee, N. and C. George (editors). 2000. Environmental Assessment in Developing and Transitional Countries. John Wiley & Sons Ltd.

4. Wathern P. 1995. Environmental Impact Assessment: Theory and Practice. BiddlesLtd, Guildford and King's Lynn.

5. Westmman W. E. 1985. Ecology, Impact Assessment, and Environmental Planning. John Wiley & Sons, Inc.

Course Title: INTELLIGENT TRANSPORTATION SYSTEMS

Paper Code: BCE 326

L	T	P	Credits
3	0	0	3

Course Objective: This course offers a good understanding in the modern urban transport, design specification and various telecommunication ideas use in modern transportation systems.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of various advance traffic management system and commercial vehicle operations.

Part-A

Introduction to Intelligent Transportation Systems (ITS) – Definition of ITS and Identification of ITS Objectives, Historical Background, Benefits of ITS, Data collection techniques -Detectors, Automatic Vehicle Location (AVL), Automatic Vehicle Identification (AVI), Geographic Information Systems (GIS), video data collection

Part-B

Telecommunications in ITS – Importance of telecommunications in the ITS system, Information Management, Traffic Management Centres (TMC). Vehicle – Road side communication – Vehicle Positioning System;

Part-C

ITS functional areas – Advanced Traffic Management Systems (ATMS), Advanced Traveller Information Systems (ATIS), Commercial Vehicle Operations (CVO), Advanced Vehicle Control Systems (AVCS), Advanced Public Transportation Systems (APTS), Advanced Rural Transportation Systems (ARTS); ITS User Needs and Services – Travel and Traffic management, Public Transportation Management, Electronic Payment, Commercial Vehicle Operations, Emergency Management

Part-D

Advanced Vehicle safety systems, Information Management; Automated Highway Systems - Vehicles in Platoons – Integration of Automated Highway Systems. ITS Programs in the World – Overview of ITS implementations in developed countries, ITS in developing countries.

REFERENCES:

1. Chowdhury, M. A., and Sadek, A., Fundamentals of Intelligent Transportation Systems Planning, Artech House 2003
2 Sussman, J. M., Perspectives on Intelligent Transportation Systems (ITS), Springer

3 Turban, E., and Aronson, J. E., Decision Support Systems and Intelligent Systems, 5th Edition, Prentice Hall

DAV UNIVERSITY, JALANDHAR

Course Title: RAILWAY AND AIRPORT ENGINEERING

Paper Code: BCE 328

L	T	P	Credits
3	0	0	3

Part-A

Railway Engineering: Permanent way, gauges in railway tracks, typical railway track cross-section, coning of wheels, Function of rails, requirement of rails, types of rail sections – comparison of rail types, length of rail, rail wear, rail failures, creep of rails, rail fixtures and fastenings–Fish plates, spikes, bolts, chairs, keys, bearing plates.

Part-B

Sleepers: Functions and requirements of sleepers, classification of sleepers, timber, metal and concrete sleeper, comparison of different types of sleepers, spacing of sleepers and sleeper density.

Ballast: Function and requirements of ballast, types, comparison of ballast materials. Geometric design: alignment, horizontal curves, super elevation, equilibrium, cant and cant deficiency, length of transition curve, gradients and grade compensation. Stations and yards, and their classification

Part-C

Points and crossings: Introduction, necessity of points and crossings, turnouts, points and crossings, design of a simple turnout.

Track Recording: Equipment, Mechanized Maintenance, High Speed Trans, Present & Future. Signaling and interlocking: objects of signaling, engineering principle of signaling, classification of signaling, control of train movements, interlocking definition, necessity and function of interlocking, methods of interlocking, mechanical devices for inter locking. Traction and tractive resistance, stresses in track, modernization of railway track.

Part-D

Airport Engineering: Airport site selection, various surveys for site selection. Classifications of obstructions, Imaginary surfaces, Approach zone and turning zone. Runway orientation, basic runway length, corrections for elevation, temperature & gradient, airport classification.

Runway & Taxiway Design: Geometric design of runway, airport capacity, factors controlling taxiway layout, geometric design standards for taxiway holding aprons, Wind-rose diagram, Structural design of runway pavements LCN/PCN method of rigid pavement design, Pavement Evaluation for runway & taxiway, design of overlay, Terminal area, building area, parking area, apron, hanger typical airport layouts

DAV UNIVERSITY, JALANDHAR

References:

1. Rangawal S C "Railway Engineering" Charotar Publishers, Anand, 2002.

2. Arora S P and Saxena (2001), "Railway Engineering", DhanpatRai Publishers, New Delhi, 2001

3. Khanna, Arora and Jain "Airport Planning & Design" Nem Chand & Bros., Roorkee 2002

4. Horren Jeff, "Airport, Planning & Design" Chapman Hall, London, 2000.

5. Srinivasan R and Rangwala S C "Harbours" Charotar Publishers, Anand, 1999

DAV UNIVERSITY, JALANDHAR

Course Title: TRANSPORTATION ECONOMICS

Paper Code: BCE 330

L	T	P	Credits
3	0	0	3

PART-A

Introductory Concepts in Transportation Decision Making: Overall transportation project development, budgeting, financial planning, the process of transportation project development, models associated with transportation impact evaluation;

PART -B

Transportation costs - Classification of transportation costs, transportation agency costs, transportation user costs, general structure and behavior of cost functions and road pricing. Estimating Transportation Demand and Supply - supply equilibration, dynamics of transportation demand and supply, elasticity of travel demand and supply, classification of elasticity

Part-C

Vehicle operating costs: Fuel costs - Maintenance and spares, Depreciation - Crew costs - Value of travel time savings - Accident costs. Economics of traffic congestion - Pricing policy; Economic analysis of projects - Methods of evaluation - Cost-benefit ratio, first year rate of return, net present value, and internal-rate of return methods;

Part-D

Indirect costs and benefits of transport projects; Financing of road projects - methods – Private Public Partnership (PPP) - Toll collection - Economic viability of Design-Build-Operate-Transfer Schemes – Risk Analysis – Value for Money analysis - Case Studies.

References:

1. Khanna, Arora and Jain "Airport Planning & Design" Nem Chand & Bros., Roorkee 2002 Horren Jeff, "Airport, Planning & Design" Chapman Hall, London, 2000

DAV UNIVERSITY, JALANDHAR

Course Title: INDUSTRIAL STRUCTURES

Paper Code: BCE 403

L	T	P	Credits
3	0	0	3

Course Objective: This course offers a good understanding in the design of various industrial buildings like Tanks, Chimneys,

Learning Outcomes: After the completion of this course the participants would gain the knowledge about forces acting on different structures, types of frames, its bracing and earthquake resistant design, various types framed as well as other structures.

Part-A

Industrial steel building frames: Types of frames, bracing, crane girders and columns, workshop sheds, trussed bents, Pressed steel tank, circular tank; Transmission and Communication towers: Types and configuration,

Part-B

Analysis and design; Chimneys; Loads and stresses in chimney shaft, Earthquake and wind effect, Stresses due to temperature difference, combined effect of loads and temperature,

Part-C

Design of Silos and Bunkers; Jassen's theory, Airy's theory, Shallow and deep bins, Steel Stacks; introduction, force acting on a steel stack, design consideration, design example of Stacks;

Part-D

Concrete Shell Structures: Folded plate and cylindrical shell structures; Introduction structural behavior of long and short shells, beam and arch action, Machine foundations; introduction, machine vibration, structural design of foundation to rotary machines.

REFERENCE:

1. Planning of industrial structures by C.W. Dunham.

2. Structural Engineers Handbook.

3. Design of steel structures-S.K.Duggal

DAV UNIVERSITY, JALANDHAR

Course Title: MODELLING AND ANALYSIS OF UNCERTAINTY

Paper Code: BCE 405

L	T	P	Credits
3	0	0	3

Course Objective: This course is aimed at introducing students, typically from an engineering background to modelling and propagating uncertainty in a probabilistic framework.

Learning Outcomes: After the completion of this course the participants will be able to model various uncertain parameters in a natural or engineering system, especially in a probabilistic way.

Part-A

Deterministic vs. nondeterministic perspectives. Sources of uncertainty. Epistemic vs. aleatoric uncertainty. Data driven vs. physics driven uncertainty modelling. Different approaches such as probabilistic, interval, fuzzy

Part-B

Introductory probability and statistics --- point estimation, hypothesis testing, time series. Modelling: connecting data to the probabilistic models. Discretization of random fields. Tools for uncertainty propagation. Computational aspects of uncertainty propagation.

Part-C

Appreciation and understanding of uncertainties and the conditions under which they occur, within the context of the engineering problem solving pedagogy of measurements, models, validation, and analysis.

Part-D

Problems and concerns in obtaining measurements; tabular and graphical organization of data to minimize misinformation and maximize information; and development and evaluation of models.

REFERENCE

1. Uncertainty Modelling and Analysis in Engineering and the Sciences Bilal M Ayyubb and George j Klir, Chapman & Hall

DAV UNIVERSITY, JALANDHAR

Course Title: EARTHQUAKE ENGINEERING

Paper Code: BCE 407

L	T	P	Credits
3	0	0	3

Course Objective: This course should provide the students with good understanding of various types of behaviour of multi-story buildings under earthquake vibrations.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of load analysis of buildings and behaviour of building under earthquake conditions.

Part-A

Philosophy of earthquake resistant design: Ductility, Redundancy & Over strength, Damping, Review of damage in past earthquakes. Criteria for earthquake resistant design, principles of reliable seismic behaviour, structural forms for earthquake resistance, earthquake forces versus other forces.

Part-B

Lateral Load Analysis: Idealization of structures and selection of analysis, equivalent lateral force concepts, response spectrum analysis, seismic forces as per IS: 1893 – 1984 and IS: 1893 – 2000.Introduction to provisions of IS 1893-2002 Part-I for buildings. Estimation of lateral forces due to earthquake.

Part-C

Seismic behaviour of Structures: Characteristics of Concrete structures, Steel and masonry structures, Material properties, influence of bond and anchorage and confinement of concrete.Codal Provisions.

Introduction to provisions of IS 4326.

Introduction to provision of IS 13920

Part- D

Design detailing of Concrete Structures: Seismic design concepts and detailing of reinforced concrete and masonry buildings (IS 13920; IS 13 827: IS 13828; IS 4326) and flexural strength and ductility of RC members, shear behaviour of RC members, beam column joints in moment resisting frames..

REFERENCES-

1. Paz M "Structural Dynamics – Theory and Computation" CBS Publishers and Distributors, New Delhi, 2003.

2. Chopra A K "Structural Dynamics" John Wiley & Sons, New Delhi, 2002.

3. Dowrick D J "Earthquake Resistant Design for Engineers and Architects" John Wiley & Sons, New York, 2000.

4. Paulay and Priestley "Seismic Design of Reinforced Concrete and Masonry Buildings" John Wiley and sons, New York, 1992.

5. Rao.S.S.,"Mechanical Vibrations" Pearson Education Publishers, 2004.

6. Aggarwal, P., ShriKhande, M., Earthquake Resistant Design of Structures, McGraw Hills (2003).

DAV UNIVERSITY, JALANDHAR

Course Title: STRUCTURAL DYNAMICS

Paper Code: BCE 409

L	T	P	Credits
3	0	0	3

Course Objective: This course should provide the students with good understanding of various types of behaviour of vibrations and to be able to perform the dynamic analysis of SDOF and MDOF systems

Learning Outcomes: After the completion of this course the participants would understand basic concepts related to dynamic analysis of structures, perform analysis of SDOF and MDOF, and perform dynamic analysis of various structures.

Part-A

Theory of Vibrations: Difference between Static and Dynamic Loading – Degree of freedom, Idealization of structures, Idealization of structure for single degree of freedom, Effect of Damping – free and forced vibrations of damped and undamped structures- Response to Periodic and Harmonic forces.

Part-B

Undamped free vibrations of single degree of freedom systems: Introduction, definitions, characteristics of a dynamic problem, degrees of freedom, Newton's law of motion, De Alembert's Principal, free body diagram, derivations of differential equation of motion, solution of differential equation of motion, equivalent stiffness of spring combinations, springs in series, springs in parallel.

Part-C

Damped free vibrations of single degree of freedom systems: Introduction, types of damping, free vibrations with viscous damping, over-damped, critically- damped and under- damped systems, logarithmic decrement, structural damping.

Part – D

Response of structures to earthquake: Effect of earthquake on different type of structures –Behaviour of Reinforced Concrete structures and Steel structures under different type of loadings.

REFERENCES-

1. Paz M "Structural Dynamics – Theory and Computation" CBS Publishers and Distributors, New Delhi, 2003.

2. Chopra A K "Structural Dynamics" John Wiley & Sons, New Delhi, 2002.

3. Paulay and Priestley "Seismic Design of Reinforced Concrete and Masonry Buildings" John Wiley and sons, New York, 1992.

4. A.K. Chopra, Earthquake Engineering Primer

5. Timoshenko, S. P., Vibration Problems in Engineering, D. Van Nostrand Company Inc. (2007).

DAV UNIVERSITY, JALANDHAR

Course Title: RELAIBILITY ANALYSIS OF STRUCTURE

Paper Code: BCE 411

L	T	P	Credits
3	0	0	3

Course Objective Understand use of general concepts of statistics for probabilistic analysis.

• Understand the basic concepts related to reliability analysis of structures.

 • Design the structures for various reliability indices

 • The ability to identify the structural systems for various combinations of gravity and horizontal loading considering their functional use and heights. To analyze the behavior and drift capacities of various high rise structural forms.

Learning Outcomes:

• Understand behavior of common structures under gravity and lateral loading

• Understand the drift capabilities of different structural forms

PART-A

Concepts of Structural Safety: General, Design methods.   Basic Statistics: Introduction, Data reduction, Histograms, Sample correlation. Probability Theory: Introduction, Random events, Random variables, Functions of random variables, Moments and expectation, Common probability distribution, External distribution.

PART-B

 Resistance Distributions and Parameters: Introduction, Statistics of properties of concrete, Statistics of properties of steel, Statistics of strength of bricks and mortar, Dimensional variations, Characterization of variables, Allowable stresses based on specified reliability. Probabilistic Analysis of Loads: Gravity loads, Wind load.

PART-C

Basic Structural Reliability: Introduction, Computation of structural reliability. Monte Carlo Study of Structural Safety: General, Monte Carlo method, Applications.   Level 2 Reliability Methods: Introduction, Basic variables and failure surface, First-order second moment methods (FOSM).

PART-D

Reliability Based Design: Introduction, Determination of partial safety factors, Safety checking formats, Development of reliability based design criteria, Optimal safety factors, Summary of results of study for Indian standard – RCC design.   Reliability of Structural Systems: Preliminary concepts as applied to simple structures.

REFERENCES:

1. Ranganatham, R. "Structural Reliability Analysis and Design"

2. Melchers, R.E. "Structural Reliability"

3. Ditlevsen, O. and Madsen, H.O. , Structural Reliability methods, John Wiley & Sons (2007). 4. Madsen, H.O., Krenk, S. and Lind, N.C, Methods of structural safety, John Wiley & Sons (1999).

DAV UNIVERSITY, JALANDHAR

Course Title: PRE-STRESSED CONCRETE

Paper Code: BCE 413

L	T	P	Credits
3	0	0	3

Course Objective: This course should provide the students with good understanding of manufacturing of precast concrete structures.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of design for different pre-stresses and precast members like beams, slabs.

Note: IS 1343 is permitted in examination.

Part-A

Materials for pre-stressed concrete and pre-stressing systems: High strength concrete and high tensile steel – tensioning devices – pre-tensioning systems – post tensioning systems.

Part-B

Analysis of prestress and bending stresses: Analysis of prestress – resultant stresses at a sector – pressure line or thrust line and internal resisting couple – concept of load balancing – losses of prestress – deflection of beams.

Part-C

Strength of prestressed 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.

Part-D

Design of prestressed concrete beams and slabs: Transfer of prestress in pre tensioned and post tensioned members – design of anchorage zone reinforcement – design of simple beams – cable profiles – design of slabs.

REFERENCES:

1. N. Krishna Raju, "Prestressed concrete", Tata McGraw Hill, 2005.

2. T.Y. Lin, Ned H. Burns, "Design of Prestressed Concrete Structures", John Wiley & Sons, 2001.

3. P. Dayaratnam, "Prestressed Concrete", Oxford & IBH, 2003.

4. R. Rajagopalan, "Prestressed Concrete".

5. IS 1343 2012 Code of Practice for Prestressed Concrete

DAV UNIVERSITY, JALANDHAR

Course Title: DESIGN OF STRUCTURAL SYSTEM

Paper Code: BCE 415

L	T	P	Credits
3	0	0	3

Course Objective: This course provides a better understanding of the Structural Design, Design requirements

Learning Outcomes: After the completion of this course the participants would gain the knowledge of Awareness among the components of structure design.

Part-A

Planning and Design Process of structure, Materials and Structural Design Criteria

Part-B

Loads and Design Safetyof functional requirements, selection of structural scheme

Part-C

Formulation of design criteria, preliminary and computer- aided proportioning

Part-D

Analysis of response, cost, and value

REFERENCES

1. Galambos, T.V., Lin, F.J., Johnston, B.G., *Basic Steel Design with LRFD*, Prentice Hall, 1996

2. Segui, W. T., *LRFD Steel Design*, 2nd Ed., PWS Publishing, Boston.

3. Salmon, C.G. and Johnson, J.E., *Steel Structures: Design and Behavior*, 3rd Edition, Harper & Row, Publishers, New York, 1990.

4. MacGregor, J. G., *Reinforced Concrete: Mechanics and Design*, 3rd Edition, Prentice Hall, New Jersey, 1997.

5. Nawy, E. G., *Reinforced Concrete: A Fundamental Approach*, 5th Edition, Prentice Hall, New Jersey.

6. Wang C-K. and Salmon, C. G., *Reinforced Concrete Design*, 6th Edition, Addison Wesley, New York.

7. Nawy, E. G. *Prestressed Concrete: A Fundamental Approach*, Prentice Hall, NJ, (2003).

8. PCI, *PCI Design Handbook: Precast and Prestressed Concrete*, Precast/Prestressed Concrete Institute, IL, 1992.

9. Smith, J. C., *Structural Analysis*, Harpor and Row, Publishers, New York.

10. W. McGuire, R. H. Gallagher and R. D. Ziemian. " Matrix Structural Analysis", 2nd Edition, John Wiley and Sons, 2000.

11. ACI, *Building Code Requirements for Structural Concrete (ACI 318-99) and Commentary (ACI 318R-99)*, American Concrete Institute, 1999.

12. AISC, *Load and Resistance Factor Design - Manual for Steel Construction*, American Institute of Steel Construction.

DAV UNIVERSITY, JALANDHAR

Course Title: MASONARY STRUCTURE

Paper Code: BCE 417

L	T	P	Credits
3	0	0	3

Course Objective: Covers masonry unit type and grades of mortar types, reinforcing and connectors. Design of beams, columns, pilasters, and walls. Structural behavior and construction practices. Includes plain and reinforced masonry. Building codes, Masonry Standard Joint Committee (MSJC) specifications

PART A

Masonry Units, Materials, types and masonry construction: Bricks, Stone and Block masonry units- strength, modulus of elasticity and water absorption of masonry materials – classification and properties of mortars. Defects and Errors in masonry construction – cracks in masonry, types, reason for cracking, methods of avoiding cracks.

Strength and Stability: Strength and stability of axially loaded masonry walls, effect of unit strength, mortar strength, joint thickness, rate of absorption, effect of curing, effect of ageing, workmanship. Compressive strength formulae based on elastic theory and empirical formulae.

PART B

Permissible stresses: Types of walls, permissible compressive stress, stress reduction and shape modification factors, increase in permissible stresses for eccentric vertical and lateral load, permissible tensile stress and shear stresses.

Design Considerations: Effective height of walls and columns, openings in walls, effective length, effective thickness, slenderness ratio, eccentricity, load dispersion, arching action in lintels. Problems on design considerations for solid walls, cavity walls, wall with pillars

PART C

Load considerations and design of Masonry subjected to axial loads: Design criteria, design examples of walls under UDL, solid walls, cavity walls, solid wall supported at the ends by cross wall, walls with piers.

PART D

Design of walls subjected to concentrated axial loads: Solid walls, cavity walls, solid wall supported at the ends by cross wall, walls with piers, design of wall with openings.

Design of walls subjected to eccentric loads: Design criteria – stress distribution under eccentric loads – problems on eccentrically loaded solid walls, cavity walls, walls with piers.

REFERENCES:

1. Masonry Designers' Guide, 3rd Edition, Edited by John H. Matthys, The Masonry Society, 2001, Boulder, CO.

2. Building Code Requirements for Masonry Structures, American Concrete Institute, 2002, Farmington Hills, MI.

3. Minimum Design Loads for Buildings and Other Structures (ASCE 7-10), American Society of Civil Engineers, New York, 2010

4. Masonry Structural Design, R. E. Klingner, McGraw-Hill, 2010.

5. Masonry Structures - Behavior and Design 3rd Edition, R. G. Drysdale and A. A.• Hamid, The Masonry Society, Boulder, Colorado, 2008.

DAV UNIVERSITY, JALANDHAR

Course Title: SUSTAINABLE CONSTRUCTION METHODS

Paper Code: BCE 419

L	T	P	Credits
3	0	0	3

Course Objective: Sustainable construction materials and methodologies related to commercial construction, including LEED/Green certifications. Demonstrate an ability to evaluate and/or design whole or parts of projects, taking into account not only the financial and economic issues but also the social and environmental impacts affecting the sustainability of infrastructure

PART A

Principles of Sustainability Introduction to Sustainability Major Environmental Challenges Global Warming Introduction to Green Buildings; LEED Greening Our Campus Sustainable Urban Development Sustainable Sites - LEED Credits.

PART B

Energy Conservation Energy Conservation in Buildings HVAC Systems Energy and Atmosphere - LEED Credits eQuest Energy Simulations Conducting an Energy Audit Fossil Fuels vs. Renewable Energy

PART C

Green Materials and Resources - LEED Credits Building Deconstruction, C&D Recycling Indoor Environmental Quality – Basic IEQ - LEED Credits Building Commissioning

PART D

Economics of Green Construction Economics of Green Buildings LCC/LCA Green Home Construction Evaluate feasibility of alternative products and solutions based on life-cycle analysis (LCA) methods

REFERENCES

1. Main text: C.J. Kibert (2008) "Sustainable Construction: Green Building Design and Delivery", 2nd Ed., John Wiley, Hoboken, New Jersey
2. Complementary text: G.T. Miller Jr. (2004) "Living in the Environment Principles, Connections, and Solutions", 14th Ed., Brooks Cole, Pacific Grove, California
3. High Performance Buildings, ASHRAE publication, http://www.HPBmagazine.com

DAV UNIVERSITY, JALANDHAR

Course Title: CONSTRUCTION EQUIPMENT AND AUTOMATION

Paper Code: BCE 421

L	T	P	Credits
3	0	0	3

Course objectives: -To enlighten students about different new techniques available around the globe

Learning Outcomes: - Students will learn different characteristics of different construction equipmen**t.**

Part A

Introduction to Conventional construction methods Vs Mechanized methods and advantages of latter

Part B

Different equipment used in construction: - Equipment for Earthmoving, Dewatering; Concrete mixing, transporting & placing; plastering machines; Prestressing jacks and grouting equipment.

Part C

Heavy Machinery: - Cranes, Hoists and other equipment for lifting; Equipment for transportation of materials. Equipment Productivities;

Part D

Aerial and Satellite Surveying: GIS and GPS in Construction; use of Drones for spread out sites; Use of robots for repetitive activities

Reference Books:

1.Construction Planning and Equipment - R.L.Peurifoy - Tata McGraw Hill, New Delhi

2. Construction Equipment & Planning and Application. - Mahesh VermaArtec Publication.

3. GPS satellite surveying- Alfred Leick,.Wiley

DAV UNIVERSITY, JALANDHAR

Course Title: CONSTRUCTION COST ANALYSIS

Paper Code: BCE 423

L	T	P	Credits
3	0	0	3

Course Objectives: To bring about a understanding of costing of construction projects. Estimating construction costs using different methods is a first step in financial costing and cost control. In addition to conventional cost it is also necessary to determine costs in terms of components like materials, labours, plant and equipment etc. at different stages of construction.

Learning Outcomes: Students will develop skills to control cost and cost monitoring and will also well familiarized with the techniques of revision of costs, cost forecasting and cost control.

PART-A

Introduction to the application of scientific principles to costs and estimates of costs in construction engineering, concepts and statistical measurements of the factors involved in construction cost.

PART-B

Concepts and statistical measurements of the factors involved in direct costs, general overhead costs, cost markups and profits.

PART-C

Determining the funds required for a construction job; preparing cash flow statements; cash inflow and outflow during contract period; project expectations.

PART-D

The fundamentals of cost recording for construction cost accounts and cost controls. Precautions in custody of cash, imprest account and temporary advance; maintenance of temporary advance; and advance account; different types of payment, first, running, advance and final payments.

REFERENCES:

1. Mueller, F.W. Integrated cost and schedule control for construction projects.

2. Gobourne: Cost control in the construction industry.

3. Schedule of rates, specification manuals etc. from PWD

4. Chris Hendrickson and Tung Au: Project Management for Construction

5. Datta : Material Management Procedures, Text and Cases, 2e Prentice Hall

6. Gopalakrishnan ,P,Sundaresan , M: Material Management - an Integrated Approach, Prentice Hall.

	L	T	P	Credits
Course Title: ECOLOGICAL ENGINEERING **Paper Code: BCE 402**	3	0	0	3

Course Objective: To understand the concept and application of ecology in Engineering

Learning Outcomes: Students will learn the basics of ecological systems and introduce them to the concept of ecological engineering

Part A

Ecology: Definition and scope of ecology, types of ecosystem, abiotic and biotic environments, biotic – abiotic interactions, Population ecology, Community structure, two-species interactions, food webs, succession, disturbance and succession, negative and positive feedbacks in succession. Energy flows, nutrient cycling

Part B

Classification of eco technology – Principles and components of Systems and Modeling – Structural and functional interactions in environmental systems – Human modifications of environmental systems.

Part C

Ecological Engineering Processes: Self-organizing processes – Multiple seeded microcosms – Interface coupling in ecological systems. Concepts of energy – Adapting ecological engineering systems to potentially catastrophic events – Agro ecosystems – Determination of sustainable loading of ecosystems

Part D

Principles and operation of soil infiltration systems – wetlands and ponds – source separation systems – aqua cultural systems – detritus based treatment for solid wastes – Applications of ecological engineering marine systems.

REFERENCES:

1.Mitsch, J.W & Jorgensen, S.E., Ecological Engineering – An Introduction to Eco technology, John Wiley & Sons, New York, 1989.

2. White, I.D, Mottershed, D.N and Harrison, S.L., Environmental Systems – An Introductory Text, Chapman Hall, London, 1994

3. Basic Ecology, E .P. Odum, H.S Publication.

4. Energy and Ecological Modelling, W.J Mitch, R. W. Bosserman and Klopatek JN, Elsevier Publication.

DAV UNIVERSITY, JALANDHAR

Course Title: AIR AND NOISE POLLUTION CONTROL

Paper Code: BCE 404

L	T	P	Credits
3	0	0	3

Course Objective: To familiarize the students with the basics of air and noise pollution including atmospheric physics and chemistry.

Learning Outcomes: - This Course will help the students to apply these concepts to Air and noise Pollution Control and Environmental Management

Part A

Introduction to air pollution– environmental engineering significance – global issues – units, Effects of air pollution– visibility – basic calculations Atmospheric composition – temperature profile

Part B

Meteorology- lapse rate – stability conditions, Maximum mixing depth– plume behavior, Dispersion– modeling – engineering decisions – maxi ground level concentration - effective stack height.

Part C

Air pollution sampling– Stack monitoring, control measures, Indoor air quality models, Air pollution control of stationary & mobile sources.

Part D

Introduction, Rating Systems, Sources & Criteria, Noise prediction and Control. Noise pollution in India, Factors Affecting Noise Pollution, Road Traffic Noise Monitoring, Ambient Noise Monitoring, Occupational Noise Monitoring, traffic noise data analysis, health effects of noise

REFERENCES:

1. Air Pollution, Perkins H C ,McGraw Hill Book Company, New York
2. Environmental Pollution Control Engineering, Rao, C S, New Age Pub. New Delhi,2nded
3. S.K. Agarwal (2009). Noise Pollution. ISBN No. 817648833X
4. S.P. Singal .Noise Pollution and Control Strategy. ISBN No. 81-7319-645-1.

DAV UNIVERSITY, JALANDHAR

Course Title: SOLID WASTE MANAGEMENT

Paper Code: BCE 406

L	T	P	Credits
3	0	0	3

Course Objective: To educate the students on the principals involved in the management of municipal solid waste from source identification up to disposal.

Learning Outcomes: - Students will learn how to handle solid waste efficiently without harming environment

Part A

Introduction to solid waste: Types and Sources of solid and hazardous wastes - Need for solid and hazardous waste management, Legislations on management and handling of municipal solid wastes, hazardous wastes, and biomedical wastes, Elements of integrated waste management.

Part B

Waste characterization and analysis Waste generation rates, Composition, Hazardous Characteristics, waste sampling, Source reduction of wastes, Recycling and reuse.

Management of solid waste Handling and segregation of wastes at source, storage and collection of municipal solid wastes, Analysis of Collection systems, need for transfer and transport – Transfer stations - labeling and handling of hazardous wastes.

Part C

Waste processing – processing technologies, biological and chemical conversion technologies, Composting, thermal conversion technologies, energy recovery, incineration, solidification and stabilization of hazardous wastes, treatment of biomedical wastes.

Part D

Disposal on landfill Disposal in landfills - site selection, design and operation of sanitary landfills, secure landfills and landfill bioreactors, leachate and landfill gas management, landfill closure and environmental monitoring, landfill remediation.

REFERENCES:

1. George Tchobanoglous, Hilary Theisen, Samuel A. Viquel, "Integrated Solid Waste Management: Engineering, Principles & Management issues", McGraw-Hill- International Edition.

2. CPHEEO Manual on Municipal Solid Waste Management.

3. Michael D. LaGrea, Phillip L. Buckingham, Jeffrey C. Evans, "Hazardous Waste Management and Environmental Resource Management", McGraw-Hill- International Edition.

4. Howard S. Peavy, Donald R. Rowe, George Tchobanoglous, "Environmental Engineering", McGraw-Hill- International Edition.

5. Mackenzige L. Davis, David A. Cornwell, "Introduction to environmental engineering", McGraw-Hill- International Edition

DAV UNIVERSITY, JALANDHAR

Course Title: DESIGN OF CONCRETE STRUCTURE-II

Paper Code: BCE 408

L	T	P	Credits
3	0	0	3

Course Objective: To develop an understanding of and appreciation for basic concepts in the behavior and design of reinforced concrete systems and elements. To introduce the basic concepts and steps for reinforced concrete sectional design mainly in accordance with ultimate strength design.

Learning Outcomes: Able to understand the general mechanical behavior of reinforced concrete in accordance with IS 456:2000. Able to analyze and design with detailing for stair case, water tanks, curved beam, footings etc. and able to analyze transfer and development length of concrete reinforcement.

Note: Indian Codes IS 456-2000 & SP16 of Practice and Design handbooks are permitted in examination.

Part-A

Redistribution of moments: Introduction; limit analysis applied to RC beam fixed at ends, Moment curvature relationship, Continuous beam and one-way continuous slab

Design of staircases: - Introduction, Types of stair case, Design considerations, design of Dog-legged and open- well staircase.

Part-B

RCC Footings - Theory and Design: Isolated Footing (Square, Rectangular), Combined Footing (Rectangular, Trapezoidal, Strap), Raft Footing

Part-C

Beams curved in plan: Design of semi-circular beams supported on three supports. Design of circular beam supported on symmetrically placed columns.

Building Frames: Load patterns for critical conditions, design of continuous beams, slabs, columns, detailing of reinforcement in the same. (Use of SP16)

Part-D

Retaining walls: Cantilever type retaining wall, Counter fort type retaining wall.

Water tank and staging; Introduction, Design criteria, Design of rectangular and

circular water tank, Design of Intze tank, Staging for overhead tank;

REFERENCES:

1. Pillai&Menon ;"Reinforced Concrete Design";; Tata McGraw-Hill Education, 2006.

2. Varghese P C "Limit state Design of Reinforced Concrete" Prentice-Hall of India Pvt. Ltd. 2009.

3. Mallick and Rangasamy ;"Reinforced Cement Concrete" Oxford-IBH, 2010.

4. Syal I.C "Behaviour, Analysis and Design of Reinforced Concrete Structural Elements" S. Chand & company, New Delhi, 2003.

5. James, G. Mac Gregor, "Reinforced Concrete- Mechanics and Design", Prentice Hall, N.J., New York, 1997

6. Design of Reinforced Concrete Structure by P Dayaratnam P Sarah

7. Design of Reinforced Concrete by Jack C. McCormac, Russell H. Brown wiley publications.

8. Reinforced concrete design by Abi O. Aghayere

DAV UNIVERSITY, JALANDHAR

Course Title: STRUCTURAL ANALYSIS BY MATRIX METHODS

Paper Code: BCE 410

L	T	P	Credits
3	0	0	3

Course Objective: This course should provide the students with good understanding of matrix methods used to analyse indeterminate structures.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of Flexibility and stiffness methods of structural analysis.

Part-A

Review of Determinants and Matrices: Introduction, summation convention, determinants and their properties, Cramer's rule, matrices and their properties, solution of non-homogeneous equations by matrix methods, differentiation and integration of a matrix.

Part-B

Flexibility method of Analysis: Introduction, method of consistent deformation, application to pin-jointed frames, effect of temperature and pre-strain, displacements and forces in members of indeterminate structures, flexibility matrix of a plane member.

Part-C

Stiffness Method of Analysis: Introduction, relation between slope deflection method and stiffness method, choice between flexibility and stiffness method, stiffness method for members with relative displacement of supports, analysis of indeterminate structures, analysis of pin-Jointed frames.

Part-D

Computer Applications: Matrix structural analysis using spreadsheets, MS Excel Matrix Commands, MS Excel procedure for stiffness method of analysis, analysis of single span beams, continuous beams, plane trusses and plane frames.

REFERENCES:

1. Gere W and Weaver J M; "Matrix Analysis of Structures" CBS Publishers, New Delhi, 1986.

2. Kanchi M B; "Matrix Methods of Structural Analysis" Wiley Eastern Limited, New Delhi, 2002.

3. Ganju T N; "Matrix Structural Analysis using Spreadsheets" TMH Publishing Co. Ltd. New Delhi,2002.

4. Vazirani V N and Ratwani M M; "Advanced Theory of Structures and Matrix Methods" Khanna Publishers, New Delhi, 1995.

5. Pandit G S and Gupta S P; "Structural Analysis A Matrix Approach" Tata McGraw Hill, New Delhi, 1994.

DAV UNIVERSITY, JALANDHAR

Course Title: ENVIRONMENTAL GEOTECHNOLOGY

Paper Code: BCE 412

L	T	P	Credits
3	0	0	3

Course Objectives

- To understand the behaviour of soil minerals
- To familiarize with the interaction of soil and water

Learning Outcomes

- Upon successful completion of this course, the student would:
- Have an exposure to interdisciplinary issues pertaining to environment and geotechnical engineering
- Be trained to develop sustainable and environmentally sound solutions for geotechnical problems
- Understand the relevance of various legal aspects involved in addressing environmental consequences associated with geotechnical issues

PART-A

Introduction and soil mineralogy: Scope of environmental geotechnology and its applications, Soil Formation, Composition and Structure: Introduction, Soil formation, Solids composition and characterization, Mineral composition, Different scales of soil structure, Structural variations due to consolidation and compaction, Role of Composition and soil structure in the engineering behavior of soils.

PART-B

Contamination in soils: Subsurface contamination, Mass transport mechanisms, Mass transfer mechanisms, Governing equation for mass transport, Soil as a geotechnical trap, effects of subsurface contamination its detection and monitoring.

Mechanisms of soil-water interaction: Diffuse double layer and simple DDL models; Force of attraction and repulsion; Soil-water-contaminant interaction; Effect of contaminants on engineering properties of soil.

PART-C

Site investigation: Introduction, Site investigation approach, phase investigations, Geophysical techniques, Hydro-geological investigations, Hydro-geochemical investigations, Geochemical data collection and analysis.

PART-D

Concepts of waste containment facilities: Desirable properties of soil; contaminant transport and retention; containment of solid waste in landfills, environmental impact of slurry waste and containment of slurry wastes, contaminated site remediation.

Case histories: Case histories on geo-environmental problems pertaining to use of readily available local soils, bio-remediation of spills etc.

References:

1. Mitchell, J.K. and Soga, K., Fundamentals of Soil Behaviour, John Wiley & Sons, Inc., New Jersey., 2005

2. Reddy, L.N. and Inyang. H. I., Geoenvironmental Engineering –Principles and Applications, Marcel Dekker, Inc., New York., 2000

3. Mohamed, A.M.O. and Antia, H.E., Geoenvironmental Engineering, Elsevier, Netherlands., 1998

4. Hsai_Yang Fang and Daniels, J.L. Introductory Geotechnical Engineering an Environmental Perspective, Taylor & Francis, Oxon., 2006

5. Yong, R. N., Geoenvironmental Engineering: Contaminated Soils, Pollutant Fate and Mitigation", CRC press LLC, Florida., 2001.

6. Fang, H.Y, Introduction to Environmental Geotechnology, CRC Press, 1997. 7. " Proceedings of the International symposium of Environmental Geotechnology (Vol. I and Vol. II) ",4. Environmental Publishing Co., 1986 and 1989.

7. CDEEP, IITB video lectures on course CE 488 and CE 641 by Prof. D. N. Singh

DAV UNIVERSITY, JALANDHAR

Course Title: ADVANCED STRUCTURAL STEEL DESIGN

Paper Code: CIV414

L	T	P	Credits
3	0	0	3

Course Objective: This course should provide the students with good understanding of design of various types of steel structures.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of design of steel foot bridge, Gantry girder etc.

Note: Use of IS-800 is allowed in the examination.

Part-A

Design of Round Tubular Structures: Introduction, round tubular sections, permissible stresses, tube columns and compression members, tube tension members, tubular roof trusses,

Part-B

Design of steel foot bridge: Introduction, design of flooring, cross girders, analysis of N- type truss, design of various members of truss, design of joints, design of bearings.

Part-C

Design of complete industrial building with design of:
- Gantry Girder
- Column bracket.
- Lateral and longitudinal bracing for column bent etc.

Part-D

Design of a single track through type Railway Bridge with lattice girders having parallel chords (for B. G):
- Design of stringer
- Design of cross girders
- Design of connection between stringer and cross girder
- Design of main girders – various members and their joints
- Design of bottom lateral bracing and top lateral bracing
- Design of portal bracing and sway bracing

REFERENCES:
1. Duggal S.K.;"Limit state design of steel structures"
2. SubramanianN.; "Design of steel structures"
3. ChandraRam; "Design of steel structures (Vol. 2)"
4. NegiL.S.; "Design of steel structures"
5. Bhavikatti S.; "Design of steel structures (by limit state method as per IS: 800-2007)"5
6. IS 800: 2007 (General construction in steel-Code of practice)
7. SP: 6(1) (Handbook for structural engineers-Structural steel sections) permitted in Examination

DAV UNIVERSITY, JALANDHAR

Course Title: PORT AND HARBOUR ENGINEERING

Paper Code: BCE 416

Course Objectives: To know about the better planning and design of docks-harbour, Port activities and infrastructure facilities. Planning of new port requires proper knowledge of location, natural phenomena, environmental impacts, hinterland products, connectivity, forecast of passenger and cargo demand, infrastructure and management aspects.

Learning Outcomes: To enhance the knowledge of Docks and Harbour Engineering for the water transportation in the context of regional and intercontinental transportation. To know techniques of planning and designing the infrastructures required for Harbour and Port area. To know regarding cargo and passenger demand forecasting, cargo handling capacity of ports and economic evaluation of port project. To be aware of the environmental and other impacts impended due to water transportation and port activities.

Part-A

Water Transportation: Scope, Merits, Developments of Water Transportation in India, Inland waterways, River, Canal, Inland water transportation, Development of ports & Harbours, Harbour classification, Site selection, Harbour dimensioning.

Part-B

Natural Phenomena: Wind, Tides, Water waves, Wave decay & port, wave diffraction, breaking, reflection, Littoral drift, sediment transport, Effects on Harbour and structure design.

Part-C

Harbour Infrastructures: Types of breakwaters, jetty, dock fenders, piers, wharves, dolphin, mooring accessories, Repair facilities, wet docks, lift docks, dry docks, gates for graving docks, floating docks, slipways, locks and gates

Part-D

Port facility: Transit shed, warehouses, cargo handling, container handling, Inland port facility, Navigational aids, types, requirements of signals, lighthouses, beacon light, buoys. Dredging & coastal protection: Types of dredgers, choices, usage of dredged material, sea wall protection-sea wall revetment, bulkhead

DAV UNIVERSITY, JALANDHAR

Planning of ports: For regional and intercontinental transportation development, forecasting cargo & passenger demand, regional connectivity, cargo handling capacity of port, economic evaluation of port project, impacts of port activities.

REFERENCES:

1. Port and Harbour Engineering: 6 (Studies in the History of Civil Engineering) by Adrian Jarvis
2. Handbook of Port and Harbor Engineering: Geotechnical and Structural Aspects by Gregory Tsinker
3. Port Engineering by Per Bruun
4. Ocean engineering by NPTEL
5. Port Engineering: Planning, Construction, Maintenance, and Security by Gregory P. Tsinker
6. Port Engineering, Volume 1: Harbor Planning, Breakwaters, and Marine Terminals by Dr. Per Bruun
7. Port Engineering, Volume 2: Harbor Transportation, Fishing Ports, Sediment Transport, Geomorphology, Inlets, and Dredging by Dr. Per Bruun

DAV UNIVERSITY, JALANDHAR

Course Title: DESIGN OF HYDRAULIC STRUCTURES

Paper Code: BCE 418

L	T	P	Credits
3	0	0	3

Course Objectives: This course should provide the students with good understanding of various types of irrigation projects like weirs and barrages.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of canal regulation and design steps of irrigation projects like weirs and barrages.

Part-A

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.

Part-B

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.

Part-C

Canal Regulators: Off take alignment, cross-regulators–their functions and design, Distributory 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

Part-D

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 and level crossing.

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

DAV UNIVERSITY, JALANDHAR

REFERENCES:

1. Garg S.K.; "Irrigation Engg. & Hydraulic Structure", Khanna Publishers, 2007.

2. Sharma R.K.; "Design of Irrigation Structures", Oxford IBH Pub, 2006.

3. Sahasrabudhe S.R.; "Irrigation Engg. and Hydraulics Structures", Katson publishing, 1996.

4. Khushlani K.B.; "Irrigation Practice and Design Vol. I to VII", Oxford IBH Pub, 1995.

5. Modi P.N.; "Irrigation with Resources and with Power Engineering", Standard Book House, 1995.

6. Ivan E. Houk; "Irrigation Engg. Vol. I & II", John Wiley and sons, 2010

DAV UNIVERSITY, JALANDHAR

Course Title: REPAIR AND REHABLITATION OF STRUCTURES

Paper Code: BCE 420

L	T	P	Credits
3	0	0	3

Course Objective: This course provides a better understanding of various techniques of repairing the structures, causes of deterioration.

Learning Outcomes: After the completion of this course the participants would gain the knowledge modern materials and techniques of repairing.

Part-A

Maintenance and Repair Strategies Maintenance, Repair and Rehabilitation, Facets of Maintenance, importance of Maintenance, Various aspects of Inspection, Assessment procedure for evaluating a damaged structure, causes of deterioration

Part-B

Strength and Durability of Concrete- Quality assurance for concrete –Strength, Durability and Thermal properties, of concrete – Cracks, different types, causes –Effects due to climate, temperature, Sustained elevated temperature, Corrosion – Effects of cover thickness

Part-C

Special Concretes- Polymer concrete, Sulphur infiltrated concrete, Fibre-reinforced concrete, High strength concrete, High performance concrete, Vacuum concrete, Self-compacting concrete, Geopolymer concrete, Reactive powder concrete, Concrete made with industrial wastes; Techniques for Repair and Protection Methods- Non-destructive Testing Techniques, Epoxy injection, Shoring, Underpinning, Corrosion protection techniques – Corrosion inhibitors, Corrosion resistant steels

Part-D

Coatings to reinforcement, cathodic protection; Repair, Rehabilitation and Retrofitting of Structures- Evaluation of root causes; Underpinning & shoring; some simple systems of rehabilitation of structures; Guniting, shotcreting; Non-Destructive testing systems; Use of external plates, carbon fibre wrapping and carbon composites in repairs. Strengthening of Structural elements, Repair of structures distressed due to corrosion, fire, Leakage, earthquake – Demolition Techniques –Engineered demolition methods – Case studies

REFERENCES

1. Denison Campbell, Allen and Harold Roper, Concrete Structures, Materials, Maintenance and Repair, Longman Scientific and Technical UK, (1991).

2. R.T. Allen and S.C. Edwards, Repair of Concrete structures, Blakie and Sons, UK, (1987)

3. M. S. Shetty, Concrete Technology – Theory and Practice, S. Chand and Company, New Delhi, (1992).

4. Santhakumar, A.R., Training Course notes on Damage Assessment and repairs in Low Cost Housing, "RHDC – NBO" Anna University, July (1992).

5. Raikar, R.., Learning from failures – Deficiencies in Design, Construction and Service – R & D centre (SDCPL), RaikarBhavan, Bombay, (1987).

6. N. Palaniappan, Estate Management, Anna Institute of Management, Chennai, (1992).PCI, *PCI Design Handbook: Precast and Prestressed Concrete*, Precast/Prestressed Concrete Institute, IL, 1992.

DAV UNIVERSITY, JALANDHAR

Course Title: MATERIAL CHARACTERIZATION

Paper Code: BCE 422

L	T	P	Credits
3	0	0	3

Course Objective: This course provides a better understanding of various techniques of repairing the structures, causes of deterioration.

Learning Outcomes: After the completion of this course the participants would gain the knowledge modern materials and techniques of repairing.

Part-A

Introduction to course; Structure of Construction Materials – An Overview :

Calorimetry

X-ray diffraction

Part-B

Thermal analysis

Surface area measurement

Optical microscopy

Scanning electron microscopy

Part-C

Image analysis

Spectroscopic techniques

Part-D

Mercury intrusion porosimetry

Impedance analysis and ultrasonic methods

REFERENCES

1. Materials Characterization: Introduction to Microscopic and Spectroscopic Methods by Yang Leng

DAV UNIVERSITY, JALANDHAR

GENERIC ELECTIVE I

Course Title: CONSTRUCTION MATERIALS AND TECHNIQUES

Course Code: BCE 801

L	T	P	Credits
3	0	0	3

Course Objective: This course offers a good understanding and study of different materials and material properties in civil engineering.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of various materials used in construction, their properties, uses and type of construction work for which they can be used.

Part-A

Building Stones: General, Uses of stones, natural bed of stones, qualities of a good building stone, deterioration of stones, artificial stones, common building stones of India and their uses. Bricks: General, Composition of good brick earth, Harmful ingredients in brick earth, qualities of good bricks, tests for bricks, classification of bricks. Timber: Definition, classification of trees, structure of a tree, felling of trees, seasoning of timber, storage of timber, market forms of timber.

Part-B

Cement: Constituents of Cement, Manufacture of Portland cement Concrete: Introduction, Constituents of concrete, batching of materials, Manufacturing process of cement concrete, workability and factors affecting it, Methods to determine workability, segregation and bleeding of concrete, Strength of concrete and factors affecting it.

Part-C

Brick and stone masonry: Terms used, Types of bonds & their merits and demerits, rubble and ashlars joints in stone masonry, cement concrete hollow blocks and their advantages and disadvantage. Damp Proofing: Sources, causes and bad effects of dampness, preventive measures for dampness in buildings.

Part-D

Plastering and pointing: Objects, Methods of plastering, Materials and types, Defects in plastering, special material for plastered surface, distempering white washing and colour washing. Foundation: Definition, types of foundations

REFERENCE:

1. Rangwala S.C. "Engineering Materials" Charotar Publishing House Anand India, 1989.
2. Bindra SP, Arora KR "Building construction" Dhanpat Rai Publications, Delhi 1970.

3. Shetty MS , "Concrete Technology" S. Chand & Co. N. Delhi, 2005
4. Punmia BC, "Building construction" Laxmi Publications Pvt. Ltd. 2008.
5. KumarSushil , "Building Construction" Standard Publishers Distributors, 2006

DAV UNIVERSITY, JALANDHAR

GENERIC ELECTIVE II

Course Title: RAILWAY AND TUNNEL ENGINEERING

Course Code: BCE 802

L	T	P	Credits
3	0	0	3

Course Objective: This course should provide the students with good understanding of railway and Tunnel engineering.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of various railways transportation components and specifications of tunnels

Part-A

Railways: History of development of Railways, Permanent Way, Requirement of ideal permanent way, cross-sections of single and double tracks in embankment and cutting. Points and Crossing: Simple types currently in use: points and crossing terminology, layout plans of simple cross over, turnouts, diamond crossing,

Part-B

Stations and yards: Selection of site for station and yards, different types of stations and yards and their layouts-way side station.] Permanent way Construction and Maintenance: Laying of track, relaying and dismantling, maintenance of track. Signalling and Interlocking: Objects of signalling, types of signals, Interlocking and devices used in interlocking.

Part-C

Tunnels: Definition and necessity of tunnels, Typical section of tunnels for a national highway and single and double broad gauge railway track.

Part-D

Ventilation: necessity and methods of ventilation, by blowing, exhaust and combination of blowing and exhaust. Drainage method of draining water in tunnels. Lighting of tunnels [6]

REFERENCES

1. Rangawal S C "Railway Engineering" Charotar Publishers, Anand, 2002.

2. Arora S P and Saxena (2001), "Railway Engineering", DhanpatRai Publishers, New Delhi, 2001

3. Vaswani, NK, "Railway Engineering", Publishing House, Roorkee

4.Deshpande, R,"A Text Book of Railway Engineering", Poonam united Book Corporation

5.Subhash C Saxena "Tunnal Engineering",Dhanpat Rai and Sons, Delhi

DAV UNIVERSITY, JALANDHAR

GENERIC ELECTIVE III

Course Title: METRO SYSTEMS AND ENGINEERING

Course Code: BCE 803

L	T	P	Credits
3	0	0	3

Course Objectives: This course should provide the students with good understanding of metro systems in India

Learning Outcomes: After the completion of this course the participants would gain the knowledge of various metro transportation components and specifications of systems.

PART A

Overview of Metro Systems; Need for Metros; Routing studies; Basic Planning and Financials Civil Engineering-Overview and construction methods for metro systems.

PART B

Elevated and underground Stations; Viaduct spans and bridges; Underground tunnels; Depots; Commercial and Service buildings. Tunnel Ventilation systems; Air conditioning for stations and buildings; Fire control systems

PART C

Initial Surveys & Investigations; Basics of Construction Planning & Management, Construction Quality & Safety Systems. Traffic integration, multimodal transfers and pedestrian facilities; Environmental and social safeguards; Track systems-permanent way. Facilities Management

PART D

Signaling systems; Automatic fare collection; Operation Control Centre (OCC and BCC); SCADA and other control systems; Platform Screen Doors.

REFERENCES

1. David Bennett METRO: The Story of the Underground Railway Mitchell Beazley Publ., ISBN 1840008385

2. Stan Fischler: SUBWAYS OF THE WORLD - Motorbooks International, 2000. Introduction to 10 of the world's most important metro systems.

3. William D. Middleton: Metropolitan Railways: Rapid Transit in America (Railroads Past and Present). - January 2003, 400 pages, Indiana University Press, ISBN 0253341795