FACULTY OF ENGINEERING & TECHNOLOGY

SYLLABUS

FOR

B. TECH.
(CIVIL ENGINEERING)

(Under Credit Based Continuous Evaluation Grading System)
(SEMESTER: I – IV)
SESSION: 2015–16

GURU NANAK DEV UNIVERSITY
AMRITSAR

B.Tech. (Civil Engineering) 1st Semester
(Under Credit Based Continuous Evaluation Grading System)

Semester – I:

S. No.	University Course Code	Course Title	L	T	P	Credits
1.	PHL181	Physics	3	1	1	5
2.	MTL101	Mathematics-I	3	1	0	4
3.	ECL115	Electrical Engineering	3	1	0	4
4.	ENL151	Communicative English	2	0	0	2
5.	ARL196	Engineering Graphics & Drafting	3	1	0	4
6.		Elective-I	2	0	0	2
	List of Electives					
1.	PBL121	Punjabi (Compulsory) **OR**	2	0	0	2
2.	PBL122	Mudhli Punjabi (In lieu of Punjabi Compulsory)	2	0	0	2
		TOTAL:	**16**	**4**	**1**	**21**

B.Tech. (Civil Engineering) 2nd Semester
(Under Credit Based Continuous Evaluation Grading System)

Semester – II:

S. No.	University Course Code	Course Title	L	T	P	Credits
1.	CYL195	Engineering Chemistry	2	1	1	4
2.	MTL102	Mathematics-II	3	1	0	4
3.	CSL125	Fundamentals of IT & Computer Programming	2	1	1	4
4.	PHL182	Material Science	3	1	0	4
5.	CEL120	Engineering Mechanics	3	1	0	4
6.		Elective-II	2	0	0	2
7.	MEP101	Workshop Practices	0	0	2	2
	List of Electives					
1.	PBL131	Punjabi (Compulsory) **OR**	2	0	0	2
2.	PBL132	Mudhli Punjabi (In lieu of Punjabi Compulsory)	2	0	0	2
		TOTAL:	**15**	**5**	**4**	**24**

B.Tech. (Civil Engineering) 3rd Semester
(Under Credit Based Continuous Evaluation Grading System)

Semester – III:

S.No.	University Course Code	Subject Group	CourseTitle	L	T	P	Contact hrs/wk	Credits
1	CEL211	CE	Building Material and Construction	3	1	0	4	4
2	CEL212	CE	Construction Machinery and Works Management	3	1	0	4	4
3	CEL213	CE	Surveying	2	1	0	3	3
4	CEL214	CE	Hydraulics and Hydraulic Machinery	2	1	0	3	3
5	ENL201	HS	Written and Oral Technical Communication	2	1	0	3	3
6	MTL201	BS	Maths–III	3	1	0	4	4
7	ESL 220	MC-4	*Environmental Studies	3	0	0	3	3
Practical's								
1	ENP 201	HS	Written and Oral Technical Communication	0	0	2	2	1
2	CEP213	CE	Surveying Lab	0	0	2	2	1
3	CEP214	CE	Hydraulics and Hydraulic Machinery Lab	0	0	2	2	1
			TOTAL:	**18**	**6**	**6**	**30**	**27**

***Note:- Credits will not be included in SGPA.**

B.Tech. (Civil Engineering) 4th Semester
(Under Credit Based Continuous Evaluation Grading System)

Semester – IV:

S. No.			Credits		
	Course Code	Course	L	T	P
1.	CEL221	Strength of Materials	2	1	0
2.	CEL222	Water Supply Engineering	3	1	0
3.	CEL223	Concrete Technology	2	1	0
4.	CEL224	Soil Mechanics	3	1	0
5.	CEL225	Numerical Methods for Civil Engineering	2	1	0
6.		Department Elective-I	3	0	0
7.		Department Elective-II	3	0	0
8.		Inter Disciplinary Course – I*	3	1	0
Practical's					
1.	CEP221	Strength of Materials Laboratory	0	0	1
2.	CEP223	Concrete Technology Laboratory	0	0	1
3.	CEP224	Soil Mechanics Laboratory	0	0	1
		Sub Total:	21	6	3
		Grand Total:	**30**		
Department Elective–I					
1.	CEL226	Elements of Remote Sensing GIS	3	0	0
2.	CEL227	Engineering Geology Rock Mechanics	3	0	0
3.	CEL228	Town Planning	3	0	0
Department Elective–II					
1.	CEL229	Building Construction	3	0	0
2.	CEL230	Disaster Management	3	0	0
3.	CEL231	Mass Transportation System	3	0	0

B.Tech. (Civil Engineering) 1st Semester
(Under Credit Based Continuous Evaluation Grading System)

PHL181: PHYSICS

L T P
3 1 1

PART-I

Quantum Mechanics: De Broglie's hypothesis of matter waves, Phase and group velocities, Uncertainty principle, Schroedinger equation: Time dependent form, Expectation value, Operators, Steady State Form, Eigen values and Eigen functions, Particle in a box; Tunnel effect.

PART-II

Statistical Mechanics: (Maxwell- Bolzmann) statistics; Bose-Einstein statistics; Rayleigh-Jeans, Planck's and Wiens displacement and Stefan-Bolzmann Laws; Einstein formula for specific heat, Bose condensation; Fermi-Dirac statistics: Free electrons in metal, Fermi energy and electron distribution.

PART-III

Lasers: Einstein coefficients, population inversion, optical resonators, Gas lasers (He-Ne and CO_2), Solid State Lasers (Three and Four level systems).

PRACTICAL

1. To find the capacitance of a capacitor using flashing and quenching of neon lamp.
2. To determine the capacitance of a capacitor by discharging it through a voltmeter.
3. To measure the low resistance using Carey-Foster's bridge.
4. To find the frequency of AC supply using an Electric vibrator.
5. To find the impedance of an AC Circuit containing R, L and C in series.
6. To study the resonance in series LCR circuit for different R-value and calculate Q-value.
7. To study the phase relationships using impedance triangle for LCR circuit and calculate impedance.

Books Recommended:

1. Concepts of Modern Physics. Arthur Beiser, (Tata McGraw-Hill, Sixth Edition 2003).
2. Lasers & Nonlinear optics. B.B. Laud (New Delhi, India: Wiley Eastern 1991).

B.Tech. (Civil Engineering) 1st Semester
(Under Credit Based Continuous Evaluation Grading System)

MTL-101: MATHEMATICS – I

L T P
3 1 0

PART – I

Calculus: Partial Derivatives, Euler's theorem on homogeneous functions, Maclaurin's and Taylor's expansions of single and two variables, Maxima and minima of functions of several variables, Lagrangian method of multipliers, Multiple integrals and their use in obtaining surface areas and volumes of solids.

PART – II

Infinite Series: Sequences and sub sequences and their convergence, Cauchy sequence, Infinite series and their convergence, Standard tests for convergence including p-test, Ratio test, Comparison test, Raabe's test, Cauchy Integral test, Cauchy root test, Gauss's test, Absolute Convergence, Alternating series and its convergence, Power Series.

PART – III

Vector Calculus: Scalar and Vector point functions, Differentiation of vectors, Gradient of a scalar field, Divergence and Curl of a vector field and their physical interpretations, Line integral of a vector field, Surface integral of vector field, Volume integral of a scalar field, Green's theorem, stokes theorem, Gauss divergence theorem (without proofs) and their applications.

Books Recommended:

1. Louis A. Pipes: Applied Mathematics for Engineers and Physicists, McGraw Hill Book Company.
2. Kreyszig: Engineering Mathematics, Wiley Eastern Ltd.
3. BS Grewal: Higher Engineering Mathematics, Khanna Publishers, New Delhi.
4. Murray & Spiegel, Vector Analysis, Schaum Publication Co.

B.Tech. (Civil Engineering) 1st Semester
(Under Credit Based Continuous Evaluation Grading System)

ECL115: ELECTRICAL ENGINEERING

L T P
3 1 0

PART – I

1. **Electricity:** A brief review of various applications of electricity, difference between AC and DC, PARTs of voltage, current and resistance, concept of electromagnetic induction and production of alternating e.m.f. – single phase and poly phase, concept of 3 phase system star and delta connections, voltage and current relations (formula only).
2. **Power Supply:** A brief review of special features of the power supply system, power-station, transmission, distribution lines, service main, domestic and industrial wiring installation.
3. **Circuit Analysis:** A brief review of DC and single phase AC circuits. Three phase AC circuits, phasor representation, star–delta transformation, concept of balanced and unbalanced three phase circuits, measurement of power and power factor in three phase balanced circuits, AC circuits (L.R.C.) solution.
4. **Electrical Machinery:** Transformers, its working principle, types of transformers and their applications, performance losses, efficiency and voltage regulation open circuit and short circuit tests on a transformer, auto transformer.

PART – II

5. **DC Motors:** Force and EMF production, methods of excitation in DC machines, various types, characteristic and application of DC shunt and series motors.
6. **Phase Induction Motor:** Construction and type of three phase induction motors, equivalent circuits, application of different types of induction motors, starters and protective devices used for motors.
7. **Phase Synchronous Machines:** Principle of working and construction of alternators and synchronous motors.
8. **Single Phase Induction Motors:** Types and construction, their working principle, starting of single phase motor, application of single phase motors.

PART – III

9. **Control and Protection:** Control mechanism, principle and application of servo motors, protection devices for wiring installation and motors – fuses MCB, LCB, relays.
10. **Cables:** Types of cables, construction of LT and HT cables, laying of cables, selection of cables.
11. **Earthing and Grounding:** Need, types, Indian Electricity Rules, use of meggar and earth tester for measurement of earth resistance.

Books Recommended:

1. Principles of Electrical Engineering by Gupta BR; S. Chand and Company, New Delhi.
2. Electrical Technology by Hughes Edward; The English Language Book Society and Longmans Group Limited, London.
3. Electrical Machines by Bhattacharya SK; Tata McGraw Hill, Delhi.
4. Experiments in Basic Electrical Engineering by Bhattacharya SK and Rastogi KM; New Age International, New Delhi.
5. Experiments in Electrical Engineering by Bhatnagar US; Asia Publishing House, Bombay.
6. Advanced Electrical Technology by Cotton H; Isaac Pitmans and Sons Limited, London.
7. Electrical Engineering – Basic Technology by Hubschar; Deutsche Gesllschaft Fur Technische Zusammenabelt (GTZ) GMBH.
8. Basic Electrical Engineering by T.K. Naggarkar& Ms. Sakhija Seventh Edition 2008, Oxford University Press.

B.Tech. (Civil Engineering) 1st Semester
(Under Credit Based Continuous Evaluation Grading System)

ENL–101: Communicative English–I

Time: 3 Hrs. **L T P**
2 0 0

Objective: To introduce students to the skills and strategies of reading and writing by identifying organizational patterns, spotting classification systems and understanding associations between ideas. This course will prepare students to read a variety of texts and also to communicate more effectively through writing. The course will also pay special attention to vocabulary building.

Prescribed Text books:

1. *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Second Edition.
2. *The Written Word* by Vandana R. Singh, Oxford University Press, New Delhi.

Course Contents:

1. Reading and Comprehension Skills:

Students will be required to read and comprehend the essays in Unit 1 and 2 of the book *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Second Edition. They will be required to answer the questions given after each essay.

2. Developing Vocabulary and using it in the Right Context:
The students will be required to master "Word List" and "Correct Usage of Commonly Used Words and Phrases" from the Chapter "Vocabulary" in the book *The Written Word.*

3. Writing Skills
Students will be required to learn "Report Writing" and "Letter Writing" as in the book *The Written Word.*

Students will be required to write long essays based on the prescribed text book *Making Connections: A Strategic Approach to Academic Reading.*

Minor 1:
Syllabus to be covered:
1. Unit 1 from *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Second Edition.
2. Report Writing from *TheWritten Word.*

B.Tech. (Civil Engineering) 1st Semester
(Under Credit Based Continuous Evaluation Grading System)

Suggested Paper Pattern:

1. Report Writing (8 marks)
2. Short answer type questions from Unit 1 of *Making Connections: A Strategic Approach to Academic Reading* (6 marks)
3. Essay type question from Unit 1 of *Making Connections: A Strategic Approach to Academic Reading* (6 marks)

Minor 2:

Syllabus to be covered:

1. "Word List" from the Chapter "Vocabulary" in the book *The Written Word.*
2. Unit-2 from the book *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Second Edition.

Suggested Paper Pattern:

1. Word List from the Chapter "Vocabulary" in the book *The Written Word* (8 marks)
2. Short answer type questions from Unit 2 of *Making Connections: A Strategic Approach to Academic Reading* (6 marks)
3. Essay type question from Unit 2 of *Making Connections: A Strategic Approach to Academic Reading* (6 marks)

Suggested Paper Pattern for Major Exam:

1. Letter Writing as prescribed in *The Written Word* /1 out of 2 (10 marks)
2. Short answer type questions from Unit 1,2 of *Making Connections: A Strategic Approach to Academic Reading* (14 marks)
3. "Word List" and "Correct Usage of Commonly Used Words and Phrases" from the Chapter "Vocabulary" present in the book *The Written Word.* (10 marks)
4. Essay type question from Unit 1,2 of *Making Connections: A Strategic Approach to Academic Reading* 1 out of 2 (8 marks)
5. Report Writing from *The Written Word* (8 marks)

B.Tech. (Civil Engineering) 1st Semester
(Under Credit Based Continuous Evaluation Grading System)

ARL196: ENGINEERING GRAPHICS & DRAFTING

L T P
3 1 0

PART – I

Drawing Techniques: Various types of lines, principles of dimensioning, size and location of dimensions, symbols, conventions scales (plane and diagonal) and lettering as per IS Code SP–46 of practice for general engineering drawings. Practice of drawing various types of lines and dimensioning exercises. Drawing exercises pertaining to symbols, conventions. Exercise on lettering techniques: Free hand printing and numerals in 3, 5, 8 and 12 mm sizes vertical and inclined at 75 ; instrumental lettering in single stroke.

Projection of Points, Lines and Planes: First angle and third angle projections, concept of horizontal and vertical planes, Projection of points and lines, True length, Horizontal and vertical traces, Projection of Planes, Traces of Planes, Auxiliary planes. Practice exercises on projection of points, lines and planes.

Projection and Selection of Solids: Projection of solids such as Prisms, Pyramids, Cylinders, Cones, Spheres, Auxiliary View. Principles of sectioning, types of sectioning, section lines, cutting plane lines. Practice on projection of solids.

PART – II

Isometric Projection: Exercises on isometric views.

Orthographic Projections: Orthographic views, Missing views. Exercises on identification of missing views. Practice on orthographic projections.

Practice of free hand sketching of different types of objects.

PART – III

Intersection and Development of Surfaces: Intersection of cylinders, cones and Prisms, Axis of solids being vertical or horizontal. Development of surfaces of truncated cylinders, cones and prisms. Exercises on intersection of solids – cylinder and cylinder, cylinder and cone, prism and prism, prism and cone, sphere with cylinder. Exercises involving development of surfaces (Y–Piece, Hopper, Tray and truncated pieces).

Fasteners: Introduction to temporary and permanent fasteners riveted and welded joints, types screw threads, conventional symbols for internal and external threads. Exercises involving drawing of bolts, nuts, studs and locking devices.

Symbols and Conventions: Symbol and conventions pertaining to relevant engineering disciplines.

Books Recommended:

1. Engineering Drawing by PS Gill, SK Kataria and Sons, Ludhiana.
2. Engineering Drawing by NK Bhatt.
3. Text Book of Engineering Drawing by R.K. Dhawan, S. Chand & Company Ltd.
4. Engineering and Teaching Drawing by Earl D. Black.

B.Tech. (Civil Engineering) 1st Semester
(Under Credit Based Continuous Evaluation Grading System)
(Elective–I)

Punjabi (Compulsory)
PBL–121: ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ

ਪਾਠ–ਕ੍ਰਮ ਅਤੇ ਪਾਠ–ਪੁਸਤਕਾਂ

Credits: 2–0–0

(I) 1. **ਆਤਮ ਅਨਾਤਮ** (ਸੰਪ. ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ ਅਤੇ ਡਾ. ਸੁਹਿੰਦਰਬੀਰ ਸਿੰਘ, ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ) ਵਿੱਚੋਂ ਹੇਠ ਲਿਖੇ ਕਹਾਣੀਕਾਰ :

(ੳ) ਗੁਰਮੁਖ ਸਿੰਘ ਮੁਸਾਫਿਰ : **ਗਟਾਰ**
(ਅ) ਸੁਜਾਨ ਸਿੰਘ : **ਪਠਾਣ ਦੀ ਧੀ**
(ਏ) ਕਰਤਾਰ ਸਿੰਘ ਦੁੱਗਲ : **ਉੱਚੀ ਅੱਡੀ ਵਾਲੀ ਗੁਰਗਾਬੀ**
(ਕਹਾਣੀ–ਸਾਰ, ਵਿਸ਼ਾ–ਵਸਤੂ, ਕਹਾਣੀ–ਕਲਾ, ਕਹਾਣੀਕਾਰ)

2. ਗੁਰਮੁਖੀ ਔਰਥੋਗਰਾਫੀ ਦੀ ਜੁਗਤ, (ਪੈਂਤੀ; ਮੁਹਾਰਨੀ; ਬਿੰਦੀ, ਟਿੱਪੀ ਤੇ ਅੱਧਕ); ਵਿਰਾਮ ਚਿੰਨ੍ਹ, ਸ਼ਬਦ ਜੋੜ (ਸ਼ੁਧ–ਅਸ਼ੁਧ)

(II) 1. **ਆਤਮ ਅਨਾਤਮ** (ਸੰਪ. ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ ਅਤੇ ਡਾ. ਸੁਹਿੰਦਰਬੀਰ ਸਿੰਘ, ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ) ਵਿੱਚੋਂ ਹੇਠ ਲਿਖੇ ਕਹਾਣੀਕਾਰ :

(ੳ) ਸੰਤੋਖ ਸਿੰਘ ਧੀਰ : **ਸਾਂਝੀ ਕੰਧ**
(ਅ) ਕੁਲਵੰਤ ਸਿੰਘ ਵਿਰਕ : **ਉਜਾੜ**
(ਏ) ਮਹਿੰਦਰ ਸਿੰਘ ਸਰਨਾ : **ਜਥੇਦਾਰ ਮੁਕੰਦ ਸਿੰਘ**
(ਕਹਾਣੀ–ਸਾਰ, ਵਿਸ਼ਾ–ਵਸਤੂ, ਕਹਾਣੀ–ਕਲਾ, ਕਹਾਣੀਕਾਰ)

2. ਲੇਖ ਰਚਨਾ (ਜੀਵਨੀ–ਪਰਕ, ਸਮਾਜਕ ਅਤੇ ਚਲੰਤ ਵਿਸ਼ਿਆਂ ਉੱਤੇ):
10 ਲੇਖ ਲਿਖਵਾਉਣੇ (ਕਲਾਸ ਵਿਚ ਅਤੇ ਘਰ ਲਈ ਅਭਿਆਸ)

(III) 1. **ਆਤਮ ਅਨਾਤਮ** (ਸੰਪ. ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ ਅਤੇ ਡਾ. ਸੁਹਿੰਦਰਬੀਰ ਸਿੰਘ, ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ) ਵਿੱਚੋਂ ਹੇਠ ਲਿਖੇ ਕਹਾਣੀਕਾਰ :

(ੳ) ਪ੍ਰੇਮ ਪ੍ਰਕਾਸ਼ : **ਮਾੜਾ ਬੰਦਾ**
(ਅ) ਗੁਲਜ਼ਾਰ ਸਿੰਘ ਸੰਧੂ : **ਕੁਲੱਛਣੇ**
(ਏ) ਮੋਹਨ ਭੰਡਾਰੀ : **ਘੋਟਣਾ**
(ਸ) ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ : **ਦਲਦਲ**
(ਕਹਾਣੀ–ਸਾਰ, ਵਿਸ਼ਾ–ਵਸਤੂ, ਕਹਾਣੀ–ਕਲਾ, ਕਹਾਣੀਕਾਰ)

2. ਪੈਰਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦੇਣਾ
(**ਆਤਮ ਅਨਾਤਮ** ਪੁਸਤਕ ਦੇ ਕਹਾਣੀ ਭਾਗ ਵਿੱਚੋਂ 15 ਪੈਰ੍ਹਿਆਂ ਦੇ ਅਭਿਆਸ ਕਰਵਾਉਣੇ)

B.Tech. (Civil Engineering) 1st Semester
(Under Credit Based Continuous Evaluation Grading System)
(Elective–I)

Mudhli Punjabi
PBL–122: ਮੁੱਢਲੀ ਪੰਜਾਬੀ
(In lieu of Punjabi Compulsory)

2-0-0

ਪਾਠ–ਕ੍ਰਮ

1. ਪੰਜਾਬੀ ਭਾਸ਼ਾ,
   ਗੁਰਮੁਖੀ ਲਿਪੀ
   ਗੁਰਮੁਖੀ ਲਿਪੀ : ਬਣਤਰ ਅਤੇ ਤਰਤੀਬ

2. ਗੁਰਮੁਖੀ ਆਰਥੋਗ੍ਰਾਫੀ
   ਸੁਰ ਬਣਤਰ ਅਤੇ ਉਚਾਰਨ
   ਵਿਅੰਜਨ ਬਣਤਰ ਅਤੇ ਉਚਾਰਨ

3. ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰ
   ਸਾਧਾਰਨ ਸ਼ਬਦ
   ਇਕ ਉਚਾਰਖੰਡੀ ਸ਼ਬਦ

ਯੂਨਿਟ ਅਤੇ ਥੀਮ

1. ਪੰਜਾਬੀ ਭਾਸ਼ਾ : ਨਾਮਕਰਣ ਅਤੇ ਸੰਖੇਪ ਜਾਣ ਪਛਾਣ, ਗੁਰਮੁਖੀ ਲਿਪੀ: ਨਾਮਕਰਣ, ਗੁਰਮੁਖੀ ਵਰਣਮਾਲਾ; ਪੈਂਤੀ ਅੱਖਰੀ, ਅੱਖਰ ਕ੍ਰਮ, ਸੁਰ ਵਾਹਕ (ਓ ਅ ਏ), ਲਗਾਂ ਮਾਤਰਾਂ, ਪੈਰ ਵਿਚ ਬਿੰਦੀ ਵਾਲੇ ਵਰਣ, ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਣ, ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ।

2. ਗੁਰਮੁਖੀ ਆਰਥੋਗ੍ਰਾਫੀ ਅਤੇ ਉਚਾਰਨ; ਸੁਰਾਂ ਦੀ ਬਣਤਰ ਅਤੇ ਉਚਾਰਨ (ਲਘੂ–ਦੀਰਘ ਸੁਰ); ਸੁਰ ਅਤੇ ਲਗਾਂ ਮਾਤਰਾਂ; ਵਿਅੰਜਨਾਂ ਦੀ ਬਣਤਰ ਅਤੇ ਉਚਾਰਨ; ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਣਾਂ (ਹ, ਰ, ਵ) ਦਾ ਉਚਾਰਨ ; ਲ ਅਤੇ ਲ਼ ਦਾ ਉਚਾਰਨ; ਭ, ਧ, ਢ, ਝ, ਘ ਦਾ ਉਚਾਰਨ; ਪੈਰ ਵਿਚ ਬਿੰਦੀ ਵਾਲੇ ਵਰਣਾਂ ਦਾ ਉਚਾਰਨ।

3. ਪੰਜਾਬੀ ਸ਼ਬਦ–ਬਣਤਰ: ਸਾਧਾਰਨ ਸ਼ਬਦ; ਇਕੱਲਾ ਸੁਰ (ਜਿਵੇਂ ਆ); ਸੁਰ ਅਤੇ ਵਿਅੰਜਨ (ਜਿਵੇਂ ਆਰ); ਵਿਅੰਜਨ ਅਤੇ ਸੁਰ (ਜਿਵੇਂ ਪਾ); ਵਿਅੰਜਨ ਸੁਰ ਵਿਅੰਜਨ (ਜਿਵੇਂ ਪਾਰ); ਕੋਸ਼ਗਤ ਸ਼ਬਦ (ਜਿਵੇਂ ਘਰ, ਪੀ); ਵਿਆਕਰਣਕ ਸ਼ਬਦ (ਜਿਵੇਂ ਨੂੰ, ਨੇ); ਪੰਜਾਬੀ ਸ਼ਬਦ ਰਚਨਾਫ਼1; ਲਿੰਗ–ਪੁਲਿੰਗ, ਇਕ ਵਚਨ–ਬਹੁ ਵਚਨ; ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ–1: ਖਾਣ–ਪੀਣ, ਸਾਕਾਦਾਰੀ, ਰੁੱਤਾਂ, ਮਹੀਨਿਆਂ, ਗਿਣਤੀ, ਮੌਸਮ ਆਦਿ ਨਾਲ ਸੰਬੰਧਿਤ।

B.Tech. (Civil Engineering) 2nd Semester
(Under Credit Based Continuous Evaluation Grading System)

CYL195 : ENGINEERING CHEMISTRY

L T P
2 1 1

PART – I

Water:

- Common Impurities of water
- Hardness of water: Determination of hardness by Clark's test and complex metric (EDTA) method, Degree of hardness.
- Numerical based on hardness and EDTA method
- Municipal Water Supply: Requisites of drinking water, Steps involved in purification of water, Sedimentation, coagulation, Filtration and Sterilization, Break point Chlorination

Water Treatment:

- Softening of Water: Lime-Soda Method, Permutit (Zeolite) Method and Deionization or Demineralization Method
- Boiler troubles their causes, disadvantages and prevention: Formation of solids (Scale and Sludge), Carry over (Priming and Foaming), Corrosion and Caustic Embrittlement
- Numerical Problems based on Lime-Soda and Zeolite softening methods.

PART – II

Cement:

- Definition, Composition, basic constituents and their significance, Manufacturing of Portland cement by Rotary Kiln Technology
- Chemistry of setting and hardening of cement and role of gypsum

Glass:

- Definition, Properties, Manufacturing of glass
- Types of silicate glasses and their commercial uses
- Importance of annealing in glass making

Refractories:

- Definition, classification, properties, Requisites of good refractory and manufacturing of refractory
- Detailed study of silica and fire clay refractory and their uses
- Seger's (Pyrometric) Cone Test and RUL Test
-

B.Tech. (Civil Engineering) 2nd Semester
(Under Credit Based Continuous Evaluation Grading System)

PART – III

Polymers:

- Different methods of classification and constituents of polymers
- Plastics: Thermosets and Thermoplasts
- Preparation, Properties and uses of polyethylene, Bakelite, Terylene and Nylon
- Elastomers: Natural rubber, vulcanization, Synthesis Rubbers viz. Buna-S, Buna-N, Butyl-1 and neoprene rubbers.

Lubricants:

- Introduction, classification and uses of lubricants
- Types of lubricants
- Viscosity & Viscosity index, flash and fire point, cloud and pour point, steam emulsification number, precipitation number and neutralization number

Books Recommended:

1. Engineering Chemistry by P.C. Jain & Monica Jain Dhanpat Rai Publishers, New Delhi.
2. Chemical Process Industries by R. Norris Shrive, McGraw Hill Ltd. New Delhi.

PRACTICAL

1. Find the strength of KMnO4 solution.
2. Determine number of water molecules in Mohr salt by titration method.
3. Determine percentage of sodium carbonate in given sample of washing soda.
4. Determine percentage of sodium carbonate and sodium hydroxide in given sample of caustic soda.
5. Determination of total Hardness of Water.
6. Determine the percentage of Ca2+ and Mg2+ in the given sample of water.
7. To determine the molecular weight of a compound by Rast's micro method.
8. Determination of coefficient of viscosity of a given liquid by viscometer.
9. To determine the unknown composition of a given mixture of two liquids by viscosity method.
10. To find the mol. wt. of high polymer by using viscosity measurements.
11. Determination of surface tension of a given liquid by drop number method by stalagmometer.
12. To determine the critical micelle concentration of a soap (sodium laurate) by surface tension measurements.
13. To determine the distribution coefficient of I2 between CCl4 and water.
14. To determine refractive index of a liquid by Abbe's refractometer and hence the specific and molar refraction.
15. Determination of Chlorine in bleaching powder.

Books Recommended:

1. Findlay's Practical Physical Chemistry.
2. Advanced Practical Physical Chemistry by J.B. Jadav.
3. Quantitative Organic Analysis by Vogel.

B.Tech. (Civil Engineering) 2nd Semester
(Under Credit Based Continuous Evaluation Grading System)

MTL102: MATHEMATICS – II

L T P
3 1 0

PART – I

Differential Equations: Exact differential Equation, Higher order linear Differential equations, ODE's with constant coefficients.

Laplace Transforms: Laplace transforms, Properties of Laplace transforms, Laplace transform of derivatives and differentiation theorem, Integration theorem, Laplace transform of Integrals, Inverse Laplace transform, Formulas for obtaining inverse Laplace transforms, Convolution theorem, The second shifting property.

PART – II

Fourier Series and Fourier Transform: Fourier Series expansion, Fourier series for even and odd functions, half range series, harmonic functions, Modulation theorem, Shifting properties, convolution theorems, sine and cosine transforms, Fourier transform of derivatives and integrals, inverse Fourier transform, Applications to PDE's and ODE's.

PART – III

Complex Analysis: De Moivre's theorem with applications, Analytic functions, Cauchy-Riemann equations, Laplace equation, Cauchy's integral theorem, Cauchy's integral formula (without proofs), Taylor series and Laurent series (without proofs), Residues and their application in evaluating real improper integrals.

Books Recommended:

1. Louis A. Pipes: Applied Mathematics for Engineers and Physicists, McGraw Hill Book Company.
2. Kreyszig: Engineering Mathematics, Wiley Eastern Ltd.
3. BS Grewal: Higher Engineering Mathematics, Khanna Publishers, New Delhi.

B.Tech. (Civil Engineering) 2nd Semester
(Under Credit Based Continuous Evaluation Grading System)

CSL125: FUNDAMENTALS OF IT AND COMPUTER PROGRAMMING

L T P
2 1 1

PART – I

Block diagram of Computer, Associated peripherals, Memories – RAM, ROM, Secondary Storage Devices, Classification of Computers and Languages, Introduction to Compilers, Interpreter and Assemblers, Introduction of various operating system with their file system, Features of DOS, Internal and External commands of DOS, Introduction to Windows and Linux.

PART – II

Algorithm and Flowchart, Introduction to C language, Various Data Types- Basic, Derived, user defined and void, Operators, Expressions, Variable, Constant, Header files, Formatted and unformatted input and output statements, Control and conditional statements. Arrays.

PART – III

String Handling, Functions- call be value and call by references, Structures and Unions, Array of structure, Pointers, Dynamic memory allocation using mallooc and calloc functions, File Handling, Modes of file handling, File handling Input and Output statements.

PRACTICALS

- Looking for directories and files under DOS.
- Changing drives, searching for files, looking at files extensions and size of files.
- Deleting and saving files, protecting and unprotecting file.
- Familiarizing with windows, closing, maximizing, shifting icons, ordering icons, changing the size of windows, moving windows.
- File manager to view the files, transfer files from directories/devices.
- Exercises (at least fifteen) involving assignment, looping, functions, arrays, structure, string, pointers and files in C.

Recommended Books:

1. Computers Today by Sanders.
2. Fundamentals of Computers TTTI Publication.
3. DOS Instant Reference by Harvey and Nelson.
4. Programming with ANSI and Turbo C 2nd edition – Kamthane, Pearson Publication
5. Let US C 8th edition – Yashwant Kanetkar- Infiniti Science Press
6. Mastering Turbo C by Brottle Stan Kelly.

B.Tech. (Civil Engineering) 2nd Semester
(Under Credit Based Continuous Evaluation Grading System)

PHL182: MATERIAL SCIENCE

L T P
3 1 0

PART-I

Structure-property relationship; crystal system, close packing, crystal planes and directions; Miller indices; Determination of crystal structure using X-Ray diffraction.

PART-II

Phase diagram; Unary and binary; Lever rule; solid solutions; steel types; non-ferrous materials and alloys.

PART-III

Elastic and Plastic deformation; Effect of temperature, impurity and grain size on strength of materials; Ferroelectric, dielectric, piezoelectric and pyroelectric materials.

Recommended Books:

1. Materials Science and Engineering by WD Callister Jr. (John Wiley & Sons Inc., Eighth Edition)
2. Materials Science and Engineering: A First Course by V Raghvan (Prentice-Hall of India Pvt. Ltd.).

B.Tech. (Civil Engineering) 2nd Semester
(Under Credit Based Continuous Evaluation Grading System)

CEL120: ENGINEERING MECHANICS

L T P
3 1 0

PART – I

Introduction: Force system, dimensions and units in mechanics, laws of mechanics, vector algebra, addition and subtraction of forces, cross and dot products of vectors, moment of a force about a point and axis, couple and couple moment, transfer of a force to a parallel position, resultant of a force system using vector method, Problems involving vector application Equilibrium: Static and dynamic equilibrium, static in determinacy, general equations of equilibrium, Varingnon's theorem, Lami's theorem, equilibrium of bodies under a force system, Problems.

PART – II

Truss and Frames: Truss, classification of truss, assumptions in truss analysis, perfect truss, analysis of perfect plane truss using method of joints and method of sections, Problems. Centroid , Centre of mass and Centre of gravity, Determination of centroid, centre of mass and centre of gravity by integration method of regular and composite figures and solid objects, Problems.
Moment of Inertia: Area moment of inertia, mass moment of inertia, parallel axis and perpendicular axis theorems, radius of gyration, polar moment of inertia, product of inertia, principle axis, problem based on composite figures and solid objects. Kinematics: Concept of rigid body, velocity and acceleration, relative velocity, translation and rotation of rigid bodies, equations of motion for translation and rotation, problems.

PART – III

Particle Dynamics: Energy methods and momentum methods, Newton's laws, work energy equation for a system of particles, linear and angular momentum equations, projectile motion, problem. Shear Force and Bending Moment Diagram for statically determinant beams Classification of beams, types of loads, shear force and bending moment calculation and their graphical presentation, point of inflection, problem.

Books Recommended:
1. Engineering Mechanics – Irving H. Shames, PHI Publication
2. Engineering Mechanics – U.C.Jindal, Galgotia Publication

B.Tech. (Civil Engineering) 2nd Semester
(Under Credit Based Continuous Evaluation Grading System)

MEP101: Workshop Practices

L T P
0 0 2

1. Carpentry Shop:
a) Study of tools & operations and carpentry joints.
b) Simple exercise using jack plane.
c) To prepare half-lap corner joint, mortise & tennon joints.
d) Simple exercise on wood working lathe.

2. Fitting (Bench Working) Shop:
a) Study of tools & operations
b) Simple exercises involving fitting work.
c) Make perfect male-female joint.
d) Simple exercises involving drilling / tapping / dieing.

3. Black Smithy Shop:
a) Study of tools & operations
b) Simple exercises based on black smithy operations such as upsetting, drawing down, punching, bending, fullering & swaging.

4. Welding Shop:
a) Study of tools & operations of Gas welding & Arc welding.
b) Simple butt and Lap welded joints.
c) Oxy-acetylene flame cutting.

5. Sheet-metal Shop:
a) Study of tools & operations.
b) Making Funnel complete with soldering.
c) Fabrication of tool-box, tray, electric panel box etc.

6. Machine Shop:
a) Study of Single point cutting tool, machine tools and operations.
b) Plane turning.
c) Step turning.
d) Taper turning.
e) Threading.

7. Foundry Shop:
a) Study of tools & operations
b) Pattern making.
c) Mould making with the use of a core.
d) Casting

8. **Electrical and Electronics Shop:**
a) Study of tools & operations

B.Tech. (Civil Engineering) 2nd Semester
(Under Credit Based Continuous Evaluation Grading System)

Punjabi (Compulsory)
PBL–131: ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ

ਪਾਠ–ਕ੍ਰਮ ਅਤੇ ਪਾਠ ਪੁਸਤਕਾਂ

Credits: 2–0–0

(I) **1. ਆਤਮ ਅਨਾਤਮ (ਸੰਪ. ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ ਅਤੇ ਡਾ. ਸੁਹਿੰਦਰਬੀਰ ਸਿੰਘ, ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ) ਵਿੱਚੋਂ ਹੇਠਾਂ ਲਿਖੇ ਕਵੀ :**

(ੳ) ਭਾਈ ਵੀਰ ਸਿੰਘ
(ਅ) ਪ੍ਰੋ: ਪੂਰਨ ਸਿੰਘ
(ੲ) ਪ੍ਰੋ: ਮੋਹਨ ਸਿੰਘ
(ਕਵਿਤਾ–ਸਾਰ, ਵਿਸ਼ਾ–ਵਸਤੂ, ਕਾਵਿ–ਕਲਾ, ਕਵੀ)

2. ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰ : ਧਾਤੂ/ਮੂਲ, ਵਧੇਤਰ (ਅਗੇਤਰ, ਪਿਛੇਤਰ, ਵਿਉਂਤਪਤ ਅਤੇ ਰੁਪਾਂਤਰੀ), ਸਮਾਸ ।

(II) 1. **ਆਤਮ ਅਨਾਤਮ** (ਸੰਪ. ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ ਅਤੇ ਡਾ. ਸੁਹਿੰਦਰਬੀਰ ਸਿੰਘ, ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ) ਵਿੱਚੋਂ ਹੇਠ ਲਿਖੇ ਕਵੀ :

(ੳ) ਅੰਮ੍ਰਿਤਾ ਪੋਤਮ
(ਅ) ਡਾ. ਹਰਭਜਨ ਸਿੰਘ
(ੲ) ਸ਼ਿਵ ਕੁਮਾਰ ਬਟਾਲਵੀ
(ਕਵਿਤਾ–ਸਾਰ, ਵਿਸ਼ਾ–ਵਸਤੂ, ਕਾਵਿ–ਕਲਾ, ਕਵੀ)

2. **ਪੈਰ੍ਹਾ ਰਚਨਾ :** ਕਲਾਸ ਵਿੱਚ 10 ਵਿਸ਼ਿਆਂ (ਸਭਿਆਚਾਰਕ, ਧਾਰਮਿਕ ਅਤੇ ਰਾਜਨੀਤਕ) ਤੇ ਪੈਰ੍ਹਾ ਰਚਨਾ ਦੇ ਅਭਿਆਸ ਕਰਵਾਉਣੇ ।

(III) 1. **ਆਤਮ ਅਨਾਤਮ** (ਸੰਪ. ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ ਅਤੇ ਡਾ. ਸੁਹਿੰਦਰਬੀਰ ਸਿੰਘ, ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ) ਵਿੱਚੋਂ ਹੇਠ ਲਿਖੇ ਕਵੀ :

(ੳ) ਡਾ. ਜਸਵੰਤ ਸਿੰਘ ਨੇਕੀ
(ਅ) ਡਾ. ਜਗਤਾਰ
(ੲ) ਡਾ. ਸੁਰਜੀਤ ਪਾਤਰ
(ਸ) ਪਾਸ਼
(ਕਵਿਤਾ–ਸਾਰ, ਵਿਸ਼ਾ–ਵਸਤੂ, ਕਾਵਿ–ਕਲਾ, ਕਵੀ)

2. ਮੁਹਾਵਰੇ ਤੇ ਅਖਾਣ (ਅਖਾਣ ਤੇ ਮੁਹਾਵਰਾ ਕੋਸ਼ ਵਿੱਚ) 200 ਮੁਹਾਵਰਿਆਂ ਅਤੇ 100 ਅਖਾਣਾਂ ਨੂੰ ਵਾਕਾਂ ਵਿੱਚ ਵਰਤਣ ਦੇ ਅਭਿਆਸ ਕਰਵਾਉਣੇ (ਕਲਾਸ ਵਿੱਚ ਤੇ ਘਰ ਲਈ) ।

B.Tech. (Civil Engineering) 2nd Semester
(Under Credit Based Continuous Evaluation Grading System)

Mudhli Punjabi
PBL–132: ਮੁੱਢਲੀ ਪੰਜਾਬੀ
(In lieu of Punjabi Compulsory)

2–0–0

ਪਾਠ–ਕ੍ਰਮ

1. ਪੰਜਾਬੀ ਸ਼ਬਦ–ਬਣਤਰ
   ਸੰਯੁਕਤ ਅਤੇ ਮਿਸ਼ਰਤ ਸ਼ਬਦ
   ਬਹੁ–ਉਚਾਰਖੰਡੀ ਸ਼ਬਦ

2. ਪੰਜਾਬੀ ਵਾਕ–ਬਣਤਰ
   ਸਾਧਾਰਨ–ਵਾਕ : ਕਿਸਮਾਂ
   ਸੰਯੁਕਤ–ਵਾਕ : ਕਿਸਮਾਂ
   ਮਿਸ਼ਰਤ–ਵਾਕ : ਕਿਸਮਾਂ

3. ਪ੍ਰਕਾਰਜੀ ਪੰਜਾਬੀ
   ਚਿੱਠੀ ਪੱਤਰ
   ਪੈਰ੍ਹਾ ਰਚਨਾ
   ਸੰਖੇਪ ਰਚਨਾ
   ਅਖਾਣ ਅਤੇ ਮੁਹਾਵਰੇ

ਯੂਨਿਟ ਅਤੇ ਥੀਮ

1. ਪੰਜਾਬੀ ਸ਼ਬਦ–ਬਣਤਰ : ਸੰਯੁਕਤ ਸ਼ਬਦ; ਸਮਾਸੀ ਸ਼ਬਦ (ਜਿਵੇਂ ਲੋਕ ਸਭਾ); ਦੋਜਾਤੀ ਸ਼ਬਦ (ਜਿਵੇਂ ਕਾਲਾ ਸਿਆਹ); ਦੋਹਰੇ ਸ਼ਬਦ/ਦੁਹਰੁਕਤੀ (ਜਿਵੇਂ ਧੂੜ੍ਹ ਧਾੜ੍ਹ/ਭਰ ਭਰ), ਮਿਸ਼ਰਤ ਸ਼ਬਦਾਂ ਦੀ ਬਣਤਰ/ਸਿਰਜਨਾ; ਅਗੇਤਰਾਂ ਰਾਹੀਂ (ਜਿਵੇਂ ਉਪ ਭਾਸ਼ਾ), ਪਿਛੇਤਰਾਂ ਰਾਹੀਂ (ਜਿਵੇਂ ਰੰਗਲਾ), ਪੰਜਾਬੀ ਸ਼ਬਦ ਰਚਨਾ–2: ਪੜਨਾਵੀਂ ਰੂਪ, ਕਿਰਿਆ/ਸਹਾਇਕ ਕਿਰਿਆ ਦੇ ਰੂਪ; ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ–2: ਮਾਰਕੀਟ/ਬਾਜ਼ਾਰ, ਵਪਾਰ, ਧੰਦਿਆਂ ਨਾਲ ਸੰਬੰਧਿਤ।

2. ਪੰਜਾਬੀ ਵਾਕ–ਬਣਤਰ : ਕਰਤਾ ਕਰਮ ਕਿਰਿਆ; ਸਾਧਾਰਨ ਵਾਕ, ਬਿਆਨੀਆ, ਪ੍ਰਸ਼ਨਵਾਚਕ, ਆਗਿਆਵਾਚਕ, ਸੰਯੁਕਤ ਅਤੇ ਮਿਸ਼ਰਤ ਵਾਕਾਂ ਦੀਆਂ ਕਿਸਮਾਂ; ਸੁਤੰਤਰ ਅਤੇ ਅਧੀਨ ਉਪਵਾਕ; ਸਮਾਨ (ਤੇ/ਅਤੇ) ਅਤੇ ਅਧੀਨ (ਜੋ/ਕਿ) ਯੋਜਕਾਂ ਦੀ ਵਰਤੋਂ; ਪੰਜਾਬੀ ਵਾਕਾਂ ਦੀ ਵਰਤੋਂ : ਵਿਭਿੰਨ ਸਮਾਜਕ/ਸਭਿਆਚਾਰਕ ਪ੍ਰਸਥਿਤੀਆਂ ਦੇ ਅੰਤਰਗਤ; ਘਰ ਵਿਚ, ਬਾਜ਼ਾਰ ਵਿਚ, ਮੇਲੇ ਵਿਚ, ਸ਼ੌਪਿੰਗ ਮਾਲ/ਸਿਨਮੇ ਵਿਚ, ਵਿਆਹ ਵਿਚ, ਧਾਰਮਿਕ ਸਥਾਨਾਂ ਵਿਚ, ਦੋਸਤਾਂ ਨਾਲ ਆਦਿ।

3. ਇਸ ਯੂਨਿਟ ਵਿਚ ਚਿੱਠੀ ਪੱਤਰ (ਨਿੱਜੀ/ਦਫ਼ਤਰੀ/ਵਪਾਰਕ), ਪੈਰਾ ਰਚਨਾਂ, ਸੰਖੇਪ ਰਚਨਾ ਅਤੇ ਅਖਾਣ ਮੁਹਾਵਰਿਆਂ ਦੀ ਵਰਤੋਂ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਦੀ ਭਾਸ਼ਾਈ ਯੋਗਤਾ ਨੂੰ ਪਰਖਿਆ ਜਾਵੇਗਾ।

GAP PAGE 23-31

B.Tech. (Civil Engineering) 3rd Semester
(Under Credit Based Continuous Evaluation Grading System)

CEL211: BUILDING MATERIALS AND CONSTRUCTION

L	T	P
3	1	0

Building Materials : Physical and chemical characteristic of commonly used buildingmaterials in Civil Engineering construction – Clay, Sand, Stone, Lime, Cement,Concrete, Bricks, Silica, Aluminum and Timber with reference to its specifications.Plywood, asbestos, plastics and polymer based materials. Protective materials: Paints and varnishes. Building construction: Bricks and stone masonry. Settingand laying out a building, safe bearing capacity of soils, types of buildingfoundation. Construction details of foundation, floors, roofs and stairs. Damp proofcourse, plastering and pointing. Doors and windows of different types.

Suggested Books:

1. Surendra Singh, 'Engineering Materials', Konark Publishers Pvt. Ltd.
2. D.S.Arora, 'Text Book of Engineering Materials', Kalyani Publishers.
3. B.C. Punmia, 'Building Construction' Laxmi Publications Pvt. Ltd.
4. Sushil Kumar, 'Building Construction', Standard Publishers, Delhi.

B.Tech. (Civil Engineering) 3rd Semester
(Under Credit Based Continuous Evaluation Grading System)

CEL212: CONSTRUCTION MACHINERY & WORKS MANAGEMENT

L T P
3 1 0

1. **INTRODUCTION** :Need for project planning & management, time, activity & event, barchart, Milestone chart, uses & draw backs.
2. **PERT** :Construction of PERT network, time estimates, network analysis, forward pass & backward pass, slack, critical path, data reduction, suitability of PERT for research project, numerical problems.
3.**CPM** :Definitions, network construction, critical path, fundamental rules, determination ofproject schedule, activity time estimates, float types, their significance in project control,numerical problems.
4. **COST ANALYSIS AND CONTRACT** :Type of costs, cost time relationships, costslopes, conducting a crash programme, determining the minimum total cost of project,numerical problems. updating a project, when to update, time grid diagram, resourcescheduling. planning of different components of civil engineering projects such as a house,workshop, dam, tunnel.
5. **CONSTRUCTION EQUIPMENT AND MACHINERY**: Tractors, bull dozers, rippers,scrappers, power shovels, dragline, hoes. Line diagram of each, sizes, output, uses, factorsaffecting selection of each equipment, economic life of equipment, maintenance and repaircost.Hoisting & Transporting Equipments: Hosts, Winches, Cranes, Belt conveyors, Ropeways,trucks & Wagons.
6. :Plants for grading, batching, mixing, types of mixers, concrete pumps, bitumen plants.

Books Recommended:

Construction Planning and Equipment - R.L.Peurifoy - Tata McGraw Hill, New DelhiPERT and CPM - L.S.Srinath, East West Press
Management Guide to PERT & CPM - Wiest& levy; Prentice Hall
Construction Equipment & Planning and Application. - Mahesh VermaArtec Publication.
Construction Planning and Management by U. K. Shrivastava; Galgotia Publications Pvt.Ltd.
Construction Planning and Management by U. K. Shrivastava; Galgotia Publications Pvt.Ltd.

B.Tech. (Civil Engineering) 3rd Semester
(Under Credit Based Continuous Evaluation Grading System)

CEL213: SURVEYING

L T P
2 1 0

1) **Introduction:** Definition, classification of surveying, objectives, principles of surveying

2) **Chain surveying:** Chain and its types, Optical square, Cross staff, Reconnaissance and siteLocation, Locating ground features by offsets – Field book. Chaining for obtaining the outlineof structures, Methods for overcoming obstacles, Conventional symbols, Plotting chain surveyand Computation of areas, Errors in chain surveying and their elimination: ProblemsCompass Surveying: Details of prismatic compass, Use and adjustments, Bearings, Localattraction and its adjustments. Chain and compass surveying of an area, Booking and plotting, Adjustments of traverse, Errors in compass surveying and precautions: Problems.

3) **Plane Table Surveying:** Equipment, Orientation, Methods of Plane Tabling, Three Point Problems.Leveling: Introduction, Basic definitions, Detail of dumpy Level, Temporary adjustment of Levels,Sensitiveness of bubble tube; Methods of leveling – Differential, Profile & fly Leveling, Effect ofcurvature and refraction, Automatic levels, Plotting longitudinal sections and Cross sections;Measurement of area and volumeContouring: Topographic Map, Characteristics of Contour, Contour Interval. Methods of LocatingContours, Interpolation of Contours.

4) **Theodolite Surveying:** Components of a Transit Theodolite, Measurement of horizontal andvertical Angles, Co-ordinates and traverse Table1Tacheometry: Definition, Details of stadia System, Determination of horizontal and vertical 1distance with Tacheometer- Staff held vertically and normal to the line of sight.

5) **Simple & Transition Curves:** Definition, Degree of Curve, Elements of Simple Curve, Setting outby Linear method and Rankine's tangential method, Transition Curves.8 Introduction to Total Station with Field applications

References:

1 Surveying:- Vol - I & II B.C. Punmia
2 Surveying & Leveling R. Subramanian (OXFORD)
3 Surveying& Leveling Vol - I [Part I & II] T.P.Kanetkar&Kulkarni
4 Surveying:- Vol - I & II S.K. Duggal Publisher.
5 Fundamental of Engineering Survey J.K. Ghosh (Studium Press, Roorkee)
6 Higher Surveying Dr. A. M. Chandra
7 Surveying R.B. Gupta & B.K. Gupta
9 Plane and Geodetic Surveying (Vol - I & II) David Clark
10 Fundamental of Surveying S. K. Roy
11 Surveying Saikia& Das (PHI)

B.Tech. (Civil Engineering) 3rd Semester
(Under Credit Based Continuous Evaluation Grading System)

CEP 213: Surveying Lab

L	T	P
0	0	2

List of Experiments:

1. To range a line between two stations.
2. Plotting of details in chain survey.
3. Plotting of traverse with a compass.
4. To determine the reduced levels of stations by height of instrument and rise and fall method.
5. Plotting of details using plane table by method of intersection and method of radiation.
6. Temporary and permanent adjustments of a theodilite.
7. Measurement of horizontal angles using a theodilite by method of repetition and method of reiteration.
8. Traverse adjustment using Gales' traverse table.

B.Tech. (Civil Engineering) 3rd Semester
(Under Credit Based Continuous Evaluation Grading System)

CEL214: HYDRAULICS & HYDRAULIC MACHINERY

L T P
2 1 0

1. Fluid statics: Forces on plane and curved surfaces, Center of pressure. Stability of floating bodies, Met centre.
2. Weirs and Notches: Rectangular, triangular, Cippoletti, sharp crested and broad crested weirs, submerged weirs
3. Turbulent flow in circular pipes: Fluid friction in pipes, head loss due to friction. Darcy-Weisbach equation, Variation of friction factor with wall roughness – Moody's chart. Minor losses in pipes
4. Water Hammer: Speed of pressure wave, slow and rapid closure, use of surge tank.
5. Steady uniform flow in open channel: Characteristics, Chezy's, Manning's and Bazin's formulae.Hydraulically efficient cross sections. Flow through channels of circular cross sections – depths formaximum velocity and discharge.
6 Varied flow through open channel: Gradually varied and rapidly varied flows. Definition, SpecificEnergy, Critical, Sub-critical and Super-critical flows. Channel transitions - constricted or raised bed.Establishment of critical flow, Venturi flume and Parshall flume. Definition and diagram for Specificforce, Hydraulic Jump
7. Dimensional Analysis and Model studies: Dimensions and dimensional homogeneity, Importance and use of dimensional analysis. Buckingham's Pi theorem with applications. Geometric, Kinematic and Dynamic similarity. Non Dimensional Numbers.
8. Introduction to Hydraulic Turbines: Working Principles of Pelton, Francis and Kaplan turbines
9. Pumps: Centrifugal pumps, performance characteristic graph – design flow rate. Workingprinciples of positive displacement pumps, gear, reciprocating and vane pumps. Hydraulic Ram

References:

1 Fluid Mechanics Modi& Seth Standard Book House, New Delhi
2 Fluid Mechanics A.K.JainKhanna Publishers, New Delhi
3 Fluid Mechanics & Machinery H. M. Raghunath CBS Publishers, New Delhi
4 Fluid Mechanics and Fluid Machines S. K. Som& G. Biswas Tata McGraw Hill.
5 Fluid Mechanics, Hydraulics and Fluid Machines, S. RamamruthamDhanpatRai
6 Basic Fluid Mechanics C. P. Kothandaraman& R. Rudramoorthy. New Age International
7 Open Channel Hydraulics Van te Chow McGraw Hill
8 Fluid Mechanics John F. Douglas, Gasiorek&Swaffield, Pearson Education
9 Introduction to Fluid Mechanics Fox, Pritchand
10 Fundamental of Fluid Mechanics Munsen, Young WIE

B.Tech. (Civil Engineering) 3rd Semester
(Under Credit Based Continuous Evaluation Grading System)

CEP 214: HYDRAULICS & HYDRAULIC MACHINERY LAB

L	T	P
0	0	2

List of Experiments

1. To study the transition from laminar to turbulent flow in a pipe.
2. Verification of Stokes law
3. To draw flow net by electrical analogy method
4. Determination of Elements of Hydraulic Jump.
5. Discharge & flow profile of a broad crested weir.
6. To determine the viscosity of a given liquid by capillary-tube-viscometer.
7. To determine Manning's co-efficient of roughness for the bed of a given flume.
8. To measure the velocity distribution in a rectangular flume and to determine the energy and momentum correction factors.
9. To calibrate a current meter.
10. To study the flow over a hump placed in an open channel.
11. Demonstration of surges in an open channel.
12. Demonstration of forced vortex.

B.Tech. (Civil Engineering) 3rd Semester
(Under Credit Based Continuous Evaluation Grading System)

ENL201: WRITTEN & ORAL TECHNICAL COMMUNICATION

L	T	P
2	1	0

Communication Skills for Scientists and Engineers:

Note taking from lectures and reference material [10%] Essay and precis writing [30%]
Slide preparation and oral presentation principles [10%] Written presentation of technical material [20%] Preparation of Bibliography [10%]
Basics of Official Correspondence [15%] Preparation of bio–data [5%]
Students should be asked to prepare and present Seminars during the practice session.

Texts / References:

1. The Chicago Manual of Style, 13th Edition, Prentice Hall of India, 1989.
2. Gowers Ernest, "The Complete Plan in Words" Penguin, 1973.
3. Menzel D.H., Jones H.M., Boyd, LG., "Writing a Technical Paper", McGraw Hill, 1961.
4. Strunk, W., & White E.B., "The Elements of Style:, 3rd Edition, McMillan, 1979.
5. Turbian K.L., "A Manual for Writers of Term Papers, Thesis and Dissertations" Univ. of Chicago Press, 1973.
6. IEEE Transactions on "Written and Oral Communication" has many papers.

B.Tech. (Civil Engineering) 3rd Semester
(Under Credit Based Continuous Evaluation Grading System)

ENP201: WRITTEN & ORAL TECHNICAL COMMUNICATION

L T P
0 0 2

Practical:

Students should be asked to prepare Technical Presentation on the emerging areas of Information

Technology and present the same to the group of Students.

Texts / References:

1. The Chicago Manual of Style, 13th Edition, Prentice Hall of India, 1989.
2. Gowers Ernest, "The Complete Plan in Words" Penguin, 1973.
3. Menzel D.H., Jones H.M., Boyd, LG., "Writing a Technical Paper", McGraw Hill, 1961.
4. Strunk, W., & White E.B., "The Elements of Style:, 3rd Edition, McMillan, 1979.
5. Turbian K.L., "A Manual for Writers of Term Papers, Thesis and dissertations" Univ. of Chicago Press, 1973.
6. IEEE Transactions on "Written and Oral Communication" has many papers.

B.Tech. (Civil Engineering) 3rd Semester
(Under Credit Based Continuous Evaluation Grading System)

MTL201: MATHEMATICS–III

L T P
3 1 0

UNIT–I

Probability: Classical and axiomatic approach to the theory of probability, additive andmultiplicative law of probability, conditional probability and bayes theorem.Random Variables: Random variable, probability mass function, probability density function,cumulative distribution function, function of random variable. Two and higher dimensionalrandom variables, joint distribution, marginal and conditional distributions, Stochasticindependence.

UNIT–II

Expectation: Mathematical expectations and moments, moment generating function and its properties. Probability Distributions: Binomial, Poisson, Uniform, Exponential, Gamma, Normaldistribution, t– distribution, chi– square distribution, F–distribution.

UNIT–III

Uniform Pseudo random number generation and random variable generation, Generating random variate from standard statistical distribution (discrete and continuous distribution), Monte – Carlointegration

Books Recommended:

1. Hogg, R.V., Mckean, J.W. and Craig, A.T.: Introduction to Mathematical Statistics.
2. Gupta, S. C. and Kapoor, K.: Fundamentals of Mathematical Statistics, Sultan Chand & Co.
3. Rubinotein, R.Y.: Simulation and the Monte Carlo Method, John Viley.
4. Probability and Statistics with Reliability by KS Trivedi, Prentice Hall.

B.Tech. (Civil Engineering) 3rd Semester
(Under Credit Based Continuous Evaluation Grading System)

ESL220: ENVIRONMENTAL STUDIES (COMPULSORY)

Credit 3-0-0

1. **The multidisciplinary nature of environmental studies:** Definition, scope & its importance, Need for public awareness.

2. **Natural resources**: Natural resources and associated problems.

   a) **Forest resources**: Use of 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, change caused by agriculture and overgrazing, effects or modern agriculture, fertilizer-pesticide problem, salinity, case studies.
   e) **Energy resources**: Growing of energy needs, renewable and non-renewable energy resources, use of alternate energy sources, case studies.
   f) **Land recourses**: Land as a resource, land degradation, soil erosion and desertification.
   g) Role of an individual in conservation of natural resources, Equitable use of resources for sustainable lifestyles.

3. **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 ecosystems:
   a. Forest ecosystem
   b. Grassland ecosystem
   c. Desert ecosystem
   d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

4. Biodiversity and its Conservation:

Definition: Genetic, species and ecosystem diversity, Biogeographical classification of India.

Value of Biodiversity: Consumptive use; productive use, social, ethical, aesthetic and option values.

Biodiversity of global, National and local levels, India as mega-diversity nation "Hot-spots of biodiversity.

Threats to Biodiversity: Habitat loss, poaching of wild life, man wildlife conflicts Endangered and endemic species of India.

Conservation of Biodiversity: In situ and Ex-situ conservation of biodiversity.

5. 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 Hazards

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

6. Social Issues and Environment:

* From unsustainable to sustainable development
* Urban problems 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 warning, acid rain, ozone layer depletion, nuclear accidents and holocause. Case studies.
* Wasteland reclamation
* Consumerism and waste products
* Environmental Protection Act
* Air (prevention and Control of Pollution) Act
* Water (prevention and Control of Pollution) Act
* Wildlife Protection Act
* Forest Conservation Act
* Issues involved in enforcement o£. environmental legislation
* Public awareness

7. **Human population and the environment**
   * Population growth, variation among nations
   * Population explosion-Family welfare programme
   * Environment and human health
   * Human rights
   * Value education
   * HIV / AIDS
   * Women and child welfare
   * Role of information technology in environment :and human health
   * Case studies
   * **Road Safety Rules & Regulations:** Use of Safety Devices while Driving, Do's and Don'ts while Driving, Role of Citizens or Public Participation, Responsibilities of Public under Motor Vehicle Act, 1988, General Traffic Signs
   * **Accident & First Aid:** First Aid to Road Accident Victims, Calling Patrolling Police & Ambulance
8. **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)

References:

1. Agarwal, K. C. 2001. Environmental Biology, Nidhi Publications Ltd. Bikaner.
2. Bharucha, E. 2005. Textbook of Environmental Studies, Universities Press, Hyderabad.
3. Bharucha, E. 2004. The Biodiversity of India, Mapin Publishing Pvt. Ltd. Ahmedabad.
4. Brunner, R. C. 1989. Hazardous Waste Incineration, McGraw Hill Inc. New York.
5. Clark, R. S. 2000. Marine Pollution, Clanderson Press Oxford.
6. Cunningham, W. P., Cooper, T. H., Gorhani, E. & Hepworth, M. T. 2001. Environmental Encyclopedia, Jaico Publications House, Mumbai.
7. De, A. K. 1989. Environmental Chemistry, Wiley Eastern Ltd.
8. Down to Earth, Centre for Science and Environment, New Delhi.
9. Hawkins, R. E. 2000. Encyclopedia of Indian Natural History, Bombay Natural History Society.
10. Heywood, V. H & Waston, R. T. 1995. Global Biodiversity Assessment, Cambridge House, Delhi.
11. Jadhav, H. & Bhosale, V. M. 1995. Environmental Protection and Laws. Himalaya Pub.
12. Joseph, K. and Nagendran, R. 2004. Essentials of Environmental Studies, Pearson Education (Singapore) Pte. Ltd., Delhi.
13. Kaushik, A. & Kaushik, C. P. 2004. Perspective in Environmental Studies, New Age International (P) Ltd, New Delhi.
14. Miller, T. G. Jr. 2000. Environmental Science, Wadsworth Publishing Co.
15. Odum, E. P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA.
16. Rajagopalan, R. 2005. Environmental Studies from Crisis to Cure. Oxford University Press, New Delhi.
17. Sharma, B. K. 2001. Environmental Chemistry. Geol Publishing House, Meerut.
18. Sharma, J. P. 2004. Comprehensive Environmental Studies, Laxmi Publications (P) Ltd, New Delhi.
19. Sharma, P. D. 2005. Ecology and Environment, Rastogi Publications, Meerut.
20. Subramanian, V. 2002. A Text Book in Environmental Sciences, Narosa Publishing House, New Delhi.
21. Survey of the Environment. 2005. The Hindu.
22. Tiwari, S. C. 2003. Concepts of Modern Ecology, Bishen Singh Mahendra Pal Singh, Dehra Dun.
23. Townsend, C., Harper, J. and Michael, B. 2001. Essentials of Ecology, Blackwell Science.
24. Booklet on Safe Driving. Sukhmani Society (Suvidha Centre), District Court Complex, Amritsar.

B.Tech. (Civil Engineering) 4th Semester
(Under Credit Based Continuous Evaluation Grading System)

CEL221: STRENGTH OF MATERIALS

L	T	P
2	1	0

Unit-I

Concept of Equilibrium: Load, reaction; general equilibrium equations; equilibrium of a point in space; equilibrium of a member; concept of free body diagrams; displacements; concept of displacement-constraints/ supports; statical-determinacy of a problem.

Simple Stress Strains: Introduction; concept of stress strain; stress-strain curves for ductile, brittle materials; generalized Hooke's law, stress-strain diagram of ductile brittle material, statically determinate indeterminate problems, compound composite bars, thermal stresses. Elastic constants, relations between various elastic constants its use; lateral strain, volumetric strain, poisons ratio; stress strains in thin cylinders, spherical shells; thin vassals subjected to internal pressures.

Unit-II

Complex Stress Strains: Introduction; normal stress, tangential stress; rectangular block subjected to normal stress along across two planes, combination of normal tangential stress; concept of principal stress its computation; Mohr circle; principal strains, computation of principal stresses from the principal strains.

Shear Force Bending Moment Diagrams: Introduction to the concept of reaction diagrams—shear force bending moment; role of sign conventions; types of load, beams, supports; shear force bending moment diagrams: simply supported, overhang cantilever beams subjected to any combination of point loads, uniformly distributed varying load, moment; relationship between load, shear force bending moment; different methods for plotting a bending moment shear force diagrams.

Unit-III

Bending Shear Stresses: Introduction; assumptions derivation of flexural formula for straight beams; centroid of simple built up section, second moment of area; bending stress calculation for beams of simple built up section, composite sections (flitched sections); shear stress; variation of bending shear stress along the depth of section.

Columns Struts: Stability of columns; buckling load of an axially loaded columns with various end conditions; Euler's Rankine's formula; columns under eccentric load, lateral load.

Torsion of Circular Shafts: Torsion, basic assumptions, derivation of torsion equation; power transmitted by shafts; analysis design of solid hollow shafts based on strength stiffness; sections under combined bending torsion, equivalent bending torsion.

Failure Theories: Maximum principal stress theory, maximum shear stress theory, distortion energy theory, strain energy theory, constant analysis of thin cylinder

Suggested Books:

1. Ramamrutham , S., " Strength of Material"
2. Popov, E., "Mechanics of Material"
3. Rajput, "Strength of Material"
4. Singh, S., "Strength of Materials"

B.Tech. (Civil Engineering) 4th Semester
(Under Credit Based Continuous Evaluation Grading System)

CEP 221: STRENGTH OF MATERIALS LABORATORY

L	T	P
0	0	2

List of Experiments

1. Draw stress strain curve for ductile brittle material in tension.
2. Draw stress strain curve for ductile brittle material in compression.
3. Draw shear stress, shear strain curve for ductile brittle material in torsion strength testing
4. Draw load deflection curve for spring in loading unloading conditions.
5. To determine the hardness of the given material by Rockwell Brinell hardness testing machine.
6. To determine the fatigue strength of the material.
7. To determine the impact strength by Izod Charpy test.
8. To determine the load carrying capacity of the leaf spring.
9. To test a mild steel cast iron specimen in double shear.

B.Tech. (Civil Engineering) 4th Semester
(Under Credit Based Continuous Evaluation Grading System)

CEL 222: WATER SUPPLY ENGINEERING

L	T	P
3	1	0

Unit-I

Public Water Supply: Beneficial uses of water, water demand, per capita demand, variation in demand, causes detection prevention of wastage of water, population forecasting.

Sources of Water Supply: Surface underground sources, relation development of source in r/o quality quantity of water, development of wells. Storage reservoir balancing service storage, capacity determination by mass curves method. Intake transmission system: distribution systems: network design. Hydrology principles, zones of under-ground water.

Unit-II

Quality Examination of Water: Necessity for examination of water impurities in water. Sampling of water, physical, chemical and bacteriological quality for domestic water supply. Drinking water quality criteria.

Water Supply Drainage of Buildings: System of water supply house connections, metering, internal distribution, sanitary fittings, pipe joints, different types of pipes pipes materials.

Unit-III

Water Treatment: Unit operations in water treatment, screening, plain sedimentation tank its theory, sedimentation, aided with coagulation, design of sedimentation tank, flocculation s filtration, rapid gravity filter, pressure filters, disinfections; necessary; requirements of a disinfectant, methods, of disinfecting, different practices of chlorination.

Miscellaneous Methods of Water Treatment: Aerial colour, odours taster from water, control, removal of iron manganese from water softening processes, base exchange process, swimming pool water treatment.

Suggested Books:

1. Garg, S. K., "Water Supply Engineering" Vol. I, Khanna Publishers, New Delhi, (*2003*).
2. Raju, B. S. N., "Waste Wastewater" Tata McGraw Hill, New Delhi, (1997).
3. Peavy, H. S. Rove D R, "Environmental Engineering" McGraw Hill, New Delhi, (*2003*).
4. Punmia, B. C., "Water Supply Engineering" Laxmi Publication, New Delhi, (*2002*).
5. Birdie, G. S., "Water Supply and Sanitary Engineering" Dhanpat Rai Publications, New Delhi, (*2003*).

B.Tech. (Civil Engineering) 4th Semester
(Under Credit Based Continuous Evaluation Grading System)

CEL 223: CONCRETE TECHNOLOGY

L	T	P
2	1	0

Unit-I

Introduction: Concrete as a structural material, constituent materials of concrete.
Cement: Types of cements, basic chemistry, heat of hydration, testing of cement: fineness, consistency, setting times, strength, types of Portland cements, expansive cements, pozzolanas.
Aggregates: Classification of aggregates, mechanical properties: bond, strength, toughness, hardness, physical properties, specific gravity, bulk density, porosity absorption, moisture content, bulking of s, sieve analysis, fineness modulus, grading of aggregate, maximum aggregate size.

Unit-II

Mix Design: Factors to be considered: water/cement ratio, durability, workability, cement aggregate content, design of mix by IS Code method.
Physical Properties of Fresh Concrete: Workability: factors affecting, methods of determination of workability, density of fresh concrete.

Unit-III

Mixing, Hling, Placing Compaction of Concrete: Mixers, mixing time, ready mixed concrete, pumped concrete, vibration of concrete, internal external vibrators, revibration, shotcrete.
Strength of Concrete: Porosity, gel/space ratio, total voids in concrete, factors affecting strength: water/cement ratio, relation between tensile compressive strengths; bond to reinforcement.
Permeability Durability: Permeability, sulphate attack, action of frost, frost resistance concrete.

Suggested Books:

1. Neville, A.M. Brookes, J.J. “Concrete Technology” Pearson Publishers, New Delhi, (*1994*).
2. Neville, A.M., “Properties of Concrete” Pearson Publishers, New Delhi, (*2004)*.
3. Gambhir, M.L., “Concrete Technology” Tata McGraw Hill, New Delhi, (*1995)*.
4. Shetty, M.S., “Concrete Technology” S. Ch and Company, New Delhi, (*2002)*.
5. Mehta, P.K., “Microstructure of Concrete” Indian Concrete Institute ACC, Bombay, (*1997)*.

B.Tech. (Civil Engineering) 4th Semester
(Under Credit Based Continuous Evaluation Grading System)

CEP 223: CONCRETE TECHNOLOGY LABORATORY

L	T	P
0	0	2

List of Experiments

1. Standard consistency of cement.
2. Initial and final setting time of cement.
3. Soundness of cement.
4. Specific gravity of cement.
5. Compressive strength of cement.
6. Water absorption, specific gravity of fine aggregates.
7. Water absorption, specific gravity of coarse aggregates.
8. Workability of concrete by slump cone method.
9. Workability of concrete by compaction factor method.
10. Workability of concrete by Vee-Bee consistometer
11. Compressive, flexural strength of concrete.

B.Tech. (Civil Engineering) 4th Semester
(Under Credit Based Continuous Evaluation Grading System)

CEL 224: SOIL MECHANICS

L	T	P
3	1	0

Unit-I

Basic Concepts: Definition of soil, soil mechanics common soil problem in civil engineering field. Principal types of soils. Important properties of very fine soil i. e. adsorbed water, base exchange soil structure. Characteristics of main clay mineral groups. Basic definitions in soil mechanics. Weight volume relationship physical properties of soils.

Index Properties: Determination of index properties, classification of coarse grained soils fine grained soils.

Unit-II

Permeability Seepage: Concept of effective stress principle. Seepage pressure, critical hydraulic gradient quick s condition, phreatic line. Capillary phenomenon in soil. Darcy's law its validity seepage velocity. Co-efficient of permeability its determination average permeability of striated soil mass Factors affecting 'K' brief discussion.

Compaction: Definition object of compaction concept of O.M.C. zero air void line. Modified proctor test. Factors affecting compaction. Effect of compaction on soil properties their discussion. Field compaction methods their comparison of performance relative suitability. Field compactive effort. Field control of compaction by proctor needle.

Unit-III

Consolidation: Definition object of consolidation difference between compaction consolidation. Concept of various consolidation characteristics i.e. av, mv Cv primary secondary consolidation. Terzaghi's method for one-dimensional consolidation. Consolidation test. Determination of Cv from curve fitting methods. Normally consolidated over consolidated clays importance of consolidation settlement in the design of structures.

Shear Strength: Stress analysis of a two - dimensional stress system by Mohr circle. Concept of pole. Coulomb's law of shear strength Coulomb - Mohr strength theory. Relations between principle stresses at failure Shear strength tests. Derivation of Skempton's pore pressure parameters. Stress strain volume change characteristics of ss.

Suggested Books:

1. Terzaghi, K. Peck, R. B., "Soil Mechanics in Engineering Practice" John Wiley Sons, New York, (*1995).*
2. Terzaghi, K., "Theoretical Soil Mechanics", John Wiley Sons, New York, (*1943).*
3. Ranjan, G. Rao, A.S.R., "Basic Applied Soil Mechanics" New Age International Pvt. Ltd., Publishers, New Delhi, (*2000).*
4. Murthy, V. N. S., Principles of Soil Mechanics Foundation Engineering ", UBSPD, (2001).
5. Donald, P., Coduto, "Geotechnical Engineering: Principles Practices", Pearson Education, Eastern Economy Edition, (*2000*).

B.Tech. (Civil Engineering) 4th Semester
(Under Credit Based Continuous Evaluation Grading System)

CEP 224: SOIL MECHANICS LABORATORY

L	T	P
0	0	2

List of Experiments

1. Visual examination of soil samples. Field identification tests. Classification as per IS Code.
2. Determination of water content of soil:
   a) By oven drying method
   b) Pycnometer method
   c) Calcium carbide method
3. Determination of in- situ density by core cutter method s replacement method.
4. Determination of liquid limit plastic Limit by Casagrade apparatus pycnometer method.
5. Determination of specific gravity of soil solids by pycnometer method.
6. Hydrometer analysis.
7. Direct shear test on a given soil sample.
8. Unconfined compression test for fine-grained soil.
9. Triaxial shear test.
10. Lab vane shear test
11. Determination of permeability by constant head methods variable head method.
12. Compaction test (Proctor) Modified proctor test. Plot of zero air voids line.
13. Consolidation test

B.Tech. (Civil Engineering) 4th Semester
(Under Credit Based Continuous Evaluation Grading System)

CEL225: NUMERICAL METHODS FOR CIVIL ENGINEERING

L	T	P
2	1	0

Unit-I

Approximation in Numerical Computation: Truncation rounding errors, fixed floating-point arithmetic, Propagation of errors.

Interpolation: Newton forward/backward interpolation, Lagrange's Newton's divided difference interpolation.

Unit-II

Numerical Integration: Trapezoidal rule, Simpson's 1/3 rule, Expression for corresponding error terms.

Numerical Solution of a System of Linear Equations: Gauss elimination method, Matrix inversion, LU Factorization method, Gauss-Seidel iterative method.

Unit-III

Numerical Solution of Algebraic Equation: Bisection method, Regula-Falsimethod, Newton-Raphson method.

Numerical Solution of Ordinary Differential Equation: Euler's method, Runge-Kutta methods, Predictor-Corrector methods Finite Difference method.

Text Books:

1. C.Xavier, "C Language Numerical Methods".
2. Dutta Jana, "Introductory Numerical Analysis".
3. Scarborough, J.B., "Numerical Mathematical Analysis".
4. Iyengar , J., Jain " Numerical Methods (Problems Solution)".

Suggested Books:

1. Balagurusamy, "Numerical Methods", Scitech.
2. Baburam, "Numerical Methods", Pearson Education.
3. Dutta, N., "Computer Programming Numerical Analysis", Universities Press.
4. Guha, Soumen Srivastava, Rajesh, "Numerical Methods", OUP.
5. Pal, Srimanta, "Numerical Methods", OUP.

Department Elective-I

B.Tech. (Civil Engineering) 4th Semester
(Under Credit Based Continuous Evaluation Grading System)

CEL 226: ELEMENTS OF REMOTE SENSING GIS

L	T	P
3	0	0

Unit-I

Introduction to Geographic Information System: Definitions related terminology, evolution of GIS, components of GIS, approaches to the study of GIS.

Maps GIS: Introduction, map scale classes of maps, the mapping process, plane coordinate systems transformations, geographic coordinate system of earth, map projection, geo referencing topographic mapping.

Unit-II

Digital Representation of Geographic Date: Introduction, database database management systems, raster geographic date representation, vector data representation, data representation data analysis in GIS.

Raster Basic GIS Data Processing: Introduction, acquiring hling raster geographic data, raster based GIS data analysis, cartographic modelling.

Unit-III

Vector Based GIS Data Processing: Introduction, Characteristics of vector based GIS data processing, topological non-topological functions.

Remote Sensing GIS: Introduction, Principles of electromagnetic remote sensing, remote sensing system classifications, imaging characteristics, extraction of metric information from remotely sensed images, integration of remote sensing GIS.

Suggested Books:

1. Lo, C. P. Young, K. W., "Concepts Techniques of Geographic Information Systems" PHI Pvt. Ltd, New Delhi, (*2002*).
2. Campbell, J. B., "Introduction to Remote Sensing" CBS Publishers and Distributors, New Delhi, (*2003*).
3. Burrough, P. A., "Principles of Geographic Information Systems for L Resources Assessment" Oxford University Press, (*2003*).
4. Duggal, S. K., "Surveying Volume 2" Tata McGraw Hill, New Delhi, (*2004*).
5. Donnay, J. P., "Remote Sensing Urban Analysis" CBS Publishers and Distributors, New Delhi, (*2003*).

B.Tech. (Civil Engineering) 4th Semester
(Under Credit Based Continuous Evaluation Grading System)

CEL 227: ENGINEEING GEOLOGY ROCK MECHANICS

L	T	P
3	0	0

Unit-I

General Geology: Importance of engineering Geology applied to Civil Engineering practices. Weathering, definition, types effect. Geological works of rivers, wind, glaciers as agents of erosion, transportation deposition.

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

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

Unit-II

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

Engineering Properties of Rocks Laboratory Measurement: Uniaxial compression test, tensile tests, permeability test, shear tests, size shape of specimen rate of testing. Confining pressure, stress strain curves of typical rocks. Strength of intact fissured rocks, effect of anisotropy, effect of saturation temperature

Unit-III

In-situ Determination of Engineering Properties of Rock Masses: Necessity of in-situ tests, uniaxial load tests in tunnels open excavations, cable tests, flat jack test, shear test, pressure tunnel test. Simple methods of determining in situ stresses, bore hole test.

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

Suggested Books:

1. Goodman, R.E., “Introduction to Rock Mechanics”.
2. Farmar, I.W., “Engineering Behaviour of rocks”.
3. Jaager Cook, “Fundamentals of Rock Mechanics”.
4. Arora, D.S., “Engineering Geology”.
5. Singh, P., “Engineering Geology”.
6. Verma, B.P. “Rock Mechanics for Engineering”.
7. C, Jaager, “Rock Mechanics Engg”.

B.Tech. (Civil Engineering) 4th Semester
(Under Credit Based Continuous Evaluation Grading System)

CEL 228: TOWN PLANNING

L	T	P
3	0	0

Unit-I

Town Planning: Definition meaning, age of planning, scope motives of planning, brief history of town planning – its origin growth, historically development of town planning in ancient valley civilizations. Indus Nile Tigris Euphrates, Greek Roman, Medieval Renaissance town planning

Unit-II

New Concepts: Garden city movement, Linear city concentric city concepts, Neighbourhood Radburm, La-cite industrial, Radiant city to present day planning.

Planning Principles: Types of town their functions, types of town planning – Grid Iron, Radial, Spider webs, Irregular mixed, their advantages disadvantages.

Unit-III

Planning Practice Techniques: Zoning – its definition, procedure districts, height bulk zoning, F. A. R., Master Plan – Meaning, preparation realization, the scope of city planning – city rehabilitation slum clearance.

Suggested Books:

1. Cherry Gordon, "Urban Planning Problems" Board Hill, London, (*1974*).
2. Sundaram, K. V, "Urban Regional Planning in India" Vikas Publishing House (P) Ltd., New Delhi, (*2000*).
3. Gallion, A. B, Eisner S, "The Urban Pattern" Van Nostr Reinhold, New York, (*1993*).
4. Jon, Lang, "A Concise History of Modern Architecture in India" Permanent Black Publishers, New York, (*1998).*
5. Taurus, Parke, "A City with Views Florence" I.B. Taurus Publishers, New York, (*1994).*

Department Elective-II

B.Tech. (Civil Engineering) 4th Semester
(Under Credit Based Continuous Evaluation Grading System)

CEL 229: BUILDING CONSTRUCTION

L	T	P
3	0	0

Unit-I

Brick Masonry: Definitions of various terms used, bond – definition, need scope, type of bonds – stretcher bond, header bond, English bond Flemish bonds, their merits demerits.
Stone Masonry: Rubble ashlars work.
Hollow Block Masonry: Hollow cement concrete block masonry hollow clay block masonry.
Walls: Types

(i) Load bearing
(ii) Non-load bearing walls, Thickness considerations.

Damp Proofing: Causes ill – effects, preventive measures

Unit-II

Arches Lintels: Definitions of various terms used in arches, types – flat, segmental, semi – circular horse – shoe, brick stone arches, types of lintels, their merits demerits.
Floors: Constituents, various types of floors commonly used their suitability for different buildings, constructional details of concrete terrazzo floors.
Doors Windows: Location sizes, types of doors windows, method of fixing door window frame in walls, ventilators.

Unit-III

Sloping roofs: Definitions of terms used, wooden trusses – king post queen post truss, steel trusses – fink, fan north light truss roofs, Jack arch roofs.
Stairs Staircases: Definition of terms used, essential requirements, proportioning of steps, types – straight flight, quarter turn, half turn spiral staircases, ramps, escalators lifts.
Footings: Types details
Miscellaneous Topics (to be covered briefly): Plastering pointing. White washing, colour washing, distempering painting, Scaffolding, underpinning shoring, building bye-laws.

Suggested Books:

1. Rangwala, S. C., "Engineering materials" Charotar Publishing House, An, (*2000*).
2. Bindra Arora, "Building Construction" Dhanpat Rai Publications (P) Ltd, New Delhi, (*2003)*.
3. Sinha, S. K. Jha, J., "Building Construction" Khanna Publishers, New Delhi, (2001).
4. Rangawala, S C, "Building Construction" Charotar Publishing House, An, (1993).
5. Ghose, D. N., "Materials of Construction" Tata McGraw Hill, New Delhi, (*2003)*.

B.Tech. (Civil Engineering) 4th Semester
(Under Credit Based Continuous Evaluation Grading System)

CEL 230: DISASTER MANAGEMENT

L	T	P
3	0	0

Unit-I

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

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

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

Unit-II

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

Capacity Building: Gender sensitive disaster management approach inculcate new skills sharpen existing skills of government officials, voluntary activists, development of professional elected representative for effective disaster management, role of media in effective disaster management, overview of disaster management in India, role of agencies like NDMA, SDMA other International agencies, organizational structure, role of insurance sector, DM act NDMA guidelines..

Unit-III

Application of Geoinformatics Advanced Techniques: Use of Remote Sensing Systems (RSS) GIS in disaster Management, role of knowledge based expert systems in hazard scenario, using risks-time charts to plan for the future, early warning systems.

Integration of public policy: Planning design of infrastructure for disaster management, community based approach in disaster management, methods for effective dissemination of information, ecological sustainable development models for disaster management.

Case Studies: Lessons experiences from various important disasters with specific reference to civil engineering.

Suggested Books:

1. Iyengar, C.B.R.I "Natural Hazards in The Urban Habitat" Tata McGraw Hill. Pub.
2. Leicester, T. R., "Natural Disaster Management" Jon Ingleton (Ed), Published.
3. Singh, R.B., "Disaster Management", Rawat Publications.
4. ESCAP: Asian The Pacific Report on Natural Hazards Natural Disaster Reduction.
5. Singh, J., "Disaster Management–Future Challenges Opportunities" I.K. International Publishing House.

B.Tech. (Civil Engineering) 4th Semester
(Under Credit Based Continuous Evaluation Grading System)

CEL 231: MASS TRANSPORTATION SYSTEM

L	T	P
3	0	0

Unit-I

History role of transit, recent trends in transit. Mass transportation characteristics. Urban mass transportation planning, demand projection, mass transportation system performance.

Unit-II

Economic evaluation methods, terminals their functions, design, typical requirement, scheduling vehicle dispatch policy, spacing of bus stops, route spacing performance, reserved bus lanes,

Unit-III

Operational management issues in transit planning, rail transit systems, underground transportation

Suggested Books:

1. Hutchinson, B.G., "Introduction to Urban Transportation Systems Planning", McGraw Hill. New York, (*1974*).
2. Kadiyali, L.R., "Traffic Engineering Transport Planning," Khanna Publishers, (*1997*).
3. Vukan R. Vuchic, "Urban Public Transportation Systems Technology" Prentice Hall Inc., N.J., (*1981*).