

**UNIVERSITY OF JAMMU, JAMMU  
FOR EXAMINATIONS TO BE HELD FOR BATCH 2014 & ONWARDS**

**COURSE OF STUDY FOR BE 1ST SEMESTER ENGINEERING**

**BRANCH: COMMON TO ALL BRANCHES**

Course No.	Course Name	Lecture	Tutorial	Pract.	Marks			
					Theory	Sessional	Practical	Total
MTH -101	Engg. Math-1	3	2	-	100	25	-	125
PHY -102	Engg. Phy-I	3	1		100	25	-	125
CHM -103	Engg. Chem-I	3	1		100	25	-	125
M -104	Engg. Mech	3	1		100	25	-	125
HUM -105	Comm. Skills	3	1	-	100	25	-	125
M-106	Engg. Graphics	1	-	3	100	-	50	150
PHY -107	Engg. Physics Lab.	-	-	2	-	-	50	50
CHM -108	Engg. Chemistry Lab	-	-	2	-	-	50	50
M -109	Engg. Mech. Lab.	-	-	2	-	-	50	50
M -110	WS Technology	1	-	3	-	-	75	75
Total		17	6	12	600	125	275	1000

**CLASS : B.E. IST SEMESTER**  
**BRANCH: COMMON TO ALL**

<b>COURSE TITLE: ENGINEERING MATHEMATICS-I</b>	<b>L</b>	<b>T</b>	<b>MARKS</b>	
<b>COURSE NO.MTH-101</b>	<b>3</b>	<b>2</b>	<b>Theory</b>	<b>Sessional</b>
<b>DURATION OF EXAM: 3 HOURS</b>			<b>100</b>	<b>25</b>

**SECTION-A**

- Differential Calculus:** Successive differentiation, Leibnitz theorem (without proof), Partial differentiation with errors and approximations, Euler's theorem on homogeneous functions, Taylor's and Maclaurin's series of two variables, Maxima and Minima of functions of two variables, Asymptotes, Double points, curvature, Curve tracing in Cartesian, polar and parametric forms.
- Integral Calculus:** -Definite integrals with important properties, differentiation under the integral sign, Gamma, Beta and error functions with simple problems, applications of definite integrals to find length, area, volume and surface area of revolutions, transformation of coordinates, double and triple integrals with simple problems.

**SECTION-B**

- Complex Trigonometry:** Hyperbolic functions of a complex variable, Inverse Hyperbolic functions, Logarithmic function of a complex variable, Summation of series by  $C+iS$  method.
- Ordinary Differential Equations:** Differential equations of first order and first degree: Exact and non-exact differential equations, Linear and Bernoulli's differential equations. Higher order linear differential equations: Complementary solution, particular integral and general solution of these equations, variation of parameters technique to find particular integral of second order differential equations, Cauchy's and Lagrange's differential equations. Applications of Ordinary Differential Equations to simple Electrical and Mechanical Engg. problems.
- Solid Geometry:** Sphere, Intersection of sphere and plane, tangent plane property, cone and cylinder, related problems to right circular cone and cylinder.

**BOOKS RECOMMENDED:**

- |                                   |   |
|-----------------------------------|---|
| 1. Engineering Mathematics        | B.S. Grewal, Khanna Publications, New Delhi |
| 2. Calculus and Analytic Geometry | Thomas and Finney, AddisonWesley, Narosa.   |
| 3. Differential Calculus          | S. Narayan, New Delhi                       |
| 4. Integral Calculus              | S. Narayan, New Delhi.                      |

**NOTE:** There shall be total eight questions, four from each section. Each question carries 20 marks. Five questions will have to be attempted, selecting at least two from each section. Use of calculator is allowed.

**COURSE OUTCOMES**

**COURSE NAME- ENGG. MATHEMATICS – I**

**COURSE CODE-MTH – 101**

After learning this course students will be able to:

<b>CO101.1</b>	Learn the rules of nth derivative, to find maximum and minimum value of any function, to trace the curves.
<b>CO101.2</b>	Understand the concept of definite integrals and find arc length, area, surface area and volume of various curves.
<b>CO101.3</b>	Solve the differential equations of first order and higher order.
<b>CO101.4</b>	Differentiate the concept of finding the equations of sphere, cone and cylinder and evaluate the complex no. in polar form and understand the idea of hyperbolic functions.

**B.E IST SEMESTER****MAXIMUM MARKS:125****BRANCH: COMMON TO ALL****SUBJECT: ENGINEERING PHYSICS-I****L T P THEORY SESSIONAL****COURSE NO.PHY-102****3 1 2 100 25****DURATION OF EXAM: 03 HOURS****SECTION-A****UNIT-I: MATHEMATICAL PHYSICS**

Review of Vector Algebra, Scalar and Vector fields, Gradient of a Scalar field, Divergence and curl of a vector field and their physical significance, solenoidal fields, Gauss Divergence theorem, Stokes theorem and their applications, Vector Identities

*No of Lectures – 10, Weightage = 25%***UNIT-II: ELECTROMAGNETIC FIELDS AND WAVES**

Gauss's law in vector notation (differential and integral forms), Applications of Gauss's law to find electric fields due to a long straight charged wire, Cylindrical and Spherical charge distributions.

Derivation of Ampere's Circuital law, Application of Ampere's circuital law to find magnetic intensity due to long cylindrical wire, due to a long solenoid. Differential & Integral form of Faraday's law of electromagnetic induction, Equation of continuity, Displacement current and its significance, Maxwell's field equations (differential and integral forms), Biot-Savart law,

Electromagnetic wave propagation in free space (e.m wave equations for  $\vec{E}$  &  $\vec{B}$  fields for free space and their solutions (plane wave solution), velocity of e.m. waves, Relation between  $E_0$  &  $B_0$ . Definition of Poynting Vector, Poynting theorem.

*No of Lectures – 16, Weightage = 25%***SECTION-B****UNIT-III: APPLIED OPTICS**

Interference in thin films (by reflection and transmission of light), Theory of Newton's rings by reflected light, Determination of wave length and refractive index of monochromatic light by Newton's theory.

Fraunhofer & Fresnel's diffractions Fresnel's half period zones and rectilinear propagation of light, Fraunhofer diffraction due to a single slit, plane diffraction grating & its theory for secondary maxima and minima.

Unpolarized and polarized light, Nicol Prism, Mathematical representation of polarization of different types, Quarter & half wave plates.

*No of Lectures – 12, Weightage = 20%***UNIT-IV: OSCILLATIONS**

Free damped and forced oscillations and their differential equations, Logarithmic decrement, power dissipation & Quality factor, ultrasonic waves and their production by Piezoelectric method and applications (General)

*No of Lectures – 05, Weightage = 15%*

**UNIT-V: FIBRE OPTICS**

Propagation of light in fibres, numerical aperture, Single mode and multimode fibres, General applications  
*No of Lectures – 05, Weightage = 15%*

TUTORIALS

S.NO.	TOPICS	UNIT NO.
T-1	Numerical problems based on vector analysis	I
T-2	Numerical problems on Gradient of Scalar fields	I
T-3	Numerical problems on Divergence of Vector fields	I
T-4	Numerical problems on Curl of vector fields	I
T-5	Numerical problems based on Guass divergence theorem and Stokes Theorem	I
T-6	Numerical problems based on the applications of Guass's Law	II
T-7	Numerical problems based on the applications of Ampere's law	II
T-8	Numerical problems pertaining to the applications of Faraday's law	II
T-9	Numerical problems pertaining to the applications of Interference phenomenon, Formation of Newton's rings	III
T-10	Numerical problems pertaining to the applications of diffraction and polarization phenomenon	III
T-11	Numerical problems based on the applications of SHM, damped and forced motion of bodies and applications of ultrasonic	IV
T-12	Numerical problems based on the applications of Fibre optics	V

NOTE: SETTING OF QUESTION PAPER (Instructions for examiners)

- i) The question paper will consist of two sections\
  - a) Section-I
  - &
  - b) Section-II
- ii) Section-I Comprises of Unit-I and Unit-II  
 Section-II Comprises of Unit-III, Unit-IV and Unit-V
- iii) Number of questions to be set in the paper =8 (eight)  
 (Four from each section) as per weightage

- iv) Number of questions to be attempted =5 (five)  
 (Selecting at least two from each section)

**BOOKS RECOMMENDED:**

S.NO.	TITLE	AUTHOR
1.	Vector Analysis	Spiegel
2.	Mathematical Physics	Rajput & Gupta
3.	Physics	Reisnick&Hatliday
4.	Optics	Brijlal&Subramaniam
5.	Sound	Subramaniam
6.	Sound	Khanna & Bedi
7.	Fibre Optics	Ghatak, Tyagrajan

**COURSE OUTCOMES**

**COURSE NAME- ENGG. PHYSICS I**  
**COURSE CODE- PHY-102**

After learning this course students will be able to:

<b>CO102.1</b>	Students should be able to understand the mathematical concepts required to understand physics.
<b>CO102.2</b>	Students should be able to derive the Maxwell's equations and understand the basis electromagnetic theory.
<b>CO102.3</b>	Students should be able to assimilate the basic concepts of interference in thin films, diffraction, polarisation and the characteristics of different types of waves.
<b>CO102.4</b>	Students should be able to gain the knowledge about lasers, their characteristic's & properties and the basics of optical fibres

**CLASS: B.E. IST SEMESTER**

**BRANCH: COMMON TO ALL**

	<b>L</b>	<b>T</b>	<b>P</b>	<b>MARKS</b>		
<b>COURSE TITLE: ENGG. CHEMISTRY</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>Theory</b>	<b>Sessional</b>	<b>Practical</b>
<b>COURSE NO.:CHM-103</b>				<b>100</b>	<b>25</b>	<b>50</b>

**DURATION OF EXAM: 3 HOURS**

**SECTION - A**

- 1. SPECTROSCOPY:** UV Spectroscopy –Electronic transitions, spectrum, shift of bonds with solvents for double bonds, carbonyl compounds and aromatic compounds.

IR-Spectroscopy –Introduction, brief idea about instrumentation, applications and interpretation of IR Spectra, characterization of functional groups and frequency shift associated with structural changes.

‘H-NMR Spectroscopy –Theory of ‘H-NMR Spectroscopy, equivalent and non-equivalent protons, chemical shift, spin-spin coupling, spin-spin splitting, H’-NMR spectrum of a few organic compounds.

- 2. EXPLOSIVES:** Introduction, classification and types of explosives, requirement for good explosives, preparation and uses of following explosives – Nitrocellulose, TNT, Dinitrobenzene, Picric Acid, Nitroglycerine and Dynamite, Gun Power, RDX, Tetracene.

**SECTION - B**

- 1. STEREOCHEMISTRY:** Optical isomerism, racemization, asymmetric synthesis, methods for resolution of racemic mixture, enantiomerism and diastereoisomerism.
- 2. ALLOYS:**Introduction, purpose of making alloys, preparation of alloys, classification of alloys. (Ferrous and non-ferrous alloys), alloy steels & copper alloys.
- 3. LUBRICANTS: DEFINITIONS,** functions of lubricants, mechanism of lubrication, classification of lubricants (Lubricating oils, semi solid lubricants and solid lubricants) synthetic lubricants, flash and fire points, oiliness, cloud and pour points.
- 4. DYES AND DRUGS:**Classification of dyes and its applications. Define drug and give the applications of following drugs.

a) Narcotics    b) Tranquilizers    c) Antipyretics    d) Antibiotics

**FORMAT OF QUESTION PAPER**

**Total No. of Questions** = **08**

**Questions to be attempted** = **05**

**(Minimum Two from Each Section A & B)**

**BOOKS RECOMMENDED:**

- |    |                                   |                    |
|----|-----------------------------------|--------------------|
| 1. | Engineering Chemistry             | Jain & Jain        |
| 2. | Engineering Chemistry             | Sharma, B.K.       |
| 3. | Engineering Chemistry             | Dara, S.S.         |
| 4. | Organic Chemistry                 | Bahl, B.S.         |
| 5. | Organic Chemistry                 | Soni, P.L.         |
| 6. | Organic Chemistry                 | Jain, M.K.         |
| 7. | Spectroscopy of Organic Compounds | Silverstain        |
| 8. | Spectroscopy of Organic Compounds | Kalsi, P.S.        |
| 9. | Engineering Chemistry             | Dr. Rajinder Kumar |

**COURSE OUTCOMES**

**COURSE NAME: ENGG. CHEMISTRY**

**COURSE NO: CHM-103**

After learning this course students will be able to:

<b>CO103.1</b>	One could acquire Knowledge about the identification of newly synthesized products.
<b>CO103.2</b>	Know the New drug development process.
<b>CO103.3</b>	Ability to design and perform in – vitro dissolution studies for various drugs as per the standards of official monographs Combine Dyeing Process and Colorants design – quality systems, develop manufacturing procedures.
<b>CO103.4</b>	know how to approach the problem of choosing an alloy for a particular application,
<b>CO103.5</b>	Know the importance of stereochemistry in organic compound and apply the knowledge gain in this course to the variety of chemical compounds.



**CLASS: B.E. IST SEMESTER**

	<b>L</b>	<b>T</b>	<b>P</b>	<b>MARKS</b>		
<b>BRANCH: COMMON TO ALL</b>						
<b>COURSE TITLE: ENGINEERING MECHANICS</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>Theory</b>	<b>Sessional</b>	<b>Practical</b>
<b>COURSE NO.M-104</b>				<b>100</b>	<b>25</b>	<b>50</b>

**DURATION OF EXAM: 3 HOURS**

### **SECTION-A (STATICS)**

Scope and basic concepts (Rigid body, force, units, etc.), concept of free body diagram, Resultant of Co-planar concurrent forces in a plane and space, moment of force, Principle of Moments, Coplanar and spatial applications. Virtual work method and its applications.

Equilibrium and its equations for a planar and spatial systems, Analysis of trusses, Method of joints and sections.

Theory of friction, its laws and applications (inclined plane). Square threaded screws, Bolt friction, Centroids and center of gravity, centroids of lines and composite areas, centroids determined by integration.

Moment of inertia, Area M.O.I, Transfer theorems, Polar M.O.I, Product of inertia, Principal M.O.I, Mohr's circle for area M.O.I, Transfer theorems and axes M.O.I of composite bodies.

### **SECTION-B (DYNAMICS)**

Kinematics of a particle rectilinear motion, motion curves, Rectangular components of curvilinear motion, Flight of Projectile, Normal and tangential components of acceleration, Radial and transverse components, Newton's Laws. D'Alembert's Principle.

Kinematics of rigid bodies: Types of rigid body motion, Angular motion, fixed axis rotation, Analysis of plane motion and its applications, Instantaneous center and Instantaneous axis of rotation.

Kinetics of Particle: Translation, Analysis of a particle as a rigid body.

Kinetics of rigid bodies: Equations of plane motion, fixed axis rotation, Rolling bodies, General plane motion, Impulse and momentum in plane motion, Angular momentum.

### **RECOMMENDED BOOKS:**

- |    |  |                      |
|----|--|----------------------|
| 1. | Engineering Mechanics (Statics & Dynamics)   | Beer and Johnson     |
| 2. | Engineering Mechanics (Statics & Dynamics)   | Mariam and Kraige    |
| 3. | Engineering Mechanics (Statics and Dynamics) | Timoshenko and Young |
| 4. | Engineering Mechanics (Statics and Dynamics) | Ferdinand L Singer.  |

**NOTE: There shall be total eight questions, four from each section. Five questions will have to be attempted selecting at least two from each section. Use of calculator is allowed.**

<b><u>COURSE OUTCOMES</u></b>	
<b>COURSE NAME: ENGINEERING MECHANICS</b>	
<b>COURSE NO: M-104</b>	
After learning this course students will be able to:	
<b>CO104.1</b>	Analyze the system of units and the conversion of units from one to another.
<b>CO104.2</b>	Demonstrate knowledge on basic calculation of forces and their resultant and resolution.
<b>CO104.3</b>	Approach to a conclusion of forces causing equilibrium.
<b>CO104.4</b>	Be proficient in the use of integral and moment methods for calculating centre of gravity.
<b>CO104.5</b>	Develop a stable, environment friendly structure for various engineering purpose using various modern tools.

**B.E IST SEMESTER**

**L T P MARKS**

**BRANCH: COMMON TO ALL**

**3 1 - Theory Sessionals**

**TITLE: COMMUNICATION SKILLS**

**COURSE NO: HUM-105**

**100 25**

**DURATION: 3 HOURS**

Exercises in comprehension, grammar vocabulary, usage, pronunciation, spelling and composition based on the following texts:

- i. Contemporary English Prose  
Edited by Menon  
Oxford University Press
  - ii. Developing English Skills  
Edited by Thanker, Desai and Purani  
Oxford University Press
- Or
- English through Reading-II  
Edited by Bhasker and Prabhu

**Note:** Test-I carries 50% weightage in the question paper and Text-II carries 50% weightage

Question Paper:

1. Six short answer questions on comprehension to be set (30 marks)

- from Text-I. Students expected to answer any three in about 150 words each
2. Phrases and idioms from text I to be used in sentences. (20 marks)  
Hundred percent choices to be given
  3. Completing a paragraph of which the first two or three short Sentences are given (10 marks)
  4. Exercise on tenses from Text II (5 marks)
  5. Exercises on active/passive transformation from Text-II (5 marks)
  6. Forming verbs or adjectives or nouns from the given words-text-II (5 marks)
  7. Propositions from text-II (5 marks)
  8. Matching words and their meanings Text-II (5 marks)
  9. Forming words ending in-ify,-ize,-tion, ec. From Text-II (5 marks)
  10. Filling in the blanks with a given set of words in Brackets-Text-II (5 marks)
  11. Questions on miscellaneous exercises from Text-II such as Question tags - articles etc. (5 marks)
- or
- Marking Stress or Syllable in given words.

### COURSE OUTCOMES

**COURSE NAME- COMMUNICATION SKILLS**

**COURSE CODE- HUM-105**

After learning this course students will be able to:

<b>CO105.1</b>	Prepare, organize, and deliver engaging oral presentations and thus increase confidence in speaking publicly.
<b>CO105.2</b>	Write effectively for a variety of professional and social settings.
<b>CO105.3</b>	Become active readers who can articulate their thoughts, views etc. and built curiosity for other perspectives and shall be able to understand the importance of communication with others.
<b>CO105.4</b>	Interpret texts with an awareness of and curiosity for other viewpoints.
<b>CO105.5</b>	Enhance his/her vocabulary.

**CLASS: B.E. IST SEMESTER**

**BRANCH: COMMON TO ALL**

	L	T	P	MARKS		
<b>COURSE TITLE: ENGINEERING GRAPHICS</b>	<b>1</b>	<b>0</b>	<b>3</b>	<b>Theory</b>	<b>Sessional</b>	<b>Practical</b>
<b>COURSE NO. Eng-106</b>				<b>100</b>	<b>0</b>	<b>50</b>

**DURATION OF EXAM: 3 HOURS**

**UNIT-1**

**Introduction:** Conventional lines and signs used in Engineering Drawing, Printing and Lettering, Curves used in Engineering Practice: Cycloidals, Involutes, Spirals and Hellices, Locus of a point on simple mechanisms.

**Theory and practice of Orthographic projections.**

**Projection of points and Lines:** Projections of points and lines in different quadrants w.r.t principle reference planes, Finding of true length, True inclinations and traces of lines.

**Projection of Planes:** Projections of a plane w.r.t. the principle planes in simple and inclined positions. Rotation method and the Auxiliary plane method. Space relation of a plane and a line. To locate a point on a plane given its projections. Parallel relation of lines and planes. Shortest distance between a line and a plane.

**UNIT-2**

**Projection of Solids:** Classification and main features-Prisms and Pyramids. Projection of solids inclined to both the reference planes by (1) Rotation Method, and (II) Auxiliary plane method. Projection of solids in combination (Co-axial) in simple and inclined positions.

**Sectioning of Solids:** Object of sectioning, Types of cutting planes, True shape of section, Auxiliary views of sections of multiple co-axial solids in simple and titled conditions.

**UNIT-3**

**Interpenetration of Solids and Intersection of Surface:** Intersection of geometrical solids/hollow sections, Tracing of lines of intersection by line method and by section method.

**Development of Surfaces:** Classification of surfaces, Methods of development-Straight line method and Radial line method, Development of solids and hollow sections in full or part development of transition pieces. To draw projections from given development.

**UNIT-4**

**Isometric Projection:** Isometric scale, Isometric axes and Isometric planes, Isometric projection of solids and simple machine blocks.

**Orthographic Projections:** Orthographic projection of simple blocks (First & Third angles), to draw the third view from given two views. Missing lines in projection.

**RECOMMENDED BOOKS:**

- |    |                                    |                             |
|----|------------------------------------|-----------------------------|
| 1. | Engineering Drawing                | N.D Bhatt                   |
| 2. | Practical Geometry                 | V. Laxminarayan & GEV       |
| 3. | Engineering Graphics               | K.L. Narayanan & P. Kamaish |
| 4. | Principles of Engineering Graphics | P.E Giesecks                |
| 5. | Engineering Graphics               | Frederic & Michelle.        |

**NOTE: At least two questions to be attempted from Unit-I and at least one question from each of the Units-II, III and IV in the theory examination paper.**

<b><u>COURSE OUTCOMES</u></b>	
<b>COURSE NAME- ENGINEERING GRAPHICS</b>	
<b>COURSE CODE- M-106</b>	
After learning this course students will be able to:	
<b>CO106.1</b>	Draw orthographic projections of sections
<b>CO106.2</b>	Use architectural and engineering scales with accuracy.
<b>CO106.3</b>	Work with zeal of office practices and standards.
<b>CO106.4</b>	Convert sketches to engineered drawing.
<b>CO106.5</b>	Perform auto cad two dimensional drawing.

<b>B.E IST SEMESTER</b>	<b>P</b>	<b>MAXIMUM MARKS</b>
<b>SUBJECT: ENGINEERING PHYSICS LAB-I</b>	<b>2</b>	<b>SESSIONAL</b>
<b>COURSE NO.: PHY-107</b>		<b>50</b>

<b>S.No.</b>	<b>Experiment No.</b>	<b>Title of Experiment</b>
1.	Exp-I	To plot a graph between the distance of the knife edges from the center of gravity and the time period of a compound pendulum. From the graph, find a) Acceleration due to gravity  b) Radius of gyration and the moment of inertia of the bar about an axis through the center of gravity.
2.	Exp-II	To find the dispersive power of a given prism using a spectrometer.
3.	Exp-III	To find the refractive index of a given liquid using a hollow prism
4.	Exp-IV	To find the focal lengths of a convex mirror and a concave lens using a convex lens and a concave mirror respectively.
5.	Exp-V	To find the frequency of A.C mains using an electrical vibrator.

6.	Exp-VI	To draw the V-I characteristics of a forward and reverse bias P-N junction diode.
7.	Exp-VII	To study the common base characteristics of PNP junction transistor.
8.	Exp-VIII	To study the common emitter characteristics of PNP junction transistor.
9.	Exp-IX	To study the common base characteristics of NPN junction transistor.
10.	Exp-X	To study the common Emitter characteristics of NPN junction transistor.
11.	Exp-XI	To evaluate the value of Planck's constant.
12.	Exp-XII	To study the characteristics of a Solar Cell.

**NOTE:** A minimum of six experiments is to be performed in a semester.

**BOOKS RECOMMENDED:**

	TITLE	AUTHOR
1.	Practical Physics	Warnop & Flint
2.	Practical Physics	Chauhan & Singh (Vol. I & Vol. II)
3.	B.Sc. Practical Physics	C.L Arora

<b>COURSE OUTCOMES</b>	
<b>COURSE NAME- ENGINEERING PHYSICS</b>	
<b>COURSE CODE- PHY-107</b>	
After learning this course students will be able to:	
<b>CO107.1</b>	calculate the value of Plank's constant by using Photoelectric effect and thereby verify the Einstein's photoelectric equation
<b>CO107.2</b>	Understand the concepts of semiconductor diodes by studying their characteristics in forward and reverse bias modes.
<b>CO107.3</b>	Understand the concepts of stationary waves and hence find the value for frequency of A.C Mains by using Sonometer.
<b>CO107.4</b>	Equip themselves with concepts of acceleration due to gravity, moment of inertia & radius of gyration and verify the same by using compound pendulum.
<b>CO107.5</b>	Calculate the angle of prism by using spectrometer and thereby verify the laws of reflection & refraction. To verify the laws of dispersion of light and calculate the minimum deviation and hence find the Refractive Index of a Prism by using Spectrometer

**“Practical performance pertaining to the above topics will be useful for the students to acquaint them with handling of instruments and experimentation”.**

**B E I<sup>ST</sup> SEMESTER**

**MAXIMUM MARKS**

**SUBJECT: ENGINEERING CHEMISTRY LAB**

**2**

**SESSIONAL**

**COURSE NO.: CHM – 108**

**50**

**CHEMISTRY PRACTICAL:**

1. Determine the percentage of  $\text{CaCO}_3$  in precipitated chalk. You are provided with 1N HCl and 0.1N NaOH.
2. To analyse the given antacid tablets.
3. Determine Volumetrically the %age purity of given sample of Ferrous sulphate, x gms of which have been dissolved per litre provided N/10  $\text{KMnO}_4$
4. Determine Volumetrically the number of molecules of water of crystallization present in the given sample of Mohr's salt, x gms. of which have been dissolved per litre provided N/10  $\text{K}_2\text{Cr}_2\text{O}_7$  (using an external indicator).
5. Determine Volumetrically the percentage of Cu in a sample of  $\text{CuSO}_4$  crystals, Z gms of which have been dissolved per litre, provided 0.1N  $\text{Na}_2\text{S}_2\text{O}_3$ .
6. To determine the coefficient of viscosity of an unknown liquid using Ostwald Viscometer.
7. Determine the surface tension of a unknown liquid using Stalagmometer.
8. To prepare a pure and dry sample of Aspirin
9. To prepare a pure and dry sample of Glucosazone
10. Determine the method of purification of organic compounds by coloumn chromatography.
11. Determine the aniline point of a given lubricating oil.

**BOOKS RECOMMENDED:**

- |    |   |                         |
|----|---|-------------------------|
| 1. | Experimental Engineering Chemistry          | Shashi Chawla           |
| 2. | Lab. Manual on Engg. Chemistry              | Basin, S K & Sudha Rani |
| 3. | A Manual of Practical Engineering Chemistry | Dr. Rajinder Kumar      |

<b>B.E IST SEMESTER</b>	<b>P</b>	<b>MAXIMUM MARKS</b>
<b>SUBJECT: ENGG. MECHANICS LAB</b>	<b>2</b>	<b>SESSIONAL</b>
<b>COURSE NO.: M – 109</b>		<b>50</b>

Lab work shall be based on theory course of Engineering Mechanics Paper

<b><u>COURSE OUTCOMES</u></b>	
<b>COURSE NAME: ENGINEERINGMECHANICS LAB</b>	
<b>COURSE CODE:M-109</b>	
After learning this course students will be able to:	
<b>CO109.1</b>	Apply the fundamentals of statics and motion principles of various engineering problems related to statics and motion.
<b>CO109.2</b>	Have the knowledge of finding the stable structures of various engineering purposes and bending of beams by using bending moment apparatus.
<b>CO109.3</b>	Solve engineering problems related to motion.
<b>CO109.4</b>	Demonstrate the knowledge on basic calculation of forces and their resultant and resolution.
<b>CO109.5</b>	Solve the engineering problems related to friction and analyze it in real life situation.

**CLASS: B.E. IST SEMESTER**

**BRANCH: COMPUTER ENGG., CIVIL ENGG., MECH. ENGG., ELECTRICAL ENGG., ELECTRONICS & COMM. ENGG.**

<b>COURSE TITLE: WORKSHOP TECHNOLOGY</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>MARKS</b>		
<b>COURSE NO.WS-110</b>	<b>1</b>	<b>0</b>	<b>3</b>	<b>Theory</b>	<b>Sessional</b>	<b>Practical</b>
<b>COURSE CONTENT:</b>				<b>0</b>	<b>0</b>	<b>75</b>

Introduction to workshop as a fabrication unit. Information regarding various material of construction i.e Ferrous and Non-Ferrous, wood, plastics, etc. Basic fabrication process i.e. castings, Mechanical working, welding and machining.

Wood working and pattern making practice, Information about working hand and wood working machines, various methods of joining of wooden parts for the fabrication of patterns, Pattern materials and allowances, pattern construction procedures, preservation of patterns.

Moulding and casting practice. Sand Moulding, Natural foundry sands and synthetic sands, preparation of moulding sands, mould making procedure, cast iron and aluminum and pouring, melting



crucible process, Extraction of Castings. Cold and hot working processes, basic tools and equipment used in mechanical working. Forging furnace operation, Smith forgoing operations.

**BOOKS:**

1. Manufacturing process and materials by Campbell.
2. Manufacturing Process by P.N. Rao
3. Workshop Technology by Hajra and ChowdharyVol.I

**SHOP PRACTICE:**

**Unit-1 Pattern Making:**

- i) Baring block pattern
- ii) Split pattern of "bench Vice" (Sliding Jaw).

**Unit-II Moulding and Casting**

Moulding and Castings of Patterns at Unit I.

**Unit-III Hand forging of:**

**COURSE OUTCOMES**

**COURSE TITLE: WORKSHOP TECHNOLOGY**

**COURSE NO.WS-110**

After learning this course students will be able to:

- i) Haxagonal headed bolt from a cylindrical rod.
- ii) Cubical Block from a Cylindrical section.

<b>CO110.1</b>	Prepare pattern making of open bearing block
<b>CO110.2</b>	Prepare pattern making of bench vice (Sliding Jaw).
<b>CO110.3</b>	Perform moulding and casting of open bearing block and bench vice .
<b>CO110.4</b>	Perform forging of hexagonal headed bolt from a cylindrical rod.
<b>CO110.5</b>	Perform forging of cubical block from a cylindrical section.

**UNIVERSITY OF JAMMU, JAMMU  
FOR EXAMINATIONS TO BE HELD FOR BATCH 2014 & ONWARDS**

**COURSE OF STUDY FOR BE 2ND SEMESTER ENGINEERING**

**BRANCH: COMMON TO ALL BRANCHES**

Course No.	Course Name	L	T	P	Marks			
					Theory	Sess.	Pract	Total
MTH –201	Engineering Math-II	4	2	-	100	25	-	125
PHY -202	Engineering Phy-II	3	1	-	100	25	-	125
CHM -203	Engineering Chem-II	3	1	-	100	25	-	125
COM -204	Computer Programming	3	1	-	100	25	-	125
HUM-205	Engineering Economics	3	1	-	100	25	-	125
M -206	Machine Drawing-I	1	-	3	100	25	-	125
M -207	Workshop Technology-II	1	-	3	-	-	75	75
PHY –208	Engineering Physics II	-	-	2	-	-	50	50

	Lab							
CHM –209	Engineering Chemistry II Lab	-	-	2	-	-	50	50
COM –210	Computer Programming Lab	-	-	2	-	-	75	75
<b>Total</b>		18	6	12	600	150	250	1000

**B.E 2<sup>ND</sup> SEMESTER**

**MAXIMUM MARKS:125**

**COURSE NO: MTH-201**

**L T THEORY SESSIONAL**

**COURSE TITLE: ENGG. MATH-II**

**4 2 100 25**

**BRANCH : COMMON TO ALL**

**DURATION OF EXAM: 3 HOURS**

**SECTION-A**

- 1. Introduction to infinite series & sequences:** - Convergence and divergence of a series, Leibnitz test, p-test, comparison test, Cauchy's root test, D' Alembert Ratio Test, Raabe's Test, Logarithmic test, alternating series.
- 2. Fourier Series:** Introduction, Euler's formulae, sufficient conditions for a Fourier expansion, functions having points of discontinuity, change of intervals. Odd and even functions, Fourier expansion of Odd and even periodic functions, half range series, typical wave forms, Parseval's formula, complex form of Fourier -series.
- 3. Power Series Solutions of Second order O.d.e:** Analytic function, ordinary point, singular point, regular and irregular singular points of o.d.e.  $Y'' + P(x)Y' + Q(x)Y=0$ , Series solution of such differential equations about an ordinary point, Frobenius series solution about a regular singular point.

**SECTION-B**

- 2. First Order partial differential equations: -**

- Formation of p.d.e, First order linear p.d.e, Non-Linear p.d.e. of 1st order, solution by Charpit's method, Four Standard forms of non-linear p.d.e with reference to Charpit's technique.
3. **Higher Order Linear p.d.e:** Homogenous and Non-homogenous higher order linear partial differential with constant coefficient inverse operator  $1/f(D, D')$ , Rules for finding P.I and C.F, Non-Linear equations of 2<sup>nd</sup> order. Application of p.d.e, method of separation of variables to solve equations of vibrations of strings (or one dim wave equation), one dim and two dim heat flow equations, Laplace equations, transmission line).
  4. **Matrices & determinants:** Introduction, Rank of matrix, Elementary transformations, Elementary matrices, Inverse using elementary transformation, Normal form of a matrix, Vector spaces, Linear dependence and independence of vectors, consistency of linear system of equations, linear and orthogonal transformations, Eigen values and Eigen vector, Properties of Eigen value, Cayley Hamilton Theorem, Reduction to diagonal form, Reduction of quadratic form to canonical form, complex matrices.

**BOOKS RECOMMENDED:**

1. Advanced Engineering Mathematics by R.K. Jain, S.R.K Iyenger, 2<sup>nd</sup> edition, Narosa, New Delhi.
2. Higher Engineering Mathematics Dr. B.S. Grewal
3. Engineering Mathematics Dr. Bhopinder Singh
4. Engineering Mathematics B.S. Grewal Khanna Publication, New Delhi.
5. Partial differential equations Singhanian

**NOTE: There shall be total eight questions, four from each section. Each question carries 20 marks. Five questions will have to be attempted, selecting at least two from each section. Use of calculator is allowed.**

<b><u>COURSE OUTCOMES</u></b>	
<b>COURSE NAME- ENGG. MATHEMATICS – II</b>	
<b>COURSE CODE-MTH – 201</b>	
After learning this course students will be able to:	
<b>CO201.1</b>	Learn the concept of linear and non- linear partial differential equations.
<b>CO201.2</b>	Understand the concept of Fourier series of any function
<b>CO201.3</b>	Apply the concept of analyticity of functions for the expansions of second order differential equations.
<b>CO201.4</b>	Find the rank, Eigen values/ vectors of matrices, solve simultaneous linear equations, find inverse of matrices using normal forms and evaluate the convergence and divergence of a given sequence of series



**B.E IIND SEMESTER (COMMON COURSE)****MAXIMUM MARKS:125**

<b>COURSE NO. PHY-202</b>	<b>L</b>	<b>T</b>	<b>THEORY</b>	<b>SESSIONAL</b>
<b>COURSE TITLE : ENGINEERING PHYSICS-II</b>	<b>3</b>	<b>1</b>	<b>100</b>	<b>25</b>

**BRANCH : COMMON TO ALL****DURATION OF EXAM: 3 HOURS**

<b>UNI-1</b>	<b>RELATIVISTIC DYNAMICS</b>	<b>NO. OF LECTURES</b>	<b>WEIGHTAGE</b>
	Concept of Relativity, Frames of reference, Galilean Transformations, Michelson and Morley's experiment, Postulates of Special Theory of relativity, Lorentz transformations, Length Contraction, Time dilation, variation of mass with velocity (Velocity addition), mass energy equivalence ( $E^2=P^2c^2+m_0^2c^4$ ).	10	25%
<b>UNI-II</b>	<b>WAVE-PARTICLE DUALITY</b> Black Body radiation spectrum (Characteristics & Energy distribution), Wien's laws, Rayleigh Jeans Law excluding mathematical derivations, ultraviolet Catastrophe, Planck's hypothesis and Planck's radiation law, Explanation of black body radiation characteristics on the basis of Planck's law, photon concept. Compton effect, derivation of the direction of emission and the change in wavelength of scattered photons, direction of recoil electron and discussion of observed results. DeBroglie's hypothesis, concept of matter waves, Davisson & Germer's experiment, wavepacket, Phase and Group velocity, Heisenberg's uncertainty principle. Experimental illustration of uncertainty principle using single slit.	12	25%
<b>UNIT-III</b>	<b>QUANTUM MECHANICS</b> Wave function definition, interpretation and significance of wave function, Schrodinger's wave equations (Steady-State and time dependent) for 1-dim case, concept of operators and expectation values, Applications of Schrodinger's equation (Time independent) to a) Particle in a 1-dimensional box of infinite height, b) single step potential barrier, c) Tunnel effect, d) Quantum Mechanical harmonic oscillator with concept of Zero point energy.	14	25%
<b>UNIT-</b>	<b>SOLID STATE PHYSICS</b>		

**IV**

Intrinsic & extrinsic semi-conductors, Fermi & impurity levels, Impurity compensation, charge neutrality equation and semi-conductor conductivity. Einstein's relation, drift and diffusion current. Introductory concepts of advanced materials viz; conducting polymers dielectric materials, Nanomaterials, Smart materials and High T <sub>c</sub> materials.	7	15%
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**UNIT-  
V**

<b>LASERS</b>  Principle of Laser action, population Inversion, Einstein's Coefficients, He-Ne & Ruby Lasers, Holography	5	10%
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**TUTORIALS**

**B.E IIND SEMESTER**

**SUBJECT: ENGG: PHYSICS-II  
COURSE NO.PHY-202**

<b>S.NO.</b>	<b>TOPICS</b>	<b>UNIT NO.</b>
T-1	Numerical problems based on Length contraction & time dilation	I
T-2	Numerical problems based on variation of mass, energy mass equivalence etc.	I
T-3	Numerical problems pertaining to energy spectrum of Black body radiations, Wien's displacement/R-J laws, Planck's law	II
T-4	Numerical problems based on photo-electric effect, work functions	II
T-5	Numerical problems based on Compton effect, recoil energy of electron etc.	II
T-6	Numerical problems based on the characteristics of De-broglie waves, Davisson-Germer's Expt.	II
T-7	Numerical problems related to Heisenberg's uncertainty principle	II
T-8	Numerical problems based on Schrodinger's wave equation, expectation values of certain physical quantities and operators	III
T-9	Numerical problems to find the Eigen function and Eigen values for particle in a box	III
T-10	Numerical problems to find the reflection and transmission co-efficients for a particle penetrating a potential barrier	III
T-11	Simple numerical problems based on finding the bandgaps in semi-conductor materials etc.	IV
T-12	Simple numerical problems based on finding the energy level difference in Lasers etc.	V

**NOTE: SETTING OF QUESTION PAPER (Instructions for Examiners)**

- i) The question paper will consist of two sections
  - a) Section-I  
&

- b) Section-II
- ii) Section-I Comprises of Unit-I and Unit-II  
Section-II Comprises of Unit-III, Unit-IV and Unit-V
  - iii) Number of questions to be set in the paper =8 (eight)  
(Four from each section as per weightage)
  - iv) Number of questions to be attempted =5 (five)  
(Selecting at least two from each section)

**BOOKS RECOMMENDED:**

<b>TITLE</b>	<b>AUTHOR</b>
1) Modern Physics	Beiser
2) Modern Physics	Blatt
3) Modern Physics	Gupta & Gupta
4) Basic Electronics	Millman&Halkias
5) Material Science	S.L. Kakani, Amit Kakani

**COURSE OUTCOMES**

**COURSE NAME: PHYSICS-II**

**COURSE NO: PHY-202**

After learning this course students will be able to:

<b>CO202.1</b>	Understand the mathematical concepts required to understand physics.
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<b>CO202.2</b>	Derive the Maxwell's equations and understand the basis electromagnetic theory.
<b>CO202.3</b>	Assimilate the basic concepts of interference in thin films, diffraction, polarization and the characteristics of different types of waves.
<b>CO202.4</b>	Gain the knowledge about lasers, their characteristic's & properties and the basics of optical fibers.

**B.E 2<sup>ND</sup> SEMESTER**

**MAXIMUM MARKS:125**

<b>COURSE NO: CHM-203</b>	<b>L</b>	<b>T</b>	<b>THEORY</b>	<b>SESSIONAL</b>
<b>COURSE TITLE: ENGG. CHEM-II</b>	<b>3</b>	<b>1</b>	<b>100</b>	<b>25</b>

**BRANCH : COMMON TO ALL**

**DURATION OF EXAM: 3 HOURS**

**SECTION-A**

**1. ENVIRONMENTAL CHEMISTRY:**

Concept of Environmental chemistry, segments of environment (a brief idea about atmosphere, hydrosphere and lithosphere)

**AIR POLLUTION** –Introduction, Types of air pollution and control of air pollution.

**WATER POLLUTION:** Introduction, Sources of water pollution and methods of controlling water pollution.

**CHEMICALS AND METAL TOXICOLOGY** (Biochemical effects of Pb, Hg, As, Zn, Cd, Ni, Se, CN, O<sub>3</sub> and pesticides in brief on man).

**2. INORGANIC CEMENTING MATERIALS:**

Cement and Lime – Introduction, classification of lime, manufacture and properties of lime, setting and hardening of lime.

Cement, types of cement, manufacture of Portland cement, setting and hardening of cement.

**3. WATER TREATMENT**

Introduction, types of water, softening of water by different processes, chemical methods and sterilization, priming and foaming, sludge and scale formation, determination of hardness of water by soap titration method and EDTA method. Radioactivity of water, numericals on hardness and softening of water.

**SECTION-B**

**1. PLASTICS:**

Introduction, importance of plastics and uses, classification of plastics, moulding constituents of a plastic, moulding of plastics into articles (compression moulding, injection moulding, transfer moulding and extrusion moulding) Preparation, properties and uses of following plastic materials:  
 a) Polymethyl methacrylate    b) Epoxy resins    c) Alkyd resins.

**2. RUBBER**

Introduction, types of rubber, treatment of latex, vulcanization of rubber, preparation, properties and uses of following synthetic rubber: Buna-S, Buna-N & Butyl rubber.

### 3. PAINTS

Introduction, requisites of a good paint, constituents of a paint, manufacture of a paint, properties and uses of important white pigments such as white lead, Zinc oxide and Lithophone.

#### BOOKS RECOMMENDED:

1.	Engineering Chemistry	Jain & Jain
2.	Engineering Chemistry	Sharma, B.K.
3.	Engineering Chemistry	Dara, S.S.
4.	Engineering Chemistry	Shashi, Chawla
5.	Organic Chemistry	Bahl, B.S.
6.	Environmental Chemistry	De, A.K.
7.	Textbook of Environmental Chemistry	Tyagi&Mehra
8.	Polymer Science	Gowrikar, V.R. etal.
9.	Engineering Chemistry	Dr. Rajinder Kumar

**NOTE:** There shall be total eight questions, four from each section. Each question carries 20 marks. Five questions will have to be attempted, selecting at least two from each section. Use of calculator is allowed.

### COURSE OUTCOMES

**COURSE NAME: ENGG. CHEM II**

**COURSE CODE: CHM-203**

After learning this course students will be able to:

<b>CO203.1</b>	Explain the air quality, emission, pollution control and Environmental. Health.
<b>CO203.2</b>	Analyze different polymerization processes used to make thermoplastic and thermosetting plastics.
<b>CO203.3</b>	Recognize the common physical, chemical process encountered in treatment process of water.
<b>CO203.4</b>	Define basic knowledge on cement, its production, characteristics, properties etc.
<b>CO203.5</b>	Summarize the chemical structure, molecular properties, vulcanization process and application of major type of rubber.

**CLASS: B.E 2<sup>nd</sup> SEMESTER**

**BRANCH: COMMON FOR ALL**

**COURSE TITLE: COMPUTER PROGRAMMING USING C**

**COURSE NO: COM –204**

**DURATION OF EXAM: 3 HOURS**

L	T	P	MARKS	
3	1	-	Theory	Sessionals
			100	25

**SECTION-A**

1. Basic structure of Computer, Stored Program Concept, Binary Arithmetic – Addition, Subtraction, Multiplication, Data Representation – Fixed and Floating Point, Semiconductor Memories.
2. Introduction to C, Data Types, Constants, Variables, Expressions, Statements, Operators, Data Input and Output.
3. Control Statements, Arrays, Recursion, Storage Classes, Library Functions.

**SECTION-B**

4. Functions, User Defined Data Types, Structures, Unions, Passing Structure to Functions.
5. Pointers, Operation on Pointers, Passing Pointers to Functions, Data Files – Opening, Closing, Creating Data Files

**BOOKS RECOMMENDED:**

1. Programming with C - Byron Gottfried.
2. Programming with C - E. Balaguruswamy.
3. C The Complete Reference - Herbert Schildt.
4. Let us C - Yashwant Kanitkar.
5. Digital Computer Fundamentals - Thomas C. Bartee.
6. Digital Computer Design - V. Rajaraman.

**NOTE:** There shall be total eight questions, four from each section. Each question carries 20 marks. Five questions will have to be attempted, selecting at least two from each section. Use of calculator is allowed.

**COURSE OUTCOMES**

**COURSE TITLE: COMPUTER PROGRAMMING USING C**

**COURSE NO: COM –204**

After learning this course students will be able to:

<b>CO110.1</b>	Remember the fundamentals of C programming.
<b>CO110.2</b>	Understand the use of loops and decision making statements to solve the problems.
<b>CO110.3</b>	Apply different operations on arrays and user-defined functions to solve real-time problems.
<b>CO110.4</b>	Analyze the operation of pointers, structures and unions.
<b>CO110.5</b>	Implement file operations in C programming for a given application.

**B.E. 2<sup>ND</sup> SEMESTER**

**MAXIMUM MARKS: 125**

**COURSE NO. HUM-205**

**THEORY      SESSIONAL**

**COURSE TITLE: ENGINEERING ECONOMICS**

**L    T**

**100**

**25**

**BRANCH: COMMON TO ALL**

**3    1**

**DURATION OF EXAM : 3 HOURS**

**SECTION-A**

**UNIT-I**

Definitions of Economics

- a) Science of Wealth
- b) Science of Material Welfare
- c) Science of Scarcity

Economic System

- a) Features of Capitalism
- b) Features of Socialism
- c) Features of Mixed Economy

**UNIT-II**

Consumer Behaviour

- a) Cardinal Utility Analysis: The Concept and Utility Maximisation: Laws of Diminishing Marginal Utility and Equi-Marginal Utility.
- b) Ordinal Utility Analysis: Meaning and Properties of Indifference Curves and Utility Maximization.

Demand Theory:

- a) Meaning of Demand and law of Demand
- b) Factors Affecting Demand
- c) Elasticity of Demand (Price Elasticity, Income Elasticity and Cross Elasticity)
- d) Demand Forecasting

**SECTION-B**

**UNIT-III**

Theory of Production:

- a) Factors of Production and Production Function.
- b) Isoquants : Meaning & Properties
- c) Law of Variable Proportions & Returns to scale

Costs and Cost Analysis

- a) The Concept of Marginal, Average, Fixed and Variable Costs.
  - b) The Shape of Fixed, Average and Marginal Cost Curves (short run)
- Market and market structures
- a) Meaning and Feature of Perfect Competition, Monopolistic Competition, Oligopoly and Monopoly.
  - b) Price Determination Under Perfect competition and monopoly.

**UNIT-IV**

Some commonly used Economic Concepts

- a) Meaning, Types and Methods to Control Inflation.
- b) Concept of Stock Market
- c) Meaning & Concept of National Income
- d) Functions of Commercial Bank & Central Bank
- e) Features of Development and Under Development
- f) Meaning & Phases of Trade/Business Cycle
- g) Index Number : Construction and difficulties in measurement of Index Number.

**BOOKS RECOMMENDED :**

- 1. K.K.Dewett : Modern Economic Theory
- 2. H.L Ahuja : Advanced Economic Theory
- 3. M.L. Jhingan : Macro Economics
- 4. P.N Chopra : Business Economics/Advanced Eco. Theory

**NOTE:** There shall be total eight questions, four from each section. Each question carries 20 marks. Five questions will have to be attempted, selecting at least two from each section. Use of calculator is allowed.

<b><u>COURSE OUTCOMES</u></b>	
<b>COURSE NAME- ECONOMICS</b>	
<b>COURSE CODE- HUM-205</b>	
After learning this course students will be able to:	
<b>CO205.1</b>	Understand difference between classical and modern economic views.
<b>CO205.2</b>	Understand business environment of a country of which every business manager has to be aware in order to execute successfully.
<b>CO205.3</b>	Apply the laws in daily routine and be able to become a rational consumer and purchaser
<b>CO205.4</b>	Suggest producing the products at minimum cost by studying in detail about the cost curves and market structures.
<b>CO205.5</b>	Apply the knowledge of macroeconomics such as national income, index numbers, business cycle etc.

**B.E. 2<sup>ND</sup> SEMESTER**

**MAXIMUM MARKS: 125**

**COURSE NO. M-206**

**THEORY**

**SESSIONAL**

**COURSE TITLE: MACHINE DRAWING-I**

**L P**

**100**

**25**

**BRANCH: COMMON TO ALL**

**1 3**

**DURATION OF EXAM : 3 HOURS**

**SECTION-A**

1. I.S. Code for Machine Drawing.
2. Types of Sections and Recommended Scale, Dimensioning and Sectioning of Machine elements.
3. Drawing and sketching of machine elements in Orthographic Projections.
4. Different types of Joints: Riveted joints, Threaded fasteners, Knuckle joint, Cotter Joints: Gib and Cotter, Sleeve and Spigot.
5. Stud assembly, Pipe joints including expansion joint.
6. Shaft pulley, cone pulley, Fast and loose pulley, etc.

**SECTION-B**

1. Simple assemblies: Shaft couplings and Clutches, Muff Coupling, split muff, Flange Couplings: Solid and Flexible, Protected and Unprotected, Universal Coupling.
2. Bearings: Pedestal bearing including Hanger bearings, Pivot bearing and Swivel bearing.

**RECOMMENDED BOOKS:**

- |    |                 |                        |
|----|-----------------|------------------------|
| 1. | Machine Drawing | P.S. Gill              |
| 2. | Machine Drawing | Sidheshwar and Kannaih |
| 3. | Machine Drawing | N.D. Bhatt             |

**NOTE: -**

1. **There will be Six questions in all, five from Section- A (each of 15 marks) and one Compulsory question of 55 marks from Section - B.**
2. **Students are required to attempt Four questions in all, three from Section-A and one compulsory question involving assembly from Sections–B.**

**COURSE OUTCOMES**

**COURSE TITLE: MACHINE DRAWING**

**COURSE NO: M-206**

After learning this course students will be able to:

<b>CO206.1</b>	Helping the student in drafting their technical ideas.
<b>CO206.2</b>	Creating knowledge about the various practices with regard to the dimensioning, sectioning and development of views.
<b>CO206.3</b>	Understanding the importance of the linking functional and visualization aspects in the preparation of the part drawing.
<b>CO206.4</b>	Preparation of the part or assembly drawings as per the conventions.
<b>CO206.5</b>	Interpretation of machine drawings that in turn helps the students in the preparation of the production drawings Machine Drawing Conventions.

**B.E 2<sup>ND</sup> SEMESTER**

**MAXIMUM MARKS : 75**

**COURSE NO: M-207**

**L P**

**PRAC/LAB**

**COURSE TITLE: WORKSHOP TECHNOLOGY-II**

**1 3**

**75**

**BRANCH : COMMON TO ALL**

**DURATION OF EXAM : 3 HOURS**

**WELDING SHOP**

1. Introduction to Welding as a fabrication process, Welding application and general safety precautions.
2. Introduction to Gas and Arc welding processes.
3. Preparation of single V-butt joint by Gas and Arc welding processes.
4. Preparation of double V-butt joint, Lap joint, Tee joint and Corner joint by Gas and Arc welding processes.

**FITTING SHOP**

1. Assembly of Snap fitting of flat pieces (Male, Female).
2. Assembly and fitting of two L-shaped rectangular flat pieces.



**SHEET METAL SHOP**

1. Introduction to sheet metal tools.
2. Practice of making regular geometrical and traditional shapes in sheet metal, which includes:
  - a) Square elbow
  - b) Tee joint
  - c) Funnel making
  - d) Tray and riveted handle.

**COURSE OUTCOMES****Course Name: Workshop Technology-II****Course code: M-207**

After learning this course students will be able to:

<b>CO207.1</b>	Perform welding process like Arc and Gas welding .
<b>CO207.2</b>	Prepare single V butt joint, double V butt joint, Lap joint, Tee joint and corner joint.
<b>CO207.3</b>	Perform Assembly of Snap fitting of flat pieces.
<b>CO207.4</b>	Perform Assembly and fitting of two L shaped flat piece.
<b>CO207.5</b>	Perform various sheet metal process like square elbow, funnel making and tray and riveted handle.

**B.E 2<sup>ND</sup> SEMESTER****MAXIMUM MARKS: 50****COURSE NO: PHY-208****P****PRAC/LAB****COURSE TITLE: ENGINEERING PHYSICS LAB-II****2****50****BRANCH : COMMON TO ALL****DURATION OF EXAM : 3 HOURS****S.NO. EXPERIMENT NO. TITLE OF EXPERIMENT**

1. Exp-1 To determine the wavelength of sodium light using a plane diffraction grating.
2. Exp-II To find the wavelength of a monochromatic source of light using Fresnel's Biprism.
3. Exp-III To determine the specific rotation of sugar using laurent's half shade polarimeter.
4. Exp-IV Verification of Faraday's laws.

- |     |          |   |
|-----|----------|---|
| 5.  | Exp-V    | To find the wavelength of monochromatic light using Newton's rings Apparatus.               |
| 6.  | Exp-VI   | To find the co-efficient of self-induction of a coil by Anderson's bridge using head phone. |
| 7.  | Exp-VII  | To determine the value of e/m for electron by a long solenoid (Helical method).             |
| 8.  | Exp-VIII | To find the impedance of LCR series and parallel circuits.                                  |
| 9.  | Exp-IX   | To study the Zener diode characteristics.   |
| 10. | Exp-X    | To find the specific resistance of given wire by using carry Foster's Bridge.               |
| 11. | Exp-XI   | To find the wavelength of He-Ne gas laser.  |
| 12. | Exp-XII  | To find the diameter of a thin wire using He-Ne gas laser.                                  |

**NOTE:** AT LEAST A MINIMUM OF SIX EXPERIMENTS IS TO BE PERFORMED IN A SEMESTER.

**BOOKS RECOMMENDED:**

- |    | TITLE                  | AUTHOR     |
|----|------------------------|------------|
| 1. | B.Sc Practical physics | C.L. Arora |

**COURSE OUTCOMES**

**COURSE TITLE: ENGG. PHYSICS LAB II**

**COURSE NO.: PHY-208**

After learning this course students will be able to:

- |    |                   |                                    |
|----|-------------------|------------------------------------|
| 2. | Practical Physics | Worsnop & Flint                    |
| 3. | Practical Physics | Chauhan & Singh (Vol. I & Vol. II) |

<b>CO208.1</b>	Insight about the working principle of LCR circuit and measurement of its impedance parameter.
<b>CO208.2</b>	Understand the concept of interference by using thin films and enable them to calculate the Wavelength of monochromatic light.
<b>CO208.3</b>	Understand the concept of diffraction of light using a transmission grating and thus find out the wavelength of monochromatic light. The students will also be able to understand the concepts of polarization of light and its rotation through optically active solutions by using Laurent's half shade polarimeter.
<b>CO208.4</b>	Work on the principles of wheat stone bridge and thereby calculate the self-induction of a given coil by Anderson's method using a headphone. The students will be able to verify Biot's Savart's Law by calculating the variation of magnetic field with distance along the axis of a circular coil.
<b>CO208.5</b>	Understand the functioning of PNP transistors for various combinations in forward and reverse bias.

**B.E 2<sup>ND</sup> SEMESTER**

**MAXIMUM MARKS : 50**

**COURSE NO: CHM-209**

**P**

**PRAC/LAB**

**COURSE TITLE: ENGINEERING CHEMISTRY LAB-II**

**2**

**50**

**BRANCH : COMMON TO ALL**

**DURATION OF EXAM : 3 HOURS**

### **EXPERIMENTS**

1. Determine the total hardness of a sample of water by complexometric method (using EDTA).
2. Determine the chloride content in supplied water sample using Mohr's method (Argentometric method).
3. Determine dissolved oxygen in the given sample of water (winkler's method).
4. Determine the free chlorine in the given sample of water.
5. Determine the acidity of a given water sample.
6. Determine the alkalinity of a given water sample.
7. Determine the percentage of calcium oxide in cement.
8. Organic Analysis: Identify the following organic compounds (preparation of at least one derivative).
  - a) Carboxylic acids
  - b) Compounds containing alcoholic and phenolic OH groups
  - c) Aldehydes & Ketones
  - d) Carbohydrates
  - e) Amides, amines, anilides and nitro compounds
  - f) Hydrocarbons
  - g) Compounds containing Sulphur or halogen

### **LIST OF BOOKS RECOMMENDED**

1. Experimental Engineering Chemistry Shashi Chawla
2. Lab. Manual on Engineering Chemistry Basin, S K & Sudha Rani
3. A Manual of Practical Engineering Chemistry Dr. Rajinder Kumar

**COURSE OUTCOMES****COURSE TITLE: ENGINEERING CHEMISTRY LAB-II****COURSE NO: CHM-209**

After learning this course students will be able to:

<b>CO209.1</b>	Capable to visualize and understand chemical engineering unit, operations related to fluid and practical mechanics and mass transfer.
<b>CO209.2</b>	Provide an overview of preparation and identification of organic compound.
<b>CO209.3</b>	Relies on quantitative analysis and make use of simple equation to illustrate the concept involved.
<b>CO209.4</b>	Handle different types of instruments for analysis of materials, using small quantity of material involved for quick and accurate results.

**B.E 2<sup>ND</sup> SEMESTER****MAXIMUM MARKS : 75****COURSE NO: COM-210****P****PRAC/LAB****COURSE TITLE: COMPUTER PROGRAMMING  
USING C LAB.****2****75****BRANCH : COMMON TO ALL****DURATION OF EXAM : 3 HOURS**

The practicals will be based on the topics covered under Theory Syllabus. The Students are required to perform at least 15 Programs.

**COURSE OUTCOMES****COURSE TITLE: COMPUTER PROGRAMMING USING C LAB.****COURSE NO: COM-210**

After learning this course students will be able to:

<b>CO210.1</b>	Read, understand and trace the execution of programs written in C language.
<b>CO210.2</b>	Exercise conditional and iterative statements to write C programs.
<b>CO210.3</b>	Implement Programs using operators, arrays and pointers to access functions.
<b>CO210.4</b>	Write programs that perform operations using derived data types and files.

UNIVERSITY OF JAMMU, JAMMU

COURSE SCHEME

FOR B.E. 3<sup>rd</sup> SEMESTER CIVIL ENGINEERING

FOR EXAMINATION TO BE HELD FOR BATCH 2014 & ONWARDS

S. No.	SUBJECT	Course	CLASSES			MARKS			
			L	T	P	Theory	Sessional	Practical	Total
1	Building Materials and Construction	C-301	3	2	0	100	25	-	125
2	Surveying – I	C-302	3	2	0	100	25	-	125
3	Building Drawing	C-303	2	0	0	100	25	-	125
4	Engineering Geology	C-304	4	0	0	100	25	-	125
5	Electrical Engineering	EE-311	3	2	0	100	25	-	125
6	Mechanical Engg. – I	M-312	3	2	0	100	25	-	125
7	Surveying - I Lab.	C-305	0	0	2	-	-	50	50
8	Building Drawing Lab.	C-306	0	0	4	-	-	50	50
9	Engineering Geology Lab.	C-307	0	0	2/2	-	-	50	50
10	Electric Engg. Lab.	EE-312	0	0	2	-	-	50	50
11	Mechanical Engg. I-Lab.	M-313	0	0	2/2	-	-	50	50
			18	8	10	600	150	250	1000

CLASS: B. E. 3<sup>RD</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

L T

MARKS

COURSE TITLE : BUILDING MATERIALS & CONSTRUCTION 3 2 THEORY SESSIONAL

COURSE NO: C-301

100

25

DURATION OF EXAM: 3 HOURS

SECTION - A (MATERIALS)

1. BUILDING STONES :- Origin, Classification and Engineering Properties. Essential requirements and selection of good building stones for various works in Civil Engineering. Dressed stones and their role in Export market.
2. BRICKS :- Selection of suitable soil for brick manufacture. Various methods of manufacturing of building bricks, brick classification, essential requirements of good building bricks. Tiles-their manufacture and requirements. Bricks used in Modern construction-hollow, glazed and soda-lime bricks.
3. TIMBER:- Felling of trees, growth of trees, Various Classifications of trees, Common structural Timbers. Seasoning of Timber, Defects and Decay in Timber and prevention. Processed Timber.
4. PORTLAND CEMENT :- Methods of manufacture of Portland Cement, Various types of Cement and their use. Engineering Properties of Cement, Storage and Testing.

SECTION - B (CONSTRUCTION)

1. Basic Principles underlying the Planning and Construction of Buildings.
2. BRICK MASONRY- Types of Bricks, Types of Bonds, Defects in Brick Masonry, Reinforced Brick work.
3. FOUNDATIONS :- Purpose, site exploration, Methods of Testing Bearing Capacity of Soils, Types of Foundations, Combined Footing and Raft Foundation. Piers, Machine Foundations, Causes of failure. Excavation of Foundations in water logged sites. Pile Foundation, Concrete Piles, Pile Driving, Cofferdams.
4. DAMP PROOFING :- Problems of dampness, Causes, Sources of Dampness. Methods of Damp Proofing Materials. Damp Proofing treatment in Building. Treatment to Flat Roofs and Floors.
5. SHORING :- Shoring, Types, Undermining, Scaffolding, Types.
6. FLOORING :- Brick flooring, Mud Flooring, Cement Concrete Flooring, Mosaic Flooring, Marble Flooring .

7. LINTELS & ARCHES :- Lintels, Brick Lintels, R.B. Lintels, R.C.C. Lintels, Types of Arches.
8. DOORS AND WINDOWS :- Location of Doors and Windows, Size, Types of Doors and Windows, Fixtures and Fittings.
9. PLASTERING, PAINTING :- Plastering, Lime Plaster, Cement Plaster, Finishes, Defects in Plaster Work, Painting, White Washing.
10. PAINTS :- Oil Paints, Characteristics of Good Paint. Bases, Vehicle, Thinners Pigments. Types of Paints, Process of Painting.
11. ACOUSTICS:- Classification of Sounds Measurements, Sound Absorbents.
12. FIRE PROTECTION :- Fire Resistant Construction Requirements.

**BOOKS RECOMMENDED :**

1. BUILDING MATERIAL BY SUSHIL KUMAR
2. BUILDING MATERIAL BY PARBIN SINGH
3. BUILDING CONSTRUCTION BY KOUL, B.N., SHARMA, S.K.
4. A BETTER BUILDING BY BERI, K.S.
5. BUILDING CONSTRUCTION BY SINGLA JUNEJA AND KUMAR.

**NOTE:** There shall be total Eight questions, four from each section. Five questions have to be attempted selecting at least two questions from each section. Use of calculator is allowed.

**COURSE OUTCOMES:**

On completion of the course students will be able to:

C301.1	Study various traditional and emerging materials in the field of civil engineering construction and understand the process of manufacture of cement and bricks
C301.2	Classification of timber, identify defects, decay of timber and methods for preservation of timber
C301.3	Understand various types of brick masonry bonds and concept of foundation.
C301.4	Know about types of flooring, doors, windows, scaffolding and methods of damp proofing.



CLASS: B. E. 3<sup>RD</sup> SEMESTER

BRANCH: CIVIL ENGINEERING	L	T	MARKS	
COURSE TITLE : SURVEYING – I	3	2	THEORY	SESSIONAL
COURSE NO: C-302			100	25

DURATION OF EXAM: 3 HOURS

#### UNIT - I

Introduction and principles of surveying and measurement of distance.

Chain Surveying, Field Equipment, Methods of Chain Surveying, Plotting from the Field Books and Degree of Accuracy, Tape corrections

#### UNIT - II

Prismatic Compass, Compass and Chain Surveying, Compass Traversing - Instruments used and procedure followed,.Closed Traverse, Correction and Plotting Errors.

Plane Table Surveying, Field Equipment, Methods of Plane Tabling, Two Point and Three Point Problems, Precautions and Accuracy in Plane Tabling.

#### UNIT - III

Levelling definition of terms, Instruments used and field book recording, Methods of Levelling height of Instrument method and Rise and Fall method, Testing of temporary and permanent adjustments in levels, Sensitivity of Bubble Tube.

#### UNIT - IV

Computation of areas and volumes by different methods.Method of contouring by rectangular grid using a level, plotting of contours.

#### BOOKS RECOMMENDED:

1. SURVEYING AND LEVELLING VOL.-I BY KANETKAR & KULKARNI.
2. SURVEYING VOL.- I BY SHAHNE.
3. SURVEYING VOL.- I BY ARORA.
4. SURVEYING BY CLARK.
5. TEXT BOOK OF SURVEYING BY HUSSAIN, S.K. &NAGARAJ.
6. SURVEYING VOL.- I BY MODI & MODI.

NOTE:- There shall be total Eight questions, Two from each Unit. Five questions have to be attempted selecting at least One from each Unit. Use of calculator is allowed

COURSE OUTCOME:

On completion of the course students will be able to:

C302.1	Understand the basic principles of surveying and various methods of measurements.
C302.2	Understand compass traversing
C302.3	Understand principles & methods of leveling.
C302.4	Compute areas and volumes by different methods.

CLASS: B. E. 3<sup>RD</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

L T MARKS

COURSE TITLE : BUILDING DRAWING

2 0 THEORY SESSIONAL

COURSE NO: C-303

100 25

DURATION OF EXAM: 3 HOURS

Section A

Standard conventions and drawings. Principles of Planning and Design.

Drawing of Plan, Elevations, Sections of small buildings including drawings of a Hostel/School building.

Section B

Drawing of Plans and Sections of Wooden Doors & Windows. Drawing of Timber Truss with joint details.

Drawing of R.C.C. Slabs, Beams, Columns & their footings with Reinforcement Details, Staircases.

Drawing of Elementary Structural Steel work like :

- i) Riveted lap and butt joint
- ii) Typical joint of a roof truss
- iii) Connection beam to column

iv) Cross section and elevation of plate girder.

**BOOKS RECOMMENDED :**

- |    |                       |                              |
|----|-----------------------|------------------------------|
| 1. | BUILDING CONSTRUCTION | BY KAUL, B.N. & SHARMA, S.K. |
| 2. | A BETTER BUILDING     | BY BERI, R.S.                |
| 3. | BUILDING CONSTRUCTION | BY SINGLA, JUNEJA AND KUMAR. |
| 4. | BUILDING DRAWING      | BY GURCHARAN SINGH.          |

NOTE:- Section-A is compulsory having weight-age of 55 Marks. From Section B students have to attempt three questions out of Five Questions, each carrying 15 Marks. Use of Calculator is allowed.

**COURSE OUTCOME:**

On completion of the course students will be able to:

C303.1	Appreciate types of Drawings and its importance. Draw various types of Projections
C303.2	Draw plan, elevation and section for various civil engineering structures
C303.3	Prepare detailed working drawings of doors, windows, roof trusses and staircases
C303.4	Generate perspective view of simple building by different methods and Develop building models

CLASS: B. E. 3<sup>RD</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

L T MARKS

COURSE TITLE : ENGINEERING GEOLOGY

4 0 THEORY SESSIONAL

COURSE NO: C-304

100 25

DURATION OF EXAM: 3 HOURS

**UNIT - I**

Introduction, Geological work of atmosphere, wind, water (running lakes, oceans and subsurface water), ice, geomorphological features resulting from their action. Minerals and Rocks. Introduction to Crystalline State of Minerals, important crystal systems, rock forming minerals, their main properties and identification. Rock

classification, textures and structures and important types of igneous, Sedimentary and Metamorphic rocks, Processes involved in their formation.

#### UNIT - II

Structural Geology, main structural features of stratified and unstratified rocks, Folding, Faulting and Jointing, Classification and major types of folds, faults, joints and unconformities. Their significance in Engineering Geology. Mountains - Types and Origin.

#### UNIT - III

Engineering properties of rocks, common methods for investigation of geological characteristics of sites and alignments for engineering projects, Geology aquifers and their characteristics, Stability of Slopes, landslide and other mass movements, their causes, types and methods to control them. Earthquakes : causes and effects, consideration for seismic designs, geological consideration for selection of sites-alignments for Dams, Tunnels, Highways, Water Storage Tanks, Multi-Storeyed buildings and Port Structures.

#### BOOKS RECOMMENDED :

1. ENGINEERING & GENERAL GEOLOGY BY PARBIN SINGH
2. ELEMENTS OF STRUCTURAL GEOLOGY BY HILLS, E.S.
3. INTRODUCTION TO PETROLOGY BY BRIAN BOLY.
4. ENGINEERING GEOLOGY & GEOTECHNICS BY KRYNINE & JUDD RUTLEYS.
5. ELEMENTS OF MINERALOGY.

NOTE :- At the most three questions to be set from each unit, to the extent the maximum number of questions in the paper may not exceed 9. The student would be required to attempt Five questions selecting at least one question from each unit.

#### COURSE OUTCOMES:

On completion of the course students will be able to:

C304.1	Understand the role of geology in the design and construction and Be able to apply geologic concepts and approaches on rock engineering projects.
C304.2	Identify and classify rock using basic geologic classification systems.
C304.3	Identify and characterize intact rock/rock mass properties.

CLASS: B. E. 3<sup>RD</sup> SEMESTER

MARKS

BRANCH: CIVIL ENGINEERING

L T THEORY SESSIONAL

COURSE NO. : EE-311

3 2 100 25

COURSE TITLE: ELECTRICAL ENGINEERING

DURATION OF EXAMINATION: 3 HOURS

SECTION –I

D.C. SERIES PARALLEL CIRCUITS: - Superposition Principle, Thevenin’s Theorem.

A.C. CIRCUITS: Pure resistance, capacitance and inductive circuits, RL, LC, RLC circuits, Series resonance.

D.C. GENERATORS:Constructional features, EMF Equation, Operating characteristics, Parallel operation.

D.C. Motors:Operating principle, Torque Equation, Starters, Speed control applications.

SECTION –II

TRANSFORMERS:-Principle of operation, Vector Diagram, Regulation, Efficiency, Parallel operation.

SYNCHRONOUS GENERATORS: - Principle of operation, EMF Equation, Parallel operation.

SYNCHRONOUS MOTORS: - Principle of operation, V-curves, Starting methods, Application.

INDUCTION MACHINES: Principle of operation, Equivalent circuits, No loads and loaded motor tests, Applications.

BOOKS RECOMMENDED:

1. “Principle of Electrical Engineering” by V.DEL TORO
2. “Electrical Technology” by H. COTTON
3. “Theory of A.C. Machines” by A.S.Langsdorf
4. “Electrical Machines” by I.G. Nagrath and D.P. Kothari

NOTE: There shall be total Eight questions, four from each section. Five questions have to be attempted selecting at least two questions from each section. Use of calculator is allowed.

COURSE OUTCOMES:

On completion of the course students will be able to:

EE311.1	Apply the basic laws of electricity to D.C. & A.C. circuits.
EE311.2	Analysis of R,L& C circuits and solutions of their circuits with independent sources.
EE311.3	Acquire the knowledge about characteristics and working principles of electromechanical machines with constant, rotating and oscillating fields.

EE311.4	Identify the types of electrical machines for a given application.
EE311.5	Recognize the rating of different electrical apparatus.

CLASS: B. E. 3<sup>RD</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

L T MARKS

COURSE TITLE : MECHANICAL ENGINEERING-I

3 2 THEORY SESSIONAL

COURSE NO: M-312

100 25

DURATION OF EXAM: 3 HOURS

UNIT-I

- a) Basic linkages, Kinematic pairs, constrained motion, Kinematic chains, mechanisms, Inversion of a mechanism, Inversion of slider crank chain.
- b) Velocity/acceleration diagrams; velocity diagrams of a link, Four bar chain, slider Crankchain, Quick return motion mechanism and other similar linkage system; acceleration diagrams for above mechanism (except that Quick return mechanism or other like mechanisms which involve Coriolis component).

UNIT-II

- a) Friction: concept, Laws of dry friction, analysis of a body on horizontal plane and inclined plane, screw jack, Thrust bearing (Collar and Conical type), Clutches: Plate type and conical type.
- b) Belts and belt drives: Flat belts and V belts, Belt tension, effect of slip, etc.

UNIT-III

- a) Gear: Basic definitions, shape of gear tooth, Gear trains: simple, compound and epicyclic.
- b) Cams: Different types of cams and cam followers and drawing of simple cam profiles.

UNIT-IV

- a) Vibrations: Free, Forced, forced damped, Resonance, torsional vibrations.
- b) Balancing: Balancing of rotating masses in a single plane and in different planes, force and couple polygon.

RECOMMENDED BOOKS:

- |    |                                   |                 |               |
|----|-----------------------------------|-----------------|---------------|
| 1. | Kinematic Analysis of Mechanisms  | JE Shigley      | --McGraw Hill |
| 2. | Kinematics & Dynamics of Machines | George H martin | --McGraw Hill |
| 3. | Mechanics of Machinery            | CW Ham, EJ Crow | --McGraw Hill |

& WL Rogers

4. Theory of Machines Thomas Bevan --Longmans, Green & Co.

5. Elementary Kinematicsof Mechanisms Zimmerman --John Wiley

NOTE: There shall be total Eight questions, Two from each Unit. Five questions have to be attempted selecting at least One from each Unit. Use of calculator is allowed.

Course Outcomes :

On completion of the course students will be able to:

M312.1	Familiar with common machine elements and mechanisms used in various types of machines.
M312.2	Able to do static and kinematic analysis of any given mechanism.
M312.3	Aware with the concept of friction from engineering point of view.

CLASS: B. E. 3<sup>RD</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

P MARKS

COURSE TITLE : SURVEYING - I LAB

2 50

COURSE NO: C-305

LIST OF EXPERIMENTS:

1. Chain Surveying of an area.
2. Measurement of angles with the help of a Prismatic Compass.
3. Plane Table Surveying of an area with emphasis on plotting of Structures, roads, and important features.
4. Temporary and Permanent adjustment of a Dumpy level.
5. Plotting of longitudinal section and cross-section with the help of a level.

COURSE OUTCOMES:

On completion of the course students will be able to:

C305.1	Use conventional surveying tools such as chain/tape, compass, plane table, level in the field of civil engineering applications such as structural plotting and highway profiling.
C305.2	Plan a survey appropriately with the skill to understand the surroundings.
C305.3	plot traverse/ sides of building and determine the location of point present on field piece of paper.

CLASS: B. E. 3<sup>RD</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

P MARKS

COURSE TITLE : BUILDING DRAWING LAB.

4 50

COURSE NO: C-306

LIST OF PRACTICALS:

1. Drawing of Plan, Elevations, Sections of small buildings including drawings of a Hostel/School Building.
2. Drawing of Plans and Sections of wooden doors & windows. Drawing of Timber Truss with joint details.
3. Drawing of R.C.C. Slabs, Beams, Columns with reinforcement details.
4. Drawing of elementary structured steel work like :
  - i) Riveted lap and butt joint
  - ii) Typical joint of a roof truss
  - iii) Connection Beam to Column
  - iv) Cross Section and elevation of plate girder

Course Outcomes: At the end of the course, the student will be able to:

C306.1	Develop concept plan of buildings. Prepare detail drawings for single and two storied residential building and public building.
C306.2	Generate perspective view of simple building by different methods and Develop building models.
C306.3	Draw details of parts of buildings And Provide scope and provisions for building



	components and services.
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CLASS: B. E. 3<sup>RD</sup> SEMESTER

BRANCH: CIVIL ENGINEERING P MARKS

COURSE TITLE : ENGG. GEOLOGY LAB. 2/2 50

COURSE NO: C-307

Laboratory work:

Megascopic and microscopic identification of minerals and rocks, study of salient characters of crystals with the help of models, study of Topographic features and geological structures (on models). Study of geological structures on sections in different directions.

Field Visit :-

Minimum 3 days field visit to acquaint with essentials of Geology.

COURSE OUTCOMES:

After completion of course students will be able to:

C307.1	Categorize rocks and minerals by their origin and engineering properties.
C307.2	Apply geological principles to rock masses and discontinuities for use in engineering design e.g. rock slopes, foundation.
C307.3	Interpret geological maps

CLASS: B.E. 3<sup>RD</sup> SEMESTER

BRANCH: CIVIL ENGINEERING P MARKS

COURSE TITLE: ELECTRICAL ENGINEERING LAB. 2 50

COURSE NO. : EE-312

LIST OF EXPERIMENTS

- 1) Verification of Kirchhoff's Laws.
- 2) Verification of Superposition Theorem.
- 3) Verification of Thevinin's Theorem.
- 4) Verification of Reciprocity Theorem.
- 5) Verification of Maximum Power Transfer Theorem.
- 6) Measurement of current in various branches of RLC series-parallel circuit.

- 7) Single phase power measuring by using a Wattmeter.
- 8) Study of three-phase A.C Circuits with Star and Delta connected Load.
- 9) Study of single phase transformers. Determination of voltage Ratio, Turns Ratio and Polarity Test. Open circuit and short circuit test of given single phase transformer. Determination of regulation and efficiency.

EE312.1	Experimentally verify the basic circuit theory theorems
EE312.2	Measure current in series –parallel RLC circuits.
EE312.3	Measure power dissipation in single phase circuit
EE312.4	Determine the turns ratio and polarity test of single phase transformer.

CLASS: B. E. 3<sup>RD</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

P MARKS

COURSE TITLE : MECHANICAL ENGINEERING LAB.  
COURSE NO: M-313

2/2 50

LIST OF EXPERIMENTS

1. Study various types of cams and followers.
2. Study of various types of gear trains.
3. Study of Epicyclic gear train apparatus:
  - i) Internal and
  - ii) External.
4. Study of Gearbox.
5. Study of Quick return motion mechanism.
6. To study free vibrations of equivalent spring mass system.
7. To study the forced vibrations of equivalent spring mass system.
8. To study static and dynamic balancing apparatus.

Course Outcomes

On completion of the course students will be able to:

M313.1	Practically familiar with working of various types of cams and followers.
M313.2	Able to understand various types of gears, gear trains and working of gearbox.
M313.3	Familiar with various quick return mechanisms.

M313.4	Familiar with various cases of vibratory motion.
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UNIVERSITY OF JAMMU, JAMMU

COURSE SCHEME

B.E. 4<sup>TH</sup> SEMESTER CIVIL ENGINEERING

FOR EXAMINATION TO BE HELD FOR BATCH 2014 & ONWARDS

S. No.	SUBJECT	Course	CLASSES			MARKS			
			L	T	P	Theory	Sess.	Pract.	Total
1	Surveying - II	C-401	3	2	0	100	25	-	125
2	Theory of Structure - I	C-402	4	2	0	100	25	-	125
3	Fluid Mechanics-I	C-403	3	2	0	100	25	-	125
4	Estimation & Costing	C-404	3	2	0	100	25	-	125
5	Engg.Mathematics - III	MTH-412	3	1	0	100	25	-	125
6	Mechanical Engg. - II	M-411	3	2	0	100	25	-	125
7	Surveying - II Lab.	C-405	0	0	2	-	-	75	75
8	Theory of Structure - I Lab.	C-406	0	0	2/2	-	-	50	50
9	Fluid Mechanics –I Lab.	C-407	0	0	2	-	-	75	75
10	Mechanical Engg.- II Lab.	M-412	0	0	2/2	-	-	50	50

	19	11	6	600	150	250	1000
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CLASS: B.E. 4<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

L

T

MARKS

COURSE TITLE :SURVEYING - II

3

2

THEORY

SESSIONAL

COURSE NO: C-401

100

25

DURATION OF EXAM: 3 HOURS

UNIT - I

Traverse Surveying, Omitted measurements.

Theodolites : Construction, temporary and permanent adjustments of a transit theodolite.

UNIT - II

Trigonometric levelling, curvature and refraction, Axis-signal correction Methods of trigonometric levelling.

Tacheometric surveying.Theory of Analytic lens.Distance and elevation formulae.Subtense bar method. Errors in stadia surveying.

UNIT - III

Curves : Elements of simple curve, Design and Setting of Compound Curve, Transition and Vertical Curve.

UNIT - IV

Geodetic Surveying.Measurement of angles.Reduction to centre.Base Line Measurement and its corrections.

Triangulation adjustments.Introduction to Hydrographic surveying and topographic surveying.

BOOKS RECOMMENDED :

- |                                   |                       |
|-----------------------------------|-----------------------|
| 1. SURVEYING AND LEVELLING VOL.II | BY KANETKAR& KULKARNI |
| 2. SURVEYING VOLS.II & III        | BY SHANNE             |
| 3. SURVEYING                      | BY CLARK              |
| 4. TEXT BOOK OF SURVEYING         | BY HUSSAIN, S.K.      |
| 5. SURVEYING VOL.II               | BY MODI               |

NOTE: There shall be total Eight questions, Two from each Unit. Five questions have to be attempted selecting at least One from each Unit. Use of calculator is allowed.

**COURSE OUTCOMES:**

On completion of the course students will be able to:

C401.1	Take accurate measurements using instruments and adjusting the traverse, understand adjustment of theodolite.
C401.2	Understand the methods of trigonometric levelling
C401.3	Set out various types of curves.
C401.4	To understand satellite station and reduction to centre

CLASS: B.E. 4<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

L T MARKS

COURSE TITLE :THEORY OF STRUCTURES – I

4 2 THEORY SESSIONAL

COURSE NO: C-402

100 25

DURATION OF EXAM: 3 HOURS

Section-A

Simple Stresses and Strains, Hooks law, Composite sections.

Strain Energy, Stresses due to different type of loadings, Gradually& suddenly applied loads.

Shear force and Bending Moment for simply supported, cantilevers, fixed beam, continuous beams & members subjected to couples & oblique loadings.

Stresses in beams, Theory of simple bending, Neutral axis, Bending stress distribution, Shear stresses, Unsymmetrical bending & shear centre.

Section -B

Direct and Bending stresses, Eccentrically loaded rectangular columns, Circular section, hollow sections, Structural sections, walls and pillars.

Deflection of beams, Slope, Deflection and radius of curvature, Derivation of slope deflection formula, Macaulay's method.

Torsion of Shafts, Pure torsion, Torsional moment of resistance, composite shafts, Close coiled helical springs.

Principal stresses and strains, Mohr's circle, Graphical and Analytical method, Strain energy in terms of principal stresses, Ellipse of strain, Thin cylinders, Circumferential & longitudinal stresses.

**BOOKS RECOMMENDED :**

1. STRENGTH OF MATERIALS BY TEMOSHONKO& YOUNG
2. THEORY OF STRUTURES BY TEMOSHONKO& YOUNG
3. ELEMENTARY THEORY OF STRUTURES BY WILLUBER, NORIS
4. ANALYSIS OF STRUCTURES BY O.P. JAIN

Note: There will be total eight questions of 20 marks each, four from each section. Students have to attempt Five questions selecting atleast two from each section use of calculator is allowed.

**COURSE OUTCOMES:**

On completion of the course students will be able to:

C402.1	Understand various type of stresses and strains in different materials.
C402.2	Determine the strain energy in the member subjected to different type of loading.
C402.3	Evaluate shear force and bending moment in the beams and draw there shear force and bending moment diagrams when subjected to loads.
C402.4	Evaluate the slope deflection of beams subjected to loads.

CLASS: B.E. 4<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING	L	T	MARKS	
COURSE TITLE :FLUID MECHANICS – I	3	2	THEORY	SESSIONAL
COURSE NO: C-403			100	25

DURATION OF EXAM: 3 HOURS

**UNIT - I**

Properties of Fluids : Mass density, Specific weight, Specific volume, Viscosity, bulk modulus of elasticity, Surface tension and capillarity.

Fluid Statics : Fluid pressure, manometers, forces on immersed plane surfaces, floating bodies.

Kinematics of Fluid flow - Types of fluid flow, stream lines, path lines, streak lines, continuity equation, rotation, vorticity, circulation, velocity potential and stream function, flow nets.

UNIT - II

Equation of motion and energy theorem - Integration of Euler's theorem of motion along a stream line.

Flow through mouth pieces. Measuring devices in pipes, weirs, flow under a sluice gate.

UNIT - III

Momentum equation and its application. Dimensional analysis and similitude, important dimensional parameters, procedure for dimensional analysis.

UNIT - IV

Forces on Immersed Bodies : Deformation drag, form drag, drag lift.

BOOKS RECOMMENDED :

- |   |                         |
|---|-------------------------|
| 1. ENGINEERING FLUID MECHANICS              | BY GARDE & MIRAJGAONKAR |
| 2. ENGINEERING FLUID MECHANICS              | BY KUMAR, K.L.          |
| 3. FLUID MECHANICS                          | BY MOHANTY, A. K.       |
| 4. FLUID MECHANICS & FLUID POWER ENGG.      | BY KUMAR, D.S.          |
| 5. FLUID MECHANICS & ITS APPLICATIONS       | BY KRISHNAMACHAR, P     |
| 6. FLUID MECHANICS & ITS APPLICATIONS       | BY GUPTA & GUPTA        |
| 7. FLUID MECHANICS (THEORY & PROBLEMS)      | BY JAIN, S.C.           |
| 8. THEORY & APPLICATIONS OF FLUID MECHANICS | BY SUBRAMANYA, K.       |

NOTE: There shall be total Eight questions, Two from each Unit. Five questions have to be attempted selecting at least One from each Unit. Use of calculator is allowed.

COURSE OUTCOMES:

On completion of the course students will be able to:

C403.1	Qualitatively describe and categorize different types of flows, Solve problems of manometers and submerged surfaces.
C403.2	Understand the concept of continuity , Bernoulli's equation and its applications.
C403.3	Understand the Momentum equation & dimensional analysis.
C403.4	Solve basic problems of losses through pipes and the concept of drag and lift on immersed surfaces.

CLASS: B.E. 4<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING	L	T	MARKS	
COURSE TITLE :ESTIMATION & COSTING	3	2	THEORY	SESSIONAL
COURSE NO: C-404			100	25

DURATION OF EXAM: 3 HOURS

Section-A

Building Estimates - Methods of building estimates, Estimate of Masonary Platform, Single room building, two/three room building estimate. Estimate of office building. Estimate of R.C.C. works, R.C.C. water tank estimate and underground water tank estimate.

Section-B

Road Estimates - Methods, estimate of earthwork of road from L Section.

Steel Roof Truss: Estimate of Rolled Section, G.I. Sheet, A.C. Sheet.

Estimate of Septic Tank and Soak Pit including Sanitary and Water Supply Installations.

Types of Estimates - Types of estimates, contingencies, work charged estimate. Layout plan, index plan. Sub-heads, Schedule of rates. Administrative approval, expenditure sanction. Technical sanction. Bill of quantities. Plinth area, floor area.

Analysis of Rates - Analysis of Rates, overhead costs, labour required. Materials for different items of work and their rates. Preparing analysis of rates for various items of building works. Specifications General specifications, detailed specifications for various items of work.

Valuations - Valuation, Gross income, Net income, outgoings, Scrap and salvage values, capitalized value, sinking fund, depreciation, valuation of buildings, fixation of rent. Plinth area required.

BOOKS RECOMMENDED :

1. ESTIMATING & COSTING BY DUTTA & DUTTA
2. CONTRACTS & ESTIMATES BY PATEL, B.S.

NOTE: Question No.1 from Section A is compulsory having a weight age of 40 Marks. From Section B students have to attempt three questions out of five each having weight-age of

20 Marks. Use of calculator is allowed.

COURSE OUTCOME:

On completion of the course students will be able to:



C404.1	Know the basic knowledge on methods and types of estimation
C404.2	Estimate the material quantities of different civil engineering structure.
C404.3	Prepare a bill of quantities, make brief and detailed specifications and prepare tender documents
C404.4	Prepare value estimates.
C404.5	Understand the knowledge of rate analysis of different item of work.

CLASS: B.E. 4<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

P MARKS

COURSE TITLE : SURVEYING - II LAB

2 75

COURSE NO: C-405

List of Practicals :

1. To find the height and horizontal distance of an inaccessible point using Theodolite.
2. To set out horizontal curves by offsets from
  - (i) Long Chord
  - (ii) Tangents
3. To lay out the junction of transition curve with the horizontal curves.
4. To determine the Tachometric constants.
5. To determine the level of any point by Trigonometric leveling taking all corrections into account.

COURSE OUTCOME:

On completion of the course students will be able to:

C401.1	use the theodolite along with chain, tape on the field
C401.2	apply geometric and trigonometric principles of basic surveying calculations
C401.3	plan a survey take accurate measurements, plotting and adjustment of errors.
C401.4	apply field procedure in basic types of surveys, as part of a surveying team.

CLASS: B.E. 4<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

P MARKS

COURSE TITLE : THEORY OF STRUCTURE - I LAB

2/2 50

COURSE NO: C-406

List of Practicals :

1. To conduct Tensile test on a given sample.
2. To conduct Torsion test on a given sample.
3. To conduct Hardness test on a given sample by
  - i) Brinell's method
  - ii) Rockwell method
4. To conduct Impact test on a given sample by
  - i) Charpy method
  - ii) Izod method
5. To conduct Ductility test on a given sample.
6. To conduct the Bending test on a given sample.

COURSE OUTCOMES:

On completion of the course students will be able to:

C401.1	Conduct tension test on steel, aluminum, copper and brass.
C401.2	Conduct flexure and torsion test to determine elastic constants
C401.3	Conduct ductility test on steel
C401.4	Determine hardness and impact loads on steel sample.

CLASS: B.E. 4<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

P MARKS

COURSE TITLE : FLUID MECHANICS-I LAB

2 75

COURSE NO: C-407

List of Practicals :

1. To verify Bernoulli's Theorem.
2. To find Metacentric height of a floating body.
3. To verify Impulse - Momentum Equation.
4. To determine  $C_C$ ,  $C_V$  and  $C_D$  for an Orifice/Mouthpiece.
5. To determine friction factor ' f ' for a given pipe
6. To determine  $C_D$  for Venturimeter and Orificemeter.
7. To study Reynold's Experiment.
8. To determine  $C_D$  for Notch/Weir.
9. To determine Coefficient of Drag on a immersed body.
10. To visualise the flow patterns for irrotational flow around aerofoil using Hele Shaw apparatus.

Course Outcomes:

At the end of the course, the student will be able to:

C407.1	Apply dimensional analysis for design of experimental procedures.
C407.2	Calibrate flow measuring devices used in pipes, channels and tanks.
C407.3	Determine fluid and flow properties
C407.4	Characterize laminar and turbulent flows.

CLASS: B.E. 4<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

L T MARKS

COURSE TITLE :ENGG. MATHEMATICS - III

3 1 THEORY SESSIONAL

COURSE NO: MTH-412

100 25

DURATION OF EXAM: 3 HOURS

SECTION - I

LAPLACE TRANSFORMS:

Laplace Transforms, Inverse Laplace Transforms, Properties of Laplace Transforms, LT of unit step function, Impulse function, Periodic function, Initial value theorem, Final value theorem, Convolution theorem, Application of LT to solve linear differential equations and convolution type integral equations.

INTEGRAL TRANSFORMS AND FOURIER INTEGRALS:

Integral transforms and Fourier Integrals Fourier integral theorem, Fourier sine and cosine Integrals, and their inverses.

SECTION – II

SPECIAL FUNCTIONS:

Special Functions Legendre polynomials, Rodrigue’s formula, Recurrence formulae, generating function, Orthogonality of Legendre polynomials, Bessel function of 1st kind. Recurrence formulae, generating function, Orthogonality of Bessel function.

BOOLEAN ALGEBRAS:

Boolean Algebras, Lattices, Finite Boolean algebra, C.N.F and D.N.F, Application of Boolean algebra to switching theory.

BOOKS RECOMMENDED:

- |     |                                |                 |
|-----|--------------------------------|-----------------|
| 01. | Higher Engineering Mathematics | B.S. Grewal     |
| 02. | Boolean Lattices               | V.K. Khanna     |
| 03. | Engineering Mathematics-III    | Bhopinder Singh |

NOTE: There shall be total Eight Questions of 20 marks each, Four questions from each section and students have to attempt at least Two from each section. Use of calculator is allowed.

COURSE OUTCOMES:

On completion of the course students will be able to:

MTH-412.1	Learn the concept of Laplace Transform, inverse Laplace transform of various function and its applications.
MTH-412.2	Understand the idea of Fourier transform, Fourier sine and cosine transform and their properties.
MTH-412.3	Understand the concept of special functions such as Bessel’s functions and Legendre’s polynomial and their relations
MTH412.4	Draw the circuits using properties of Boolean algebra.

CLASS: B.E. 4<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

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T

MARKS

COURSE TITLE :MECHANICAL ENGG.-II

3

2

THEORY SESSIONAL

COURSE NO: M-411

100

25

DURATION OF EXAM: 3 HOURS

UNIT-1

Thermodynamics: Basic concepts and definitions, system, property, state, process, cycle, equilibrium. dimensions and units.

Thermal equilibrium and Zeroth Law of Thermodynamics, Concept of temperature.

Thermodynamic definitions of Work and Heat.

First Law of Thermodynamics: Internal energy and Open system and Steady flow energy equation.

Second Law of Thermodynamics. Kelvin -Planck and Clausius's statements, Heat pump. Reversible and Irreversible process. Carnot cycle. Clausius inequality and entropy.

Ideal gases and process calculations.

UNIT 2

Air Standard cycles: Otto cycle, Diesel cycle and Dual cycle Working principles of 4-stroke and 2-stroke engines and their relative merits. Valve timing diagrams. Spark ignition engines and compression ignition engines. Carburetion and fuel injection.

UNIT 3

Properties of pure substance-water, Steam quality.

Principles of refrigeration: Vapour compression cycle, Components of vapour compression system and its C.O.P.

Properties of air-water vapour mixture. Psychometric processes .

UNIT 4

Elements of Heat transfer: Conduction, Convection and Radiation .One dimensional Steady state heat conduction in slabs, cylinders and spheres. Kirchoff's Law and the black body.

Boilers: Fire tube and water tube boilers. Babcock and Wilcox boiler, Cochran boiler. Boiler mountings and accessories. Steam Power plant ,Rankine cycle and elementary calculations.

RECOMMENDED BOOKS:

- |   |                 |
|---|-----------------|
| 1. Thermal Engineering                    | PL Ballaney     |
| 2. Heat Engineering                       | VP Vasandani    |
| 3. Thermodynamics- Work and Heat Transfer | Rogers & Mayhew |
| 4. Engineering Thermodynamics             | PK Nag.         |

NOTE:

Two questions to be set from each unit. Five questions out of eight to be attempted by the student selecting at least one from each unit in the theory examination paper.

Use of Steam tables, Mollier diagram, Refrigeration tables & charts and a scientific calculator will be allowed in the examination hall.

COURSE OUTCOMES:

On completion of the course students will be able to:

M411.1	Use and practice two property rule and hence thermodynamic tables thermodynamic diagrams and concept of equation of state, also their simple application
M411.2	Develop intuitive problem solving technique
M411.3	Discuss second law of thermodynamics and its corollaries viz. absolute (thermodynamics) temperature scale, reversibility, entropy, feasibility of a process based on first law and second law, isentropic efficiency of adiabatic machines
M411.4	Reviews introductory concept of power and refrigeration cycles, their efficiencies and coefficients of performance. Illustrate ideas of heat transfer in conduction, convection and radiation modes and Application of these concepts to heat transfer in single and combined mode.

CLASS: B.E. 4<sup>TH</sup> SEMESTER

P MARKS

BRANCH: CIVIL ENGINEERING

2/2 50

COURSE TITLE: MECHANICAL ENGG.-II LAB.

COURSE NO.412

LIST OF EXPERIMENTS

1. To find the thermal conductivity of a given insulating material.
2. To find out the dryness fraction of steam with throttling calorimeter.
3. To find the power of a four stroke petrol engine.
4. To draw the heat balance sheet of a boiler.
5. Study and analysis of various types of boilers.
6. (a) Study of multi-cylinder Petrol engine.  
(b) Heat balance of the engine.  
(c) Morse test.  
(d) Valve timing diagram.
7. Study of domestic refrigerator & to find the C.O.P. of a refrigeration unit on a refrigeration tutor.

8. To find out the C.O.P. of the refrigeration plant.

**COURSE OUTCOMES:**

On completion of the course students will be able to:

MTH-412.1	Learn the concept of Laplace Transform, inverse Laplace transform of various function and its applications.
MTH-412.2	Understand the idea of Fourier transform, Fourier sine and cosine transform and their properties.
MTH-412.3	Understand the concept of special functions such as Bessel's functions and Legendre's polynomial and their relations
MTH412.4	Draw the circuits using properties of Boolean algebra.

UNIVERSITY OF JAMMU, JAMMU

COURSE SCHEME

B.E. 5<sup>TH</sup> SEMESTER CIVIL ENGINEERING

FOR EXAMINATION TO BE HELD FOR BATCH 2014 & ONWARDS

S. No.	SUBJECT	Course	CLASSES			MARKS			
			L	T	P	Theory	Sessional	Practical	Total
1	Engineering Math – IV	MTH-501	3	2	0	100	25		125
2	Theory of Structures - II	C-501	4	1	0	100	25	-	125
3	Soil Mechanics (GEOTECHNICAL ENGG.-1)	C-502	4	1	0	100	25	-	125
4	Fluid Mechanics - II	C-503	4	1	0	100	25	-	125
5	Construction Planning & Management	C-504	4	1	0	100	25	-	125
6	Environment Engineering -I	C-505	4	1	0	100	25		125
7	Survey Camp *	C-506	-	-	-	-	-	100	100
8	Theory of Strtures-II Lab	C-507	0	0	2	-	-	50	50
9	Soil Mechanics Lab	C-508	0	0	2	-	-	50	50
10	Environment Engineering-I Lab	C-509	0	0	2	-	-	50	50
Total			23	7	6	600	150	250	1000

\* Duration of Survey Camp will be at least 2 weeks



CLASS: B.E. 5<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

L T MARKS

COURSE TITLE : ENGINEERING MATHEMATICS - I 3 2 THEORY SESSIONAL

COURSE NO: MTH- 501 100 25

DURATION OF EXAM: 3 HOURS

SECTION - I

**THEORY OF COMPLEX VARIABLES:** Functions of a complex variable, Limits, Continuity, Derivative, Analytic function, Cauchy-Riemann equations, Conformal mappings, Standard Transformation, Bilinear transformation, Line integral, Cauchy's theorem, Cauchy's integral formula, Cauchy's inequality, Liouville's theorem, Taylor and Laurent series expansions, Poles and singularities, Contour integration, Residue theorem, Evaluation of Real Integrals using residue theorem, and Contour integration.

SECTION - II

**NUMERICAL METHODS:** Definition of operators, Finite and divided difference, Newton's and Lagrange's Interpolation formulas, Numerical differentiation and Numerical integration, Trapezoidal and Simpson's one-third Rule.

Numerical Solutions of Algebraic and Transcendental Equations by RegulaFalsi, Newton-Raphson and direct iterative methods, Solution of difference equations, solution of differential equations by Picard's method, Euler's method, Modified Euler's method, Taylor's method, Runge-Kutta method.

BOOKS RECOMMENDED:

01. Advance Engineering Mathematics by Jain &Iyengar
02. Numerical Methods in Engg. & Science by B.S. Grewal
03. Difference Calculus (New Edition) by S.C. Sexena
04. Engineering Mathematics by S.S. Sastri

NOTE: There shall be total Eight questions, four from each section. Five questions have to be attempted selecting at least two questions from each section. Use of calculator is allowed.

COURSE OUTCOMES

On completion of the course Students will be able to:

C501.1	Remember the concept of limit, continuity, differentiability of a function in a plane.
C501.2	Calculate the integrals using residue evaluation instead of actual complicated calculation.
C501.3	The basics of Operators and their types.
C501.4	To obtain the values of function at a given point within the given data by using certain method of Interpolation

CLASS: B.E. 5<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

L T

MARKS

COURSE TITLE : THEORY OF STRUCTURE - II 4 1 THEORY SESSIONAL

COURSE NO: C-501

100 25

DURATION OF EXAM: 3 HOURS

UNIT - I

Strain Energy due to axial load, bending and torsion. Principle of Virtual work. Maxwell's reciprocal theorem. Betti's Law. First theorem of Castigliano, Deflection of Truss Joints (Determinate Trusses) by Maxwell's Method. Statically indeterminate Structures. The Second Theorem of Castigliano and its applications for beams and portal frames. Degree of redundancy of structures. Forces in members of redundant trusses (Single Degree).

UNIT - 2

Fixed & Continuous Beams : Fixed beams, bending moment diagrams. Fixed beams with ends at different levels. Advantages & disadvantages. Continuous beams. Claryon's three moment theorem.

UNIT - 3

Moment Distribution Method. Stiffness of Member. Distribution theorem, Analysis of beams and portal frames, B.M. & S.F. Diagrams. Temperature effects.

Rotation Contribution Method : Analysis of beams & Portal frames by Rotation Contribution Method (Kani's Method).

UNIT - 4

Columns & Struts : Short & Long Columns Euler's Theory. Effective Length, Empirical Formulae. Eccentrically Loaded Columns. Laterally Loaded Columns.

Column Analogy Method. Application to non-prismatic fixed beams and symmetrical frames.

BOOKS RECOMMENDED :

1. ELEMENTARY STRUCTURAL ANALYSIS BOGGS, R.G.
2. THEORY OF STRUCTURES RAMAMURTHAM, S.
3. INDETERMINATE STRUCTURAL ANALYSIS WANG, C.K.
4. THEORY AND ANALYSIS OF STRUCTURES JAIN & ARYA

NOTE:-There shall be total eight questions of 20 marks each, two from each unit. Five questions have to be attempted selecting atleast one from each unit. Use of Calculator is allowed.

COURSE OUTCOMES

On completion of the course Students will be able to:

C501.1	Understand various theorems and methods for deflection of truss joints.
C501.2	Solve problems of fixed beam and continuous beams using three moment theorem.
C501.3	Analyze beams and portal frames by moment distribution method and Kani's rotation method.
C501.4	Know the Application of column Analogy method for non prismatic fixed beam and symmetrical frames.

CLASS: B E 5<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

MARKS

COURSE TITLE: SOIL MECHANICS (GEOTECHNICAL ENGG.-1)	L 4	T 1	THEORY 100	SESSIONAL 25
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COURSE NO: C-502

DURATION OF EXAM: 3 HOURS

UNIT – I

- 1.1 Introduction, Brief Historical Development, Formation and General Types of Soils.
- 1.2 Structure and Properties of Soils-Soil Particle Size and Shape, Specific Surface, composition of Clay Mineral, Soil Particle - Water Relationship, Various Bonds, Soil Mass Structure.
- 1.3 Soil Weight and Volume Relationships - Three Phase Soil System. Inter – relationships of different Parameters.
- 1.4 Index Properties of Soils - Specific Gravity, Determination of Grain Size distribution of Soils, Sieve Analysis, Wet Mechanical Analysis, Hydrometric Method of Analysis, Grain Size distribution Curves, Relative Density and Consistency of Soils, Atterberg Limits.

UNIT – 2

- 2.1 Identification and Classification of Soils - Field Identification, Various Classification Systems, General Comments on the Systems of Soil Classification.
- 2.2 Intergranular and Pore Water Pressures, Capillary Phenomena.
- 2.3 Permeability - Introduction, Poiseuille's Law, Darcy's Law, Discharge and Seepage Velocity, Methods of determination of Co-efficients of Permeability, Factors affecting Permeability, Field Permeability Tests.
- 2.4 Seepage through Soils - Introduction, Flow net, Various Boundary conditions, Analytical and Electrical Analogy Methods, Uplift Pressures, Seepage through Earth Dams, Piping Mechanics, Method of Locating Phreatic Line.

UNIT – 3

- 3.1 Compaction of Soils - Methods, Field and Laboratory Methods, AASHO and Modified AASHO Tests, Zero Air void line, Factors affecting Dry Density.
- 3.2 Compressibility and Consolidation - Principle of Consolidation, One - dimensional Consolidation, Standard One-dimensional Consolidation Tests, Pre-consolidation Pressure, Secondary Compression, Computation of Ultimate Settlement.

UNIT – 4

- 4.1. Stress distribution of Soils - Boussinesq's formula, Westergaard's formula, Comparison of the Two Point load, line load, Strip load, 2:1 method, Pressure Isobars, Stress Beneath loaded areas.
- 4.2 Shear Strength of Soils - Basic Concepts, Coulumb's Equation, Box and Triaxial Shear Tests, Mohr's Circle, Mohr's Coulumb's Equation, Classification of Shear Tests on the basis of drainage conditions.

BOOKS RECOMMENDED :

- |    |                                     |                 |
|----|-------------------------------------|-----------------|
| 1. | SOIL MECHANICS- THEORY AND PRACTICE | ALAM SINGH      |
| 2. | SOIL MECHANICS & FOUNDATION ENGG.   | ARORA K.R       |
| 3. | SOIL MECHANICS AND FOUNDATION ENGG. | PUNMIA B.C      |
| 4. | GEOTECHNICAL ENGINEERING            | KASMALKAR, B.J. |

NOTE:-There shall be total eight questions of 20 marks each, two from each unit. Five questions have to be attempted selecting atleast one from each unit. Use of Calculator is allowed.

COURSE OUTCOMES

On completion of the course students will be able to:

C502.1	Understand the fundamentals of soil mechanics, identify and classify the type of soil
C502.2	Identify and analyse the soil behavior, characteristics of various soil in India & various soil investigation
C502.3	Evaluate soil parameters such as permeability, compaction, shear strength etc.
C502.4	Perform various laboratory as well as field tests.
C502.5	Solve actual field problems related to main engineering properties of soil(shear strength, permeability and consolidation)

CLASS: B E 5<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

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MARKS

COURSE TITLE :FLUID MECHANICS – II

4

1

THEORY

SESSIONAL

COURSE NO: C-503

100

25

DURATION OF EXAM: 3 HOURS

#### Section-A

Laminar Flow:Navier Stokes Equations, Hagen-Poiseuille's Equation for Laminar flow in Pipes, Stokes Law, Darcy's Law.

Boundary Layer Theory : Definition and Characteristics, Laminar Boundary Layer, Turbulent Boundary Layer, Hydrodynamically Smooth and Rough Surfaces. Applications of Momentum Equation. Separation and its control.

Turbulent Flow : Characteristics, Turbulent Shear, Velocity distribution in Turbulent Flow, Commercial Pipes and their laying, Water hammer.

#### Section-B

Open Channel Flow : Steady uniform flow, most efficient channel section, specific energy, transitions in open channels, Hydraulic jump. Gradually varied flow, Afflux and Back water curve, Channel Slopes and flow profiles, Surges in open channels.

Pumps : Classification, Reciprocating Pumps, Rotodynamic Pumps, Velocity diagram, Specific speed.

Turbines : Impulse Turbines, Pelton Wheel, Reactions Turbines, Francis Turbine, Kaplan Turbine, Selection of Turbine.

#### BOOKS RECOMMENDED :

- |    |                                  |                      |
|----|----------------------------------|----------------------|
| 1. | ENGINEERING FLUID MECHANICS      | GARDE & MIRAJGOANKAR |
| 2. | FLUID MECHANICS AND APPLICATIONS | GUPTA & GUPTA        |
| 3. | OPEN CHANNEL FLOW                | RANGA RAJU           |
| 4. | FLUID MECHANICS & MACHINERY      | MODI & SETH          |
| 5. | HYDRAULIC MACHINES               | DR.JAGDISH LAL       |

NOTE:- There shall be total eight questions of 20 marks each, four from each section. Five questions have to be attempted selecting atleast two from each section. Use of Calculator is allowed.

#### COURSE OUTCOMES:

On completion of the course students should be able to:

C503.1	Solve problems of laminar flow and understand the concept of boundary layer development and its characteristics
C503.2	Understand concept of Hydrodynamically smooth and rough pipes, velocity distribution in turbulent flow
C503.3	Understand concept of efficient channel section, specific energy, hydraulic jump and flow profiles
C503.4	Classify Pumps and Turbines and their selection.

CLASS: B E 5<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE : CONSTRUCTION PLANNING	L	T	MARKS	
& MANAGEMENT	4	1	THEORY	SESSIONAL
COURSE NO: C-504			100	25

DURATION OF EXAM: 3 HOURS

UNIT - I

Introduction to CPM and PERT, Network preparation and analysis, Critical Path method, Evaluation of total float, free float and independent float. Event Time, Determination of Slack, Critical Path and Semi-critical path, Scheduling by Bar Charts for Material, Equipment, Finance.

UNIT - 2

Resource smoothing, resource allocation and levelling, crashing of networks for getting optimum duration and optimum cost of project, feasibility report, cost benefit ratio.

UNIT - 3

Management of different Technical Personnel, Coordination, Material Management, Objectives, Purchasing Procedure, Records, Inventory Control and Storing.

Accounting, Cash Book, Imprest, Contractors, Bills, Store Account, Indent, Invoice, Debit and Credit Notes. Tenders, Earnest Money, Security Deposit, Comparative Statements, Contracts, Types and Conditions.

Construction hazards, Safety in construction and at site works. Standardisation, BIS, ISO.

UNIT- 4

Classification of construction equipment, selection, operation and investment cost, depreciation, economic life.



Source of Water - Surface and Subsurface Sources of water, Hydraulic of ground and infiltration works.

Transmission of Raw Water : Various Transmission Systems, Design of gravity and rising main including optimization technique. Design of pipes, Stresses in pipes subjected to internal and external pressure. Gate valves, check valves, Air valves, Pressure regulating valves. Fire hydrants, Service fittings, Testing of pipes and fittings.

#### Section-II

Treatment of Water : Quality Standards, Physical Chemical and Bacteriological aspects of water, Details and Design of Screens, Principles and types of Plain Sedimentation, Mechanical Mixings and devices, Coagulation, Flocculation, Clarification and Sludge removal. Theory of filtration. Details and Design of rapid and gravity filtration, Pressure filters and portable filters. Disinfection, different methods of Chlorination, Types of pre-post, Super chlorination, dechlorination, use of break point chlorination.

Miscellaneous Water Treatment Methods : Aeration Activated Carbon, Carbonate and Non-carbonate Hardness, Treatment of Sea Water.

Distribution of Water : Aim of Distribution of Water, Zoning of Areas, Service Reservoirs, Ground and Elevated, their purpose and capacity.

Systems of Distribution : Pressures in Distribution System. Determination of diameter of mains, Hydraulic gradient, flow of water in networks.

#### BOOKS RECOMMENDED :

- |  |                     |
|--|---------------------|
| 1. WATER SUPPLY AND SEWAGE               | STEEL,E.W. & MCGHEE |
| 2. ELEMENTS OF PUBLIC HEALTH ENGINEERING | DUGGAL, K.N.        |
| 3. WATER SUPPLY ENGINEERING VOL.1        | GARG, S.K.          |

NOTE:-There shall be total eight questions of 20 marks each, four from each section. Five questions have to be attempted selecting atleast two from each section. Use of Calculator is allowed.

#### COURSE OUT COMES:

On completion of the course students will be able to:

C505.1	Identify the source of water and water demand.
C505.2	Apply the water treatment concept and methods.
C505.3	Apply water distribution process, operation and maintenance of water supply
C505.4	Prepare basic process design of water treatment plant and evaluate basic water quality data.



CLASS: B E 5<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE : SURVEY CAMP

MARKS

COURSE NO: C-506

100

Use of all the important Surveying Instruments shall be made over the entire duration of Survey Camp, for preparation of :

1. Site Plan of the Area.
2. Location of roads and important Installations.
3. Leveling of the area to determine the difference of altitudes, at specified location
4. Preparation of Contour Map of the prescribed area.

NOTE: The site for the Survey Camp shall be selected by the College and duration of the Survey Camp shall be of at-least two weeks. Normally the camp shall be conducted after 4th Semester concludes (Summer Vacations).

COURSE OUTCOMES:

On completion of the course students will be able to:

C506.1	Conduct various types of surveys in the field as per the requirements.
C506.2	Conduct survey using advanced instruments
C506.3	Prepare contour maps as per data obtained from the survey

CLASS: B E 5<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE: THEORY OF STRUCTURE - II LAB

P

MARKS

COURSE NO: C-507

2

50

LIST OF EXPERIMENTS:

1. To find horizontal thrust and draw the influence line for horizontal thrust for a two hinged arch.
2. Calibration of electrical strain gauge and determination of gauge factor.
3. To find deflection in fixed continuous beams.

4. To find maximum tension in the cable supporting suspension bridge carrying series of loads.
5. To find value of flexural rigidity (EI) for a given beam and compare it with theoretical value.
6. To verify moment area theorem.
7. To verify the Maxwell's reciprocal theorem for beam.
8. To measure strain in cantilever beam with the help of strain gauge.
9. To study the behaviour of different types of struts and to calculate Euler's buckling load.
10. Use of Begg's deformer.
11. To determine reaction components of three hinged arch.
12. Determination of material fringe value.

**COURSE OUT COMES:**

On completion of the course students will be able to:

C507.1	Determine value of flexural rigidity (EI) for a given beam and compare it with theoretical value.
C507.2	Verify the Maxwell's reciprocal theorem for beam
C507.3	Measure strain in cantilever beam with the help of strain gauge.

CLASS: B E 5<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE SOIL MECHANICS LAB P MARKS

COURSE NO: C-508 2 50

LIST OF EXPERIMENTS :

1. Moisture content.
2. Specific gravity of Soil.
3. Grain Size distribution (Sieve Analysis)
4. Atterbergs Limits
5. Permeability by constant head or falling head method.

6. Proctors compaction test.
7. Field density determination - Sand replacement method.
8. Field density determination - Core cutter method.
9. Unconfined compression Test
10. Direct Shear Test.
11. Triaxial Compression Test.

**COURSE OUTCOME:**

On completion of the course students will be able to:

C508.1	Determine various engineering as well as index properties of soil.
C508.2	Determine moisture content using oven drying method.
C508.3	Conduct sieve analysis test on soil and identify the gradation of soil.

CLASS: B E 5<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE : ENVIRONMENTAL ENGG. –I LAB

P MARKS

COURSE NO: C-509

2 50

**LIST OF EXPERIMENTS :**

1. Determination of Solids (total, dissolved, suspended, organic, inorganic) in water.
2. Determination of turbidity of Water.
3. Determination of alkalinity of Water.
4. Determination of hardness of Water.
5. Determination of PH value of Water.
6. Determination of chlorides of Water.
7. Determination of Iron and Manganese in Water.
8. Determination of Sulphates&Sulphides in Water.

9. Determination of dissolved oxygen in Water.

COURSE OUTCOME:

On completion of the course students will be able to:

C509.1	Determine physical, chemical characteristics of water.
C509.2	Quantify the pollution concentration in water
C509.3	Determine the PH value.
C509.4	Assess the quality of water

UNIVERSITY OF JAMMU, JAMMU

COURSE SCHEME

B.E 6<sup>TH</sup> SEMESTER CIVIL ENGINEERING

FOR EXAMINATION TO BE HELD FOR BATCH 2014 & ONWARDS

S. No.	SUBJECT	Course	CLASSES			MARKS			
			L	T	P	Theory	Sess	Pract	Total
1	Foundation Engineering (GEOTECHNICAL ENGG.-II)	C-601	4	1	0	100	50	-	150
2	Theory of Structure - III	C-602	4	2	0	100	50	-	150
3	Engineering Hydrology	C-603	3	2	0	100	50	-	150
4	Design of Structures – I	C-604	4	2	0	100	50	-	150
5	Environmental Engg.-II	C-605	3	2	0	100	50	-	150
6	Elective - I **	C-606/ C-607/ MTH-608	4	1	0	100	50	-	150
7	Environment Engg -II Lab	C-608	0	0	2		-	50	50
8	Design of Structure -I Lab	C-609	0	0	2		-	50	50
Total			22	10	4	600	300	100	1000

\*\*Note: The students have to choose one course out of the three elective courses shown under course No. C-606/C-607/MTH-608 in consultation with the Department. The courses are:

C-606      Architecture &Townplanning

C-607      Advanced Hydraulics

MTH-608    Statistics

CLASS: B. E. 6<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE : FOUNDATION ENGINEERING	L	T	MARKS	
COURSE NO: C-601	4	1	THEORY	SESSIONAL
DURATION OF EXAM: 3 HOURS			100	50

UNIT - 1

Lateral Earth Pressure various Theories, Rankine's Coulomb's Theories, Active and Passive Earth Pressure Cases, Earth Pressure in Walls, Soil Tension Effects, Rupture Zone, Graphical Solution for Lateral Earth Pressure.

Stability of Slopes - Finite and Infinite Slopes, Stability Number, Analysis for Stability of Slopes, Various Methods, Swedish Circle Method.

UNIT - 2

Various Types of Foundations - Shallow and deep types of foundations, bearing capacity;

Terzaghi's approach, Indian Standard Code for B.C.,

Bearing Capacity for footings in layered Soils, Slopes, Bearing capacity from field tests, Bearing capacity on rocks,

UNIT - 3

Well Foundations:- Situations where adopted, Elements of wells, Types, Methods of Construction, Tilt & Shift, Remedial measures.

UNIT - 4

Soil Exploration: Objectives and Programme, Various approaches, Standard Penetration tests (SPT), boring, DCPT, SCPT, Correlations.

Settlement : Components of Settlement, limits of settlement, stresses in soil below loaded areas, Boussinesq's equation for vertical stress, concept of bulb, Newmark chart, Westergard and I.S.code method.

BOOKS RECOMMENDED:

- |  |             |
|--|-------------|
| 1. Soil Mechanics in Theory and Practice   | Alam Singh  |
| 2. Soil Mechanics & Foundation Engineering | Arora, K.K. |
| 3. Handbook on Design of Foundations       | Kaniraj     |
| 4. Analysis and Design of Foundations      | Prakash, S  |

NOTE: There shall be eight question of 20 marks each, two from each unit .Five question have to be attempted selecting atleast one question from each unit. Use of Calculator is allowed.

COURSE OUTCOMES

On completion of the course students will be able to:

C601.1	Analyze earth retaining structures for different kind of soil.
C601.2	Calculate the bearing capacity of shallow and deep foundation.
C601.3	Carry out soil investigation for different civil engineering construction
C601.4	Understand various soil improvement techniques to investigate different types of soils through exploration methods and fields tests

CLASS: B. E. 6<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE: THEORY OF STRUCTURE-III	L	T	MARKS	
COURSE NO: C-602	4	2	THEORY	SESSIONAL
DURATION OF EXAM: 3 HOURS			100	50

UNIT - 1

Arches :-Analysis of three hinged, two hinged and fixed arches, Reaction locus, Settlement, Temperature effects, Influence Lines.

Cables & Suspension Bridges :- Equilibrium of loaded chord. Cables with ends at different levels. Temperature stresses, Suspension Bridge with three hinged stiffening girder and two hinged stiffening girder.

UNIT - 2

Influence lines for reaction, shear and bending moment in simply supported beams, overhanging beams, compound beams. Influence lines for forces in members of trusses, criteria for maximum effects in beams and trusses. Reversal of stress.Muller-Breaslau's Principle for determination of influence for continuous beams. Max. bending moment and shear force diagrams. Rolling loads on beams. Max. bending moment and shear force.

UNIT - 3

Slope Deflection Methods:-Analysis of beams and frames by slope deflection method. Conjugate Beam Method Concept. Relation between given beam and Conjugate beam.

UNIT - 4

Plastic Theory :-Plastic bending of beams, Plastic hinge, Plastic moment, Shape factor, Plastic Modulus, Analysis of Rectangular, T and I sections, Simply supported beams, propped cantilevers, Continuous beams, Portal frames.

Analysis of redundant beams using stiffness and force methods (matrix method).

**BOOKS RECOMMENDED :**

- |   |                     |
|---|---------------------|
| 1. Elementary Structural Analysis           | Wilbur, Norris      |
| 2. Theory of Structures                     | Ramamurtham, S      |
| 3. Elementary Matrix Analysis of Structures | Manickaselvam, V.K. |
| 4. Structural Mechanics                     | Dr.Desai&Dr.Thadani |
| 5. Structural Analysis                      | Williams & Lucas    |

NOTE:- There shall be eight question of 20 marks each, two from each unit .Five question have to be attempted selecting atleast one question from each unit. Use of Calculator is allowed.

**COURSE OUTCOMES**

On completion of the course students will be able to:

C602.1	Solve problems of Arches, and suspension bridges.
C602.2	Understand the concept of Influence lines and draw ILD for beams and trusses
C602.3	Analyze beams and frames by slope deflection and conjugate beam method
C602.4	Understand the concept of Plastic theory and analyse beams using Matrix method.

CLASS: B. E. 6<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

L T MARKS

COURSE TITLE : ENGINEERING HYDROLOGY

3 2 THEORY SESSIONAL

COURSE NO: C-603

100 50

DURATION OF EXAM: 3 HOURS

**UNIT - 1**

Hydrological Cycle, Precipitation, Evaporation, Infiltration. Factors affecting precipitation over India. Automatic and non-automatic rain gauges, selection of site. Analysis of rain fall data, Hydrographs and mass curves.Intensity duration-frequency and depth area duration analysis. Sources and components of runoff,, estimation, Rainfall-runoff relations.

**UNIT - 2**



Typical flood hydrograph and its components. Base flow and separation. Theory of Unit Hydrograph, Relationship between s-curve and hydrograph, Relationship between Instantaneous hydrograph and unit hydrograph.

UNIT - 3

Floods causes and effects. Importance of flood studies. Estimation of peak flows. Low flow. Flood forecasting, return period. Flood routing through reservoir, Flow duration curves, Frequency Analysis by Gumbel's method.

UNIT - 4

Elements of ground water hydrology. Porosity, permeability, transmission, specific yield and specific retention. Darcy's law. Hydraulics of wells. Boundary effects. Confined and Unconfined Wells. Transmissibility and Storage Coefficient. Thein method, Jacob's method. Ground water investigation. Tube Wells, Quality of ground water.

BOOKS RECOMMENDED:

- |  |                           |
|--|---------------------------|
| 1. Engineering Hydrology                     | Subramanya, K             |
| 2. Hydrology for Engineers                   | Linsley, Kohler & Paulhus |
| 3. Ground Water                              | Garg, S.P.                |
| 4. Hydrology and Water Resources Engineering | Garg, S.K.                |

NOTE:- There shall be eight question of 20 marks each, two from each unit .Five question have to be attempted selecting atleast one question from each unit. Use of Calculator is allowed.

COURSE OUTCOMES:

On completion of the course students will be able to:

C603.1	Understand the essential components and function of the hydrologic cycle including precipitation, evaporation/evapotranspiration, overland flow and surface storage, groundwater flow and storage, and channel flow, storm water runoff and water quality.
C603.2	Compute hydrologic mass balance in a closed basin.
C603.3	Develop unit hydrographs based on stream flow data, and conduct basic unit hydrograph analysis.
C603.4	Conduct frequency analysis on hydrologic data to determine return period or recurrence interval.
C603.5	Perform hydrologic and hydraulic routing using governing equations for hydraulic river routing.

CLASS: B. E. 6<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE: DESIGN OF STRUCTURES – I	L	T	MARKS	
COURSE NO: C- 604	4	2	THEORY	SESSIONAL
DURATION OF EXAM: 3 HOURS			100	50

#### UNIT - 1

Introduction, Materials - basic properties of concrete & reinforcement, characteristic strength, admixtures, quality control. I.S. Specifications. Design of Concrete Mix. Acceptance Criteria, various methods - I.S. Code method in detail.

Timber - properties, factors affecting strength of timber, allowable stresses, design of simple beams, struts and ties.

#### UNIT - 2

Design philosophies, knowledge of working stress method. Ultimate Load Method. Limit State Method in detail and its statistical back ground. Various Limit States.

Analysis and design of singly, doubly reinforced beams, T-beams, cantilever beams using Limit State Method.

#### UNIT - 3

Shear, bond, anchorage provisions for rectangular beams using Limit State method. Serviceability conditions. Reinforcement detailing and drawings. Design of beams for Torsion, Design of continuous R.C. beams.

#### UNIT - 4

Analysis and design of columns by working stress method and Limit State method. Short and long columns, biaxial bending. Use of design charts, Analysis and design of isolated footing, eccentric footing, combined footing, Rafts.

#### BOOKS RECOMMENDED :

1. Reinforced Concrete Structures and Limit State Design Jain, A.K.
2. Limit State Design of R.C.C. Hughes
3. Plain and Reinforced Concrete Jain & Jaikrishen
4. Relevant I.S. Codes



Types of air pollutants and sources, air quality and emission standards, effect of air pollutants, control measures.

**SECTION - II**

**Sewage Treatment**

Various Units : Their purposes sequence and efficiencies, Preliminary treatment : screening and grit removal units, oil and grease removal, Primary treatment, Secondary treatment : activated sludge process, trickling filter, Sludge digestion and drying beds. Stabilization pond, Septic tank, Soakage systems, Imhoff tank, Recent trends in sewage treatment, advanced waste water treatment : nutrient removal, solids removal.

**Waste Water Disposal and Reuse**

Disposal of sewage by dilution, self purification of streams, sewage disposal by irrigation & sewage farming, waste water reuse.

**Solid Waste Management :Generation, collection and disposal**

**BOOKS RECOMMENDED:**

- |    |                           |            |
|----|---------------------------|------------|
| 1. | Environmental Engineering | Peavy      |
| 2. | Water Supply and Sewage   | McGhee     |
| 3. | Air Pollution and Control | Rao        |
| 4. | Waste Water Engg. Vol.II  | Garg, S.K. |

NOTE:- There shall be eight question of 20 marks each, Four from each section .Five question have to be attempted selecting atleast two from each section. Use of Calculator is allowed in Examination.

**COURSE OUTCOMES:**

On completion of the course students will be able to:

C605.1	Determine various sewage characteristics.
C605.2	Understand various types of air pollution and control devices
C605.3	Carry out various waste water treatment system, design and operation
C605.4	Know various methods of waste water disposal and its reuse.

**CLASS: B. E. 6<sup>TH</sup> SEMESTER**  
**BRANCH: CIVIL ENGINEERING**

**COURSE TITLE : ARCHITECTURE AND TOWN PLANNING**  
**COURSE NO: C-606**  
**DURATION OF EXAM: 3 HOURS**

L	T	MARKS
4	1	THEORY SESSIONAL
		100 50

Section-A

Introduction : Architecture and Civil Engineering, History, Brief Historical Review of various styles of Architecture and factors influencing their Development. Contemporary Architecture.

Design Principles like Aesthetics, Utility and the Structure. Elements like contrast, symmetry etc.

General Principles of composition of various types of spaces and forces. Design consideration of residential and public buildings including interior decoration. Environmental control- both exterior & interior, physical and economical constraints with reference to residential & public buildings.

Section-B

TOWN PLANNING : Planning at various levels, National, Regional, City and Village level.

Origin and growth of Towns-Horizontal and vertical development. Satellite and neighbour hood planning.

MASTER PLAN : It's importance for redevelopment of existing towns. Building Bye-Laws.

Zoning regulations for various urban land uses.Place of Multistorey buildings in zoning.Variou road patterns, Express ways, Junctions, Parkways etc.

Slum Formation: Their clearance, Garden City concept.

BOOKS RECOMMENDED:

- |    |                                 |                     |
|----|---------------------------------|---------------------|
| 1. | A History of World Architecture | Fletcher, Banistere |
| 2. | Design Fundamentals             | Scof                |
| 3. | Theory of Architectural Design  | Broadbent           |
| 4. | Urban Planning                  | Gallien             |

NOTE:- There shall be eight question of 20 marks each, four from each section. Five question have to be attempted selecting atleast two questions from each section. Use of Calculator are allowed in Examination.

COURSE OUTCOMES

On completion of the course students will be able :

C606.1	apply the knowledge of architecture aspects in new buildings
C606.2	Apply the knowledge of architectural, design considerations of residential buildings and public buildings including interior decorations.
C606.3	To understand basic concepts of town planning and aspects of zoning
C606.4	Able to understand basic concepts of Building planning and by learning the principles of planning, principles of architecture and byelaws, they will be able to design the buildings and draw the various building drawings.

CLASS: B. E. 6<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE: ADVANCED HYDRAULICS

L T MARKS

COURSE NO: C-607

4 1 THEORY SESSIONAL

DURATION OF EXAM: 3 HOURS

100

50

UNIT - 1

Introduction to Sediment and Fluvial Hydraulics, Nature of Sediment Problems, Origin and Properties of Sediments, Fundamental properties of individual Sedimentary particles, Bulk properties of Sediments, Incipient motion of Sediment particles, Competent velocity, Lift concept, Critical Tractive Force, Critical Tractive Stress of Cohesive materials.

UNIT - 2

Regimes of flow, ripple and dune regime, Antidune regime, importance and prediction of regimes of flow, Resistance of flow and velocity distribution, Rough boundaries, resistance to flow in Alluvial Streams, Velocity distribution in Alluvial Streams.

UNIT - 3

Bed load transport and saltation, bed load equations-dimensional considerations, Semi-theoretical equations. Suspended load transport, Mechanism of suspension, Assumptions in derivation of Sediment Distribution Equation, Simple relations for suspended load, wash load etc. Total load transport microscopic method, macroscopic method, sediment yield from catchment.

UNIT - 4

Design of stable channels, tractive force method and regime method, Sediment control in canals, water requirements, River training and bank protection for flood control, navigation etc. Alluvial river models, debris flow, density currents. Introduction to Sediment transport through pipes, Degradation and aggradation of alluvial rivers and their bed-level variation.

BOOKS RECOMMENDED:

1. Loose Boundary Hydraulics Randkivi, A.J.
2. Sediment Transport and Alluvial River Problems Garde&RangaRaju
3. Sediment Transport Graf
4. Flow Through Open Channel RangaRaju.

NOTE:- There shall be eight question of 20 marks each, two from each unit .Five question have to be attempted selecting atleast one question from each unit. Use of Calculator are allowed in Examination.

COURSE OUTCOME

On completion of the course students will be able :

C607.1	To apply the knowledge of critical tractive stress of cohesive materials in design ofhydraulic structures
C607.2	Will able to analyze the resistance to flow in alluvial streams
C607.3	Apply the knowledge to design the stable channels
C607.4	Apply the knowledge to analyze the bed level variations of alluvial rivers i.e degradation and aggradations

CLASS: B. E. 6<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE: STATISTICS

L

T

MARKS

COURSE NO: MTH - 608

4

1

THEORY

SESSIONAL

DURATION OF EXAM: 3 HOURS

100

50

SECTION-A

Special Continuous Distributions: Probability distribution of a continuous random variable. Mean, Variance and other moments. Moments generating function and characteristic function. Normal distribution. Properties of normal probability curve. Additive property. Beta and Gamma distributions. Sampling distributions: Chi-square  $\chi$  distribution and its properties, Sampling distribution of the sample of the sample mean and sample variance, t, F and Z- distributions and their properties. Inter-relations between t, F, Z,  $\chi$  and normal distribution.

Theory of Estimation (Point estimation): The problem of estimation, Fisher's criterion of the best estimator, Unbiased estimator, Consistent estimator and efficient estimator, Sufficient estimator, Likelihood function, Roa- Blackwall Theorem.

Method of Estimation: Maximum likelihood method of estimation, Properties of the M.L. estimation, Intrinsic accuracy and amount of information, Fisher's inequality.

Minimum variance method of estimation, Rao-Cramer inequality, Least square method of estimation, Bayesian method of estimation.

Theory of Estimation (Interval estimation): Confidence Interval (C.I.) and its interpretation, confidence region, C.I. for large samples, C.I. for population parameters, C.I. for means, C.I. for proportions, C.I. for difference and C.I. for variance ratios.

#### SECTION-B

Testing of Hypothesis: Statistical hypothesis- Null hypothesis and tests of hypothesis. Type I and Type II errors, Level of significance, tests involving normal distribution, One –tailed and Two –Tailed tests, Tests for large samples and small samples. Relation between estimation theory and hypothesis testing, Operating characteristic curve (O.C. curve), Power of test, Simple and Composite hypothesis, Likelihood Ratio test.

Non-Parametric Tests: The Sign Test, The Run Test, The Median Test, The Wilcoxon Two Sample Rank Test, The H-Test.

#### BOOKS RECOMMENDED:

1. Statistical Methods , by S.P.Gupta, S Chand & Sons, New Delhi
2. Probability and Statistics for Engineers, by Richard A . Johnson, PHI, New Delhi
3. Elements of Probability and Statistics , by A.P. Baisnab and Manoranjan Jas, Tata McGraw Hill, New Delhi.
4. Engineering Mathematics, by Srivastava, R.S.L.

NOTE:- There shall be eight question of 20 marks each, four from each section .Five question have to be attempted selecting atleast two question from each section. Use of Calculator is allowed in Examination.

#### COURSE OUTCOME:

On completion of the course students will be able to:

C608.1	Understand the meaning of Mean, Variance and Moments
C608.2	Understand the concept of Normal distribution and its properties.
C608.3	Inter- relate between t, F & Z distributions.
C608.4	Understand the theory of Estimation (Point estimation & Interval estimation).
C608.5	Understand the concept of Statistical hypothesis.



CLASS: B. E. 6<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE : ENVIRONMENTAL ENGINEERING - II LAB	P	MARKS
COURSE NO: C-608	2	50

List of Experiments

1. Determination of B.O.D. of Sewage.
2. Determination of C.O.D. of domestic and industrial sewage.
3. Determination of Kjeldal nitrogen.
4. Determination of volatile, mixed, filtrable and dissolved solids.
5. Determination of optimum dose of coagulants.
6. Determination of iron and two heavy metals.
7. Measurement of SO<sub>2</sub> in ambient air.
8. Measurement of Particulate matter in air.

COURSE OUTCOME:

On completion of the course students will be able to:

C608.1	Determine physical, chemical and biological characteristics of wastewater
C608.2	Assess the quality of wastewater and ambient air.
C608.3	Recommend the degree of treatment required for the wastewater.
C608.4	Analyze the survival conditions for the microorganism and its growth.

CLASS: B. E. 6<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE: DESIGN OF STRUCTURE-I LAB	P	MARKS
COURSE NO: C-609	2	50

LIST OF EXPERIMENTS:

1. To determine the physical properties of cement using Vicat's apparatus (consistency, initial setting time, final setting time and compressive strength).

2. To find the specific surface area of given combined aggregates.
3. To determine the fineness modulus of fine and coarse aggregates.
4. To find bulk density and bulking factor of medium sand, fine sand and coarse sand.
5. To perform soundness test on cement using Le Chatlier's apparatus.
6. To find out absolute density of cement using specific gravity bottle.
7. To determine workability of concrete (any grade) by compaction factor apparatus and slump test.
8. To determine the tensile strength of concrete by split cylinder test.
9. To establish (i) age Vs Cube Strength relationship (ii) Strength Vs W.C. Ratio relationship.
10. Concrete mix design completes (any grade).
11. Study of nondestructive test on concrete.

COURSE OUTCOMES:

C609.1	Conduct Quality control tests on concrete making materials
C609.2	Conduct quality control tests on fresh and hardened concrete.
C609.3	Design and test concrete mix
C609.4	Conduct Non- destructive tests on concrete.

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COURSE SCHEME

FOR B.E 7<sup>TH</sup> SEMESTER CIVIL ENGINEERING

FOR EXAMINATION TO BE HELD FOR BATCH 2014 & ONWARDS

Course No.	Name of the Course	Hours Per Week			Marks			
		L	T	P	Theory	Sessional	Practical	Total
C-701	Design of Structure-II	4	2	-	150	50	-	200
C-702	Irrigation and flood control	4	2	-	100	50	-	150
C-703	Transportation Engg-I	4	2	-	100	50	-	150
C-704	Minor Project	-	-	6	-	-	100	100
C-705	Industrial Training	-	-	-	-	-	75	75
Elective-II**								
C-706	Water Resource Engineering							
C-707	Environmental Pollution Control Engineering	4	2	0	100	50	-	150
COM-709	Computer Basics and Applications							
C-708	Seminar	-	-	2	-	75	-	75
C-709	Irrigation and Flood Control Laboratory	-	-	2	-	-	50	50
C-710	Transportation Engg.-I Lab.	-	-	2	-	-	50	50
Total		16	8	12	450	275	275	1000

Note :The students have to choose one course out of the three elective courses shown under course No. C-706/C-707/Com-709 in consultation with the Department.

CLASS: B. E. 7<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE: DESIGN OF STRUCTURE – II

MARKS

COURSE NO: C-701

L T THEORY SESSIONAL

DURATION OF EXAM: 3 HOURS.

4 2 150 50

SECTION – A

R.C.C. DESIGN

Design of one way slab, Design of two way slab with simply supported and restrained edges. Design of stairs.

Retaining Walls, types, forces, stability requirements. Design of cantilever and counterfort retaining walls, surcharge.

Pre-stressed concrete, Advantages, Prestressing systems, losses, initial and final stresses. Moment of Resistance, shear reinforcement, simple design problems.

SECTION – B

STEEL STRUCTURES

Types and Properties of structural steel, I.S. rolled sections, Loads, Design of riveted and welded connections. Eccentrically loaded joints, beam to column connections.

Tension and compression members – tension members, design of axially loaded tension members, struts and columns including built up columns, lacing and battens.

Column bases:- design of slab base and gusseted base, Grillage foundations.

Beams:- design of laterally restrained and unrestrained beams, web buckling.

BOOKS RECOMMENDED:-

- |    |  |                |
|----|--|----------------|
| 1. | Reinforced Concrete - Limit State Design | Jain, A.K.     |
| 2. | Reinforced Concrete Design               | Sinha, S.N.    |
| 3. | Design of Steel Structures               | Duggal, S.K.   |
| 4. | Design of Steel Structures               | Raghupathi, M. |

NOTE: - There shall be total seven questions, from two sections. Four questions have to be attempted selecting atleast two from each section. Use of Calculator, relevant IS codes and steel tables are allowed.

**COURSE OUTCOMES:**

On completion of the course students will be able

C-701.1	Design reinforced concrete beams subjected to transverse loading.
C-701.2	Design reinforced concrete short columns subjected to axial and flexural loading.
C-701.3	Design a simple reinforced concrete structural system.
C-701.4	Ability to perform analysis and design of steel members and connections

CLASS: B. E. 7<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE: IRRIGATION & FLOOD CONTROL

MARKS

COURSE NO: C-702

L T THEORY SESSIONAL

DURATION OF EXAM: 3 HOURS.

4 2 100 50

**SECTION - A**

Introduction : Lift and Flow Irrigation. Advantages of Irrigation. Development of Irrigation in India. Water requirement of Crops. Irrigation methods.

Design procedure for Irrigation Channels, Stable Channel Design. Water Logging and its control. Lining of Channels and Drainage.

Irrigation Outlets : Classes of outlets. Non modular outlets. Types of Semi Modules, Rigid Modules.

Principles of Design for Canal Masonary Works.

River Training Methods.

**SECTION –B**

Khosla's Theory for determination of pressures and exit gradients, Bligh's creep theory.

Regulation Works : Falls, Distributory head Regulators and other works.

Cross Drainage Works : Necessity and types. Design of Syphon, Syphon Acqueducts, and Superpassage, Level crossings.

Canal Headworks : Locations of Headworks, Weir, Divide Wall, Fish Ladder.

Earthen Dams : Investigation and Planning Materials used, Criteria for Safe Design including design of filter.

BOOKS RECOMMENDED:-

1. Irrigation Engineering & Hydraulic Structures Garg, S.K.
2. Irrigation (Practice & Design) Khushalani, K.B
3. Theory and Design of Irrigation Structures Varshney, R.S. & Gupta
4. Irrigation Engineering & Hydraulic Structures Sahasrabudhe, S.R.

NOTE:-There shall be total Eight questions, Four from each section. Five questions have to be attempted selecting atleast two from each section. Use of Calculator is allowed.

COURSE OUTCOMES:

On completion of the course students will be able to:

C-702.1	Understand the design aspects of various hydraulic structures on permeable foundation and their causes of failure
C-702.2	Plan and design the efficient silt control structures and relevant river training works.
C-702.3	Plan and design suitable irrigation channels and canal regulation works.
C-702.4	Understand the concept of cross drainage works, canal head works and earthen dams

CLASS: B. E. 7<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE: TRANSPORTATION ENGINEERING-I

MARKS

COURSE NO: C-703

L T THEORY SESSIONAL

DURATION OF EXAM: 3 HOURS.

4 2 100 50

SECTION - A

Highway Engineering

Introduction, History and Classification of Roads. Alignment Design, Highway Location, Route Surveys.

Highway Geometric Design:- elements, Signs, Distance, Design of horizontal and Vertical alignments.

Highway Materials : Subgrade Soil and its preparation, properties and tests for subgrade soil, road stone aggregates and bituminous materials.

Design of bituminous concrete mix. Traffic Engineering : Introduction, Scope and Characteristics of Traffic, Traffic Studies, Traffic Capacity. Design of Intersections, Signals and Parking facilities. Highway lighting.

Hill Roads : Problems of alignment, geometric design requirements and drainage.

SECTION - B

Highway Pavement Design : Types of Pavement Structure, Objects and requirements of Pavements, Functions of Pavement Components, Design factors for Pavement, ESWL. Strength Characteristics of Pavement Materials. Various methods of design of Flexible Pavements e.g., group index method, CBR method and Burmister's method, Triaxial Method. General design consideration of Rigid Pavements, difference between Rigid and Flexible Pavements, Westergaard's Method for design of Rigid Pavements and concept for stresses due to load and temperature in rigid pavements. Joints in Cement Concrete roads, Highway Drainage

Air Port Engineering

Introduction, ICAO Classification of Airports, Layout, Classification of Flying activity, Aircraft characteristics, Airport site selection.

Runways and taxiways, runway length. Wind rose diagram, orientation and pattern of runways.

Introduction to various design methods of airport pavement design, drainage and navigation aids.

BOOKS RECOMMENDED:-

- |  |                |
|--|----------------|
| 1. Traffic Engineering and Transportation Planning | Kadiyali, L.R. |
| 2. Highway Engineering                             | Khanna & Justo |
| 3. Highway Engineering                             | O'flherty      |
| 4. Planning and Design of Airports                 | Horonjoff      |

NOTE:- There shall be total Eight questions, Four from each section. Five questions have to be attempted selecting atleast two from each section. Use of Calculator is allowed.

COURSE OUTCOMES:

On completion of the course students will be able to:

C-703.1	Understand the factors influencing road vehicle performance characteristics and design.
C-703.2	Apply basic science principles in estimating stopping and passing sight distance requirements.
C-703.3	Understand basic traffic stream parameters and models, traffic flow models, and queuing theory.
C-703.4	The students after completion of this course will have an in-depth knowledge in Traffic Engineering, Transport Planning, Highway Design and Construction, Sustainable Urban and Transport Development and will be efficient enough to take up projects in the field.

CLASS: B. E. 7<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE: MINOR PROJECT	P	MARKS
COURSE NO: C-704	6	100

Project work will be taken up by every student of 7th semester Civil Engineering at the beginning of the Semester. However, the problem will be enunciated by the Department. The project may be on one of the followings:

1. Geometric design of a typical stretch of a Highway.
2. Public health and water supply project for a given locality.
3. Detailed design of a Plate Girder Bridge.
4. Development of interactive computer programme for some Civil Engineering design problems.
5. Detailed estimation and costing of a building.

Distribution of Marks as per University statues:

Total Marks for End semester Evaluation	= 100 marks
1) Presentation/ Demonstration	= 40 marks 30%
2) Viva-voce	= 40 marks 30%
3) Actual work done	= 60marks 40%

Award of Marks

- Marks under (1) and (2) will be awarded by the Departmental committee constituted comprises of convener and atleast two members.
- Marks under (3) will be awarded by the Project Guide/supervisor concern

COURSE OUTCOME

Upon successful completion of this work, it is expected that students will be able to:

C-704.1	Work in a team to select a problem for project work
C-704.2	Formulate the methodology to solve the identified problem
C-704.3	Apply the principles, tools and techniques to solve the problems and can be extended for major project also
C-704.4	Prepare and present project report



CLASS: B. E. 7<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE: INDUSTRIAL TRAINING

MARKS

COURSE NO: C-705

75

Students shall be deputed by the college for practical training to various Sites/Agencies for one month normally during the summer vacations. However, in case the summer vacations falls after the 7<sup>th</sup> Semester is over, the students shall have to go in for such training during these vacations. After the successful completion of this training each student has to submit a report of work done at the site or in the organization deputed to. The report of work done by the individual student shall be authenticated by a competent officer of the agency.

Also the department shall evaluate the student on the basis of the report presented and the viva-voce examination conducted by the departmental committee.

Guidelines for evaluation of Practical Training:

The evaluation shall be done by the departmental committee by the end of 7<sup>th</sup> semester. The committee shall have a convener and atleast two member.

Distribution of Marks as per the University statutes:

Total Marks for Evaluation	= 75 marks	
i) Report	= 30	40%
ii) Viva-Voce	= 22.5	30%
iii) Miscellaneous Marks	= 22.5	30%

Due weightage will be given to those who have opted Industrial Training outside the State as well as keeping in view the profile of that Industry.

Award of the Marks:

Marks under (i), (ii) & (iii) will be awarded by the departmental committee constituted for the purpose.

COURSE OUTCOME:

Upon successful completion of this training, it is expected that students will be able to:

C-705.1	Interact and study with a range of students and to practice multiple management skills including constructional work, independent action and teamwork & Relate the theoretical knowledge with working site.
C-705.2	Deal with the major ongoing challenges while working at site
C-705.3	Manage a project within a given time frame.
C-705.4	Identify sources of hazards, and assess/identify appropriate health & safety measures

CLASS: B. E. 7<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE: WATER RESOURCE ENGINEERING

COURSE NO: C-706 (ELECTIVE -II)

DURATION OF EXAM: 3 HOURS

L	T	MARKS	
4	2	THEORY	SESSIONAL
		100	50

#### SECTION-A

Introduction : Importance of water & water resource engineering, surface & ground water resources, water Resources of World and India. Necessity for Conservation and Development of Country's Water Resources. Different uses of Water Resources. Need for multipurpose and Single Purpose Projects. River systems in India and Environment impacts on water resources, various national water policies.

Project Planning for Water Resources, different types of data and their collection. Project formulation. Interstate Water transfer and Interstate River disputes.

#### SECTION-B

Optimization Techniques, elementary principles, graphical techniques for single purpose and multipurpose projects. Dynamic programming.

Economics of Water Resource Planning, Principles of Engineering Economics, Mathematics of Economic Analysis, Capital budgeting.

Economic Planning for flood control, domestic and Industrial Water Supply, Irrigation and Hydroelectric Power.

Cost allocation in multipurpose projects.

#### BOOKS RECOMMENDED:-

1. Water Resource Engineering Linsley
2. Economics of Water Resource Planning James & Lee
3. A Text Book of Hydrology & Water Resources Sharma, R.K.
4. Water Resource Project Planning Kuiper

NOTE:-There shall be total Eight questions, Four from each section. Five questions have to be attempted selecting atleast two from each section. Use of Calculator is allowed.

#### COURSE OUTCOMES:

On completion of the course students will be able to:

C706.1	The importance of water and various water resources of India and the world.
C706.2	Understand various Interstate river disputes.
C706.3	Understand various steps involved in water resource planning of engineering projects.
C706.4	Formulation and solving of Linear Programming Problems using Graphical and Simplex methods.
C706.5	Fixing of Cost allocations in multipurpose projects.

CLASS: B. E. 7<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE: ENVIRONMENTAL POLLUTION CONTROL ENGINEERING

COURSE NO: C-707 (ELECTIVE-II)

MARKS

DURATION OF EXAM: 3 HOURS

L	T	THEORY	SESSIONAL
4	2	100	50

SECTION - A

Environmental Pollution- Inter relationship between various forms of pollution.

Surface Water Pollution Surveys - Integrated River Basin Water Management - Restoration of Water bodies - water quality parameters and optimization of treatment - water quality changes by domestic use, Industrial use, radio active materials - Thermal pollution and underground disposal - Types of water pollutants and their effects - Instrumentation for water quality and treatment - Role of waste water treatment as pollution control measure.

Light Pollution - Light and its characteristics - Visual activity and visual performance - Glare - Outdoor lighting and glare sources - Corrective procedures.

Water Pollution Laws and Regulations - Air Pollution Control Act of India- Chimney heights - Land Pollution Laws and Regulations.

SECTION - B

Air Pollution Control Strategy - Basic approaches - Areas of legal responsibility - Source identification - Particulate control and control of gases and vapours - Factors affecting control approach selection - Air pollution control technology - Settling chambers, filters, electrostatic precipitators, wet scrubbers, entrainment separators - Gas absorption, gas absorption and combustion.

Land Pollution - The pollution cycle - Ecological factors in plant site selection - Ecological aspects of vegetation control.

Noise Pollution - The physics of sound and hearing - Effects of noise - Sources - Instruments and techniques for noise measurement.

**BOOKS RECOMMENDED :**

1. Water Pollution Control Act (1974) passed by Govt. of India.
2. Solid waste management in developing countries A.D.Bhide
3. Solid waste management course manual NEERI
4. Air Pollution control Tech. Roert M. Bethea
5. Air Pollution Control Act of India.
6. Relevant Indian Standards & Factory Acts.

NOTE:-There shall be total Eight questions, Four from each section. Five questions have to be attempted selecting atleast two from each section. Use of Calculator is allowed.

**COURSE OUTCOMES:**

On completion of the course students will be able to:

C707.1	Know various types of pollution and their interrelationship.
C707.2	Understand water pollution and instrument for water quality and treatment.
C707.3	Select suitable ecological factors in plant site selection and ecological aspects of vegetation control
C707.4	Apply various techniques for nice measurement.

CLASS: B. E. 7<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE: COMPUTER BASICS AND APPLICATIONS

COURSE NO: COM-709(ELECTIVE-II)

MARKS

DURATION OF EXAM: 3 HOURS.

L	T	THEORY	SESSIONAL
4	2	100	50

**SECTION-A**

Computer basics and characteristics.TechnologicalAdvances.Various components, Hardware Processor.Memory overview and organisation, basic input output unit.Binary number system.Data and its

representation. Information representation in Digital Computers. Storage devices and peripherals. Operating system and its importance. Networking Computer and Communication.

High Speed Computation, Computer Arithmetic, Errors, Machine Computations. Numerical methods, Polynomial equations bisection method, iteration method, rate of convergence, iterative method for system of linear equations- complete with analysis, flow charts and FORTRAN/C Programmes.

**SECTION-B**

Computer Automated Design and Management (CAD/CAM), Various Engineering Utilizations. CAD/CAM tools. Over view of geometric modelling and graphics application. CAD specific characteristics of an application. Hardware requirements. Types of Systems. Input output devices. CAD/CAM Software. Basic definitions, data structure, database, coordinate systems. User interface. Introduction to curve representation.

Data base, data organization. Conceptual understanding and advantages of data base management system, basic concepts. Table Design, queries. Relational approach. Overview of database models. Security and concurrency.

**BOOKS RECOMMENDED :**

1. Computer Organization Hamacher, V
2. CAD/CAM Theory and Practice Zeid Ibrahim
3. Computer Database Organization Martin, J.

NOTE:-There shall be total Eight questions, Four from each section. Five questions have to be attempted selecting atleast two from each section. Use of Calculator is allowed.

**COURSE OUTCOMES:**

On completion of the course students will be able to:

C-709.1	Acquire knowledge about the various components of computer system, latest advancements in the fields of information representation and networking.
C-709.2	Compute computer arithmetic operations, polynomial equations using FORTRAN/C programming language.
C-709.3	Acquire the knowledge of Computer Automated Design and Management (CAD/CAM) in synthesizing common engineering designing situations.
C-709.4	Understand the basic terminology of data structure and its applications.
C-709.5	Understand DBMS architecture , identify basic database storage structures and access techniques.

CLASS: B. E. 7<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE: SEMINAR	P	MARKS
COURSE NO: C-708	2	75

This will involve a detailed study of a topic of interest reproduced in the candidate's own style. For this, a student has to prepare a seminar by doing proper survey of literature, compilation of information so gathered and then presentation of the same followed by question-answer session. The report of which has to be submitted by the student well before the conduct of seminar. The handout submitted by the student will be in accordance with the standards of technical papers.

Guidelines and evaluation of Seminar in 7th semester:

The topic of the Seminar is to be finalized and approved by the departmental committee by the end of 6th Semester. The committee shall have a convener and atleast two members.

Distribution of Marks:

Total Marks for Seminar Evaluation = 75 marks

- 1) Project Report = 25 marks
- 2) Presentation = 35 marks
- 3) Attendance = 15 marks.

Award of Marks:

- Marks Under (1) will be awarded by the Seminar Incharge.
- Marks Under (2) and (3) will be awarded by the Departmental committee constituted for the purpose.

CLASS: B. E. 7<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE: IRRIGATION & FLOOD CONTROL LAB	P	MARKS
COURSE NO: C-709	2	50

The practical work consists of :

1. Complete design and drawing of Irrigation Channel with the data provided by the Department. The drawings shall include Longitudinal Section and Cross Section, showing all important details.
2. Design and drawing of a weir or a barrage with the data provided by the department. The students shall be required to furnish hydraulic and structural design.

3. Design and drawing of a cross drainage work with the given data.
4. Complete design and drawing of a earthen dam with the given data.

NOTE : The Department will ensure that students design and prepare the drawing of atleast two of the above problems.

**COURSE OUTCOME:**

At the end of the course, the student will be able to:

C709.1	Understand the practical knowledge involved in irrigation and flood control system.
C709.2	Estimate consumptive use of water for irrigation.
C709.3	Plan irrigation system and assess the benefits of irrigation system.
C709.4	Design various hydraulic structures related to irrigation and flood control system

CLASS: B. E. 7<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE: TRANSPORTATION ENGINEERING-I LAB P      MARKS

COURSE NO: C-710 2      50

Practical work shall comprise of atleast Five experiments out of the following experiments :

1. Subgrade Soil : Classification, group index, CBR test.
2. Aggregates : Specific gravity & Water absorption, flakiness index, impact, crushing and abrasion value tests. Petrographic identification.
3. Bitumen : Penetration, Softening Point, Flash Point. Ductility, Stripping, Viscosity of Tar and Cut back.
4. Stabilized Mixes : Compressive Strength, Durabi

**COURSE OUTCOMES:**

At the end of the course, the student will be able to:

C710.1	Conduct traffic studies for estimating traffic flow characteristics.
C710.2	Characterize the pavement materials
C710.3	Perform quality control tests on pavements and pavement materials.
C710.4	Estimate earth work from longitudinal and cross section details.



UNIVERSITY OF JAMMU, JAMMU

COURSE SCHEME

B.E 8<sup>TH</sup> SEMESTER CIVIL ENGINEERING

FOR EXAMINATION TO BE HELD FOR BATCH 2014 & ONWARDS

Course No.	Name of the Course	Hours Per Week			Marks			
		L	T	P	Theory	Sessional	Practical	Total
C-801	Design of Structure-III	4	2	0	150	50	-	200
C-802	Water Power Engg.	4	2	0	100	50	-	150
C-803	Transportation Engg.-II	4	2	0	100	50	-	150
C-804	Major Project	0	0	8	-	-	225	225
Elective-III**								
C-805	Computational Hydraulics							
C-806	Structural Analysis	4	2	0	100	50	-	150
C-807	Elements of Earthquake Engineering							
HUM-807	Org & Management	3	1	0	100	25		125
Total		19	9	8	550	225	225	1000

\*\*Note : The students have to choose one elective course out of the three elective courses shown under course No. C-805/C-806/C-807 in consultation with the Department

CLASS: B. E. 8<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE: DESIGN OF STRUCTURES – III

MARKS

COURSE NO: C-801

L T THEORY SESSIONAL

DURATION OF EXAM: 3 HOURS.

4 2 150 50

#### SECTION-I

R.C.C. Design

Multi-storeyed Building Frames. Analysis and design of Single Bay single storeyed Portal Frames.

Water Tanks : Tanks resting on ground, overhead tanks, underground tanks (rectangular and circular) Bracings, staging.

Culverts & Bridges : Design of slab culverts, T-beam bridge, Box culverts as per I.R.C. loadings.

#### SECTION-II

Steel Design

Roof trusses, types of trusses, spacing, design loads, wind load calculation.

Design of various members of a roof truss and joint bracings.

Plate Girder Bridges, components. Complete design with curtailment of flange plates, various connections, web stiffeners. Design of bearings.

Truss Bridges - General arrangement, Design Loads, Design of Truss bridge for railway loadings. (Main components only).

Pressed Steel Water Tanks with Staging,

#### BOOKS RECOMMENDED:

1. Reinforced Concrete - Limit State Design by Jain, A.K.
2. Reinforced Concrete Design by Sinha, S.N.
3. Design of Steel Structures by Duggal, S.K.
4. Design of Steel Structures by Raghupatti, M.

NOTE:-There shall be atleast Five questions. Three questions have to be attempted selecting atleast One from each section. Use of Calculator, relevant IS codes and steel tables is allowed.

**COURSE OUTCOMES:**

On completion of the course students will be able to:

C801.1	Design Analyze and design of single bay single storeyed portal frames
C801.2	Design of various water tanks
C801.3	Design of culverts and bridges
C801.4	Design of various roof truss members
C801.5	Design of plate girders

CLASS: B. E. 8<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE: WATER POWER ENGINEERING

MARKS

COURSE NO: C-802

L T

THEORY SESSIONAL

DURATION OF EXAM: 3 HOURS.

4 2

100

50

**SECTION-I**

Introduction, Sources of Energy, Status of Power in India, Place of Hydro-power in a Power System, Estimation of Water Power Potential.

Run-off and Stream Flow, Stream Flow Analysis (Data Generation ), Mass Curve, Flow Duration Curve.

Electrical Load on Hydro-Turbines - Load Curve, Load Factor, capacity Factor, Utilization Factor, Diversity Factor, Load duration Curve, Firm Power, Secondary Power, Prediction of Load.

Types of Hydro-Power Plants - Clasification of Hydel Plants, Run-off River Plants, Valley Plants, Diversion Canal Plants, Storage and Pondage.

Pumped Storage Power Plants- Advantages of Pumped Storage Plants, Two Unit and Three Unit Arrangement, Efficiency of Pump Storage Plants.

**SECTION-II**

Dams and Spillways : Classification of Dams, Gravity Dam, Embankment Dam, Arch Dam, Buttress Dam, Safety of Dams, Types of Spillways, Gates, Energy Dissipation Below Spillways.

Penstocks - Design Criteria, Economic Diameter of Penstocks, Anchor Blocks, Conduit Values, Water Hammer, Resonance, Channel Surges, Intakes, Air Entrainment at Intakes, Canals, Forebay and Tunnels.

Turbines - Layout arrangement, Hydraulics of Turbines, Draft Tubes, Cavitation in Turbines.

Power House Planning, Surface Power Station, Underground Power Station, Introduction to Structural Design of Power Houses.

**BOOKS RECOMMENDED:**

- |    |   |                   |
|----|---|-------------------|
| 1. | Irrigation Engineering and Hydraulic Structures | Garg, S.K.        |
| 2. | Hydro Power Engineering                         | Dandekar & Sharma |
| 3. | Water Power Engineering                         | Barrows           |
| 4. | Water Power Engineering (Vol.I& II)             | Massony           |

NOTE:-There shall be total Eight questions, Four from each section. Five questions have to be attempted selecting atleast two from each section. Use of Calculator is allowed.

**COURSE OUTCOMES:**

On completion of the course student will be able to know:

C802.1	The various sources of energy and estimation of water power potential.
C802.2	The various electrical loads on hydro turbines and its estimation.
C802.3	The classification of Dams and their design.
C802.4	The various types of Power house stations.

CLASS: B. E. 8<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE: TRANSPORTATION ENGINEERING – II

MARKS

COURSE NO: C-803

L T THEORY SESSIONAL

DURATION OF EXAM: 3 HOURS.

4 2 100 50

**SECTION-I**

Railway Track - Introduction, Gauge, Axle Loads and Train Resistance, Grades and Curve Compensation, Coning of Wheel and Canting of Rails.

Rails - Requirements of Rail Section, Types of Rails, Nominal Weight of Rails, Standard Rail Section, Defects in Rails, Service Life of Rails.

Rail Joint - Need for Rail Joint Requirements of a Rail Joint, Standard Joint, Combination Fishplate, Insulated Rail Joints.

Sleepers : Historical Development, Requirements, Sleeper Density and Sleeper Spacing, Type of Sleepers, Design of Sleepers, Ballastless Track.

Ballast - Functional Requirements, Types, Size, Specifications, Sub-Ballast and Blanket.

Formation -Function, Earth Work for Formation, Width, Consolidation and Compaction, Formation Treatment Methods, Troublesome Formations.

Railway Curves-Necessity of Curves, Geometrical Terms, Classification of Curve, Degree of a Curve, Maximum Degree of a Curve, Branching of Curves, Superelevation (Cant).

Welding of Rails-Gap Between Rail Ends, Methods of Welding, Long Welded Rails.

Rail to Sleeper Fastenings-Conventional Fastening for Sleepers, Elastic Fastenings, Check Rails and Guard Rails.

## SECTION-II

Switches and Crossings : Switches, Switch Assembly and Crossing Assembly, Turnouts, Crossovers.

Track Stresses - Bending Stresses, Thermal Stresses, Rail Wheel Contact Stresses, Combined Stresses in the Rail Head, Formation Pressures, Track Deterioration and Maintainability of Track.

Bridges : Introduction, Different Stages of Investigation, Techno-economic Study, Classification of Bridges, Soil Particulars, Topographical details, Hydrologic Particulars.

Site Selection, River Regime, Design Flood Discharge determination by various Methods.

Linear Waterway, Economic Span, Superstructure, Foundations for piers and abutments, Pile Foundations, Well Foundations.

Docks and Harbours - Introduction, Harbours, Various Types of Harbours, Natural and Artificial Harbours, Breakwaters, Dry and Wet Docks, Flotation Docks.

### BOOKS RECOMMENDED :

- |    |   |                    |
|----|---|--------------------|
| 1. | Railway Engineering                                   | Sexena and Arora   |
| 2. | Railway Track Design<br>(New Book Co.Pvt.Ltd. Mumbai) | Antia K.F.         |
| 3. | Design and Construction of Ports                      | Quinn (McGrawHill) |

NOTE:-There shall be total Eight questions, Four from each section. Five questions have to be attempted selecting atleast two from each section. Use of Calculator is allowed.

COURSE OUTCOMES:

On completion of the course students will be able to:

C-803.1	Understand the components of Permanent way and their functions
C-803.2	Able to understand the geometric design elements of Railway Track and their design Methods.
C-803.3	Understand the aircraft characteristics and their influence on various design elements.
C-803.4	Acquire the knowledge of types of Docks, Ports and Harbours.
C-803.5	Select and test materials on site and laboratory as per IS requirement.

CLASS: B. E. 8<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE: MAJOR PROJECT P MARKS

COURSE NO: C-804 8 225

Major Project work will be taken up by every student of 8th semester Civil Engineering at the beginning of the Semester. However, the problem will be enunciated by the Department. The project will consists of :

1. a real life problem, as may be obtained from the field conditions.
2. will include almost all important design and other aspects of Civil Engineering.

Guidelines for evaluation of Project work in 8<sup>th</sup> semester:

Sub-distribution of marks:

- For External Examiner : 100
- For Internal Examiner : 125

Sub distribution of internal Marks:

- Mark distribution of internal Project work as per the University statutes shall be based on:
  - a. Viva-Voce = 30%
  - b. Presentation = 30%
  - c. Report = 40%

**COURSE OUTCOMES:**

After completion of course students will be able to:

C804.1	Propose an engineering based project in a clear and concise manner.
C804.2	Identify and summarize an appropriate list of literature review, analyze previous research work and relate them to current project.
C804.3	Formulate clearly a work plan and procedures
C804.4	Organize, compile and record all work details in an efficient manner
C804.5	Present the research outcome effectively using good presentation skills

CLASS: B. E. 8<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE: COMPUTATIONAL HYDRAULICS

MARKS

COURSE NO: C-805 (ELECTIVE-III)

L T THEORY SESSIONAL

DURATION OF EXAM: 3 HOURS.

4 2 100 50

Gradually Varied Flow : Numerical solution of GVF problems, Direct step method, Standard step method, Advanced Numerical method, Graphical method. Flow profiles in divided channels. Delivery in mild channels under varying downstream pool elevation.

Hydraulic jump in channels, jump on a sloping floor, length of jump, jump as an energy dissipator, location of jump, means of control of hydraulic jump, abrupt drop, abrupt rise, efficiency of jump etc.

Gradually varied unsteady flow : Continuity and dynamic equation for unsteady flow, monoclinal rising wave, uniformly progressive flow, wave propagation.

Hydraulic flood routing : Method of characteristics. Numerical methods.

**BOOKS RECOMMENDED :**

- |    |                                   |               |
|----|-----------------------------------|---------------|
| 1. | Open Channel Hydraulics           | Chou, Ven-Te  |
| 2. | Flow in Open Channels Vol.I& V.II | Subramanya, K |
| 3. | Flow through Open Channels        | RangaRaju     |
| 4. | Open Channel Flow                 | French        |

NOTE:- There shall be total Eight questions. The students have to attempt Five questions. Use of Calculator is allowed.

**COURSE OUTCOMES**

On completion of the course students will be able to:

C805.1	Apply the knowledge to solve numerical solutions of GVF Problems by different methods.
C805.2	Able to design hydraulic jump in channels.
C805.3	Know the knowledge of continuity and dynamic equation for unsteady flow problems.
C805.4	Apply the knowledge of hydraulic flood routing and its various characteristics to solve hydraulic flood routing problems

CLASS: B. E. 8<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE : STRUCTURAL ANALYSIS (ELECTIVE-III)

COURSE NO: C-806

DURATION OF EXAM: 3 HOURS

L	T	MARKS
4	2	THEORY SESSIONAL
	100	50

Review of Matrix Algebra, Flexibility and stiffness Matrices. Static and Kinematic indeterminacy. Concept of Flexibility Matrix Method. Stiffness method. End Action of restrained members. Steps in flexibility matrix and stiffness matrix methods, Element approach (stiffness matrix).

Review of Principle of virtual work. Theorem of minimum potential energy. Elements of theory of elasticity.

Finite element formulation: Basic concepts discretisation, procedure, elementary application of principles & formulation of problems, steps of FEM (no numerical). Space frames using vector method, statical conditions. Method of Joints. Forces in the members.

Approximate analysis of frames by substitute method.

**BOOKS RECOMMENDED :**

- |    |  |                 |
|----|--|-----------------|
| 1. | Finite Element Analysis Fundamentals     | Gallagher, R.H. |
| 2. | Statically Indeterminate Structures      | Wang, C.K.      |
| 3. | Elementary Matrix Analysis of Structures | Manickaselvam   |
| 4. | Introduction to Finite Element method    | Desai & Abel    |



NOTE:-There shall be total Seven questions. The students have to attempt Four questions. Use of Calculator is allowed.

COURSE OUTCOMES:

Students who successfully complete this course will be able to:

C806.1	Distinguish between stable and unstable and statically determinate and indeterminate structures.
C806.2	Apply equations of equilibrium to structures and compute the reactions.
C806.3	Derive the shear and bending moment equations.
C806.4	Draw the shearing force and bending moment diagrams.

CLASS: B. E. 8<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE :ELEMENTS OF EARTHQUAKE ENGG.	L	T	MARKS
COURSE NO: C-807	4	2	THEORY SESSIONAL
DURATION OF EXAM: 3 HOURS			100 50

Introduction to Earthquakes, Causes of Earthquakes, Basic Terminology, Magnitude, Intensity, Peak ground motion parameters.

Past Earthquakes and Lessons learnt, Various Types of Damages to Buildings.

Introduction to theory of Vibrations, Sources of Vibrations, Types of Vibrations, Degree of Freedom, Spring action and damping, Equation of motion of S.D.O.F. systems, Undamped, Damped system subjected to transient forces, general solution, green's function.

Lateral Force analysis, Floor Diaphragm action, moment resisting frames, shear walls.

Concepts of seismic design, Lateral Strength, Stiffness, ductility and structural configuration.

Introduction to provisions of IS 1893-2002 Part-I for buildings. Estimation of lateral forces due to earthquake.

Introduction to provisions of IS 4326.

Introduction to provision of IS 13920.

BOOKS RECOMMENDED :

- |   |                                |
|---|--------------------------------|
| 1. Earthquake Resistant Design of Structures                                    | Agrawal P, Shrikhande M        |
| 2. Dynamics of Structures-<br>Theory and Applications to Earthquake Engineering | Chopra A.K                     |
| 3. Elements of Earthquake Engg<br>Chandra B                                     | Krishna.J, Chandrasekaran A.R, |
| 4. Structural Dynamics –Theory & Computation                                    | Paz M                          |
| 5. Earthquake Resistant Design:   | Dowrick. D.J                   |
| 6. Mechanical Vibrations:   | Rao SS                         |
| 7. BIS codes: IS 4326, IS 13920, IS 1893  |                                |

NOTE: There shall be total Eight questions of 20 marks each. The students have to attempt Five questions. Use of Calculator is allowed.

COURSE OUTCOMES:

Students who successfully complete this course will be able:

C807.1	Learn causes of earthquakes and basic terminologies related to earthquake.
C807.2	Know about the types of vibrations, degree of freedom, and equation of motion of S.D.O.F system
C807.3	Analyze the lateral forces and concepts about seismic design, lateral strength and structure configurations.
C807.4	Estimation of earthquake lateral forces due to earthquake.

CLASS: B. E. 8<sup>TH</sup> SEMESTER

BRANCH: CIVIL ENGINEERING

COURSE TITLE: ORGANISATION & MANAGEMENT

MARKS

COURSE NO: HUM-807

L T THEORY SESSIONAL

DURATION OF EXAM: 3 HOURS.

3 1 100 2

Section - A

The Nature of Management and Organizational Behaviours : Approaches to Organization and Management, The Classical Approach, Scientific Management, The Human Relation Approach, Contingency Theory.

Organizations : Setting, Classification, Organizational Goals and Objectives, Structures and Systems.

Staffing : Manpower Planning, Recruitment and Selection Process.

Management : Managerial Behaviours, Delegation, Motivation, Job Satisfaction, Job Design.

Behaviors in Groups : Communication, Group Performance and Effectiveness, Brain storming, Group Dynamics.

#### Section – B

Leadership : Traits, Approach, Situational Approach, Functional Approach, Leadership Styles.

Management Control : Meaning, Approaches, elements, Forms and Classification of Control Systems, Strategies of Control, Effective Management Control.

Management Information System

Organizational Development - Organizational Climate, Employee Commitment, Organizational Conflict, Views of Conflict, Sources of Conflict, Managing Conflict, Organisational Change and Its Management.

The Relation between Management Development and Organizational Effectiveness - Management Development, Management Education and Training.

#### BOOKS RECOMMENDED:

1. Management and Organisational Behaviour by Mullins, Laurie, J.
2. Organisational Behaviour by Keith Davis
3. Business Organisation and Management by Shukla, M.C.
4. Principles of Management by Terry, G.R.

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting atleast two questions from each section.

#### COURSE OUTCOMES:

Students who successfully complete this course will be able to:

HUM807.1	Understand manpower planning and different methods of selecting competent employees.
HUM807.2	Understand the concept and relevance of leadership, leadership styles, and approaches to leadership.
HUM807.3	Understand the elements of organizational climate and thus contribute towards organizational development.
HUM807.4	Work effectively in groups and play a vital role in team building.
HUM807.5	Analyze and resolve conflicts emerging while working within the organizations in future.

