

**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
COURSE TITLE: ENGINEERING MATHEMATICS-I
COURSE NO.MTH-101
DURATION OF EXAM: 3 HOURS

L	T	MARKS	
3	2	Theory	Sessional
		100	25

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, Addison Wesley, 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 carry 20 marks. Five questions will have to be attempted, selecting atleast two from each section. Use of calculator is allowed.

B.E IST SEMESTER**BRANCH: COMMON TO ALL****SUBJECT: ENGINEERING PHYSICS-I****COURSE NO.PHY-102****DURATION OF EXAM: 03 HOURS****L**
3**T**
1**P**
2

MAXIMUM MARKS:125	
THEORY	SESSIONAL
100	25

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, Guass Divergence theorem, Stokes theorem and their applications, Vector Identities

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

Guass's law in vector notation (differential and integral forms), Applications of Guass'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), Betaron,

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-1
 - &
 - 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

CLASS : B.E. IST SEMESTER
BRANCH: COMMON TO ALL
COURSE TITLE: ENGG. CHEMISTRY
COURSE NO.:CHM-103
DURATION OF EXAM: 3 HOURS

L	T	P	MARKS		
3	1	2	Theory	Sessional	Practical
			100	25	50

SECTION - A

- SPECTROSCOPY :** UV Spectroscopy – Electronic transitions, spectrum, shift of bands 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.
- 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

- STEREOCHEMISTRY :** Optical isomerism, racemization, asymmetric synthesis, methods for resolution of racemic mixture, enantiomerism and diastereoisomerism.
- ALLOYS :** Introduction, purpose of making alloys, preparation of alloys, classification of alloys. (Ferrous and non-ferrous alloys), alloy steels & copper alloys.
- 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 |

CLASS : B.E. IST SEMESTER

BRANCH: COMMON TO ALL

COURSE TITLE: ENGINEERING MECHANICS

COURSE NO.M-104

DURATION OF EXAM: 3 HOURS

L	T	P		MARKS	
3	1	2	Theory	Sessional	Practical
			100	25	50

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 atleast two from each section. Use of calculator is allowed.

B.E IST SEMESTER

BRANCH: COMMON TO ALL

TITLE: COMMUNICATION SKILLS

COURSE NO: HUM-105

DURATION: 3 HOURS

L	T	P	MARKS	
3	1	-	Theory	Sessionals
			100	25

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.

CLASS: B.E. IST SEMESTER
BRANCH: COMMON TO ALL
COURSE TITLE: ENGINEERING GRAPHICS
COURSE NO.Eng-106
DURATION OF EXAM: 3 HOURS

L	T	P	MARKS		
1	0	3	Theory	Sessional	Practical
			100	0	50

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

S. No.	Experiment No.	Title of Experiment
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.E 1ST SEMESTER	P	MAXIMUM MARKS
SUBJECT: ENGINEERING CHEMISTRY LAB	2	SESSIONAL
COURSE NO.: CHM – 108		50

CHEMISTRY PRACTICAL :

- Determine the percentage of CaCO_3 in precipitated chalk. You are provided with 1N HCl and 0.1N NaOH.
- To analyse the given antacid tablets.
- Determine Volumetrically the %age purity of given sample of Ferrous sulphate, x gms of which have been dissolved per litre provided N/10 KMnO_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).
- Determine Volumetrically the percentage of Cu in a sample of CuSO_4 crystals, Z gms of which have been dissolved per litre, provided 0.1N $\text{Na}_2\text{S}_2\text{O}_3$.
- To determine the coefficient of viscosity of an unknown liquid using Ostwald Viscometer.
- Determine the surface tension of a unknown liquid using Stalagmometer.
- To prepare a pure and dry sample of Aspirin
- To prepare a pure and dry sample of Glucosazone
- Determine the method of purification of organic compounds by coloumn chromatography.
- Determine the aniline point of a given lubricating oil.

BOOKS RECOMMENDED :

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

B.E IST SEMESTER
SUBJECT: ENGG. MECHANICS LAB
COURSE NO.: M – 109

P
2

MAXIMUM MARKS
SESSIONAL
50

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

CLASS : B.E. IST SEMESTER
BRANCH: COMPUTER ENGG., CIVIL ENGG., MECH. ENGG., ELECTRICAL ENGG.,
ELECTRONICS & COMM. ENGG.
COURSE TITLE: WORKSHOP TECHNOLOGY
COURSE NO.WS-110

L	T	P	MARKS		
1	0	3	Theory	Sessional	Practical
			0	0	75

COURSE CONTENT:

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 Chowdhary Vol.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:

- i) Hexagonal headed bolt from a cylindrical rod.
- ii) 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	Lecture	Tutorial	Pract	Marks			
					Theory	Sess.	Pract	Total
MTH –201	Engineering Math-1I	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 Lab	-	-	2	-	-	50	50
CHM –209	Engineering Chemistry II Lab	-	-	2	-	-	50	50
COM –210	Computer Programming Lab	-	-	2	-	-	75	75
Total		18	6	12	600	150	250	1000

B.E 2ND SEMESTER
COURSE NO: MTH-201
COURSE TITLE: ENGG. MATH-II
BRANCH : COMMON TO ALL
DURATION OF EXAM: 3 HOURS

		MAXIMUM MARKS:125	
L	T	THEORY	SESSIONAL
4	2	100	25

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 2nd 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, 2nd 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 Singhania

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

B.E IIND SEMESTER (COMMON COURSE)

COURSE NO. PHY-202

COURSE TITLE : ENGINEERING PHYSICS-II

BRANCH : COMMON TO ALL

DURATION OF EXAM: 3 HOURS

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1

MAXIMUM MARKS:125	
THEORY	SESSIONAL
100	25

UNIT-1	RELATIVISTIC DYNAMICS	NO. OF LECTURES	WEIGHTAGE
	<p>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 ($E^2 = P^2 c^2 + m_0^2 c^4$).</p>	10	25%
UNIT-II	<p>WAVE-PARTICLE DUALITY</p> <p>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.</p> <p>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.</p> <p>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.</p>	12	25%
UNIT -III	<p>QUANTUM MECHANICS</p> <p>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.</p>	14	25%
UNIT-IV	<p>SOLID STATE PHYSICS</p> <p>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_c materials.</p>	7	15%

UNIT-V LASERS

Principle of Laser action, population Inversion, Einstein's Coefficients, He-Ne & Ruby Lasers, Holography 5 10%

TUTORIALS

**B.E IIND SEMESTER
SUBJECT: ENGG: PHYSICS-II
COURSE NO.PHY-202**

S.NO.	TOPICS	UNIT NO.
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 :

TITLE	AUTHOR
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

B.E 2ND SEMESTER**COURSE NO: CHM-203****COURSE TITLE: ENGG. CHEM-II****BRANCH : COMMON TO ALL****DURATION OF EXAM: 3 HOURS**

L	T
3	1

MAXIMUM MARKS:125	
THEORY	SESSIONAL
100	25

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, O₃ 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 carry 20 marks. Five questions will have to be attempted, selecting atleast two from each section. Use of calculator is allowed.

CLASS: B.E 2nd 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

- Basic structure of Computer, Stored Program Concept, Binary Arithmetic – Addition, Subtraction, Multiplication, Data Representation – Fixed and Floating Point, Semiconductor Memories.
- Introduction to C, Data Types, Constants, Variables, Expressions, Statements, Operators, Data Input and Output.
- 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 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. Use of Calculator is allowed.

B.E. 2ND SEMESTER**COURSE NO. HUM-205****COURSE TITLE: ENGINEERING ECONOMICS****BRANCH: COMMON TO ALL****DURATION OF EXAM : 3 HOURS****MAXIMUM MARKS: 125****THEORY SESSIONAL****100****25****L T**
3 1**SECTION-A****UNIT-1**

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 carry 20 marks. Five questions will have to be attempted, selecting atleast two from each section. Use of calculator is allowed.

B.E. 2ND SEMESTER**COURSE NO. M-206****COURSE TITLE: MACHINE DRAWING-I****BRANCH: COMMON TO ALL****DURATION OF EXAM : 3 HOURS****MAXIMUM MARKS: 125****THEORY SESSIONAL****100 25****L P
1 3****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 form Section-A and one compulsory question involving assembly from **Sections-B**.

B.E 2ND SEMESTER**COURSE NO: M-207****COURSE TITLE: WORKSHOP TECHNOLOGY-II****BRANCH : COMMON TO ALL****DURATION OF EXAM : 3 HOURS****MAXIMUM MARKS : 75****PRAC/LAB****75****L P
1 3****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.

B.E 2ND SEMESTER**COURSE NO: PHY-208****COURSE TITLE: ENGINEERING PHYSICS LAB-II****BRANCH : COMMON TO ALL****DURATION OF EXAM : 3 HOURS****MAXIMUM MARKS : 50****P****PRAC/LAB****2****50****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 |
| 2. | Practical Physics | Worsnop & Flint |
| 3. | Practical Physics | Chauhan & Singh (Vol.I & Vol. II) |

B.E 2ND SEMESTER
COURSE NO: CHM-209
COURSE TITLE: ENGINEERING CHEMISTRY LAB-II
BRANCH : COMMON TO ALL
DURATION OF EXAM : 3 HOURS

MAXIMUM MARKS : 50
P PRAC/LAB
2 50

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 |

B.E 2ND SEMESTER
COURSE NO: COM-210
COURSE TITLE: COMPUTER PROGRAMMING
USING C LAB.
BRANCH : COMMON TO ALL
DURATION OF EXAM : 3 HOURS

MAXIMUM MARKS : 75
P PRAC/LAB
2 75

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