Baba Ghulam Shah Badshah University Rajouri (J&K)-185131

Syllabus First Semester
B. Tech. Degree Course

Department of Electrical Engineering
College of Engineering and Technology
School of Mathematical Sciences & Engineering
Baba Ghulam Shah Badshah University
Rajouri (J&K)-185131

Curriculum Structure

Semester–I

Theory Courses

Course Code	Title	Scheme of Exam				Hrs./Week		
		Duration (Hrs.)	IA	UE	Total Marks	L	T	P
ERE-221/ ERE-121	Communication Skills/ Fundamentals of Mech. Engg.	3	40	60	100	3	1	0
ERE-122	Mathematics-I	3	40	60	100	3	1	0
ERE-123	Computer Fundamentals	3	40	60	100	3	1	0
ERE-124/ ERE-224	Basic Electrical Engineering/ Basic Electronics	3	40	60	100	3	1	0
ERE-125	Engineering Physics	3	40	60	100	3	1	0
ERE-126	Engineering Chemistry	3	40	60	100	3	1	0
Total			**240**	**360**	**600**			

Laboratory Courses

Course Code	Title	Duration	IA	UE	Total	L	T	P
ERE-131	Computer Fundamentals	2	25	25	50	0	0	2
EE-132/ ERE-232	Basic Electrical Engineering/ Basic Electronics	2	25	25	50	0	0	2
ERE-133	Engineering Physics	2	25	25	50	0	0	2
ERE-134	Engineering Chemistry & Environmental Science	2	25	25	50	0	0	2
Total			**100**	**100**	**200**			
Total (Theory + Lab)			**340**	**460**	**800**			

Semester I

Course Title: Fundamentals of Mechanical Engg.   **Max. Marks: 100**
Course Code: ERE-121   **University Exam: 60**
Duration of Exams: 3 hours   **Sessional Assessment: 40**

Objective: This course is designed to acquaint the students with fundamental concepts of mechanical engineering.

Unit-I

Basic concept of thermodynamics: Introduction, States, Work, Heat, Temperature, Zeroth, first, second and third law of thermodynamics, Concept of internal energy, enthalpy and entropy.

Unit-II

Properties of Steam & Steam Generator:
Properties of Steam & Steam Generator Formation of steam at constant pressure, Thermodynamic properties of Steam, Use of steam tables, Measurement of dryness fraction by throttling calorimeter.

Unit-III

Refrigeration & Air conditioning: Introduction to refrigeration and air -conditioning, Rating of refrigeration machines, Coefficient of performance, Simple refrigeration vapour compression cycle, Psychometric charts and its use, Human comforts.

Unit-IV

Hydraulic Turbines & Pumps: Introduction, Classification, Construction details and working of Pelton, Francis and Kaplan turbines, Specific speed and selection of turbines, Classification of water pumps and their working. Introduction to IC Engines.

Unit-V

Motion, Power Transmission Methods and Devices: Rotational motion, angular velocity and rotational work & power. Introduction to Power transmission, Types of gears, power in gear set, Belt, Rope, Chain and Gear drive. Types and functioning of clutches.

Text Books:

1. Rajput R. K., Elements of Mechanical Engineering, Lakshmi Pub., Delhi
2. Nag P.K. Engineering Thermodynamics, TMH, New Delhi.
3. Arora C.P., Refrigeration & Airconditioning, TMH, New Delhi

References:
1. Ryder G.H., Strength of Materials, ELBS Publication
2. Modi and Seth, Hydraulic and Fluid Mechanics, Standard Book House, Publication, New Delhi
3. Arora C.P., Engineering Thermodynamics, TMH, New Delhi
4. Ostwald, Munoz, Manufacturing Process and Systems, John Wiley, India

Note for paper setter: The question paper shall comprise of 10 questions. Two questions shall be set from each Unit. The students have to attempt five questions, selecting one from each Unit.

Semester I

Course Title: Mathematics-I   **Max Marks: 100**
Course Code: ERE-122   **University Exam: 60**
Duration of Exam: 3 hours   **Internal Assessment: 40**

Objective: The course is designed to provide basic knowledge of theory of differential calculus to engineering students.

Unit-I

Complex Trigonometry : Review of algebra of complex numbers, De'Moiver's Theorem and its application, Exponential and Circular functions of a complex variable, Hyperbolic and Inverse hyperbolic functions, Logarithmic function of a complex variable, Summation of series- C+iS method.

Unit-II

Differential Calculus: Successive differentiation and Leibnitz's theorem, Functions of more than one variable and partial differentiation, Geometrical and physical significance of partial derivatives, Homogenous functions and Euler's theorem, Taylor's and Maclaurin's series of function of one and two variables, Expansion of functions, Maxima and Minima of two variables and Lagrange's multipliers.

Unit-III

Integral Calculus: Definite Integral and their properties, Differentiation under integral sign, Gamma, Beta and Error functions. Transformation of Cartesian co-ordinates into polar, spherical and cylindrical co-ordinates, Multiple integrals, Change of order of integration and applications to simple problems.

Unit-IV

Ordinary Differential Equations: Differential equations of first order and first degree and their solution of the types: equations where variables are separable, Homogenous equations, Linear equations, Exact equations and equations reducible to the above forms, Higher order linear differential equation with constant co-efficient, Solutions of equations reducible to linear equations with constant co-efficient, Cauchy's homogenous linear equation and Legendre's linear equation, Applications of ODEs to simple problems of physical sciences and Engineering.

Unit-V

Sequence and Series: Convergence and Divergence of sequences and series, Comparison test, D'Alembert's ratio test and Cauchy's root test, Alternating series, Leibnitz's rule, Conditionally and absolute convergence.

Text Books:

1. **Grewal B.S.,** Higher Engineering Mathematics.
2. **Narayan Santi**, Differential Calculus.

Reference Books:

3. **Narayan Santi**, Integral Calculus.
4. **Ross S. L**., Differential Equations.
5. **Piaggio H.T. H**., Differential Equations and its Applications.

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit. Use of calculator is allowed in the Exam

Course Title: Computer Fundamentals	**Max Marks: 100**
Course Code: ERE-123	**University Exam:60**
Duration of Exam: 3 hours	**Internal Assessment:40**

Objective: The course is designed to provide knowledge of basic computing concepts, & make the student able to perform fundamental operating system functions, to use common software applications.

Unit-I

Introduction: History of Computers, Generations of Computers, Classification of Computers, Application of Computers, Computer Hardware, Input, and Output devices. Memory Hierarchy, RAM, ROM, PROM and types, Secondary memory, working of a Hard Disk and its types.

Unit-II

Software and Languages: Computer Software, System and Application Software, BIOS, POST, Booting Process, Virus, WORM, and Trojans.
Programming Languages, Generations of Languages, Compilers, Assemblers, Machine Language and Assembly Language. Introduction to algorithm and Flow chart: - Representation of an algorithm, flowchart symbols and levels of flow chart, rules, advantage and limitations of flowchart and pseudo code.

Unit-III

Data Representation, Number System: Binary, Decimal, Octal and Hexadecimal number systems, Inter conversion of number system, 1's compliment, 2's compliment, 9's compliment, n's compliment. Logic Gates, Boolean Algebra, Alphanumeric representation, Fixed point representation.

Unit-IV

Booting process details of Dos and Windows: - DOS system files , Internal and External Commands , Difference between External and Internal Commands. Internal Commands:- MD, CD, RD, COPY CON, TYPE, DATE & TIME, VOLUME VERSION, REN, PROMPT, CLS, DIR/P/W, COPY , DEL External commands:-FORMAT , DISKCOPY, DISKCOMP, XCOPY, CHKDISK, SCANDISK, HELP, DEBUG, PRINT. Creation of Batch Files.

Unit-V

Introduction to Computer networks: Applications, types of computer networks, Peer-to-Peer Networks, Client Server Networks, Centralized and Distributed Systems, Internet, Intranet, Extranet, email, ISPs.

Text Books:

1. **Peter Norton**, Introduction to Computers, TMH.
2. **Sanjay Toledo Mata**, A First Course in Computers, TMH.

Reference Books:

1. **Rajaraman,** Introduction to Digital Computer Design, Prentice Hall India.
2. **Bartee, Thomas,** Digital Computer Fundamentals, TMH.

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Course Title: Basic Electrical Engineering   Max Marks: 100
Course Code: ERE-124   University Exam: 60
Duration of Exam: 3 hours   Internal Assessment: 40

Objective: The objective of the course is to impart the knowledge of basic principles of Electrical Engineering and Its applied aspects.

Unit-I

Review of Electric Circuit Laws and Energy Sources: Basic Electrical circuit terminology, concept of charge and energy, circuit parameters (resistance, inductance & capacitance), Ohm's law, Kirchhoff's current law, Kirchhoff's voltage law, series and parallel combinations of resistance, inductance & capacitance. Ideal and practical voltage, current sources and their transformations, dependent voltage and current sources.

Unit-II

D.C. Circuit analysis: Power & energy relations, analysis of series parallel DC circuits, Star Delta transformations (Δ'Y), Loop & Nodal methods, Network Theorems: Thevenin's, Norton's, maximum power transfer and superposition theorems.

Unit-III

Electromagnetism: Review of Fundamentals of Electromagnetism, Ampere's Law, analogies between electric circuits and magnetic circuits, Faraday's laws of electromagnetic induction, direction of induced emf, Lenz's law, magnetic saturation and leakage fluxes.

Unit-IV

A.C. Circuit analysis: Basic terminology and definitions, phasor and complex number representations, power energy relations in AC circuits, Resonance in series and parallel circuits, Concepts of active & reactive powers, Introduction to 3 phase circuits.

Unit-V

Transformers: Concept of Inductance, Self & Mutual Inductance, Conventions for magnetically coupled circuits, Transformers: introduction, classification & construction of single phase transformer, emf equation and phasor diagrams.

Text Books:

1. **David Bell**, Electrical Engineering Principles. PHI.
2. **Vincent Del Toro**, Electrical Engineering Principles, PHI.

Reference Books:

1. **Cotton H.,** Electrical Technology.
2. **Gupta B.R.,** Principles of Electrical Engineering.

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit

Course Title: Engineering Physics	**Max Marks: 100**
Course Code: ERE-125	**University Exam: 60**
Duration of Exam: 3 hours	**Internal Assessment: 40**

Objective: The course is designed to acquaint the students with ultrasonic, acoustics, atomic physics, their applications and electromagnetic waves.

Unit-I

Wave Motion & Introduction to Acoustics: Longitudinal and transverse waves, transfer of energy, momentum and Intensity. Impedance offered by a string. Introduction to ultrasonic waves, magnetostriction and piezoelectric effect, productions of ultrasonic waves and their applications. A brief introduction to acoustics, Reverberation and Time of Reverberation, Sabine's Formula for Reverberation Time (qualitative treatment only). Simple related numerical problems.

Unit-II

Atomic & Molecular Physics-I: Uncertainty principle, matter waves and their characteristics properties, de-Broglie wave hypothesis and its experimental verification, photo-electric effect and Compton Effect. Bohr's quantization condition. Emission & Absorption spectra. Introduction to Zeeman, Paschenback and Raman's effects.

Unit-III

Atomic & Molecular Physics-II: Wave Function, Its physical significance, limitations imposed on wave function. Schrodinger's time dependent and time independent wave equations and its application to one dimensional problems. Potential steps, Potential barrier, infinite potential well and simple harmonic oscillator.

Unit-IV

Lasers: Characteristics of Lasers, Spontaneous and Stimulated Emission of Radiation, Meta-stable State, Population Inversion, Lasing Action, Einstein's Coefficients and Relation between them, Helium-Neon Laser, Ruby Laser, Applications of Lasers.

Unit-V

Electromagnetic Waves: Concept of Electric Field and Potential, Polarization of di-electrics, Guass's law and its applications to uniformly charged hollow sphere, uniformly charged plane sheet and cylinder, Electro Static Energy, Lorentz Force, Integral and differential Amperes law, Brief introduction to Maxwell's Equations.

Text Books:

1. **Pathania K. S.** & **Khera S. K.**, Waves and Vibration,
2. **Beiser**, **Arthur**, Concepts of Modern physics, TMH.

Reference Books:

1. **Ghatak A. K., Dass P.,** Laser theory & application of ultrasonic waves,
2. **David J. & Cheek**, Fundamentals and application of ultrasonic waves,
3. **Avadhanulu M. N. & Khsirsagar P. G.,** Engineering Physics (S. Chand & Co.)
4. **Vijaya K. K., Chandralingam S.**, Modern Physics, S. Chand & Co. Ltd, New Delhi

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions selecting one from each unit.

Semester I

Course Title: Engineering Chemistry & Env. Sc.   **Max Marks: 100**
Course Code: ERE-126   **University Exam:60**
Duration of Exam: 3 hours   **Internal Assessment:40**

Objective: The course is designed to acquaint the students with environmental science, water treatment and application of chemical properties of materials and alloys.

Unit-I

Environmental Chemistry: Concept of Environmental chemistry, segments of environment (a brief idea about atmosphere, hydrosphere & lithosphere), Air pollution-Introduction, Air pollutants and control of air pollution, water pollution- Introduction, water pollutants, methods of controlling water pollution.

Unit-II

Effects of Environmental Pollution: Acid rain, ozone chemistry, Green House effect & Global warming. Chemicals & metal Toxicology, Biochemical effects of Pb, Hg, As, Zn, Cd, Ni, Se, Cn & pesticides in brief on man.

Unit-III

Inorganic Chemistry materials cement & lime: Optical isomerism, racemerization, asymmetric synthesis. Water treatment; Introduction, types of water, softening of water by different processes, disadvantages of hard water, numericals on hardness of water. Introduction & classification of lime, manufacture & properties of lime, setting & hardening of lime. Cement, types of cement, manufacture of Portland cement, setting & hardening of cement.

Unit-IV

Alloys and Lubricants: Introduction, purpose of making alloys, preparation of alloys, classification of alloys, (ferrous & non-ferrous alloys), alloy steels & copper alloys.
Definition, functions of lubricants, mechanism of lubrication, classification of lubricants (lubricating oils, semi-solid lubricants, solid lubricants) synthetic lubricant, flash & fire points, oiliness, cloud & pour points.

Unit-V

Rubber and Dyes: Introduction, types of rubber, vulcanization of rubber, preparation, properties & uses of following synthetic rubber: Buna–S, Buna-N & Butyl rubber. Dyes, classification & applications of dyes.

Text Books:

1. **Jain & Jain**, Engineering Chemistry, Dhanpat Rai Publishing Co. 15th Ed.
2. **Sharma, B.K.,** Engineering Chemistry, Krishna Publications.

Reference Books:

1. **Bahl, B. S.**, Organic Chemistry, S. Chand & Co. Ltd, New Delhi.
2. **Soni P. L.,** Organic Chemistry, Sultan Chand and Sons.
3. **De. A. K.,** Environmental chemistry, Willey Eastern Pvt. Ltd, New Delhi.
4. **Tyagi & Mehra,** Text Book of Engineering Chemistry, Vikas Publication House.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions, selecting one from each unit.

Course Title: Computer Fundamentals Lab   **Max Marks: 50**
Course Code: ERE-112   **University Exam: 25**
Duration of Exam: 2 hours   **Internal Assessment: 25**

Note: A student is required to undergo training in the following areas:

1. Introduction to Windows.

2. MS-Office software.

3. Create, save, retrieve text file.

4. Spreadsheet program- Create, manage, and manipulate numeric data

5. Presentation software – Create presentations

6. DOS: Internal, external commands.

7. Introduction to the components of a PC.

8. Assembling of a PC.

9. Basic trouble shooting of a PC.

10. Software Installation (both system and application software's).

Note: These are only the suggested list of experiments. Instructor may add or change some practical relevant to the course contents

Semester I

Course Title: Basic Electrical Engg. Lab   **Max Marks: 50**
Course Code: ERE-132   **University Exam: 25**
Duration of Exam: 2 hours   **Internal Assessment: 25**

List of suggested experiments:

1. Introduction to Circuit Elements.

2. Verification of Ohms Law.

3. Verification of Kirchhoff's Current and Voltage Law (KCL & KVL)

4. Verification of Thevenin's Theorem & Norton's Theorem.

5. Transformation of Star & Delta Networks.

6. Measurement of Power using 2-Wattmeter method.

7. Verification of Superposition Theorem.

8. Verification of reciprocity theorem.

9. To plot the Resonance curve for a Series & Parallel Resonance.

10. Determination of resonance frequency using LCR Meter.

11. To study working of a single phase step-up and step down transformer.

12. To perform ratio test of a single phase transformer

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Semester I

Course Title: Engineering Physics Lab   **Max Marks:50**
Course Code: ERE-133   **University Exam:25**
Duration of Exam: 2 hours   **Internal Assessment:25**

List of Experiments:

1. To find out the intensity response of a solar cell/photo diode.

2. To find the angle of given prism using a spectrometer.

3. To analyze the atomic spectra of Neon/Sodium lamp.

4. To determine the laser parameters like diversions, wavelength, etc for a given laser source (2 or 3 experiments)

5. To find the dispersive power of a given prism using a spectrometer.

6. To find the refractive index of a given liquid using hollow prism/glass prism.

7. Determination of wavelength of light by Newton's rings experiment.

8. To deter mine the wavelength of monochromatic light (Sodium Lamp) with the help of Fresnel's biprism.

9. To determine the focal length of two lenses separated by a distance with the help of nodal slide.

10. Young's double slit experiment.

11. To find the wavelength of light by diffraction grating.

12. To find the frequency of AC main using an electrical vibrator.

13. To plot a graph between a distance of knife edges from the centre of gravity and the period of a compound pendulum and find acceleration due to gravity from the graph.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents

Semester I

Course Title: Engg. Chemistry & Env. Science Lab   **Max Marks: 50**
Course Code: ERE-134   **University Exam:25**
Duration of Exam: 2 hours   **Internal Assessment: 25**

List of the experiments:

1. Determine the percentage of $CaCO_3$ in precipitated chalk (provided I NHCL and 0.1 N NaOH)
2. Determine volumetrically the percentage purity of given sample of ferrous sulphate, x gms of which have been dissolved per litre provided $N/10$ $KMnO_4$
3. Determine the alkalinity of a given water sample.
4. Organic analysis: Identify the following organic compounds (preparation of at least one derivative)
   - Carboxylic acid
   - Compounds containing alcoholic and phenolic OH group
   - Aldehydes and Ketones
   - Carbohydrates
   - Amides, amines, Anilides and nitro compounds
   - Hydrocarbons
   - Compounds containing sulphur or halogen
5. Determine volumetrically the number of molecules of water of crystallization present in the given sample of Mohr's salt, x gms of which is dissolved per litre provided $N/10$ $K_2Cr_2O_8$ (using external indicator)
6. Determine volumetrically the percentage of Cu in a sample of $CuSO_4$ crystals z gms of which is dissolved per litre, provided $N/10$ $Na_2S_2O_3$.
7. Determine the coefficient of viscosity of an unknown liquid using Ostwald viscometer.
8. Determine the surface tension of an unknown liquid using stalagmometer.
9. To prepare pure and dry sample of Glucosazone
10. Determine the aniline point of given lubricating oil.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents