

Babu Banarasi Das University, Lucknow

School of Engineering

Bachelor of Technology

Evaluation Scheme (First Year)

SEMESTER I									
Course Category	Course Code	Code Title	Contact Hours			Evaluation Scheme			Credits
			L	T	P	CIA	ESE	Course Total	
C	BAS2101	Matrices and Calculus	3	1	0	40	60	100	4
C	BAS2102	Physics-I	2	1	0	40	60	100	3
Students need to select either GROUP 'A' or GROUP 'B'									
	GP2101	General Proficiency	-	-	-	100	-	100	1
Total			5	2	0	180	120	300	8

GROUP 'A'									
Course Category	Course Code	Code Title	Contact Hours			Evaluation Scheme			Credits
			L	T	P	CIA	ESE	Course Total	
F	BME2101	Engineering Mechanics	3	1	0	40	60	100	4
F	BCS2101	Foundation of Information Technology	3	1	0	40	60	100	4
F	BEC2101	Basic Electronics Engineering	3	1	0	40	60	100	4
C	BAS2104	Environmental Studies	2	0	0	40	60	100	2
F	BME2151	Engineering Mechanics Lab	0	0	2	40	60	100	1
F	BCS2151	Foundation of Information Technology Lab	0	0	2	40	60	100	1
F	BME2152	Workshop Practice Lab	0	1	2	40	60	100	2

C	BAS2152	Physics-I Lab	0	0	2	40	60	100	1
Total			11	4	8	320	480	800	19
GROUP 'B'									
Course Category	Course Code	Code Title	Contact Hours			Evaluation Scheme			Credits
			L	T	P	CIA	ESE	Course Total	
F	BEE2101	Basic Electrical Engineering	3	1	0	40	60	100	4
F	BME2102	Basic Mechanical Engineering	2	1	0	40	60	100	3
C	BAS2103	Chemistry	3	1	0	40	60	100	4
C	BHS2101	Professional Communication	3	1	0	40	60	100	4
F	BEE2151	Basic Electrical Engineering Lab	0	0	2	40	60	100	1
F	BME2153	Engineering Graphics Lab	0	1	2	40	60	100	2
C	BHS2151	Professional Communication Lab	0	0	2	40	60	100	1
C	BAS2153	Chemistry Lab	0	0	2	40	60	100	1
Total			11	5	8	320	480	800	20

SEMESTER II									
Course Category	Course Code	Code Title	Contact Hours			Evaluation Scheme			Credits
			L	T	P	CIA	ESE	Course Total	
C	BAS2201	Differential Equations and Fourier Analysis	3	1	0	40	60	100	4
C	BAS2202	Physics-II	2	1	0	40	60	100	3
Students need to select either GROUP 'A' or GROUP 'B'									
	GP2201	General Proficiency	-	-	-	100	-	100	1
Total			5	2	0	180	120	300	8

Note: Students who have selected GROUP 'A' in the first semester will select GROUP 'B' in the second semester and Vice-Versa

GROUP 'A'									
Course Category	Course Code	Code Title	Contact Hours			Evaluation Scheme			Credits
			L	T	P	CIA	ESE	Course Total	
F	BME2201	Engineering Mechanics	3	1	0	40	60	100	4
F	BCS2201	Foundation of Information Technology	3	1	0	40	60	100	4
F	BEC2201	Basic Electronics Engineering	3	1	0	40	60	100	4
C	BAS2204	Environmental Studies	2	0	0	40	60	100	2
F	BME2251	Engineering Mechanics Lab	0	0	2	40	60	100	1
F	BCS2251	Foundation of Information Technology Lab	0	0	2	40	60	100	1
F	BME2252	Workshop Practice	0	1	2	40	60	100	2
C	BAS2252	Physics-I Lab	0	0	2	40	60	100	1
Total			11	4	8	320	480	800	19
GROUP 'B'									
Course Category	Course Code	Code Title	Contact Hours			Evaluation Scheme			Credits
			L	T	P	CIA	ESE	Course Total	
F	BEE2201	Basic Electrical Engineering	3	1	0	40	60	100	4
F	BME2202	Basic Mechanical Engineering	2	1	0	40	60	100	3
C	BAS2203	Chemistry	3	1	0	40	60	100	4
C	BHS2201	Professional Communication	3	1	0	40	60	100	4
F	BEE2251	Basic Electrical Engineering Lab	0	0	2	40	60	100	1
F	BME2253	Engineering Graphics	0	1	2	40	60	100	2

C	BHS2251	Professional Communication Lab	0	0	2	40	60	100	1
C	BAS2253	Chemistry Lab	0	0	2	40	60	100	1
Total			11	5	8	320	480	800	20

SYLLABUS

BCS2101/BCS2201 Foundation of Information Technology

Course Objective:

1. Study the basic concepts and functions of hardware and software.
2. Study the basic concepts and functions of operating system.
3. Study the basic concepts and functions of computer network.
4. Study the basic concepts and functions of Information Technology.
5. Study the basic concepts of C programming language.

Learning Outcome:

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

1. An ability to understand the basics of computer hardware and software.
2. To understand the use of Information Technology in business.
3. To analyse and understand various types of software system.
4. An ability to understand operating system and its functions.
5. To analyse various computer networks.

Course Contents:

Module	Course Topics	Total Hours	Credits
I	<p>Hardware and Software Hardware, Software, Information technology, Types of computer: Mainframe computer, network computer, personal computer, laptop, personal digital assistant (PDA); Personal computer: Central processing unit (CPU), hard disk, common input or output devices, types of memory viz. RAM, ROM, peripheral device, computer performance. Input Devices: Mouse, keyboard, trackball, scanner, touchpad, light pen, joystick, digital camera and microphone. Output Devices: Monitors, screens, printers, plotters, speakers. Input/output Devices: Modems , touch screens. Storage Devices: Diskette, Zip disk, data cartridges, CD-ROM, internal, external hard disk: Disk formatting Software: Types Of Software: Operating systems software and application software, Software versions, Operating System : Functions and Types. Application Software: Word processing, spreadsheet and database, web browsing, desktop publishing and accounting Graphical User Interface (GUI), SDLC and its phases.</p>	30 Hours	1
II	<p>Computer Network Networks: LAN, WAN, client/server, sharing printers, applications, and files across a network. Intranet, Extranet, Internet and its uses, World Wide Web (WWW) The Telephone Network In Computing: Public Switched Telephone Network (PSTN), Integrated Services Digital</p>	30 Hours	1

	Network (ISDN), Asymmetric Digital Subscriber Line (ADSL), Analog and digital modem and transfer rate.		
III	<p>Information Technology (IT) Applications of IT: Applications in business such as: business administration systems, airline booking systems, insurance claims processing, online banking. Uses of large-scale computer applications in government such as: public records systems (census, vehicle registration), revenue collection, electronic voting. Applications in education such as: student registration and timetabling systems, computer-based training (CBT), distance learning, homework using the Internet. Electronic World: electronic mail, E-Commerce, concept of purchasing goods and services online, payment methods, advantages and disadvantages of purchasing goods and services online Health, safety and environment: Ergonomics, health issues, precautions, recycling printed outputs, recycling printer toner cartridges, using efficient monitor</p>	30 Hours	1
IV	<p>Introduction to the C Language Introduction to the C Language and its Advantages, C Program: Structure, Writing, Building an Executable Version, Debugging, and Running. Data Types and Variables, Operands, Operators, and Arithmetic Expressions, Control statements and loop structure.</p>	30 Hours	1

Text/Reference Books:

1. D. S. Yadav, "Foundations of Information Technology", New Age International Pvt. Ltd.
2. Silberschatz, Galvin and Gagne, "Operating Systems Concepts", Wiley Publication
3. D M Dhamdhere, "Operating Systems: A Concept based Approach", TMH
4. Yashavant P. Kanetkar, "Let us C", BPB

BCS2151/BCS 2251 Foundation of Information Technology Lab

- 1) Run basic DOS commands.
- 2) Learn the use of Word Processor.
- 3) Learn the use of Excel.
- 4) Prepare presentation on any topic of your choice.
- 5) Write a C program to find sum of two numbers.
- 6) Write a C program to learn the function of FOR loop.
- 7) Write a C program to learn the function of WHILE/ DO WHILE loop.
- 8) Write a C program for pattern printing
- 9) Write a C program to print Fibonacci series.
- 10) Write a C program to find factorial and reverse of a number.

BEC2101/BEC2201 BASIC ELECTRONICS ENGINEERING

Course Objective:

This course provides

1. Comprehensive idea about basic electronics devices like Diodes, BJT, JFET, MOSFET, Operational Amplifier.
2. Fundamental principles of Electronic instruments like CRO and digital multimeter.
3. Fundamental principle of communication.

Learning Outcome:

At the end of the course students will be able to gain knowledge about the

1. Fundamentals of electronic devices like Diodes, BJT, JFET, MOSFET, Operational Amplifier and Electronic instruments like CRO and digital multimeter.
2. Number system, Boolean algebra, logic gates, Karnaugh map
3. Basics of communication systems.

Course Contents:

Module	Course Topics	Total Hours	Credits
I	DIODES : Energy band theory, Semiconductor material, PN junction: Forward and Reverse Bias characteristics, Diode as Rectifier: Half wave and Full wave Rectifiers, Breakdown Mechanism: Zener & Avalanche breakdown, Zener Diode and its application, LED, LCD, and Solar Cell.	30 Hours	1
II	TRANSISTORS Construction of Bipolar Junction Transistor: PNP and NPN, Working of Transistor, BJT configurations: CE, CB and CC, Input & Output characteristics of CB & CE configuration, Biasing: Fixed bias, Emitter bias, Potential divider bias, Comparison of biasing circuits. JFET: Basic construction and characteristics, Concept of pinch off, maximum drain saturation current, Input and transfer characteristics, Biasing: Self bias and fixed bias. MOSFET- Depletion and Enhancement type MOSFET- construction, operation and characteristics.	30 Hours	1
III	DIGITAL ELECTRONICS AND COMMUNICATION SYSTEM Number System, Complements, Boolean Algebra: Basic Theorems and De Morgan Theorems, Standard logic gates, Universal Logic Gates, Implementation of Boolean function using Basic gates and Universal gates, Reduction of Boolean function using K-Map upto 4 variables.	30 Hours	1

	Block Diagram of Communication System, Electromagnetic spectrum, Need for Modulation, Basic Definitions AM,FM,PM		
IV	<p>OPERATIONAL AMPLIFIER AND ELECTRONIC INSTRUMENTS</p> <p>Introduction to OP-AMP, Characteristics of ideal OP-AMP, Basics of ideal and practical OP-AMP, Configurations: Open loop and closed loop, Applications of OP-AMP, Inverting amplifier , Non-inverting amplifier, Voltage follower, summing amplifier, Integrator and Differentiator.</p> <p>Introduction and Basic Principle of CRT, Block Diagram of CRO, Introduction and Basic Principle of Digital Multimeter</p>	30 Hours	1

Text Books:

1. Robert L. Boylestad and Louis Nashelsky Electronic Devices and Circuit Theory, Pearson India.
2. Kennedy, Electronic Communication System, TMH
3. Kalsi H.S., Electronic Instrumentation, TMH
4. M.Morris Mano, Digital Logic and Computer Design, PHI

Reference Books:

1. Jacob Millman, Christos C. Halkias, Integrated Electronics: Analog and Digital Circuits and Systems (McGraw-Hill electrical and electronic engineering series).
2. William D. Cooper, Albert D. Hefrick, Modern Electronic instrumentation and measurement technique 5th edition Prentice Hall Of India, New Delhi 1997.
3. Ramakant Gaikwad .Op –Amp’s & linear Integrated Circuits, 4th edition, Prentice Hall of India, New Delhi 2002.
4. Albert Paul Malvino, Donald P Leach , Digital Principle & Application 4th edition, Tata McGraw –Hill Edition , New Delhi -1991.

BEE2101/BEE2201BASIC ELECTRICAL ENGINEERING

Course Objective:

1. This course provides comprehensive idea about circuit analysis.
2. The subject gives the knowledge about combinational circuits.
3. Subject gives the knowledge about the analysis and design of new electrical circuits.
4. Other logical working principles of machines and common Measuring instruments.

Learning Outcome:

At the end of the course students will be able.

1. Understand basic electrical engineering.
2. To understand the basic concepts of magnetic, AC & DC circuits.
3. To explain the working principle, construction, applications of DC & AC machines & measuring instruments.
4. To gain knowledge about the fundamentals of electric components, devices.

Course Contents:

Module	Course Topics	Total Hours	Credits
I	Electric Circuit: Introduction to linear and nonlinear circuits, circuit elements, various sources and source transformation, Star delta transformation, solution of D.C. circuits using Kirchhoff's laws- Mesh Analysis and Nodal Analysis. Signal wave forms, Passive elements specifications. Basic theorems: Thevenin, Norton, Maximum Power, Superposition, Millman's Theorem, Tellegen's Theorem applied to DC networks.	30 Hours	1
II	A. C. Circuits: A.C. voltage and currents, average and r.m.s. values, Form factor and peak factor, Phasor representation of sinusoidal quantities, phasor in polar, rectangular and exponential forms. Analysis of single phase series, parallel and series-parallel circuits, Active & reactive and apparent power, p.f., Volt-amperes, frequency response and Q-factor. Analysis of balanced three phase a.c. circuits, Introductory concept, voltage, current and power in three phase balanced circuits. Star-delta connections. Measurement of three phase power by Wattmeter Method.	30 Hours	1

III	<p>Measuring Instruments & Electromagnetic and Transformer: Types of instruments, construction, working principles & applications, PMMC, MI, Single phase dynamometer, Ammeter, Voltmeter, Wattmeter, Induction type Energy meter, Use of shunt and multiplier.</p> <p>Magnetic circuit concept, B-H curves characteristics of magnetic materials, Practical magnetic circuits. Magnetic circuits with D.C. and A.C. excitation, Hysteresis and eddy current losses, Magnetic force.</p> <p>Self and mutual inductances, Faraday`s laws, Lenz`s Law, Statically and dynamically induced emfs, Energy stored in magnetic fields.</p> <p>Principle of Transformer operation, emf equation, Equivalent circuit of transformer, Losses and efficiency, Introduction of Auto Transformer and its applications.</p>	30 Hours	1
IV	<p>Electrical Machines: Basic concepts of rotating electric machines, DC machines (motor and generator), working principle, types, EMF and torque equations characteristics and application of DC motor. Three phase induction motors, types, principle of operation, applications.</p> <p>Single phase induction motors, principle of operation, starting methods, applications. Synchronous machines (motor and generator), principle of operation and applications.</p>	30 Hours	1

Text & Reference books:

1. 'Fundamental of Electric Circuits' by Charles K Alexander and Matthew N. O. Sadiku, Tata McGraw Hill Publication.
2. 'Electrical Engineering Fundamentals' by Vincent Del Toro, PHI Publication.
3. 'Electric Technology' by H Cotton, CBS Publishers and Distributors.
4. 'Basic Electrical Technology' by A.E. Fitzgerald, McGraw Hill Publication.
5. 'Basic Electrical Engineering' by Kothari and I.J. Nagrath, Tata McGraw Hill.
6. 'Basic Electrical Engineering' by S. N. Singh, PHI Publication.

BEE2151/BEE2251BASIC ELECTRICAL ENGINEERING LAB

(Any 10 experiments)

1. Verification of KCL & KVL.
2. Verification of Thevenin's theorem and Norton's theorem.
3. Verification of Superposition theorem.
4. Measurement of active and reactive power in 1-phase and Power Factor Improvement.
5. Measurement of active power in 3 -phase circuit using TWO wattmeter methods.
6. Study of transformer through assembling and polarity check.
7. Determination of equivalent circuit parameters of a single phase transformer by O.C. and S.C. tests and estimation of voltage regulation and efficiency at various loading conditions and verification by load test.
8. Study of dc shunt motor speed control using (1) Armature control (2) Field Control.
9. Determination of efficiency of DC shunts motor by load test.
10. Study of Electrical Equipment used in daily life.
11. Study of DC Machine.
12. Full wave rectifier circuit using diodes.
13. Transistor input-output characteristics.

ENGINEERING MECHANICS (BME2101/BME2201)

Course Objective:

1. To know how to apply laws of mechanics to actual engineering problems.
2. To calculate the reactive forces and analyse the structures.
3. To know the geometric properties of the different shapes & to learn energy and momentum methods.
4. To know the elastic properties of different bodies.

Learning Outcome:

At the end of the course student should be able to:

1. Solve the engineering problems in case of equilibrium and non- equilibrium conditions & solve the problems involving dry friction.
2. Calculate the reaction forces and forces in members of statically determinate structures.
3. Determine the centroid, centre of gravity and moment of inertia of various surfaces and solids & calculate the forces acting on the rigid body, structures using varying principles.
4. To find out the stress, strain and elastic properties of different bodies.

Course Contents:

Module	Course Topics	Total Hours	Credits
I	Two Dimensional Force Systems: Basic concepts, Laws of motion, Principle of Transmissibility of forces, Transfer of a force to parallel position, Resultant of a force system, Simplest Resultant of Two dimensional concurrent Force systems, Simplest Resultant of Two dimensional Non-concurrent Force systems, Distributed force system, free body diagrams, Equilibrium and Equations of Equilibrium, Applications. Friction: Introduction, Laws of Coulomb Friction, Equilibrium of Bodies involving Dry friction, Belt friction, Application.	30	1
II	Beam: Introduction, Shear force and Bending Moment, Differential Equations for shear force & bending moment, Shear force and Bending Moment Diagrams for Statically Determinate Beams. Trusses: Introduction, Simple Truss and Solution of Simple truss, Method of	30	1

	Joints, Method of Sections.		
III	<p>Centroid and Moment of Inertia: Introduction, Centroid of plane, curve, area, volume and composite bodies, Moment of inertia of plane area, Parallel Axes Theorem & Perpendicular axes theorem, Moment of inertia of composite bodies.</p> <p>Kinematics and Kinetics: Linear motion, Instantaneous center, D'Alembert principle, Rotation of rigid bodies, Impulse and momentum principle, Work and energy principle.</p>	30	1
IV	<p>Simple Stress and Strain: Normal and Shear stresses, Stress- Strain Diagrams for ductile and brittle material, Elastic Constants, One Dimensional Loading of members of varying cross-sections, Strain energy.</p> <p>Pure Bending of Beams: Simple Bending Theory, Stress in beams of different cross sections.</p> <p>Torsion: Torsion of shafts of circular section, Torque and twist, Shear stress due to torque.</p>	30	1

Reference Books:

1. Engineering Mechanics by Irving H. Shames. Prentice-Hall.
2. Engineering Mechanics by S.S. Bhavikatti, K.G. Rajashekarappa, New Age Publications.
3. A textbook of Engineering Mechanics by Dr. R.K. Bansal, Laxmi Publications.
4. Mechanics of Solids by Abdul Mubeen, Pearson Education Asia.
5. Mechanics of Materials by E.P. Popov, Prentice Hall of India Private Limited.

BASIC MECHANICAL ENGINEERING (BME2102/BME2202)

Course Objective:

1. To learn the basic principles of classical thermodynamics.
2. To apply the laws of thermodynamics to various systems and analyze the significance of the results.
3. To learn the basic concepts of internal combustion engines.

Learning Outcome:

At the end of the course student should be able to:

1. Differentiate between closed and open systems and analyze related problems.
2. Apply the concept of first and second law to analyze thermodynamic systems.
3. Analyze the performance of IC engines and identify methods to improve the efficiency.

Course Contents:

Module	Course Topics	Total Hours	Credits
I	Fundamental Concepts and Definitions: Definition of thermodynamics, Microscopic and Macroscopic approaches, Systems, surroundings and universe, Concept of continuum, Properties and state, Thermodynamic properties, Thermodynamic path, process and cycle, Thermodynamic equilibrium, Reversibility and irreversibility, Quasi static process, Work and heat, Zeroth law of thermodynamics, concept of temperature.	30	1
II	First law of thermodynamics: Thermodynamic processes, flow work, Joules' experiment, Internal energy and enthalpy, First law of thermodynamics applied to open systems, Steady flow systems and their analysis, Application of steady flow energy equation, Limitations of first law of thermodynamics, PMM-I. Second law of thermodynamics: Statement of second law, heat engine, heat pump and refrigerator, PMM- II, Efficiency of Carnot engine, Entropy, Clausius Inequality, definition of third law of thermodynamics.	30	1

III	<p>IC engines:</p> <p>Classification of IC engines, engine terminology, Compression Ignition engines and Spark Ignition engines, Construction and working of two stroke and four stroke engines, Difference between SI and CI engines, difference between 2-stroke and 4-stroke engine, Efficiency of Otto cycle and diesel cycle.</p>	30	1
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Reference Books:

1. P.K. Nag, Basic and Applied Thermodynamics, Tata McGraw-Hill Publishing Company Ltd.
2. Yunus A. Cengel and M.A. Boles, Thermodynamics: An Engineering Approach, Tata McGraw- Hill Publishing Company Ltd.
3. C.P. Arora, Thermodynamics, Tata McGraw- Hill Publishing Company Ltd.

ENGINEERING MECHANICS LAB (BME2151/BME2251)

(Any 10 experiments of the following)

1. To conduct the tensile test and determine the ultimate tensile strength, percentage elongation for a steel specimen.
2. To determine the compression test and determine the ultimate compressive strength for a specimen.
3. To conduct the Impact-tests (Izod/Charpy) on Impact-testing machine to find the toughness.
4. To determine the hardness of the given specimen using Vickers/Brinell/Rockwell hardness testing machine.
5. Friction experiment(s) on inclined plane and/or on screw-jack.
6. Worm & worm-wheel experiment for load lifting.
7. Belt-Pulley experiment.
8. Bending of simply-supported and cantilever beams for theoretical & experimental deflection.
9. Torsion of rod/wire experiment.
10. Experiment on Trusses.
11. Statics experiment on equilibrium.
12. Experiment on Moment of Inertia.

WORKSHOP PRACTICE (BME2152/BME2252)

- 1. Carpentry Shop:** Study of tools & operations and carpentry joints, Simple exercise using jack plane, to prepare half-lap corner joint, mortise & tenon joints, Simple exercise on wood working lathe.
- 2. Fitting Bench Working Shop:** Study of tools & operations, Simple exercises involving fitting work, Make perfect male-female joint, Use of drills/taps idea.
- 3. Black Smithy Shop:** Study of tools & operations, Simple exercises base on black smithy operations such as upsetting, drawing down, punching, bending, fullering & swaging.
- 4. Welding Shop:** Study of tools & operations of Gas welding & Arc welding, Simple butt and Lap welded joints, Oxy-acetylene flame cutting.
- 5. Sheet-metal Shop:** Study of equipment & operations, Making Funnel complete with 'soldering', Fabrication of tool-box, tray, electric panel box etc.
- 6. Machine Shop:** Study of machine tools and operations, Plane turning, Step turning, Taper turning, Threading, Grinding of turning equipment.
- 7. Foundry Shop:** Study of tools & operations, Pattern making, Mould making with the use of a core, Method of material pouring and Casting.

ENGINEERING GRAPHICS LAB (BME2153/BME2253)

1. **Scales:** Representative factor, plain scales, diagonal scales, scales of chords.
2. **Projection:** Types of projection, orthographic projection, first and third angle projection.
3. **Projection of points:** The principle of orthographic projections of a point on HP and VP, Conventional representation, Projection of a point in all the quadrants.
4. **Projection of Lines:** Line inclined to one plane, inclined with both the plane, True Length and True Inclination, Traces of straight lines.
5. **Projection of planes and solids:** Projection of Planes like circle and polygons in different positions; Projection of polyhedrons like prisms, pyramids and solids of revolutions like cylinder, cones in different positions.
6. **Section of Solids:** Section of right solids by normal and inclined planes; Intersection of cylinders.
7. **Isometric Projections:** Isometric scale, Isometric axes, Isometric Projection from orthographic drawing.
8. **Perspective Projection:** Nomenclature of Perspective Projection, Method of drawing perspective views, Visual Ray Method, using Top and Front, Top and Side views.
9. **Computer Aided Drafting (CAD)-I:** Introduction, benefit, software's basic commands of drafting entities like line, circle, polygon, polyhedron, cylinders.
10. **Computer Aided Drafting (CAD)-II:** Transformations and editing commands like move, rotate, mirror, array; solution of projection problems on CAD.

Reference Books:

1. Computer Aided Engineering Drawing by S.Trymbaka Murthy, I.K. International Publishing House Pvt. Ltd., New Delhi, 3rd revised edition-2006.
2. Engineering Graphics by K.R.Gopalakrishna, 32nd edition, 2005, Subash Publishers Bangalore.