Jabalpur Engineering College, Jabalpur

(Declared Autonomous by MP Govt., Affiliated to RGPV, Bhopal)

(AICTE Model Curriculum Based Scheme)

Bachelor of Technology (B.Tech.) I Semester (EE/EC/IP/IT Group A)

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours Per Week			Total Credits
				Theory Slot			Practical Slot						
				End. Sem.	Mid Sem. Exam.	Quiz/ Assignment	End Sem.	Lab Work		L	T	P	
1	BT201	BSC	Engineering Physics	70	20	10	30	20	150	3	1	2	5
2	BT102	BSC	Mathematics-I	70	20	10	-	-	100	3	1	-	4
3	BT203	ESC	Computer Programming and Problem Solving	70	20	10	30	20	150	3	-	2	4
4	BT204	ESC	Basic Mechanical Engineering	70	20	10	30	20	150	3	-	2	4
5	BT205	ESC	Basic Civil Engineering	70	20	10	30	20	150	3	-	2	4
6	BT206	HSMC	Language Lab	-	-	-	30	20	50	-	-	2	1
7	BT107	DLC	Induction program of first three weeks	Physical activity,creative arts,universal human values,Literary proficiency Modules,Lecturs by Eminent people,visits to local areas,Familiarization to department /branch & innovation.									
Total				350	100	50	150	100	750	15	2	10	22
NSS/NCC/Swachhata Abhiyan/Rural Outreach				Qualifier									

1 hour lecture (L) = 1 credit

1 hour Tutorial (T) = 1 credit

2 hour Practical (P) = 1 credit

Controller (Acad.)
Jabalpur Engineering College
Jabalpur - 482 011 (M.P.)

Registrar (Academic)
for Principal
Jabalpur Engineering College
Jabalpur - 482 011 (M.P.)

Principal
Jabalpur Engineering College
Jabalpur - 482 011 (M.P.)

DEAN
Academic
JEC, Jabalpur (M.P.)

Jabalpur Engineering College, Jabalpur

(Declared Autonomous by MP Govt., Affiliated to RGPV, Bhopal)

(AICTE Model Curriculum Based Scheme)

Bachelor of Technology (B.Tech.) II Semester (EE/EC/IP/IT Group A)

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours Per Week			Total Credits
				Theory Slot			Practical Slot			L	T	P	
				End. Sem.	Mid Sem. Exam.	Quiz/Assignment	End Sem.	Lab Work					
1	BT101	BSC	Engineering Chemistry	70	20	10	30	20	150	3	-	2	4
2	BT202	BSC	Mathematics-II	70	20	10	-	-	100	3	1	-	4
3	BT103	HSMC	English	70	20	10	-	-	100	3	1	-	4
4	BT104	ESC	Basic Electrical Engineering	70	20	10	30	20	150	3	-	2	4
5	BT105	ESC	Engineering Graphics	70	20	10	30	20	150	2	-	4	4
6	BT106	ESC	Manufacturing Practice/Workshop	-	-	-	30	20	50	-	-	2	1
7	BT108	HSMC	Seminar/Soft Skills	-	-	-	30	20	50	-	-	2	1
8	BT207	DLC	Summer Industrial Training	Minimum four week duration. Evaluation will be done in 3rd semester									
Total				350	100	50	150	100	750	14	2	12	22
NSS/NCC/Swachhata Abhiyan/Rural Outreach				Qualifier									

Note: Industrial training should be apart from laboratory work undertaken in the college rather it should have industrial orientation and practical aspects/field work. Report to be submitted at the beginning of 3rd semester. Evaluation will be done in 3rd semester.

1 hour lecture (L) = 1 credit | 1 hour Tutorial (T) = 1 credit | 2 hour Practical (P) = 1 credit

Controller (Exam.)
Jabalpur Engineering College
Jabalpur - 482 011 (M.P.)

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Jabalpur - 482 011 (M.P.)

Principal
Jabalpur Engineering College
Jabalpur - 482 011 (M.P.)

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JABALPUR ENGINEERING COLLEGE, JABALPUR (MP)
SYLLABUS & SCHEME OF EXAMINATION FOR B.Tech. I/II SEMESTER (CBGS)
[AICTE MODEL CURRICULLAM BASED SCHEME]
ENGINEERING PHYSICS

WITH EFFECT FROM 26 / July /2018; SESSION 2018-19 ONWARDS

SUBJECT CODE	CATEGORY CODE	SUBJECT NAME	MAXIMUM MARKS ALLOTED					HOURS/WEEK			CREDITS
			THEORY			PRACTICAL		L	T	P	
			END SEM	MID SEM	QUIZ/ASSIGNMENT	END SEM	LAB WORK				
BT 201	BSC	ENGINEERING PHYSICS	70	20	10	30	20	3	1	2	5

L: LECTURE; T: TUTORIAL; P: PRACTICAL

DETAILED SYLLABUS

MODULE I:

Electrodynamics: Gradient, Divergence and Curl. Gauss Divergence Theorem, Stokes theorem. Introduction to Dielectrics, Electric Polarization P, Displacement vector D, Relation between D, E and P. Concept of Displacement current, Maxwell's equations (Integral and differential forms), Equation of continuity, EM –wave equation in free space. Electromagnetic waves.

Plasma: Definition of Plasma, Quasi neutrality, Debye length and Debye potential. Qualitative Ideas of Fusion reactor.

MODULE II:

Quantum Mechanics: Basic Ideas of quantum mechanics. deBroglie's hypothesis. Davisson and Germer experiment. Group & Phase velocity, Heisenberg's Uncertainty principle, Compton Effect. Wave function (ψ) and its physical significance. Schrödinger Time Dependent & Time Independent wave equation. Application of Schrödinger wave equation: Particle in one dimension box.

MODULE III:

Optics: Interference on the basis of Division of wavefront (Fresnel Biprism) and Division of amplitude (Interference in Thin films & Newton's Rings).Michelson Interferometer. Diffraction

(Dr. J.M. Keller) (Dr. P.K. Purohit) (Dr. Jyoti Choubey) (Dr. K.K. Kushwaha) (Dr. S.K. Tiwary)

of light, Diffraction at Single-Slit. Plane Transmission grating (PTG). Concept of Polarized light, Brewster's law, Nicol Prism.

MODULE IV:

Nuclear Physics: Static properties of Nucleus. Liquid Drop Model and Semi-empirical mass formula. Particle Accelerators: Linear Accelerator (LINAC), Cyclotron, Betatron. Geiger Müller counter and Bainbridge mass spectrograph.

Nano Technology: Elementary ideas about Nano science & Nano Technology and its applications in science and engineering.

MODULE V:

Laser: Einstein's coefficients, Principle and properties of Laser. Construction, working, energy level diagram and applications of Ruby Laser, He-Ne Laser, CO_2 and Semiconductor Laser. Laser Speckle phenomenon.

Fiber Optics: Fundamental ideas and applications of optical fiber, Types of Optical Fiber on the basis of mode, material and refractive index. Propagation of signal into optical fiber, Numerical aperture & V-number of an optical fiber, Dispersion in optical fibers. Losses in optical fibers.

REFERENCE BOOKS: *(1) Concepts of Modern Physics by Arthur Beiser (2) Fundamentals of Physics by Resnick, Halliday & Walker (3) A Text Book of Engineering Physics by Navneet Gupta & S.K.Tiwary (5) Plasma Physics by S. N. Sen (6) Introduction to Astrophysics by Baidyanath Basu (PHI)*

LIST OF EXPERIMENTS:

1. To determine the resistance o per unit length (ρ) of material of given wire using Carey Foster Bridge.
2. To determine refractive index (μ) of the material of given prism.
3. To determine the dispersive power (ω) of a prism.
4. To determine the grating element (e) of a plane transmission grating (PTG).
5. To determine the wavelength of green light using PTG and spectrometer.
6. To determine the wavelength of red light using diode laser and PTG.
7. To determine radius of curvature of a Plano convex lens using Newton's ring method.
8. To draw graph between RI and wavelength for light of different wavelengths using Hg vapor lamp and spectrometer and verify the Cauchy's formula.
9. To determine the resolving power of a PTG.
10. To determine the energy band gap of a semiconductor using a junction diode.
11. To determine the resolving power of telescope.
12. To plot the V-I characteristics of P-N junction diode.
13. To plot the V-I characteristics of Zener diode.
14. To plot the V-I characteristics of NPN transistor.
15. To plot the V-I characteristics of LED.
16. Study of preparation of nano materials.

(Dr JYOTI Chouhey)

(Dr J.M. Keller) (Dr. P.K. Purohit) (Dr. K.K. Kushwaha) (Dr. SK Tiwary)

Dean

Programme Educational Objectives (PEOs) of the Engineering Physics

1. To identify, formulate, create, analyze, design, develop and optimize various problems related to various fields of physics through basic knowledge.
2. To the industry by applying the skills and knowledge acquired during the course period.
3. To be prepared for the successful pursuit of graduate studies and shall have abilities to engage in lifelong learning in various field and will understand the challenges of a dynamically and globalised changing world adapting their skills through continuous l earning and self improvement.
4. To demonstrate the ability of gauging the impact of science on society, and possess knowledge of the ethical, social and professional implications/responsibilities of their work.
5. To inculcate a sense of ethics, professionalism and effective communication skills amongst Engineering graduates.

Programme Outcomes (POs) of the Engineering Physics course

Program Outcomes (POs) of the Engineering Physics course in B. Tech are as follows:

Engineering Physics course in B. Tech. has been design to generate the following skills and abilities amongst the students as stated under (i) through (v) below in conformity with PEOs. After the completion of the course students will be able to:

1. Apply the concepts of fundamental Physics in their respective fields
2. Design and conduct experiments in the relevant areas of physics and as well as to analyze and interpret the results
3. Identify, formulate and solved physical problems related to engineering
4. Communicate effectively
5. Understand the impact of engineering physics in a global, economic, environment and social context
6. Use fundamental techniques and skills of physics in modern engineering

(Dr. Jyoti Choubey)

(Dr. J. M. Kelley)

(Dr. P.K. Purohit)

(Dr. K. K. Kushwaha)

(Dr. S.K. Sharma)

Course Outcomes:

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

CO1. Solve the problems of electrodynamics used in various related applications.

CO2. Apply principles of quantum mechanics at microscopic level.

CO3. Analyze principles of optics towards the optical applications.

CO 4. Apply concept of nanotechnology in various fields and the problems related to nuclear physics.

CO 5. Analyze features of laser system and optical communication system.

Mapping of Course Outcomes (COs) with Program Outcomes (POs)

Engineering Physics (BT 1001)

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	02	01	01	-	01	01	01	-
CO2	01	02	01	01	-	-	-	-
CO3	02	01	-	-	-	-	-	-
CO4	02	01	1	-	-	-	01	-
CO5	01	-	-	-	-	-	01	-

The above mentioned scheme and syllabus is approved here with:

1. Dr. P. K. Purohit : Member: Professor and Head, Department of Applied Sciences, NITTTR, Bhopal (MP) (External member)
2. Dr. Poornima Swarup Khare : Member: Department of Physics, RGPV, BHOPAL (MP) (RGPV Nominee) — NOT PRESENT —
3. Dr. J. M. Keller : Member: Professor and Head , Department of PG Studies & Research in Physics and Electronics, RDVV, Jabalpur (MP) (External member)
4. Dr. Jyoti Choubey, Professor : Member: JEC, Jabalpur (MP) (Internal member)
5. Dr. Kamal Kumar Kushwaha, Assistant Professor : Member: JEC, Jabalpur (MP) (Internal member)

Dated:
21st July, 2018 (Saturday)

21.7.2018

(Dr. Shailendra Kumar Tiwary)
Chairman
Board of Studies in Applied Physics
Jabalpur Engineering College,
Jabalpur (MP) 482011

(Dr J. M. Keller) (Dr. P. K. Purohit) (Dr Jyoti Choubey) (Dr S K Tiwary) (Dr K. K. Kushwaha)

Jabalpur Engineering College, Jabalpur (M.P.)
(Common to all Disciplines) w.e.f. July 2018
(Based on AICTE Model Syllabus)

SUBJECT –MATHEMATICS-I BT102 [L+T+P =TC][3+1+0=4]

Module 1: Calculus-I (08 hours)
Rolle's theorem, mean value theorem, Expansion of functions by Maclaurin's and Taylor's theorem, Partial differentiation, Homogeneous functions, Euler's theorem, Maxima and Minima of two variables, method of Lagrange's multipliers.

Module 2: Calculus-II (08 hours)
Definite integral as limit of a sum, Application in summation of series, Double integrals, Change of order of integrals, Triple integrals, Length of curves, Area and Volume of surfaces using double and triple integrals, Beta and Gamma functions and their properties.

Module 3: Sequences, Series and Laplace Transform (10 hours)
Convergence of sequence and series, tests for convergence; Power series, Taylor's series, series for exponential, Trigonometric and logarithm functions; Fourier series: Half range sine and cosine series, Parseval's theorem. Laplace Transform, inverse Laplace transform.

Module 4: Matrices (06 hours)
Rank of Matrix, Solution of simultaneous equations by elementary Transformation & Consistency of equations, Eigen values and Eigen Vectors, Cayley Hamilton theorem and its application to find the Inverse of matrix, Diagonalisation of matrices.

Module 5: Vector Space (08 hours)
Vector Space, Linear dependence of vectors, basis, dimension; Linear transformations (maps) range and kernel of a linear map, rank and nullity, Inverse of a linear transformation, rank-nullity theorem, composition of linear maps, Matrix associated with a linear map.

Books References:

1. G.B. Thomas and R.I. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006
3. Veerarajan T, Engineering Mathematics for first year. Tata McGraw-Hill, New Delhi, 2008.
4. Ramana B.V. Higher Engineering Mathematics, Tata McGraw-Hill, New Delhi. 11th Reprint. 2010.
5. D. Poole, Linear Algebra: A modern Introduction, 2nd Edition, Books/Cole, 2005.
6. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
7. B.S. Grewal, Higher Engineering Mathematics, Khanna Publisher, 36th Edition. 2010.

Course Outcomes:
At the end of the course the students will able to :
1. Apply differential and integral calculus to notions of curvature and to improper integrals.
2. Understand basic knowledge of Beta and Gamma functions , functions of several variables.
3. Apply the fallouts of Rolle's Theorem of analysis to Engineering problems.
4. Determine the tool of power series and Fourier series, Laplace transform for learning advanced Engineering Mathematics.
5. Solve various problems using matrices and linear algebra in a comprehensive manner.

20.7.18 20/7/18

(Dr V.K. Gupta) (Dr. H.K. Patel)

B.Tech. (AICTE) I Sem.

BT102 Mathematics-I

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2				1							
CO2	1	2										
CO3	2	1										
CO4	1		2									
CO5	1	2										

Jabalpur Engineering College, Jabalpur
(AICTE Model Curriculum based scheme)
B.Tech. (AICTE) I/II Sem.

(w.e.f. July 2018)

Subject Code	Subject Name & Title	Maximum Marks Allotted						Hours/Week			Total Credits
		Theory			Practical		Total Marks	L	T	P	
		End Sem	Mid Sem MST	Quiz, Assignment	End Sem	Lab Work					
BT203	Computer Programming and Problem Solving	70	20	10	30	20	150	3	-	2	4

Module 1 Computer Hardware - Block diagram of computer Hardware, Software and Firmware Type of software, Interaction of Hardware and Software, General function of CPU, ALU, Control unit and memory, Type of memory, Motherboard and BIOS, Understanding the Boot Process.

Module 2 Introduction to algorithm and Flowchart, Generations of Programming Languages, Introduction to Programming. History of C , Characteristics of C, C Program Structure , Constants, Data types, Variables, Keywords ,Console Input/Output Statements, Compling, linking and executing C programs.

Module 3 Operators and expressions: arithmetic, Unary, Assignment, Relational, Logical & Conditional, Type Casting. Branching Statements - if Statement, switch Statement. Looping Statements - for, while, do-while loop Jump statement- goto, continue and break. Arrays- Array Concepts, Rules & Restrictions, Single & Multi-Dimensional arrays.

Module 4 Functions- Types of Functions, Built-in Functions, Function definition, Function Prototypes, Function calls. Storage classes & Scope of Variables. Strings- String manipulation functions. Structures-Defining New Data types, Unions, Enumerated Data types, Static Variables.

Module 5 Pointers-Pointer Concepts, Pointers and Functions, Pointers and Arrays, Array of Pointers Static Initialization, Pointers and Structures, Illegal indirection Dynamic Memory Allocation and Data Structures- sizeof(), malloc(), calloc(), realloc() and free()

Suggested Books:

- C Programming Language by Karnighan & Ritchie, TMH publications.
- Let us 'C' by Yashwantkanetkar, BPB publications
- Fundamentals of Computers by E Balagurusamy, TMH publications..

23/7/18

23.07.2018

23/7/18

Semester – I/II

Computer Programming and Problem Solving

Course Outcomes:

The course will enable the students to:

CO 1. Explain hardware, software, booting process, types of statements in C language such as I/O, branching and looping etc.

CO 2. Describe various ingredients of C program such as constants, variables, keywords, datatypes, header files, functions, pointers and dynamic memory allocation functions.

CO 3. Compose C program to solve simple arithmetic and logical problems.

CO 4. Compose C program using arrays, pointers, functions and structures etc.

Jabalpur Engineering College, Jabalpur (M.P.)
Programme: B.Tech. I/II Sem.: Mechanical Engineering (AICTE)

BT204 BASIC MECHANICAL ENGINEERING

Course Objectives:

1. To familiarize with the basics concepts of mechanical engineering.
2. To familiarize with the scope of mechanical engineering.
3. To familiarize with the job prospects of mechanical engineer.

Course Contents:

Module 1 : Materials: Classification of engineering material, Composition of Cast iron and Carbon steels, Iron Carbon diagram. Alloy steels their applications. Mechanical properties like strength, hardness, toughness, ductility, brittleness , malleability etc. of materials , Tensile test- Stress-strain diagram of ductile and brittle materials ,Hooks law and modulus of elasticity, Hardness and Impact testing of materials, BHN etc.

Module 2 : Measurement: Concept of measurements, errors in measurement, Temperature, Pressure, Velocity, Flow strain, Force and torque measurement, Venire caliper, Micrometer, Dial gauge, Slip gauge, Sine-bar and Combination set.

Production Engineering: Elementary theoretical aspects of production processes like casting, carpentry, welding etc. Introduction to Lathe and Drilling machines and their various operations.

Module 3 : Fluids: Fluid properties pressure, density and viscosity etc. Types of fluids, Newton's law of viscosity,Pascal's law, Bernoulli's equation for incompressible fluids,only working principle of Hydraulicmachines, pumps, turbines, Reciprocating pumps.

Module 4 : Thermodynamics: Thermodynamic system, properties, state, process, Zeroth, First and second law ofthermodynamics, thermodynamic processes at constant pressure, volume, enthalpy & entropy.

Steam Engineering: Classification and working of boilers, mountings and accessories of boilers,Efficiency and performance analysis, natural and artificial draught, introduction to steam properties.

Module 5 : Reciprocating Machines: Working principle of steam Engine, Carnot, Otto, Diesel and Dual cycles P-V& T-S diagrams and its efficiency, working of two stroke &four stroke Petrol & Diesel engines.Working principle of compressor.

Evaluation:

Evaluation will be continuous and integral part of the class as well as through external assessment.

Reference Books:

1- Kothandaraman&Rudramoorthy, Fluid Mechanics & Machinery, New Age.
2- Nakra&Chaudhary, Instrumentation and Measurements, TMH.
3- Nag P.K, Engineering Thermodynamics,T M H.
4- Ganesan, Internal Combustion Engines, TM H.
5- Agrawal C M, Basic Mechanical Engineering, Wiley Publication.
6- AchuthanM, Engineering Thermodynamics, PHI.

21/7/2018

Course Outcomes:
At the completion of this course, students should be able to-

CO1	Classify the engineering materials and their mechanical properties.
CO2	Outline the basics of thermodynamics and boilers.
CO3	Illustrate the working of Internal combustion engines.
CO4	Illustrate various machine tools and production processes.

Mapping of Course outcomes (COs) with Program Outcomes (POs):

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	-	-	-	-	-	-	-	-	-
CO2	2	1	-	-	-	-	-	-	-	-	-	-
CO3	2	1	-	-	-	-	-	-	-	-	-	-
CO4	2	-	-	-	-	-	-	-	-	-	-	-

List of Suggestive Core Experiments:

Theory related Eight to Ten experiments including core experiments as follows:

1. Tensile testing of standard Mild Steel specimen.
2. Verification of Bernoulli's Theorem.
3. Linear and Angular measurement using, Micrometer, Slip Gauges, Dial Gauge and Sine-bar.
4. Study of different types of Boilers and Mountings.
5. To find COP of a Refrigeration unit.
6. Study of different IC Engines.
7. Study of Lathe & Drilling Machines.
8. Study of UTM and performing tensile test on it.

Evaluation:
Evaluation will be continuous and integral part of the class followed by the final practical examination as well as through external assessment.

Course Outcomes:
At the completion of this course, students should be able to-

CO1	Demonstrate working of petrol and diesel engine.
CO2	Explain testing of mechanical properties of materials
CO3	Classify various types of boilers.

Mapping of Course outcomes (COs) with Program Outcomes (POs):

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2								1			
CO2	2	1							1			
CO3	1								1			

21/7/2018

Jabalpur Engineering College, Jabalpur
(AICTE Model Curriculum based scheme)
B.Tech. (AICTE) I Sem. (EE/EC/IT/IP)

(w.e.f. July 2018)

Course	Subject Title	Subject Code	Hours/week	Total Credits
B.Tech.	Basic Civil Engineering	BT205	3-0-2	4

BASIC CIVIL ENGINEERING

PART A-BUILDING MATERIALS & CONSTRUCTION

MODULE- I

Types, properties, test & uses of: Stones, bricks, cement, lime, timber. Laboratory tests of concrete and mortar materials, workability, strength properties of concrete, nominal proportion of concrete, preparation of concrete, compaction, curing.

PART B- SURVEYING

MODULE -II

Introduction to surveying, Various Instruments used in Surveying, Measurement of distances-conventional and EDM methods, Types of Chain, Tape, Correction, Measurement of Horizontal angles, Prismatic and Surveyor's Compass, Bearing, Traversing, Included angle, Magnetic declination, Local Attraction

MODULE- III

Measurements of Elevation, Types of leveling, Rise and Fall method, Height of Instrument method, Reciprocal leveling, Contours, Properties of Contour, Measurement of Area and Volume, Simpson's rule, Trapezoidal rule

PART C- ENGINEERING MECHANICS

MODULE -IV

Forces and Equilibrium: Graphical and Analytical treatment of concurrent and non concurrent co-planar forces, free body diagram, Force diagram and Bow's notations, Application of Equilibrium Concepts. Analysis of plane trusses: Method of Joints, Method of sections, Friction force in equilibrium problems.

MODULE-V

Moment of Inertia of area and mass, centre of gravity, centroid, Radius of Gyration, Introduction to product of Inertia and Principle Axes. Support Reactions in beams. Shear force and bending moment Diagram for Cantilever & simply supported beam with concentrated load, distributed load and couple.

Reference Books

1. S.Ramamrutam& R Narayanan Dhanpat Rai Pub. By "Basic Civil Engineering"
2. Prasad I.B. by Applied Mechanics Khanna Pub.
3. Punmia B.C. Surveying Standard book Depot.
4. S.P.Timoshenko, Mechanics of Structure, East West Press Pvt. Ltd.

5. Surveying by Duggal- Tata McGraw Hill New Delhi
6. Building Construction by S.C. RangwalaCharotar Pub. House Anand
7. R.K. Rajput, Engineering Mechanics S. Chand & Co.

COURSE OUTCOMES (COs)

After completion of this course the students will be able to

CO 1. Summarize properties and uses of building materials, contours, Remote sensing & its applications
CO 2. Calculate resultant forces, axial forces in simple truss, shear force, bending moment, centre of gravity, moment of inertia, horizontal & vertical distances and angles using different survey instruments, area & volume
CO 3. Draw SFD & BMD for simply supported and cantilever beam.

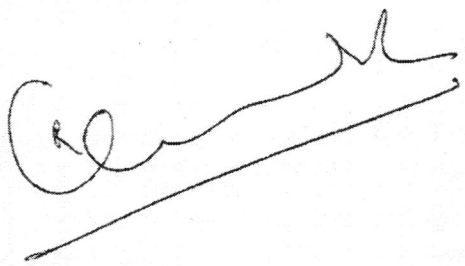
List of Experiments-

1. Determine the magnitude of resultant force using law of polygon of forces and compare the result with analytical and graphical method.
2. Determine the coefficient of friction between the two given surfaces and find the weight of box.
3. Find the coefficient of friction between drum and cord.
4. Determine the modulus of Elasticity of mild steel and timber using simply supported beam.
5. Determine the modulus of inertia of a closed coiled helical spring.
6. Find the forces in the members of a simple jib crane and compare them with analytical and graphical method.
7. Draw the location of given points on a medium size field using chain survey.
8. Complete closed traverse and surrounding offsets by prismatic compass.
9. Determine reduced level of 10 stations by Auto level/Dumpty level.

COURSE OUTCOMES

After completion of this course the students will be able to

1. Measure horizontal & vertical distances and angles using different survey instruments.
2. Verify law of polygon of forces
3. Determine material properties of different building material, coefficient of friction, modulus of elasticity, moment of inertia.



Jabalpur Engineering College, Jabalpur (M.P.)
(Common to all Disciplines) w.e.f. July 2018
(Based on AICTE Model Syllabus)
B. Tech (AICTE) II SEM (BT-202)

SUBJECT –MATHEMATICS-II **[L+T+P =TC] [3+1+0=4]**

Module 1: Ordinary differential equations-I (08 hours)
Ordinary differential equations of first order (Linear and higher degree), Linear higher order differential equations with constant coefficients, Homogeneous linear differential equations, simultaneous differential equations, solving ODEs by Laplace Transform method.

Module 2: Ordinary differential equations-II (10 hours)
Second order ordinary differential equations with variable coefficients using one solution known, Removal of first derivative, Change of independent variable, Method of operational factor, Method of variation of parameters, Solution of second order ordinary differential equations by series method; Legendre polynomials, Bessel functions of the first kind and their properties.

Module 3: Partial differential equations (08 hours)
Formulation of partial differential equation, solution of first order linear partial differential equations, first order non-linear partial differential equations, Homogeneous linear partial differential equations with constant coefficients of second and higher order, Method of separation of variables, applications of PDE in the solution of one dimensional Heat and wave equations.

Module 4: Functions of Complex variable (08 hours)
Functions of complex variables: Analytic functions, Harmonic conjugate, Cauchy-Riemann Equations (Without proof), Line integral, Cauchy-Goursat theorem (without proof), Cauchy integral formula (without proof), singular points, poles & Residues, Residue theorem, Application of Residues theorem for Evaluation of real integral. (Unit Circle)

Module 5: Vector Calculus (06 hours)
Differentiation of vectors, scalar and vector point function Gradient Geometrical meaning of gradient, Directional Derivative, Divergence and Curl, line integral Surface integral and Volume integral, Gauss Divergence, Stokes and Green theorems.

Books References:

1. G.B. Thomas and R.I. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. W.E. Boyce and R.C. Di prima, Elementary differential Equations and Boundary Value Problem, 9th Edition Wiley India, 2009.
3. S.L. Ross Differential Equations , 3rd Edition Wiley India 1984.
4. J.W. Brown and R.V. Churchill. Complex Variables and Applications, 7th Edition Mc Graw Hill, 2004.
5. N.P. Bali and Manish Goya, A text book of Engineering Mathematics, Laxmi Publications, Reprint 2008.
6. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition 2010.

Course Outcomes :

At the end of the course the students will able to :

CO1. Solve the differential equations that model physical processes.
CO 2. Understand mathematical tools needed in evaluating partial differential equation and their usage.
CO3. Determine the differentiation and integration of functions of a complex variable.
CO4. Apply Vector calculus in various techniques dealing with engineering problems.

HKpalal 20/7/18

20.7.18

B.Tech. (AICTE) II Sem.

BT202 Mathematics-II

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	2									
CO2	1	2										
CO3	2		1									
CO4	2	1										

B. Tech (AICTE) - I/II sim

BT 103 - ENGLISH

Detailed Syllabus:

Module1:

Words, morphemes, phrase, clause, kinds of sentences ; Review of Basic Grammar: tenses, narration, active passive voice, prepositions articles, gerunds, subject-verb agreement; punctuation marks; Paragraph writing, Precise writing, Comprehension passage, Technical Description of simple engineering objects, Writing Bibliography and references,

Module2:

Business Correspondence: Letter Components and Layouts, Principles of Effective Letter Writing, Applications, Enquiry Letters, Quotation Letters, Order and Complaint Letters, adjustments letters; Job Application: Cover Letter, Resume writing, Difference between Bio-data, CV and Resume; Note writing

Module3:

Meaning and Process of Communication, Barriers to Communication, Verbal and Nonverbal Communication; **Job Interview Skills:** Pre-interview Preparation Techniques, Facing the Interview, **Group Discussion:** Selection Group Discussion Strategies; **Presentation Skills :** Defining Purpose, Organizing Contents, Preparing outline, Audio Visual Aids, Nuances of Delivery , Audience awareness; **Listening Skills :** Importance of listening, Types of listening, Difference between listening and hearing; **Interpersonal Skills**

Module4:

Report Writing: Basics of Report Writing, Structure of a Report; Types of report: Informational and Analytical Report, Routine and Special Report, Formal and Informal Reports; Formats of Report: Printed Forms, Letter Format and Memo Format; Process of Report Writing, E-mail etiquettes, notice, agenda , minutes

Module5:

Techniques of Reading; Tryst with Destiny by Jawaharlal Nehru, Portrait of a Lady by Kushwant Singh, Where the Mind is Without Fear by Rabindranath Tagore, Lord Ullins Daughter by T.C Campbell, A Letter to God by G.L Fuentes, How Much Land does a Man Need by Leo Tolstoy.

Topics of Language lab:

(1) Introduction to the sounds of English: Phonetics symbols and Pronounciation, speech mechanism, Organs of Speech
(2) Basic Grammar
(3) Interview
(4) Group Discussion
(5) Presentation Skill
(6) Students will be trained in the four basic skills viz. speaking, listening, reading and writing

Final assessment will be based on assignment, presentation and GD

Refrences:

1. English Grammar & Composition, Wren and Martin.
2. Effective Technical Communication, M Ashraf Rizwi, Tata McGraw- Hill, New Delhi.
3. Essentials of Business Communication, Rajendra Pal & J.S Korlahalli, Sultan Chand & Sons, New Delhi.
4. Business Correspondence and Report Writing, R.C Sharma & Krishna Mohan, McGraw Hill,New Delhi.
5. Technical Communication : Principles and Practice, Meenakshi Raman and Sangeeta Sharma, Oxford University Press, New Delhi.
6. Business Communication, Lesikar and Petit, McGraw Hill, New Delhi.

Jabalpur Engineering College, Jabalpur (MP)
Department of Humanities
Syllabus &Scheme of Examination For B.Tech. I/II Semester
ENGLISH (AICTE Model Curriculum Based Scheme)

S.No.	Subject Code	Subject Name & title	Maximum marks allotted							Hours per week			Total Credits	Total Marks
			Theory			Practical								
			End SEM.	Mid SEM MST	Quiz Assign	End Sem.	Lab Work	Assignment /Quiz/Term paper	Total Mark	L	T	P		
1.	BT103	ENGLISH	70	20	10	30	20		150	3	1	2	4 1	

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

CO1	Understand the basic rules of grammar
CO2	Develop the skills of official letter writing, report writing, precise writing
CO3	Apply the Skills of oral and interpersonal communication along with listening skills
CO4	Demonstrate the ability to read and evaluate the various genres of English language for the proper use of voice modulation, punctuation marks to and develop effective vocabulary

Program Outcomes:

	PO1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1						1				3		
CO2						1				3		
CO3								1	2	3		
CO4								2		3		

Jabalpur Engineering College, Jabalpur
(AICTE Model Curriculum based Scheme)
B. Tech. (AICTE) Semester: I/II Sem.

(w.e.f. July 2018)

Subject Code	Subject Name & Title	Maximum Marks Allotted						Hours/Week			Total Credits
		Theory			Practical		Total Marks	L	T	P	
		End Sem	Mid Sem MST	Quiz, Assignment	End Sem	Lab Work					
BT104	Basic Electrical Engineering	70	20	10	30	20	150	3	-	2	4

Course Objective:
This course provides comprehensive idea about circuit analysis, working principles of machines and common measuring instruments.

BASIC ELECTRICAL ENGINEERING

Module 1 : Fundamentals of Electrical Technology

Electricity, Electric Potential, Electric Current, Laws of electrical engineering, Resistance, Conductance, Electromotive Force, Electrical Energy, Electrical Power, DC circuits, series circuits, parallel circuits, series-parallel circuits, Electric Network, voltage and current sources, source transformation, Kirchoff's laws, Maxwell's mesh current method (loop analysis), nodal analysis, Delta-Star and Star-Delta transformation, superposition theorem, Thevenin's theorem, Norton's theorem.

Steady state response of circuits: Steady state response of series R-L, R-C, R-L-C circuits, complex impedances, average and effective values of periodic functions, series and parallel resonance, various responses of RL, RC, RLC circuits.

Module 2 : AC Circuits

1-Phase AC Circuits: Generation of sinusoidal AC voltage, Average value, R.M.S. value, Form factor and peak factor of AC quantity, Concept of phasor, Concept of power factor, Concept of impedance and admittance, Active, reactive and apparent power.

3-Phase AC Circuits: Necessity and advantages of three phase systems, Phase sequence, Balanced and unbalanced supply and loads, Relationship between line and phase values for balanced star and delta connections, Power in balanced & unbalanced three - phase system and their measurements.

Module 3 : Magnetic Circuits

Basic definitions, magnetization curves of ferro magnetic materials, magnetic circuit concepts and analogies, self-inductance and mutual inductance, energy in linear magnetic systems, magnetic field and force calculation of a current carrying conductor.

Module 4 : Single Phase Transformer

General construction, theory of operation, e.m.f. equation, equivalent circuits, referred values, phasor diagram, voltage regulation, losses and efficiency, open circuit and short circuit test, all day efficiency,

Auto transformer.

Module 5 : Electrical Machines

Construction and overview of DC machine, induction machine and synchronous machine.

Text Books:

1. D. P. Kothari & I. J. Nagrath, Basic Electrical Engineering, Tata McGraw Hill, latest edition.
2. B. L. Theraja & A. K Theraja Textbook of Electrical Technology - Vol. 1, S. Chand Publication.
3. Vincent Del Toro Electrical Engineering Fundamentals.
4. C. L. Wadhwa, Basic Electrical Engineering, New Age International.

Electrical Engineering Lab

List of Experiments:

1. Verification of Kirchhoff's laws.
2. Verification of Superposition Theorem.
3. Verification of Thevenin Theorem.
4. Separation of R and L of a choke coil in single phase AC supply.
5. Determination of parameters of ac single phase series RL, RC & RLC circuits.
6. Active, Reactive power and apparent power measurement in single phase AC circuit.
7. Measurement of power in three phase AC circuit by two wattmeter method.
8. Determination of equivalent circuit parameters of a single phase transformer by O.C. and S.C. tests.

Course Outcomes:

After completion of this course students will be able to:

CO→ 1. Apply KVL, KCL and network theorem to solve basic AC and DC network problems.
CO→ 2. Analyze various parameters in single phase & three phase AC circuits.
CO→ 3. Analyze the similarities and dissimilarities between series and parallel magnetic circuits.
CO→ 4. Calculate losses, efficiency and voltage regulation of single phase transformer.
CO→ 5. Draw characteristics of different electrical machines.

Jabalpur Engineering College, Jabalpur (M.P.)
Programme: B.Tech. I/II Sem. Mechanical Engineering (AICTE)

BT105 ENGINEERING GRAPHICS

Course Objectives:

1. To familiarize with the construction of geometrical figures.
2. To familiarize with the projection of 1d, 2d, 3d elements.
3. To familiarize with the sectioning of solids and development of surfaces.
4. To familiarize with preparation and interpretation of building drawings.

Course Contents:

Module 1 **Scales**: Representative factor, plain scales, diagonal scales and Vernier scales.
Conic sections: Construction of ellipse, parabola, hyperbola by General method only; Normal and Tangent.
Special Curves: Cycloid, Epi-cycloid, Hypo-cycloid, Involutes, Archimedean and logarithmic spirals.
Projection: Types of projection, orthographic projection, first and third angle projection,
Projection of points and lines, Line inclined to one plane, inclined with both the plane, True Length and True Inclination, Traces of straight lines.

Module 2 **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.
Section of Solids: Section of right solids by normal and inclined planes; Intersection of cylinders, Prism, Pyramid, Cone, Line cutting plane method.

Module 3 **Development of Surfaces**: Parallel line and radial - line method for right solids.
Isometric Projections: Isometric scale, Isometric axes, Isometric Projection from orthographic drawing.

Module 4 **Overview & Customisation of CAD**: Listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.; Isometric Views of lines, Planes, Simple and compound Solids]; consisting of set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning and tolerancing ; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles;

Module 5 **Introduction to 2D & 3D Modeling using CAD**: Applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines (extend/lengthen); Printing documents to paper using the print command; orthographic projection techniques; Drawing annotation, Computer-aided design (CAD) software modeling of parts and assemblies. Parametric and non-parametric solid, surface, and wireframe models. Part editing and two-dimensional documentation of models. Planar projection theory, including sketching of perspective, isometric, multiview, auxiliary, and section views. Dimensioning guidelines, dimensioning and scale multi views of dwelling; Geometry and topology of engineered components: creation of engineering models and their presentation in standard 2D blueprint form and as 3D wire-frame and shaded solids; meshed topologies for engineering analysis and tool-path generation for component manufacture; geometric dimensioning and tolerancing; Use of solid-modeling software for creating associative models at the component and assembly levels relevant to concern discipline.

References

1. Visvesvaraya Tech. University; A Premier on Computer Aided Engg drawing; VTUBTlgaum
2. Bhatt N.D.; Engineering Drawing, Charotar
3. VenugopalK.;Engineering Graphics; New Age
4. John KC; Engg. Graphics for Degree; PHI.
5. Gill P.S.; Engineering Drawing; kataria
6. Jeyopoovan T.; Engineering drawing & Graphics Using AutoCAD; Vikas
7. Agrawal and Agrawal; Engineering Drawing;TMH
8. Shah MB and Rana BC; Engg.drawing; Pearson Education
9. Luzadder WJ and Duff JM; Fundamental of Engg Drawing; PHI
10. Jolhe DA; Engg. Drawing an Introduction; TMH
11. Narayana K.L.; Engineering Drawing; Scitech

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

Course Outcomes (COs) Engineering Graphics (BT105):

At the completion of this course, students should be able to-

CO1	Illustrate the fundamentals of engineering drawing and AutoCAD.
CO2	Make use of the basic principles of drawing and AutoCAD to draw various geometric elements like point, line, curves, scale, planes and solids.
CO3	Examine various types of geometries like point, line, curves, scale, planes and solids and draw its projections by manual drafting and AutoCAD.
CO4	Evaluate objects like regular polyhedral and solid of revolutions and its sections to develop their surfaces.

Mapping of Course outcomes (COs) with Program Outcomes (POs):

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	-	2	1	-	-	-	-	-	-	-
CO2	2	1	-	1	1	-	-	-	-	-	-	-
CO3	2	1	-	2	2	-	-	-	-	-	-	-
CO4	1	2	-	1	-	-	-	-	-	-	-	-

List of Practical:
Sketching and drawing of geometries and projections based on above syllabus.

Evaluation:
Evaluation will be continuous an integral part of the class followed by the final examination as well as through external assessment.

Term work: *A min. of 30 hand drawn sketches (on size A4 graphic sketch Book) plus 5CAD-printouts on size A4 sheets plus 10 sheets of size A2 or 6 sheets of size A1, (50% marks to BT allotted for this record + 25% marks for attendance +25%marks for Teachers Assessment.*

Practical Marks to be allotted based on written test and viva.

Note: *To cover above syllabus, Institute must have CAD software and a computer lab (6to 12 hrs/month/student).*

HOD
Deptt. of Mechanical Engineering
Jabalpur Engineering College
Jabalpur - 482 011 (M.P.)

JABALPUR ENGINEERING COLLEGE, JABALPUR (M.P.)
New Scheme Based On AICTE Flexible Curricula
B.Tech. First Year
Branch- Common to All Disciplines

BT101	Engineering Chemistry	3L-0T-2P	4 Credits

Course Contents:

Module -1 Water – Analysis, Treatments, Boiler problem & softening methods

Sources, Impurities, Hardness & its units, Determination of hardness by EDTA method, Alkalinity & It's determination and related numerical problems.
Boiler troubles (Sludge & Scale, Priming & Foaming, Boiler Corrosion, Caustic Embrittlement), Softening methods (Lime-Soda, Zeolite and Ion Exchange Methods) and related numerical problems.

Module -2 Fuels & Combustion

Fossil fuels & classification, Calorific value, Determination of calorific value by Bomb calorimeter. Proximate and Ultimate analysis of coal and their significance, calorific value. Carbonization, Manufacturing of coke. Cracking of higher Hydrocarbons & mechanism of cracking, Knocking, relationship between knocking & Structure of hydrocarbon, improvement of anti-knocking. Characteristics of IC engine fuels & Diesel engine fuels, Octane number, Cetane number, combustion and its related numerical problems. Gaseous and bio fuels.

Module -3 Lubricants and Lubrication

Introduction, Mechanism of lubrication, Classification of lubricants, significance & determination of Viscosity and Viscosity Index, Flash & Fire Points, Cloud & Pour Points, Iodine Value, Aniline Point, Acid Number, Saponification Number, Steam Emulsification Number and related numerical problems. Solid lubricants, Semi-solid lubricants.

Module -4 Polymer & Polymerization

Introduction, types of polymerisation, Classification, mechanism of polymerisation (Free radical & Ionic polymerization). Thermoplastic & Thermosetting polymers, Elementary idea of Biodegradable polymers, preparation, properties & uses of the following polymers- PVC, PMMA, Teflon, Nylon 6, Nylon 6:6, Polyester Phenol formaldehyde, Urea- Formaldehyde, Buna N, Buna S, Vulcanization of Rubber.

Module -5 Spectroscopic and Chromatographic techniques

Principle, Instrumentation & Applications, Electronic spectroscopy, Vibrational & Rotational spectroscopy. Gas chromatography and its applications.

Cement and Refractories:

Classification of Cements, Manufacture of Portland cement. Chemical composition and ISI specifications, Setting and Hardening. Decay of Cement, Gypsum, Plaster of Paris, Concrete & RCC. Definition, Classification & Properties of Refractory materials. Properties & uses of Silica bricks, Fire clay, Carborundum & Dolomite.

Practical List

NOTE: At least 8 of the following core experiments must be performed during the session.

1. Water testing

(i) Determination of Total hardness by Complexometric titration method.

(ii) Determination of mixed alkalinity

(a) OH^- & CO_3^{--} (b)CO_3^{--} & HCO_3^-

(iii) Chloride ion estimation by Argentometric method.

2. Fuels & Lubricant testing:

(i) Flash & fire points determination by

a) Pensky Martin Apparatus, b) Abel's Apparatus

c) Cleveland's open cup Apparatus d) Calorific value by bomb calorimeter.

(ii) Viscosity and Viscosity index determination by

a) Redwood viscometer No.1 b) Redwood viscometer No.2

(iii) Proximate analysis of coal

a) Moisture content b) Ash content

c) Volatile matter content d) Carbon residue

(iv) Steam emulsification No & Anline point determination

(v) Cloud and Pour point determination of lubricating oil

3. Alloy Analysis

(i) Determination of percentage of Fe in an iron alloy by redox titration using N-Phenyl anthranilic acid as internal indicator.

(ii) Determination of Cu and or Cr in alloys by Iodometric Titration.

(iii) Determination of % purity of Ferrous Ammonium Sulphate & Copper Sulphate.

Reference Books :

1. Chemistry in Engineering and Technology - Vol.1 &2 Kuriacose and Rajaram , McGraw Hill Education

2. Fundamental of Molecular Spectroscopy C.N. Banwell , McGraw Hill Education

3.Engineering Chemistry – B.K. Sharma, Krishna Prakashan Media (P) Ltd., Meerut.

4. Basics of Engineering Chemistry – S.S. Dara & A.K. Singh, S. Chand &Company Ltd., Delhi.

5 .Applied Chemistry – Theory and Practice, O.P. Viramani, A.K. Narula, New Age International Pvt. Ltd. Publishers, New Delhi.

6. Elementary Spectroscopy ,Y .R. Sharma , S. Chand Publishing

7. Polymer Science, Vasant R. Gowariker, N. V. Viswanathan, Jayadev Sreedhar, New Age International Pvt. Ltd

8. Advanced Inorganic Chemistry, G.R. Chatwal, Goal Publishing house

9. Engineering Chemistry (NPTEL Web-book) B.L. Tembe, Kamaluddin and M.S. Krishna

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Jabalpur Engineering College

B.Tech I/II Semester (Common to all branches)

Course content

EVALUATION

Sub code	Sub name	L	T	P	Max. marks	Credits
BT-101	Engineering Chemistry	3	1	–	70	4

COURSE OUTCOME: At the end of the course the student will be able to

CO1	Identify the quality of water for industrial and municipal applications
CO2	Determine the use of fuels for engineering applications
CO3	Determine the use of Lubricants for engineering applications
CO4	Select the appropriate polymers for desired applications
CO5	Apply the fundamentals of spectroscopic and chromatographic techniques , to acquire knowledge of engineering materials like Cement and Refractories

Mapping of course outcome with program outcome

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												

11/7/19 11/7/19 11/7/19 11/7/19 11/7/19