Jabalpur Engineering College, Jabalpur

Semester I (Set-B) Credit Based Grading System (CBGS) w.e.f. July 2017

Scheme of Examination

Bachelor of Technology B.Tech. (Common to all Disciplines)

Branches(CE, ME, CSE)

Subject wise distribution of marks and corresponding credits

S. No.	Subject Code	Subject Name & Title	Maximum Marks Allotted						Hours / week.			Total Credits	Total Marks
			Theory			Practical							
			End Sem	Mid Sem. MST	Quiz, Assignment	End Sem.	Lab Work	Total Marks	L	T	P		
1	**BT2001**	Engineering Physics	70	20	10	30	20	150	3	1	2	6	
2	**BT1002**	Mathematics-I	70	20	10	-	-	100	3	1		4	
3	**BT2003**	Basic Mechanical Engineering	70	20	10	30	20	150	3	1	2	6	
4	**BT2004**	Basic Civil Engineering & Engineering Mechanics	70	20	10	30	20	150	3	1	2	6	
5	**BT2005**	Basic Computer Engineering	70	20	10	30	20	150	3	1	2	6	
6	**BT2006**	Language Lab	-	-	-	30	20	50	-	-	2	2	
Total			**350**	**100**	**50**	**150**	**100**	**750**	**15**	**5**	**10**	**30**	**750**

MST: Minimum of two mid semester tests to be conducted.

L: Lecture **T: Tutorial** **P: Practical**

B.TECH. I SEMESTER SET-B (CE, ME, CS)
ENGINEERING PHYSICS

Course	Subject Title	Subject Code	Grade for End Sem.		CGPA at the end of every even semester
			T	P	
B.E.	Engineering Physics	BT2001	Min. "D"	Min. "D"	5.0

Course Outcomes:

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

CO1	To develop the basic understanding for Electrodynamics, Plasma & Astrophysics.
CO2	To understand the concepts of Modern Physics (Quantum Mechanics)
CO3	To understand the salient properties of Light (EM waves)
CO4	Develop the understanding of Physics of Nucleus and Nanotechnology
CO5	To develop the basic idea about concepts of Optical Fibre, propagation, communication and Laser physics

Unit- 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.**

Plasma & Astrophysics: Definition of Plasma, Quasi neutrality, Debye length and Debye potential. Origin of Geomagnetic field. Geomagnetic field variations. Solar variations. Heliosphere

Unit - 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.

Unit- III:

Optics: Interference on the basis of Division of wavefront (Fresnel Biprism) and Division of amplitude (Interference in Thin films & Newton's Rings). Diffraction of light, Diffraction at Single-Slit. Plane Transmission grating (PTG). Concept of Polarized light, Brewster's law, Nicol Prism.

Unit -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.

Unit -V:

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

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.

Books References:

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
4. Plasma Physics by S.N.Sen
5. Introduction to Astrophysics by Baidyanath Basu (PHI)

ENGINEERING PHYSICS

List of Physics Experiment:

1. To determine the resistance per unit length (ρ) of material of given wire using Carey foster bridge.
2. To determine refractive index (μ) of the material of prism using spectrometer.
3. To determine depressive power (ω) of a prism.
4. To determine grating element (e) of a plane transmission grating (PTG).
5. To determine the wavelength (λ) of green light using plane transmission grating (PTG) and spectrometer.
6. To determine wavelength of red light using diode laser and plane transmission grating (PTG).
7. To determine the radius of curvature $(e)$of a Plano-convex lens using Newton's ring method.
8. To draw a graph between reflective index (μ) and wavelength (λ) for light of Different wavelength using the mercury vapour lamp with the help of spectrometer and with this to verify the Cauchys formula.
9. To draw a graph between the angles of minimum deviation (δ_m) and wavelength (λ) for light of different wavelength using the mercury vapor lamp with the help of spectrometer.
10. To determine the wavelength (λ) of the given monochromatic light with the help of Newton's circular fringes.
11. To determine the refractive index (μ) of a liquid by Newton's ring method.
12. To determine the wavelength of main spectral lines of radium lamp with the help of plane transmitting grating (PTG).
13. To determine the temperature coefficient of (α) of resistance of given material with the help of Carey Foster Bridge.

14. To determine the resolving power of plane diffracting grating.

15. To determine the energy band gap of a semiconductors using a junction diode.

16. To determine the resolving power of telescope.

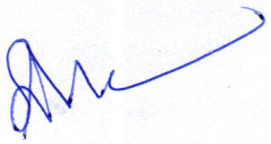
17. To plot the V-I characteristics of P-N junction diode.

18. To plot the V-I characteristics of Zener diode.

19. To plot the V-I characteristics of NPN transistor.

20. To plot the V-I characteristics of LED.

21. Study of nano materials synthesis .



B.TECH. I SEMESTER SET-B (CE, ME, CS)

MATHEMATICS-I

Course	Subject Title	Subject Code	Grade for End Sem.		CGPA at the end of every even semester
			T	P	
B.E.	Mathematics-I	BT1002	Min. "D"	Min. "D"	5.0

Course Outcomes:

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

CO 1	Expand the functions by Malaren's and Taylor's theorem and to apply in Engineering problems.
CO 2	Differentiate the function under Integral sign and to apply in Engineering problems.
CO 3	Estimate the maxima and minima of multivariable functions
CO4	Evaluate the Area and Volume of surfaces using double and triple integrals, and its application in various in Engineering problems.
CO5	Solve any given first order ordinary differential equation and its application in various in Engineering problems.
CO6	Solve any higher order linear ordinary differential equation with constant coefficients and its application in various in Engineering problems.
CO7	Solve linear system equation
CO8	Determine the Eigen values and vectors of a matrix
CO9	Understand the concept of Mathematical logic and graphs and their application in Hardware and Software problems.

Mapping of Course outcomes with program outcomes:

Course Out come	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	2			1				2
CO2	2			1				2
CO3	2			-				2
CO4	2			-				2
CO5	2	1		1	1	1		2
CO6	2	1	1	-		1		2
CO7	2			1				2
CO8	2			1				2
CO9	2			2				2

Unit-I:

Expansion of functions by Maclaurin's and Taylor's theorem, Partial differentiation , total differential coefficients , homogeneous functions, Euler's theorem , approximations and errors, differentiation under Integral sign. Maxima and Minima of two variables, Curve tracing (Cartesian and Polar curve), Curvature, Radius of Curvature.

Unit-II:

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.

Unit-III:

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.

Unit-IV:

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, Diagnolisation of matrices.

Unit-V:

Binomial, Poisson and Gaussian (Normal) Distribution and their properties. Boolean algebra, Algebra of logic, Principle of Duality and basic theorems, Boolean expressions and functions Introduction to Graph and Sub Graphs, degree and distance, Tree, Cycles and matrix representation of graphs.

Course Outcomes:

The curriculum of the Department is designed to satisfy the diverse needs of students. Coursework is designed to provide students the opportunity to learn key concepts of differentiations, Integration, differential equations, matrices, Boolean algebra , Graph theory, probability distributions and their applications.

Books References:

1. Higher Engineering Mathematics by B.V. Ramana, TMH.
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
3. Advanced Engineering Mathematics by Erwin Kreyszig, John Willey & Sons.
4. Differential calculus by Gorakh Prasad , Pothi Shala Publication.
5. Integra calculus by Chandrika Prasad , Pothi Shala Publication.
6. Introduction to theory of Statistics by Mood, TMH.
7. Graph Theory with Application to Engineering and Computer Science by Narsingh Deo, Prentice-Hall, Inc, Englewood cliffs, N. J.

B.TECH. I SEMESTER SET-B (CE, ME, CS)

BASIC MECHANICAL ENGINEERING

Course	Subject Title	Subject Code	Grade for End Sem.		CGPA at the end of every even semester
			T	P	
B.E.	Basic Mechanical Engineering	BT2003	Min. "D"	Min. "D"	5.0

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.

Unit -I: Materials:

Classification of engineering material, Composition of Cast iron and Carbon steels, IronCarbon 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 brittlematerials ,Hooks law and modulus of elasticity, Hardness and Impact testing of materials, BHN etc.

Unit -II: Measurement:

Concept of measurements, errors in measurement, Temperature, Pressure, Velocity, Flowstrain, Force and torque measurement, Vernier caliper, Micrometer, Dial gauge, Slip gauge, Sine-bar andCombination set.

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

Unit-III: 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.

Unit-IV: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, steam properties, use of steam tables.

Unit- V: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.

Books Reference:

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.

Course Outcome:

CO1 : Learned about different mechanical materials, selection and use.
CO2 : Capable to measure the mechanical components.
CO3 : Ability for selection and applications of machine tools for given job.
CO4 : Understand the principles of fluid mechanics and applications in mechanical engineering.
CO5 : Capable to solve numerical problems on thermodynamics and steam.
CO6 :Understand the working of various internal and external combustionengines, reciprocating machines.

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

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	-	2	-	-	-	-	-	-
CO2	-	1	-	2	-	1	-	-
CO3	1	-	1	-	-	-	1	-
CO4	-	1	2	-	-	-	-	1
CO5	-	-		2	1	1	-	-
CO6	-	1	2	-	-	1	-	-

Evaluation:

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

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. Study of different steam Engines.
6. Study of different IC Engines.
7. Study of Lathe & Drilling Machines.
8. Study of UTM and performing tensile test on it.

B.TECH. I SEMESTER SET-B (CE, ME, CS)

BASIC CIVIL ENGINEERING & ENGINEERING MECHANICS

Course	Subject Title	Subject Code	Grade for End Sem.		CGPA at the end of every even semester
			T	P	
B.E.	Basic Civil Engineering & Engineering Mechanics	BT2004	Min. "D"	Min. "D"	5.0

Unit -I: Buildings Materials & Construction:

Stones bricks cement lime, timber-types, properties test & uses. Laboratory tests on concrete and mortar materials, Workability, Strength properties of concrete. Nominal Proportion of Concrete, preparation of concrete, compaction curing.

Unit -II: Surveying & Positioning:

Introduction to surveying Instruments, levels, the odolites, plane tables and related devices Electronic surveying instruments etc. Measurement of distances – conventional and EDM methods, measurement of directions by different methods, measurement of elevations by different methods, Reciprocal levelling.

Unit -III: Mapping & Sensing:

Mapping details and contouring, profile cross sectioning and measurement of areas, volumes, application of measurements in quantity computations. Survey station introduction of remote sensing and its applications.

ENGINEERING MECHANICS

Unit -IV:

Forces and Equilibrium: Graphical and Analytical Treatment of Concurrent and non concurrent co-planner forces, free diagram. Force Diagram and Bow's notations Application of Equilibrium Concepts. Analysis of plane Trusses Method of Joints, Method of sections. Frictional force in equilibrium problems.

Unit -V:

Centre of Gravity and moment of Inertia Centroid and Centre of Gravity. Moment Inertia of area and Mass, Radius of Gyration, Introduction to product of Inertia and Principle Axes.Support Rections. Shear force and bending moment Diagram for Cantilever & simply supported beam with concentrated distributed load and couple.

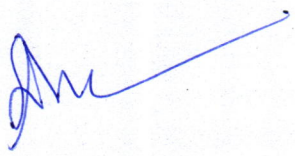
Books References:

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. Shesha Prakash and Mogaveer, Elements of Civil Engg & Engg. Mechanics HPI
5. S.P.Timoshenko, Mechanics of Stricture, East West Press Pvt. Ltd.
6. Surveying by Duggal- Tata McGraw Hill New Delhi
7. Building Construction by S.C. Rangwala – Charotar Pub.House Anand
8. Building Construction by Grucharan Singh – Standard Book House, new Delhi
9. Global Positioning System Principles and Application Gopi, TMH
10. R.C. Hibbler – Engineering Mechanics Statics & Dynamics
11. A.Boresi & Schmidt – Engineering Mechines- Statics Dynamics, Thomson' Books.
12. R.K.Rajput, Engineering Mechanics S.Chand & Co.

BASIC CIVIL ENGINEERING & ENGINEERING MECHANICS

List of Experiments:

1. Measurement, Water absorption.
2. Find out slump & Compaction factor.
3. Determine consistency of cement & initial setting time of cement.
4. Find out crushing strength of concrete.
5. Study of Chain, Tape, Ranging, Rod, Arrows, Prismatic compass.
6. Chain survey of a small building.
7. Compass survey of a small building.
8. Plane table survey of small building using by radiation & intersection method.
9. Levelling of ground by dumpy level.
10. Contouring, by grid method.
11. Study of advanced special & electronics surveying instrument.
12. Determine the magnitude of resultant force using Law of Polygon of forces and compare the result with Analytical and Graphical method.
13. Determine the coefficient of friction between the two given surfaces and find the weight of box.
14. Find the coefficient of friction between drum and cord.
15. Determine the Modulus of Elasticity of mild steel and timber using simply supported.
16. Determine the Modulus of Elasticity of mild steel and timber using cantilever beam.
17. Determine the Moments of inertia of a fly wheel.
18. Find the forces in the-members of a Simple Jib Crane and compare them with Analytical and Graphical method.
19. Find the forces in the-members of a Simple roof truss and compare them with Analytical and Graphical method.
20. Determine the bending moment at a given section of simply supported been and verify it analytically.



B.TECH. I SEMESTER SET-B (CE, ME, CS)

BASIC COMPUTER ENGINEERING

Course	Subject Title	Subject Code	Grade for End Sem.		CGPA at the end of every even semester
			T	P	
B.E.	Basic Computer Engineering	BT2005	Min. "D"	Min. "D"	5.0

Program outcomes:

1. Students will learn the concept of fundamentals of Computer, compiler and assembler and operating systems, Algorithm & Clown chart.
2. Students will learn the concept of CH, character set identifiers and keywords, data type & sizes, variable names, declaration. Statements.
3. Students will learn the concept of Arithm&ie operators, relational and logical operators,. type; conversion, Standard **input** and output, forinatted output and input
4. Students will learn the concept of Flow of Control and.propram Structures
5. Students will learn the concept of Arrays, Pointers, Structures Union and Files
6. Students will get the knowledge of object .oriented programming and its properties
7. Students will get the knowledge of OOP and other conventional programming paradigms.
8. Students will get the concepts of DBMS, Data Models(likc 1..:,ntity Relationship Model, relational Databases)
9. Students will get the concepts of Data communication and Networking, Reference models
10. Students will get the concepts of Operating system, advantage and disadvantage of OS

Unit-I:

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.

Unit-II:

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.

Unit-III:

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.

Unit-IV:

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.

Unit-V:

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()

Reference Books:

1. C Programming Language by Karnighan & Ritchie, TMH publications.
2. Let us 'C' by Yashwant kanetkar, BPB publications
3. Fundamentals of Computers by E Balagurusamy, TMH publications.

BASIC COMPUTER ENGINEERING

List of Experiment:

1. Write a program for addition of 2 numbers.
2. Write a program to find greatest among 3 numbers.
3. Write a program to find whether the given number is even or odd.
4. Write a program to find sum of n numbers entered by user using for loop, while loop and do while loop.
5. Write a program to print the prime numbers between 1 to n.
6. Write a program to print following pattern

I.

```
*
* *
* * *
* * * *
```

II.

```
        *
      *   *
    *   *   *
  *   *   *   *
```

III.

```
        1
      1   2
    1   2   3
  1   2   3   4
```

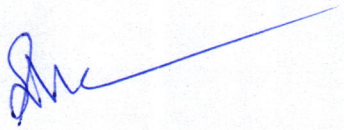
7. Write a program to generate Fibonacci series up to n.
8. Write a program to convert decimal number into binary number.
9. Write a program to convert binary number into decimal number.
10. Write a program to implement basic calculator using switch case (the calculator should provide the user with the choice to press the desired operator such as +, -, *, / and % to perform the operations)
11. Write a program to show the use of break and continue statements.
12. Write a program to perform addition of two matrices.
13. Write a program to perform multiplication of two matrices.
14. Write a program to create functions to find area of a rectangle, a square, a right triangle and a circle.
15. Write a program to perform addition of two matrices by creating functions for the input, output and addition of two matrices.
16. Write a program to interchange the values of two variables using a swap function (call by address).

17. Write a program to create functions to perform following string operation:
   a. Find length of string
   b. To reverse a string.
   c. To concatenate two string.

18. Write a program for generating Armstrong number.

19. Write a program to demonstrate the use of following Dynamic memory allocation function :-
   a) Mal loc.
   b) Cal loc.
   c) Real loc.
   d) Free.

20. Write a program to generate student mark-sheet using structure.



B.TECH. I SEMESTER SET-B (CE, ME, CS)

LANGUAGE LAB

Course	Subject Title	Subject Code	Grade for End Sem.		CGPA at the end of every even semester
			T	P	
B.E.	Language Lab	BT2006	Min. "D"	Min. "D"	5.0

Course Content:

Public Speaking and oral skills with emphasis on conversational practice, Role plays, extempore speech, describing objects and situations, reading aloud the various genres of English, recitation of poems, dialogue delivery(reading material to be selected by the teacher)

Book review:

Oral and written review of any two novel/play- a brief written analysis including summary and appreciation- oral presentation of the novel in the class.One Seminar and two group discussions Learning English through dramas