

Academic Year: 2015-16

**1. FIRST YEAR B.Tech. Sem. I & II  
(CIVIL /MECHANICAL /ELECTRICAL)  
ACADEMIC SCHEME AND SYLLABUS  
Year 2015-16**

**Academic Year: 2015-16**

<b>Scheme for First Year B.Tech. in Civil Engineering (Semester - I): Academic year: 2015-16</b>													
Sr. No.	Subject	Code	Course Plan for Each Week (Hrs)			Credits	Evaluation (Marks)					Total Marks	
			Lectures	Laboratory	Tutorial		Test 1	Test 2	End Semester		End Semester Weightage (%)		In Semester Evaluation
									Marks	Duration (Hrs)			
1	Engineering Mathematics-I	BT101	4	--	--	4	20	20	100	3	60	-	100
2	Basic Electrical and Electronics-I	BT102	3	-	--	3	20	20	100	3	60	--	100
3	Engineering Graphics-I	BT103	3	-	2	4	20	20	100	3	60	25	125
4	Engineering Mechanics-I	BT104	3	-	--	3	20	20	100	3	60	--	100
5	Applied Physics-I	BT105	2	--	--	2	20	20	75	3	60	--	85
6	Applied Chemistry-I	BT106	2	-	--	2	20	20	75	3	60	--	85
7	Communication Skills	BT107	2	--	2*	3	20	20	100	3	60	25	125
Laboratory													
8	Basic Electrical and Electronics-I (Lab.)	BT152	-	2	-	1	--	--	--	--	--	25 <sup>#</sup>	25 <sup>#</sup>
9	Engineering Mechanics-I (Lab.)	BT154	-	2	-	1	--	--	--	--	--	25 <sup>#</sup>	25 <sup>#</sup>
10	Applied Physics-I (Lab.)	BT155	--	2*	--	1	--	--	--	--	--	15 <sup>#</sup>	15 <sup>#</sup>
11	Applied Chemistry-I (Lab.)	BT156	--	2*	-	1	--	--	--	--	--	15 <sup>#</sup>	15 <sup>#</sup>
12	Workshop Practice-I	BT199	--	3	--	2	--	--	--	--	--	50 <sup>#</sup>	50 <sup>#</sup>
<b>Total</b>			<b>19</b>	<b>11</b>	<b>4</b>	<b>27</b>	<b>140</b>	<b>140</b>	<b>---</b>	<b>---</b>		<b>180</b>	<b>850</b>

**Academic Year: 2015-16**

1. Test 1, Test 2 and End semester weightage marks will be added and shown as the theory marks in the mark sheet. Duration of Test 1, Test 2 is of 1 hour.
2. For passing in theory subjects, Student must secure minimum 40% marks in each subject with all heads of passing taken together and minimum 40% marks in the end semester examination
3. Laboratory work is considered as separate head and student must secure 40 % of marks for passing.
4. # Assessment criteria for laboratory/Tutorial work. i.e. weightage for assessment shall be as follows:
  - (i) Attendance in Laboratory/Tutorial = 20%,
  - (ii) Journal/Drawing sheet/Sketch book = 40%,
  - (iii) MCQ/Oral/Test = 40%.
5. \* Laboratory/Tutorials of these subjects will be held on alternate weeks.

**Academic Year: 2015-16**

<b>Scheme for First Year B.Tech. in Civil Engineering (Semester – II): Academic year 2015-16</b>													
Sr. No.	Subject	Code	Course Plan for Each Week (Hrs)			Credits	Evaluation (Marks)					Total	
			Lectures	Laboratory	Tutorial		Test 1	Test 2	End Semester		End Semester Weightage (%)		In Semester Evaluation
									Marks	Duration (Hrs)			
1	Engineering Mathematics-II	BT201	4	---	---	4	20	20	100	3	60	--	100
2	Basic Electrical and Electronics-II	BT202	3	--	---	3	20	20	100	3	60	--	100
3	Engineering Graphics-II	BT203	1	--	--	3	20	20	100	3	60	--	100
4	Engineering Mechanics-II	BT204	3	--	---	3	20	20	100	3	60	--	100
5	Applied Physics-II	BT205	2	---	--	2	20	20	75	3	60	--	85
6	Applied Chemistry-II	BT206	2	---	---	2	20	20	75	3	60	--	85
7	Computer Programming	BT207	4	--	---	4	20	20	100	3	60	--	100
Laboratory													
8	Basic Electrical and Electronics-II (Lab.)	BT252	--	2	--	1	--	--	--	--	--	25 <sup>#</sup>	25 <sup>#</sup>
9	Engineering Graphics-II (Lab.)	BT253	--	2	--	1	--	--	--	--	--	25 <sup>#</sup>	25 <sup>#</sup>
10	Applied Physics-II	BT255	--	2*	--	1	--	--	--	--	--	15 <sup>#</sup>	15 <sup>#</sup>
11	Applied Chemistry-II	BT256	--	2*	--	1	--	--	--	--	--	15 <sup>#</sup>	15 <sup>#</sup>
12	Computer Programming	BT257	--	2	--	1	--	--	--	--	--	25 <sup>#</sup>	25 <sup>#</sup>
13	Workshop Practice-II	BT299	---	3	---	2	---	---	---	---	---	50 <sup>#</sup>	50 <sup>#</sup>
<b>Total</b>			<b>19</b>	<b>11</b>	<b>2</b>	<b>28</b>	<b>140</b>	<b>140</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>155</b>	<b>825</b>

**Academic Year: 2015-16**

1. Test 1, Test 2 and End semester weightage marks will be added and shown as the theory marks in the mark sheet. Duration of Test 1, Test 2 is of 1 hour.
2. For passing in theory subjects, Student must secure minimum 40% marks in each subject with all heads of passing taken together and minimum 40% marks in the end semester examination
3. Laboratory work is considered as separate head and student must secure 40 % of marks for passing.
4. # Assessment criteria for laboratory/Tutorial work. i.e. weightage for assessment shall be as follows:
  - (i) Attendance in Laboratory/Tutorial = 20%,
  - (ii) Journal/Drawing sheet/Sketch book = 40%,
  - (iii) MCQ/Oral/Test = 40%.
5. \* Laboratory/Tutorials of these subjects will be held on alternate weeks.

<b>SEMESTER-I</b>	<b>CLASS: F.Y.B.Tech. (Civil/Mechanical/Electrical)</b>		
<b>CODE: BT101</b>	<b>SUBJECT: Engineering Mathematics –I</b>		
Period per week (each of 60 minutes)	Lecture	04	
	Laboratory	---	
	Tutorial	---	
Evaluation system		Hours	Marks
	In Semester	01	20 X 02
	End Semester*	03	100
	Practical	---	---
	Laboratory Work (Journal)	---	---
	<b>TOTAL</b>	<b>---</b>	<b>100</b>

\* 60% Weightage for end semester

### Course Objectives

1. Introduce differential calculus
2. Introduce partial derivatives and its applications to find maxima and minima, errors and approximations.
3. Introduce complex numbers and its applications to find roots of equations.
4. Introduce Vector Calculus

### Course Outcomes

Upon successful completion of the course, students should be able to

1. Find  $n^{\text{th}}$  order derivative of functions and product of functions.
2. Find expansions of functions.
3. Calculate partial derivatives of functions of more than one variable.
4. Roots of algebraic equations using complex numbers.
5. Angle between surfaces. Scalar potential using Vector Calculus

### Detailed Syllabus:

Module No.	Details	Hrs.
1	<b>Differential Calculus</b> 1.1. Successive differentiations, $n^{\text{th}}$ -derivative of Exponential, Trigonometric & Algebraic functions. Leibnitz's theorem (without proof) 1.2. Expansion of functions, Taylor's series, Maclaurin's series & Examples.	9

2	2.1 Indeterminate forms $\frac{0}{0}$ , $\frac{\infty}{\infty}$ , $0 \times \infty$ , $\infty - \infty$ , $1^\infty$ , $0^0$ , $\infty^0$ L' Hospital rule 2.2 Evaluation of limits using expansions of functions	5
3	<b>Partial Differentiations</b> 3.1 Partial differentiation, Differentiation of Composite & Implicit functions. 3.2 Euler's theorem on Homogeneous function with two & three Independent variables (with proof), Deductions from Euler's theorem.	9
4	4,1 Errors & approximations, 4.2 Maxima & Minima of a function of two independent variables, Lagrange's method of undetermined multipliers with one constraint	5
5	<b>Complex Numbers</b> 5.1 Complex Numbers. Cartesian, Polar and exponential form of complex numbers. De- Moivre's Theorem 5.2 Expansion of $\sin(n\theta)$ , $\cos(n\theta)$ in terms of powers of $\sin\theta$ and $\cos\theta$ . Expansion of $\sin^n\theta$ , $\cos^n\theta$ in terms of $\sin(n\theta)$ , $\cos(n\theta)$	6
6	6.1 Circular and Hyperbolic functions. Inverse Circular and Inverse Hyperbolic functions. 6.2 Logarithmic functions, Roots of complex numbers	10
7	<b>Vector differentiation</b> 7.1 Scalar and vector point functions 7.2 Gradient, Divergence and curl, Solenoidal and Irrotational Vector Field .Properties of divergence curl gradient. Directional derivative, angle between surfaces	4

**Recommended Books:-**

1. Erwin Kreyszig (2010), "Advanced Engineering Mathematics" Wiley Eastern Limited, Singapore 10<sup>th</sup> edition, ISBN 0470458365, 1280 Pages
2. Shanti Narayan (2005), "Differential Calculus", S.Chand Publications, 30<sup>th</sup> Edition, ISBN 8121904714, 572 Pages
3. B S Grewal (2013), "Higher Engineering Mathematics", Khanna Publications, 43<sup>rd</sup> Edition, ISBN 8174091955, 1312 Pages

Sr. No.	Examination	Module
1	T-1	Module 1 & 2
2	T-2	Module 3 & 4
3	End Semester	Module 1 to 7

<b>SEMESTER-I</b>	<b>CLASS: F.Y.B.Tech. (Civil/Mechanical/Electrical)</b>		
<b>CODE: BT102</b>	<b>SUBJECT: Basic Electrical and Electronics I</b>		
Period per week (each of 60 minutes)	Lecture	03	
	Laboratory	---	
	Tutorial	---	
Evaluation system		Hours	Marks
	In Semester	01	20*2
	End Semester*	03	100 X 01
	Practical	---	---
	Laboratory Work (Journal)	---	---
	<b>TOTAL</b>	<b>---</b>	<b>100</b>

\*60% Weightage for end semester

**Course Objectives:**

1. Introduction to D.C. and A.C. circuits.
2. Study of Three phase circuits..
3. Introduction to single phase transformer, electrical motors, meters..

**Course Outcomes:**

1. Able to use various theorems and analyze D.C. circuits.
2. Aware of the electrical machines and meters.
3. Able to analyze A.C. circuits.

**Detailed Syllabus:**

Module	Details	Hrs.
1.	<b>D.C. circuits :( Only independent sources)</b> Voltage divider rule, current divider rule, power dissipation in resistance, Star delta transformation, Mesh and nodal analysis, source transformation.	04
2.	<b>D.C. Circuits Theorems:</b> Superposition, Thevenin's, Norton's and Maximum power transfer theorems.	06
3.	<b>A.C. Circuits:</b> A.C. through resistance, inductance and capacitance, R-L, R-C, R-L-C series and parallel circuits, phasor diagrams, power and power factor. Problems by analytical as well as graphical methods.	07
4.	<b>Three Phase Circuits:</b> Three phase voltage and current generation, star and delta connections(Balanced load), Relationship between phase and line current and voltages, phasor diagrams, Measurement of power by two wattmeter method Problems by analytical as well as graphical methods.	07
5.	<b>Single Phase Transformer:</b> Construction, working principal, Emf equation, Ideal and practical transformer, phasor diagrams, Equivalent circuit, O.C. and S.C. test, efficiency and regulation, All day efficiency.	05
6.	<b>Electrical Motors (No numerical expected):</b> D.C. Motors: construction, working principal, Characteristics, emf equation, A.C. Motors: Rotating magnetic field theory, 3- $\phi$ Induction Motor. Single phase induction motor: Construction, working principal, double field revolving theory, split phase and capacitor start motors.	05
7.	<b>Study of Meters:</b> Study of Tachometer, voltmeter, ammeter, multi-meter, wattmeter etc.	02

**Recommended Books:-**

1. Vincent Deltoro (1986), 'Electrical Engineering fundamentals', Pearson Education, 2<sup>nd</sup> Edition New Delhi, ISBN 0132471310, 896 Pages
2. Mittle and Mittle (2005), 'Basic Electrical Engineering', Tata McGraw Hill, New Delhi, 2<sup>nd</sup> Edition, ISBN 0070593574
3. Joseph A. Edminster (1965), 'Electrical Circuits', Tata McGraw Hill, New Delhi, 4<sup>th</sup> Edition, ISBN 0070189749
4. H. Cotton (2011), 'Advanced Electrical Technology', Wheeler Publication, Alahabad, ISBN 8190630717, 1293 Pages
5. L.J. Nagrath and D.P. Kothari (2004), 'Electrical Machines ', Tata McGraw Hill, New Delhi, ISBN 0070583773, 834 Pages

<b>Sr. No.</b>	<b>Examination</b>	<b>Module</b>
1	T-1	Module 1 and 2
2	T-2	Module 3 ,4and 5
3	Final Examination	1 To 7

<b>SEMESTER-I</b>	<b>CLASS: F.Y.B.Tech. (Civil/Mechanical/Electrical)</b>		
<b>CODE: BT103</b>	<b>SUBJECT: Engineering Graphics-I</b>		
Period per week (each of 60 minutes)	Lecture	03	
	Laboratory	---	
	Tutorial	02 per batch	
Evaluation system		Hours	Marks
	In Semester	01	20 X 02
	End Semester*	03	100
	Practical	---	---
	Tutorial/Journal	---	25
	<b>TOTAL</b>		<b>125</b>

\* 60% Weightage for end semester

# Assessment criteria for laboratory/Tutorial work. i.e. weightage for assessment shall be as follows:

- (i) Attendance in Laboratory/Tutorial = 20%,
- (ii) Journal/Drawing sheet/Sketch book = 40%,
- (iii) MCQ/Oral/Test = 40%.

#### Course Objectives:

1. To understand the fundamental principles of solid geometry, this is the base of engineering Graphics.
2. To understand the concepts of projections of an object and various ways of projection for visualization of various engineering parts and components.
3. To develop competence in correct expression of the visualized objects.
4. To develop competence in use of Autocad as an effective tool for Engineering Graphics.
5. To provide an insight of the technical drawing.

#### Course Outcome:

1. Student will have thorough knowledge and understanding of the subject of Engineering Graphics and also will develop adequate competence in visualization, interpretation and expression of drawing of engineering parts and objects.

#### Detailed Syllabus:

<b>Module No.</b>	<b>Details</b>	<b>Hrs.</b>
1	Engineering Curves: Conics-Parabola, Ellipse, Hyperbola. Involutives, Cycloidal Curves: Cycloid, Epicycloid, Hypocycloid. Spirals, Helix.	07
2	Projection of points&lines inclined to both the reference planes. HT, VT. Applications and Problems on them	06
3	Loci of points, simple mechanisms such as slider crank mechanism, four bar mechanism etc.	03
4	Projection of Planes inclined to both the Reference Planes	05
5	Projection of Right regular Solids: Regular Polyhedrons (Tetrahedron), Prisms, Pyramids, Cylinders, Cones inclined to both the Reference Planes.	07

6	Sections of solids cut by inclined planes.	07
7	Development of Lateral surfaces of solids cut by inclined plane and curved plane	07

**Termwork:**

Term work shall comprise of total five A2 size drawing sheets consisting of 2 to 3 problems on each module and class assignments. The class assignments and each drawing sheet shall have equal weightage in termwork marks.

**Recommended Books:-**

1. N.D.Bhatt (2011), 'Elementary Engineering Drawing', Charotar Publishing House, ISBN 9380358172, 728 Pages
2. M.L.Dabhade (2004), 'Engineering Graphics', Association of Technical Authors, ISBN 8187575751, 772 Pages
3. M.B.Shah&B.C.Rana (2009), 'Engineering Drawing', Pearson Education 2<sup>nd</sup> Edition, ISBN 8131710564, 580 Pages
4. T.Jeyapovan (2010), 'Engineering Drawing and Graphics, Vikas Publishing House Pvt. Ltd. 3<sup>rd</sup> Edition, ISBN 8125940006, 712 Pages
5. K.Venugopal (2007), 'Engineering Drawing and Graphics', New Age International Publishers, ISBN 8122415458, 410 Pages
6. K.L.Narayana&P.Kannaiah (1988), 'Engineering Graphics', Tata McGraw-Hill Co .Ltd., New Delhi, ISBN 0074517902, 544 Pages
7. Giesecke, Mitchell, Spencer & Hill (2011), 'Technical Drawing', Macmillan Publishing Co. Inc. 14<sup>th</sup> Edition, ISBN 0135090490, 936 Pages
8. Warren H .Luzadder (1976) , 'Fundamentals of Engineering Drawing', Prentice Hall of India Pvt.Ltd., New Delhi 7<sup>th</sup> Edition, ISBN 0133383687, 620 Pages

Sr. No.	Examination	Module
1	T-1	Module 1 and 2
2	T-2	Module 3 and 4
3	Final Examination	Module 1 to 7

<b>SEMESTER-I</b>	<b>CLASS: F.Y.B.Tech. (Civil/Mechanical/Electrical)</b>		
<b>CODE: BT104</b>	<b>SUBJECT: Engineering Mechanics-I</b>		
Period per week (each of 60 minutes)	Lecture	03	
	Laboratory	---	
	Tutorial	---	
Evaluation system		Hours	Marks
	In Semester	01	20 X 02
	End Semester*	03	100
	Practical	---	---
	Laboratory Work (Journal)	---	---
	<b>TOTAL</b>		<b>100</b>

\* 60% Weightage for end semester

**Course Objectives:**

The main objectives of the course are

- To introduce the students to the principles and methods of statics (mechanics), and to apply those fundamentals to solve the problems on statics.
- To prepare the base for the students to study other engineering/structural engineering subjects such as Mechanics-II, Strength of Materials, Structural Analysis-I etc. at a later stage.

**Course Outcomes:**

At the end of the course the students shall be able to

- determine the resultant of coplanar and non coplanar system of forces.
- solve the problems involving equilibrium of coplanar and non coplanar system of forces.
- analyse determinate beams using the principle of virtual work.

**Detailed Syllabus:**

Module No.	Details	Hrs.
1	<b>System of Coplanar forces:</b> Introduction to coplanar & non-coplanar force system. Forces and their components. Moment of the force about a point, couple.	02
2	Resultant of coplanar force system - concurrent forces, parallel forces, non-concurrent non-parallel system of forces. Varignon's theorem.	06
3	<b>Equilibrium of coplanar force system:</b> Meaning of equilibrium, free body diagrams, equilibrium of concurrent, parallel and non-concurrent non-parallel (general) system of forces. Types of supports, determination of reactions at supports for various types of determinate beams.	06
4	<b>Forces in space:</b> Rectangular components of forces in space, Resultant of concurrent forces, moment of a force about a point, moment of a force about a given axis, resultant of general force system, Equilibrium of a particle in space.	06
5	<b>Analysis of pin jointed frame / truss:</b> Perfect truss, Imperfect truss, Analysis of truss by method of joints and method of section.	06

6	<b>Friction:</b> Laws of friction, angle of friction, angle of repose, cone of friction, Equilibrium of bodies on rough horizontal and inclined plane, application to problems involving wedges, ladder. Belt friction, flat belts on the flat pulleys.	06
7	<b>Principle of virtual work:</b> Application to determine the reactions of determinate beams with / without internal hinges.	04

**Recommended Books:-**

1. R. C. Hibbeler (2007); "Engineering Mechanics", Pearson Education Inc., ISBN 0132215098, 656 pages
2. B. N. Thadani(1966); "Engineering Mechanics", Asia Publishing House, ISBN 0210269405, 655 pages
3. Beer & Johnson (2013), "Engineering Mechanics", Tata McGraw Hill, ISBN 1259062919, 470 pages
4. F. L. Singer (1975), "Engineering Mechanics", Harper & Row Publication, ISBN 0060462329, 724 pages
5. A. Nelson (2009), "Engineering Mechanics", Tata McGraw Hill, ISBN 0070146143
6. A. K. Tayal (2010), 'Engineering Mechanics', Umesh Publication, ISBN 9380117388
7. Kumar(1956), "Engineering Mechanics", Tata McGraw Hill, ISBN 0070681813, 673 pages
8. Shames (2006), 'Engineering Mechanics', Prentice Hall, India, ISBN 8177581236, 837 pages

Sr. No.	Examination	Module
1	T – I	Module 1, 2 and part of Module 3
2	T – II	Part of Module 3, Module 4 and part of Module 5
3	Final exam	Module 1 to7

<b>SEMESTER-I</b>	<b>CLASS: F.Y.B.Tech. (Civil/Mechanical/Electrical)</b>		
<b>CODE: BT105</b>	<b>SUBJECT: Applied Physics –I</b>		
Period per week (each of 60 minutes)	Lecture	02	
	Laboratory	---	
	Tutorial	---	
Evaluation system		Hours	Marks
	In Semester	01	20 X 02
	End Semester*	03	75
	Practical	---	---
	Laboratory Work (Journal)	---	--
	<b>TOTAL</b>	<b>---</b>	<b>85</b>

\*60% Weightage for end semester

### **APPLIED PHYSICS – I**

#### **Rationale:**

A strong applied sciences programme, that creates a bridge between the sciences and engineering, for first-year students, is a prerequisite for a good engineering programme. This syllabus primarily focuses on the concepts needed for first year engineering students for their further technological studies.

#### **Course Objectives (General)**

1. To extend students' knowledge of Physics in the areas of Engineering.
2. To develop general analytical capabilities those are important and relevant in their higher semesters.
3. To setup theory related laboratory experiments so as to apply his/her theoretical knowledge to a practical situation

#### **Course Objectives:**

1. To understand theory of optical interference and diffraction.
2. To understand principle of working of optical fibers and their application in communication.
3. To understand principle of working of LASERs and study different types of lasers and their applications.
4. To introduce students to Quantum mechanics basic concepts.

#### **Course Outcomes:**

At the end of this course, students will be able to:

1. Understand thin film interference in films of equal thickness and wedge shaped films.
2. Understand essential differences between two diffraction types and Fraunhofer diffraction through single, double and multiple slits.
3. Understand working and construction of optical fibers and their applications in communication.
4. Understand different processes of absorption and emission, principle of working of lasers using stimulated emission, understand pumping of atoms and different pumping schemes and working of different types of lasers.
5. Understand basic differences between Newtonian mechanics and quantum mechanics, wave-particle duality, Heisenberg's uncertainty principle and Schrodinger's equations and applications of these equations.

**Detailed Syllabus:**

Module No.	Details	Hrs.
1	<b>Interference:</b> Interference in thin films- equal thickness and wedge shaped films, Newton's rings. Applications.	6
2	<b>Diffraction:</b> Types of diffraction, Fraunhofer diffraction through a single slit and diffraction grating, grating spectra, resolving power of a grating.	6
3	<b>Fiber optics and Fiber optic communication:</b> Optical fiber: Propagation of light in an optical fiber- TIR, Angle of Acceptance; Numerical Aperture; Types of Fibers; Advantages of Optical Fiber, Applications.	6
4	<b>LASERS:</b> Absorption, spontaneous and stimulated emission, Einstein's coefficients. Terms Associated with Lasers: population inversion, metastable state, pumping and pumping schemes, active medium, and resonant cavity. Ruby laser, He-Ne Laser, semiconductor diode laser. Applications: Holography.	6
5	<b>Quantum Mechanics:</b> Introduction, Wave particle duality, de Broglie wavelength; experimental verification of de Broglie theory; properties of matter waves; wave packet, group velocity and phase velocity; Wave function, Physical interpretation of wave function; Heisenberg's uncertainty principle; Electron diffraction experiment and Gamma ray microscope experiment; Applications of uncertainty principle; Schrodinger's time dependent wave equation, time independent wave equation, Motion of free particle, Particle trapped in one dimensional infinite potential well.	8

**Recommended Books:-**

- Halliday and Resnick (2013), 'Fundamentals of Physics', Wiley Eastern Limited, 10<sup>th</sup> Edition, ISBN 1118230647, 1232 Pages
- Jenkins & White (2001), 'Fundamentals of optics', McGraw-Hill Int., 4<sup>th</sup> Edition, ISBN0072561912, 768 Pages
- Arthur Beiser (2009), 'Concepts of Modern Physics', TataMcGraw Hill, 6<sup>th</sup> Edition, ISBN 0070151555
- K. Thyagarajan and AjoyGhatak (2010), 'Lasers theories and application', Springer, 2<sup>nd</sup> Edition, ISBN 1441964410, 650 Pages
- AjoyGhatak and K Thyagarajan (2006), 'Fiber Optics and LASERs the two revolutions', McMillan India, ISBN 1403930112, 248 Pages
- A.S. Vasudeva (2008), 'Modern Engineering Physics', S. Chand Publications, ISBN 8121917573, 383 Pages
- Kshirsagar and Avadhanulu (1992), 'A textbook of Engineering Physics', S. Chand Publications, ISBN 8121908175, 758 Pages

Sr. No.	Examination	Module
1	T-1	Module 1 and 2
2	T-2	Module 3 and 4
3	Final Examination	Module 1 to 5

<b>SEMESTER-I</b>	<b>CLASS: F.Y.B.Tech. (Civil/Mechanical/Electrical)</b>		
<b>CODE: BT106</b>	<b>SUBJECT: Applied Chemistry –I</b>		
Period per week (each of 60 minutes)	Lecture	02	
	Laboratory	---	
	Tutorial	---	
Evaluation system		Hours	Marks
	In Semester	01	20 X 02
	End Semester*	03	75
	Practical	---	---
	Laboratory Work (Journal)	---	---
	<b>TOTAL</b>	<b>---</b>	<b>85</b>

\*60% Weightage for end semester

### **APPLIED CHEMISTRY – I**

#### **Rationale:**

Applied Chemistry deals with industrial applications, engineering & technologies which are related with the basic need of an individual, society & environment so the students should be aware of the basic fundamental as well as relevant up-dates .

#### **Course Objectives:**

To apply the knowledge of basic science in engineering and technology and also understand the concept of applied chemistry and analyze it with experiments.

#### **Course Outcomes:**

After successful completion of this course, the student will able to :

- 1) Illustrate the basic parameters of water, different water softening processes and effect of hard water in industries.
- 2) Describe the basic properties and application of various polymers as an engineering material.
- 3) Summarize the classification, preparation, properties and application of ferrous alloys.
- 4) Demonstrate the mechanism, physical and chemical properties of lubricants and their applications.

## Detailed Syllabus

Module No.	Details	Hrs.
1.	<p><b>Water:</b>  Hardness of water, types of hardness, units of Hardness, determination of hardness by EDTA method and numerical problems.  Internal treatment of hard water.  External Treatment of hard water by  i) lime soda method with equations in general &amp; Numerical problems.  ii) Zeolite or permutit process &amp; numerical problems.  iii) Ion exchange method.</p>	04
2	<p><b>Water:</b> Desalination of BRACKISH WATER - Reverse osmosis  Ultra filtration and it's industrial applications.  Methods to determine extent of water pollution i) BOD. ii) COD  Chemical Analysis of water with special reference to Total Dissolved Salts-TDS  Methods to control water pollution – activated sludge process for sewage treatment, flow sheet diagram for sewage treatment.</p>	04
3	<p><b>Lubricants:</b>  Definition, classification, functions, characteristic properties of an ideal lubricant with special reference to flash point, fire point, cloud point, pour point, Acid Value, saponification value and numerical problems on acid value &amp; saponification value</p>	04
4	<p><b>Steels</b>  Plain Carbon Steel-Limitations  Introduction to Alloy Steels, Special Steels</p>	02
5	<p><b>Polymers</b>  Conducting-polymers, electrical properties &amp; liquid crystal properties of Polymers.</p>	02
6	<p><b>Energy:</b>  Classification of sources of energy-Renewable(Non-Conventional) &amp; Non-Renewable Or(Conventional) Energy Sources, Biomass Energy, Solar Energy-production of electricity using solar energy with schematic diagrams.  Hydrogen as a fuel, fuel cells. Rechargeable alkaline storage Batteries-Nickel Hydrogen Batteries, Rechargeable Lithium ion Batteries (Diagram, charging, discharging reactions, advantage &amp; applications).</p>	04
7	<p><b>Nano –Materials:</b>  Graphite, Fullerenes, Carbon Nanotubes, Nanowires, Nanocones  Haeckelites-structure &amp; their electronic and mechanical properties  Applications of Nanomaterials in – i) Medicine ii) Catalysis  iii) Environmental Technologies iv) Electronics &amp; related fields  v) Mechanics</p>	04

**Recommended Books:-**

1. P.C.Jain& Monica Jain (2004), 'Engineering Chemistry', DhanpatRai publishing company Pvt. Ltd, 15<sup>th</sup> Edition, ISBN 8187433175, 1288 Pages
2. S. S. Dara&Dara (1986), 'Engineering Chemistry', S. Chand & Company Ltd, 12<sup>th</sup> Edition, ISBN 8121903599, 992 Pages
3. Emil Roduner (2006), 'Nano Scopic Materials', RSC Publishing, ISBN 0854048571, 285 Pages
4. VasantGowarikar (1986), 'Polymer science', New Age International Pvt Ltd, ISBN 0852263074, 505 Pages
5. Cotlon (1994), 'Basic Inorganic Chemistry', Wiley India, 3<sup>rd</sup> Edition, ISBN 0471505323, 856 Pages
6. O.P. Khanna (2010), 'Material Science for engineering students', DhanpatRai, Publications (p) Ltd., ISBN 8189928317, 1179 Pages

<b>Sr. No.</b>	<b>Examination</b>	<b>Module</b>
1	T-1	Module 1 and 2
2	T-2	Module 3 ,4and 5
3	Final Examination	All Module

<b>SEMESTER-I</b>	<b>CLASS: F.Y.B.Tech. (Civil/Mechanical/Electrical)</b>		
<b>CODE: BT107</b>	<b>SUBJECT: Communication Skills</b>		
Period per week (each of 60 minutes)	Lecture	02	
	Laboratory	---	
	Tutorial	02 per batch	
Evaluation system		Hours	Marks
	In Semester	01	20 X 02
	End Semester*	03	100
	Practical	---	---
	Tutorial/Journal	---	25
	<b>TOTAL</b>		<b>125</b>

\*60% Weightage for end semester

# Assessment criteria for laboratory/Tutorial work. i.e. weightage for assessment shall be as follows:

- (i) Attendance in Laboratory/Tutorial = 20%,
- (ii) Journal/Drawing sheet/Sketch book = 40%,
- (iii) MCQ/Oral/Test = 40%.

#### **Rationale:**

Language is the most commonly used and effective medium of self-expression in all spheres of human life, personal, social and professional. A student must have a fair knowledge of English language and be able to pursue the present course of study and further handle jobs in industry. The focus of this course is to assist the students entering the technical field to acquire proficiency both in the spoken and the written language.

#### **Course Objectives:**

1. To maintain good linguistic competence through accuracy in pronunciation, stress, word accent, intonation and grammar and vocabulary.
2. To increase students' ability to improve and utilize the skills necessary to be a competent interpersonal communicator, increase the students understanding of his or her own communication behavior and that of others.
3. To acquire strategic competence to use spoken and written language in a wide range of communication strategies and respond appropriately in different socio-cultural and professional contexts.

#### **Course Outcome:**

1. To familiarize students with business writing of organizations, communication skills and develop in them an ability to critically analyze them and use the spoken and written language proficiently.
2. To help students cultivate the habit of reading passages and improving their reading skills and, comprehension, inferring meanings and summarizing.
3. To provide an insight into the understanding of technical writing, and develop necessary skills for understanding and adapting the corporate culture and be able to communicate effectively in all circumstances.

**Detailed Syllabus:**

<b>Module No.</b>	<b>Details</b>	<b>Hrs.</b>
01	<b>Vocabulary Building:</b> Synonyms and Antonyms, One-word substitutes,	02
02	<b>Techniques to improve communication:</b> 2.1. Reading Skills - Reading, comprehending, scanning, skimming, inferring meanings from contexts. 2.2. Speaking Skills - Voice Modulation, Good Pronunciation,-Speaking without Fear, -Extempore & Prepared Speaking, role play in different situations. 2.3. Listening Skills - Barriers to Listening, Listening & Note Making. 2.4. Writing Skills - Effective Sentences& Paragraphs,-Summarizing. The 7 C's of effective writing.	06
03	<b>Communication theory:</b> Meaning, Definitions, components, objectives, Importance of communication in a business organization. Barriers to communication, Methods of communication,	06
04	<b>Business Correspondence:</b> Principles of correspondence, Language, Style, Types of formats-3, Types of letters: Request letters, Enquiry and Reply, Complaint and Adjustments.	06
05	Modern means of Communication: Video conferencing, Netiquette	01
06	<b>Technical Writing:</b> Types of Exposition, Description of an Object, Explanation of a Process, Giving Instructions.	02
07.	<b>How to present effective speeches.</b> Talk power program.	01

**List of Tutorial:**

1. 2 assignments on vocabulary topics
2. 3 assignments on techniques to improve communication
3. 1 Practical session through self-introductory speeches
4. 3 assignments on Communication Theory
5. 4 assignments on Business Correspondence
6. 2 assignments on Technical Writing
7. 2 practical sessions on speech
8. 2 class test based on all the topics

**Recommended Books:-**

1. R.C Sharma and Krishna Mohan (2002), 'Business Correspondence and Report Writing', Tata McGraw Hill Publications 3<sup>rd</sup> Edition, ISBN 0070445559, 431 Pages
2. Meenakshi Raman and Prakash Singh (2006), 'Business Communication', Oxford University Press 1<sup>st</sup> Edition, ISBN 0195676955, 624 Pages
3. Dr. Meenakshi Raman and Dr. Sangeeta Sharma (2004) , 'Communication Skills', Oxford University Press 3<sup>rd</sup> Edition, ISBN 0195668049, 599 Pages
4. RaiUrmila, Rai S.M.(2008), 'Business Communication', Himalaya Publishing house, ISBN 9350245712, 219 Pages
5. K KSinha (2006), 'Business Communication', ISBN 8185989362, 606 Pages
6. Kitty O Locker, Stephen KyoKaczmarek (2010), 'Business Communication: Building Critical Skills', McGraw Hill, 5<sup>th</sup> Edition, , ISBN 0073403156, 576 Pages

<b>Sr. No.</b>	<b>Examination</b>	<b>Module</b>
1	T – I	Module 1 & 2
2	T – II	Module 3 & 4
3	Final exam	All: Module 1 to 7

<b>SEMESTER-I</b>	<b>CLASS: F.Y.B.Tech. (Civil/Mechanical/Electrical)</b>		
<b>CODE: BT152</b>	<b>SUBJECT: Basic Electrical and Electronics I</b>		
Period per week (each of 60 minutes)	Lecture	-	
	Laboratory	02 per batch	
	Tutorial	---	
Evaluation system		Hours	Marks
	In Semester		
	End Semester*		
	Practical		
	Laboratory Work (Journal)	02	25
	<b>TOTAL</b>	<b>---</b>	<b>25</b>

# Assessment criteria for laboratory/Tutorial work. i.e. weightage for assessment shall be as follows:

- (i) Attendance in Laboratory/Tutorial = 20%,
- (ii) Journal/Drawing sheet/Sketch book = 40%,
- (iii) MCQ/Oral/Test = 40%.

**List of Experiments:**

**Demonstration Experiments:**

1. Relationships between phase and line current and voltages in a three phase system (star and delta)
2. Power and phase measurement in a three phase system by two wattmeter method.
3. Study of meters (Tachometer, voltmeter, ammeter, multi-meter, wattmeter etc.)
4. D.C. Motor characteristics (Series and Shunt).

**Experiments to be performed:**

1. Mesh and Node analysis.
2. Superposition Theorem.
3. Maximum power transfer theorem (Thevenin and Norton)
4. R-L circuits
5. R-C circuits
6. Load test on a single phase transformer by direct loading
7. O.C. and S.C. test on a single phase transformer.

**Note:** Practical examination will be as follows:

Attendance 20%, Practical performed during semester and graded Journals 40%,  
Practical/Mini Project 40%

<b>SEMESTER-I</b>	<b>CLASS: F.Y.B.Tech. (Civil/Mechanical/Electrical)</b>		
<b>CODE: BT154</b>	<b>SUBJECT: Engineering Mechanics-I</b>		
Period per week (each of 60 minutes)	Lecture	-	
	Laboratory	02 per batch	
	Tutorial	---	
Evaluation system		Hours	Marks
	In Semester	-	-
	End Semester*	-	-
	Practical	---	---
	Laboratory Work (Journal)	---02-----	25
	<b>TOTAL</b>		<b>25</b>

**Course Objectives:**

The main objectives of the course are

- To introduce the students to the experimental methods to verify the principles and methods of statics (mechanics).

**Course Outcomes:**

At the end of the course the students shall be able to

- Experimentally verify the principles of statics (mechanics).

**# Assessment criteria for laboratory/Tutorial work. i.e. weightage for assessment shall be as follows:**

- Attendance in Laboratory/Tutorial = 20%,
- Journal/Drawing sheet/Sketch book = 40%,
- MCQ/Oral/Test = 40%.

**List of Experiments:**

1. To find reactions of simply supported beam (Parallel force system)
2. To verify polygon law of forces (Concurrent force system)
3. To verify Lami's theorem using simple jib crane
4. Equilibrium of non-concurrent non parallel force system
5. To verify moment equilibrium condition using bell crank lever
6. To determine coefficient of friction using friction plane
7. To determine coefficient of friction using angle of repose method

<b>SEMESTER-I</b>	<b>CLASS: F.Y.B.Tech. (Civil/Mechanical/Electrical)</b>		
<b>CODE: BT155</b>	<b>SUBJECT: Applied Physics –I</b>		
Period per week (each of 60 minutes)	Lecture	-	
	Laboratory	12 per batch	
	Tutorial	---	
Evaluation system		Hours	Marks
	In Semester	-	-
	End Semester*	-	-
	Practical	---	---
	Laboratory Work (Journal)	---	15
	<b>TOTAL</b>	---	<b>15</b>

# Assessment criteria for laboratory/Tutorial work. i.e. weightage for assessment shall be as follows:

- (i) Attendance in Laboratory/Tutorial = 20%,
- (ii) Journal/Drawing sheet/Sketch book = 40%,
- (iii) MCQ/Oral/Test = 40%.

**List of Experiments: (Minimum 5 to be performed)**

1. Wedge shaped films: to find the wedge angle and thickness of paper.
2. Newton's rings: to find radius of curvature of given lens.
3. Spectrometer: to find wavelength of mercury spectrum/grating element using diffraction grating.
4. Ultrasonic interferometer: to find velocity of sound in a given liquid.
5. Ultrasonic distance meter: to find carpet area and volume of the room using ultrasonic distance meter.
6. He-Ne laser: to find grating element of diffraction grating/wavelength of He-Ne laser.
7. Optical fiber: to find numerical aperture of optical fiber/ Fiber optic communication

<b>SEMESTER-I</b>	<b>CLASS: F.Y.B.Tech. (Civil/Mechanical/Electrical)</b>		
<b>CODE: BT156</b>	<b>SUBJECT: Applied Chemistry –I</b>		
Period per week (each of 60 minutes)	Lecture	---	
	Laboratory	01 per batch	
	Tutorial	---	
Evaluation system		Hours	Marks
	In Semester	---	---
	End Semester*	---	---
	Practical	---	---
	Laboratory Work (Journal)	---	15
	<b>TOTAL</b>	---	<b>15</b>

# Assessment criteria for laboratory/Tutorial work. i.e. weightage for assessment shall be as follows:

- (i) Attendance in Laboratory/Tutorial = 20%,
- (ii) Journal/Drawing sheet/Sketch book = 40%,
- (iii) MCQ/Oral/Test = 40%.

**LIST OF EXPERIMENTS-(Minimum 5 to be performed)**

1. To Determine Total, Temporary & Permanent hardness of water sample.
2. Removal of hardness of water by Ion-Exchange Column.
3. To Determine COD of an effluent sample.
4. CO<sub>2</sub> from air by Orsat's method.
5. To Determine Acid-Value of the given Lubricating Oil.
6. To Determine Saponification-Value of the given Lubricating Oil.
7. To Determine Flash-Point/Fire-Point of lubricating oil
8. To determine the conductance of the polymer.
9. To Determine Melting Point/Glass Transition Temperature of a polymer.
10. To prepare Nano-Oxide using combustion method.

<b>SEMESTER-I</b>	<b>CLASS: F.Y.B.Tech. (Civil/Mechanical/Electrical)</b>		
<b>CODE: BT199</b>	<b>SUBJECT: Workshop - I</b>		
Period per week (each of 60 minutes)	Lecture	---	
	Laboratory	03 per batch	
	Tutorial	---	
Evaluation system		Hours	Marks
	In Semester	---	---
	End Semester	---	---
	Practical	---	---
	Laboratory Work (Journal)	---	50
	<b>TOTAL</b>		<b>50</b>

\*60% Weightage for end semester

# Assessment criteria for laboratory/Tutorial work. i.e. weightage for assessment shall be as follows:

- (i) Attendance in Laboratory/Tutorial = 20%,
- (ii) Journal/Drawing sheet/Sketch book = 40%,
- (iii) MCQ/Oral/Test = 40%.

**Rationale:**

Workshop forms not an indispensable part of any industry. An engineer working in field must have thorough knowledge of various tools, machines, devices used in engineering practice for creating objects from material. The students of engineering discipline must be conversant with the various operations performed on materials for producing desired shapes with comprehensive knowledge of working principles of machine tools, use of tools and devices with their effective use and application. Basic Workshop Practice is a practical subject which emphasizes on laying basic foundation for an engineering student.

**Course Objectives:**

1. To impart knowledge to students to develop their technical skill sets for creating entities from raw material.
2. To give “hands on” training and practice to students for use of various tools, devices, machines.
3. To develop ability of students to understand, plan and implement various processes and operations to be performed on the raw material to create object of desired shape and size.
4. To give exposure to inter disciplinary domains.

**Course Outcome:**

1. Thorough knowledge of various tools, machines, devices used in engineering practice for creating objects from material.

2. Thorough knowledge of carrying out various operations in basic engineering shops
3. Ability of interpretation of job drawing, application of processes and operations to produce basic components from raw material.

**Detailed Syllabus:**

Module No.	Details	Hrs.
01	Fitting (Compulsory):- <ul style="list-style-type: none"> <li>• Use and settings of fitting hand tools for marking, chipping, cutting, filing, centre punching, hammering, drilling, tapping.</li> <li>• Term work to include one job:- Male –female joint involving above operations.</li> </ul>	12
02	Carpentry (Compulsory):- <ul style="list-style-type: none"> <li>• Use and setting of carpentry hand tools like hacksaws, jackplanes, chisels and gauges for construction of various joints. Term work to include one job involving a use of tools and operations:- Half Check joint.</li> </ul>	12
03	Carpentry (Demonstration):- <ul style="list-style-type: none"> <li>• Wood turning Demonstration.</li> </ul>	03
04	Forging / Smithy (Demonstration):- <ul style="list-style-type: none"> <li>• One job: - Lifting Hook and Handle to be demonstrated by instructor to a batch.</li> </ul>	04
05	Welding ( Demonstration):- <ul style="list-style-type: none"> <li>• Edge preparation for welding jobs, arc welding, different types of joints such as Lap Welding, Butt Welding etc.</li> <li>• One job each involving Lap welding and Butt welding of two plates to be demonstrated by instructor to a batch.</li> </ul>	04
06	Machine Shop (Demonstration):- <ol style="list-style-type: none"> <li>1. One turning job to be demonstrated by instructor to a batch.</li> </ol>	04
07	Electrical Board Wiring (Demonstration):- <ol style="list-style-type: none"> <li>2. House wiring, staircase wiring for fluorescent tube light, go-down wiring and three phase wiring for electrical motors.</li> </ol>	03

**Termwork:**

Every student has to perform one job from one compulsory trade and attend demonstration in two trades in each of semester I and II. Term work shall comprise of 01 compulsory job and demonstration jobs (any two) performed in the semester.

The syllabus of Basic Workshop Practice and term work to be done in Semester –I & II are given together. The jobs for practice and demonstration are designed with the work of the

subject spread over two semesters. In each semester every student has to perform a job in one compulsory trade and attend demonstrations in other two trades

<b>Sr. No.</b>	<b>Examination</b>	<b>Module</b>
1	T-1	Module 1 and 2
2	T-2	Module 3 and 4
3	Final Examination	Module 1 to 7

2015-16

<b>SEMESTER-II</b>	<b>CLASS: F.Y.B.Tech. (Civil/Mechanical/Electrical)</b>		
<b>CODE: BT201</b>	<b>SUBJECT: Engineering Mathematics -II</b>		
Period per week (each of 60 minutes)	Lecture	04	
	Practical	---	
	Tutorial	---	
Evaluation system		Hours	Marks
	In Semester	01	20 X 02
	End Semester*	03	100
	Practical	---	---
	Laboratory Work (Journal)	---	---
	<b>TOTAL</b>	<b>---</b>	<b>100</b>

\* 60% Weightage for end semester

#### **Course Objectives:**

1. Introduce Curve tracing and rectification of curves.
2. Introduce double integral and its applications to find area and mass of lamina.
3. Introduce triple integral and its applications to find volume.
4. Introduce first order and first degree ordinary differential equations and its applications to solve engineering problems
5. Introduce higher order linear differential equations with constant coefficients and its applications to engineering problems.
6. Introduce Gamma and Beta functions.

#### **Course Outcomes:**

Upon successful completion of the course, students should be able to

1. Trace curves and find length of arc of the curve.
2. Change double integral from Cartesian co-ordinate system to Polar co-ordinate system.
3. Find area and mass of plane lamina
4. Solve Triple integral and change from Cartesian co-ordinate system to spherical and cylindrical polar co-ordinate system.
5. Find volume of three dimensional solids.
6. Classify differential equations in terms of ordinary/partial, Order, Exact, Linear.
7. Find the general solution of linear higher order linear differential equation with constant coefficients.
8. Use Gamma and beta functions to evaluate integrals
9. Use Differentiation of Integral to evaluate integrals

**Detailed Syllabus:**

Module No.	Details	Hrs.
1	<b>Integral Calculus:</b> 1.1 Curve tracing in Cartesian and Polar Coordinates. 1.2 Rectification of plane curves.	4
2	2.1 Double Integral, Change of order of double integral. Evaluation by changing to polar form. 2.2 Applications to find area and mass of lamina.	10
3	3.1 Triple Integral, Evaluation using Cartesian, Cylindrical and Spherical polar coordinates. 3.2 Applications to find volume.	6
4	<b>First Order and First Degree Ordinary Differential Equations</b> 4.1 Exact differential equations, Differential Equations which are reducible to the exact form by using integrating factors. 4.2 First order linear differential equations and differential equations reducible to the linear form	8
5	<b>Higher Order Linear Differential Equations</b> 5.1 Higher Order Linear differential equations with constant coefficients – Complimentary functions, particular integrals of differential equations of the type $F(D)y = Q(x)$ . Method of variation of parameters 5.2 Cauchy's homogenous linear differential equation and Legendre's differential equation. 5.3 Simple application of differential equations of first and second order to engineering problems	10
6	<b>Gamma and Beta Functions</b> 6.1 Gamma function, reduction formula. 6.2 Beta function. Duplication formula (with proof), Relation between Gamma and Beta function (without proof) and examples	7
7	7.1 Differentiation Under the Integral Sign	3

**Recommended Books:-**

1. Erwin Kreyszig (2010), "Advanced Engineering Mathematics" Wiley Eastern Limited, Singapore 10<sup>th</sup> edition, ISBN 0470458365, 1280 Pages
2. Shanti Narayan (2005), "Differential Calculus", S.Chand Publications, 30<sup>th</sup> Edition, ISBN 8121904714, 572 Pages
3. B S Grewal (2013), "Higher Engineering Mathematics", Khanna Publications, 43<sup>rd</sup> Edition, ISBN 8174091955, 1312 Pages

Sr. No.	Examination	Module
1	T-1	Module 1 & 2
2	T-2	Module 3 & 4
3	End Semester Examination	Module 1 to 7

<b>SEMESTER-II</b>	<b>CLASS: F.Y.B.Tech. (Civil/Mechanical/Electrical)</b>		
<b>CODE: BT202</b>	<b>SUBJECT: Basic Electrical and Electronics II</b>		
Period per week (each of 60 minutes)	Lecture	03	
	Laboratory	---	
	Tutorial	---	
Evaluation system		Hours	Marks
	In Semester	01	20*2
	End Semester*	03	100
	Practical	---	---
	Laboratory Work (Journal)	---	---
	<b>TOTAL</b>	<b>---</b>	<b>100</b>

\*60% Weightage for end semester

**Course Objectives:**

1. To create awareness amongst students regarding electronic devices, circuits and systems used in industry, laboratories.
2. To introduce technology used in day to day applications

**Course Outcomes:**

1. Able to appreciate use electronic devices in the applications like D.C. power supply, voltage regulators, amplifiers, switch, controlled rectifiers..

**Detailed Syllabus:**

<b>Module No</b>	<b>Details</b>	<b>Hrs.</b>
<b>1.</b>	<b>Diode :</b> LED, Photodiode, Zener and avalanche breakdown ,	<b>02</b>
<b>2.</b>	<b>Diode Applications:</b> Half wave, Full wave, Bridge Rectifiers, Specifications of the devices required for C, LC, and CLC filter, Zener as a regulator.	<b>08</b>
<b>3.</b>	<b>Bipolar Junction (BJT):</b> BJT configurations such as CE, CC, CB, Characteristics, BJT as a switch, BJT as an amplifier.	<b>07</b>
<b>4.</b>	<b>Field Effect Transistors FET:</b> JFET construction, characteristics (CS), FET as an amplifier.	<b>06</b>
<b>5.</b>	<b>Silicon Controlled Rectifier:</b> Principle of operation of SCR, SCR Characteristics.	<b>03</b>
<b>6.</b>	<b>Digital Electronics Fundamentals:</b> Difference between analog & digital signals, Basic & Universal Gates, Symbols, Boolean algebra, Truth tables, Expressions, Logic simplification.	<b>05</b>
<b>7.</b>	<b>Op amp:</b> Op amp as a basic block. Op amp as a inverting and on inverting Amplifier. Applications like adder, subtractor, voltage follower, etc.	<b>05</b>

**Recommended Books:-**

1. Robert Boylestad and Louis Nashelsky (2009), 'Electronic devices and circuits', Prentice Hall of India 10<sup>th</sup> Edition, ISBN 0135026490, 894 Pages
2. Jain R.P. (2003), 'Modern Digital Electronics', Tata McGraw Hill, ISBN 0070494924, 611 Pages
3. Mottershed Allen (1973), 'Electronic Devices and Circuits an Introduction', Prentice Hall of India, 1<sup>st</sup> Edition, ISBN 8120301245, 656 Pages
4. Bhargava, Kulshreshtha, Gupta (1984), 'Basic Electronics and Linear Circuits', TTTI Chandigarh, TMH, ISBN 0074519654, 490 Pages

<b>Sr. No.</b>	<b>Examination</b>	<b>Module</b>
1	T – I	Module 1 & 2
2	T – II	Module 3 & 4
3	End Semester	Module 1 To 7

<b>SEMESTER-II</b>	<b>CLASS: F.Y.B.Tech. (Civil/Mechanical/Electrical)</b>		
<b>CODE: BT203</b>	<b>SUBJECT: Engineering Graphics-II</b>		
Period per week (each of 60 minutes)	Lecture	03	
	Practical	---	
	Tutorial	---	
Evaluation system		Hours	Marks
	In Semester	01	20 X 02
	End Semester*	03	100
	Practical	---	---
	Laboratory Work (Journal)	---	---
	<b>TOTAL</b>		<b>100</b>

\* 60% Weightage for end semester

**Course Objectives:**

1. The subject aims at understanding the tools and techniques of AutoCAD package and appreciate AutoCAD as a powerful tool for creation of fast & error free drawings
2. To understand the concepts of projections of an object and various ways of projection for visualization of various engineering parts and components.
3. To develop competence in correct expression of the visualized objects.
4. To provide an insight of the technical drawing.

**Course Outcome:**

1. The student will comprehend the use of CAD hardware & software
2. To develop competence in use of AutoCAD as an effective tool for Engineering Graphics.
3. Understand the features and commands of AutoCAD package
4. Apply basic skills in producing a simple 2D drawing

**Detailed Syllabus:**

<b>Module No.</b>	<b>Details</b>	<b>Hrs.</b>
1	Introduction to Auto CAD package	2
2	Orthographic Projections	2
3	Sectional views of Orthographic Projections	2
4	Isometric Projections using Natural Scale, four center method, method of points, typical practical problems	2
5	Isometric Projections using Isometric Scale	2
6	Missing views	2
7	Introduction to M/C Parts: Types of nuts, bolts, screws, studs and riveted joints	1

**Recommended Books:-**

1. N.D.Bhatt (2011), 'Elementary Engineering Drawing', Charotar Publishing House, ISBN 9380358172, 728 Pages
2. M.L.Dabhade (2004), 'Engineering Graphics', Association of Technical Authors, ISBN 8187575751, 772 Pages
3. M.B.Shah&B.C.Rana (2009), 'Engineering Drawing', Pearson Education 2<sup>nd</sup> Edition, ISBN 8131710564, 580 Pages
4. T.Jeyapovan (2010), 'Engineering Drawing and Graphics, Vikas Publishing House Pvt. Ltd. 3<sup>rd</sup> Edition, ISBN 8125940006, 712 Pages
5. K.Venugopal (2007), 'Engineering Drawing and Graphics', New Age International Publishers, ISBN 8122415458, 410 Pages
6. K.L.Narayana&P.Kannaiah (1988), 'Engineering Graphics', Tata McGraw-Hill Co .Ltd., New Delhi, ISBN 0074517902, 544 Pages
7. Giesecke, Mitchell, Spencer & Hill (2011), 'Technical Drawing', Macmillan Publishing Co. Inc. 14<sup>th</sup> Edition, ISBN 0135090490, 936 Pages
8. Warren H .Luzadder (1976) , 'Fundamentals of Engineering Drawing', Prentice Hall of India Pvt.Ltd., New Delhi 7<sup>th</sup> Edition, ISBN 0133383687, 620 Pages

<b>Sr. No.</b>	<b>Examination</b>	<b>Module</b>
1	T-1	Module 1 and 2
2	T-2	Module 3 and 4
3	Final Examination	Module 1 to 7

<b>SEMESTER-II</b>	<b>CLASS: F.Y.B.Tech. (Civil/Mechanical/Electrical)</b>		
<b>CODE: BT204</b>	<b>SUBJECT: Engineering Mechanics-II</b>		
Period per week (each of 60 minutes)	Lecture	03	
	Laboratory	---	
	Tutorial	---	
Evaluation system		Hours	Marks
	In Semester	01	20 X 02
	End Semester*	03	100
	Practical	---	---
	Laboratory Work (Journal)	---	---
	<b>TOTAL</b>		<b>100</b>

\* 60% Weightage for end semester

<b>Rationale:</b> Engineering mechanics deals with the particles / bodies which are at rest or in motion under the action of various types of forces. This course is the foundation to many fields of engineering / technology and hence it is an essential requirement for their study.
<b>Course Objectives:</b> The main objectives of the course are <ul style="list-style-type: none"> <li>To introduce the students to the principles and methods of dynamics (mechanics), and to apply those fundamentals to solve the problems on dynamics.</li> <li>To prepare the base for the students to study other engineering/structural engineering subjects at a later stage.</li> </ul>
<b>Course Outcomes:</b> At the end of the course the students shall be able to <ul style="list-style-type: none"> <li>Find the centroid and moment of inertia of plane areas.</li> <li>solve the problems on kinematics of particles and kinematics of rigid bodies.</li> <li>solve the problems on kinetics of particles and kinetics of rigid bodies.</li> </ul>

**Detailed Syllabus:**

Module No.	Details	Hrs.
01	<b>Centroid of Plane Areas:</b> Concept of Centroid of plane areas. Centroid of areas by integration. Centroid of composite areas.	04
02	<b>Moment of Inertia:</b> Moment of inertia of plane areas, parallel axis theorem. Introduction to polar moment of inertia, product of inertia and mass moment of inertia.	03
03	<b>Kinematics of particle:</b> Velocity and acceleration in terms of rectangular coordinate system, rectilinear motion, motion along plane curved path, tangential and normal component of acceleration, acceleration - time , velocity- time, graphs and their use, relative velocity, projectile motion, simple harmonic motion.	10
04	<b>Kinematics of rigid bodies:</b> Translation, pure rotation and plane motion of rigid bodies, instantaneous	06

	centre of rotation for the velocity for bodies in plane motion, link mechanisms (upto two links).	
05	<b>Kinetics of particles:</b> Newton's laws of motion, D'Alembert's principle, equation of dynamic equilibrium, linear motion, curvilinear motion.	04
06	<b>Energy and Momentum principles:</b> Work done by a force, potential and kinetic energy, power, work energy equation, principle of conservation of energy, momentum, impulse and momentum principle, principle of conservation of momentum, impact of solid bodies, elastic impact, semi-elastic impact and plastic impact.	07
07	<b>Kinetics of rigid bodies:</b> D'Alembert's principle for bodies under translational motion, rotational motion about a fixed axis and plane motion. Application to motion of bars, cylinders, spheres.	06

**Recommended Books:-**

1. R. C. Hibbeler (2007); "Engineering Mechanics", Pearson Education Inc., ISBN 0132215098, 656 pages
2. B. N. Thadani(1966); "Engineering Mechanics", Asia Publishing House, ISBN 0210269405, 655 pages
3. Beer & Johnson (2013), "Engineering Mechanics", Tata McGraw Hill, ISBN 1259062919, 470 pages
4. F. L. Singer (1975), "Engineering Mechanics", Harper & Row Publication, ISBN 0060462329, 724 pages
5. A. Nelson (2009), "Engineering Mechanics", Tata McGraw Hill, ISBN 0070146143
6. A. K. Tayal (2010), 'Engineering Mechanics', Umesh Publication, ISBN 9380117388
7. Kumar(1956), "Engineering Mechanics", Tata McGraw Hill, ISBN 0070681813, 673 pages
8. Shames (2006), 'Engineering Mechanics', Prentice Hall, India, ISBN 8177581236, 837 pages

Sr. No.	Examination	Module
1	T – I	Module 1, 2 & part of module 3
2	T – II	Part of module 3, Module 4 & 5
3	End Semester	Module 1 to 7

<b>SEMESTER-II</b>	<b>CLASS: F.Y.B.Tech. (Civil/Mechanical/Electrical)</b>		
<b>CODE: BT205</b>	<b>SUBJECT: Applied Physics -II</b>		
Period per week (each of 60 minutes)	Lecture	02	
	Laboratory	---	
	Tutorial	---	
Evaluation system		Hours	Marks
	In Semester	01	20 X 02
	End Semester*	03	75
	Practical	---	---
	Laboratory Work (Journal)	---	---
	<b>TOTAL</b>	<b>---</b>	<b>85</b>

\* 60% Weightage for end semester

## **APPLIED PHYSICS – II**

### **Rationale:**

A strong applied sciences programme, that creates a bridge between the sciences and engineering, for first-year students, is a prerequisite for a good engineering programme. This syllabus primarily focuses on the concepts needed for first year engineering students for their further technological studies.

### **Course Objectives (General)**

1. To extend students' knowledge of Physics in the areas of Engineering.
2. To develop general analytical capabilities those are important and relevant in their higher semesters.
3. To setup theory related laboratory experiments so as to apply his/her theoretical knowledge to a practical situation.

### **Course Objectives:**

1. To understand theory of crystal structures and crystal planes.
2. To understand how X-rays are produced in laboratory and applications of X-rays in crystallography.
3. To understand different types of magnetic materials and their distinction, theory of paramagnetic magnetization and ferromagnetism also, to understand similarities and dissimilarities between electric and magnetic circuits.
4. To understand theory of static electric and magnetic fields and study about theory of gradient, divergence and curl of these fields.
5. To understand Special theory of Relativity.

### **Course Outcomes:** At the end of this course, students will be able to:

1. Understand seven types of crystal systems, unit cell properties of different cubic, HCP and diamond structures, identify Miller indices of given crystal planes and draw planes using Miller indices, important orientation of crystal planes in cubic systems and interplanar spacing.
2. Understand how X-rays are produced in laboratory using Coolidge tube, types of X-rays and application in crystallography.
3. Understand different types of magnetic materials and their interaction with external field, Langevin's theory of paramagnetism, Curie's law, Curie-Weiss law and hysteresis.
4. Understand concept of gradient, divergence and curl of fields, Gauss' law in electrostatics, electric potential, Biot-Savart's law in magnetostatics and magnetic potential and also to understand the relation between electrostatics and magnetostatics.
5. Understand the laws of Special theory of relativity, theory of length contraction and time dilation.

**Detailed Syllabus:**

Module No.	Details	Hrs.
1	<p><b>Crystallography:</b>            Basic concepts: Seven basic types of crystal systems, lattice, basis, crystal axes, unit cells, lattice parameters, co-ordination number, atomic packing factor, void space.            Crystal structures: SC, BCC, FCC, Diamond and NaCl.            Crystal planes and directions: Miller indices, drawing of crystal planes and directions in a simple cubic unit cell, interplanar spacing between planes, important planes of SC, BCC and FCC structures.</p>	6
2.	<p><b>X-rays:</b>            Production of X-rays in laboratory, Types of X-rays, Continuous and characteristic X-ray spectrum, X-ray diffraction and Bragg's law, Bragg's X-ray spectrometer, Applications in crystallography.</p>	6
3	<p><b>Magnetic materials and circuits:</b>            Prerequisite: different types of magnetic materials.            Atomic origin of magnetization, magnetic moment of atom, paramagnetic, diamagnetic and ferromagnetic materials. Langevin's theory of paramagnetism and Curie's law, Curie-Weiss law.            Hysteresis and hysteresis loss.            Magnetic circuits: basic definitions and relation with electric circuits, Ohm's law for magnetic circuits.</p>	8
4	<p><b>Electrostatics:</b>            Concept of gradient, divergence and curl. Fundamental theorems: of calculus, for gradients, for divergences and for curls.            Divergence and curl of electrostatic fields, Gauss' law, introduction to scalar potential, relation of potential with field.  <b>Magnetostatics:</b>            Divergence and curl of B, Biot Savart law, magnetic vector potential.            Comparison of Electrostatics and magnetostatics.</p>	6
5	<p><b>Special Theory of Relativity:</b> Result of Michelson-Morley Experiment, Postulates of STR, Galilean transformation, Lorentz transformation, Simultaneity, Length contraction, Time dilation, Addition of velocities, Variation of mass with velocity, Mass-energy relation.</p>	8

**Recommended Books:-**

1. Charles Kittel (2004), 'Introduction to Solid State Physics', John Wiley & Sons; 8<sup>th</sup> Edition, ISBN 0471415268, 704 Pages
2. A.J Dekker (2000), 'Solid State Physics', Macmillan India 1<sup>st</sup> Edition, ISBN 0333918339, 556 Pages
3. M. Ali Omar (1999), 'Elementary Solid State Physics', Pearson Education Publication 5<sup>th</sup> Edition, ISBN 8177583778, 669 Pages

4. Arthur Beiser (2009), 'Concepts of Modern Physics', TataMcGraw Hill, 6th Edition, ISBN 0070151555
5. David J. Griffiths (2012), 'Introduction to Electrodynamics', PHI Publications 4<sup>th</sup> Edition, ISBN 8120347765
6. Robert Resnik (1979), 'Introduction to Special Relativity', Wiley India Edition, ISBN 0471717258, 248 Pages
7. A.S. Vasudeva (2008), 'Modern Engineering Physics', S. Chand Publications, ISBN 8121917573, 383 Pages
8. Kshirsagar and Avadhanulu (1992), 'A textbook of Engineering Physics', S. Chand Publications, ISBN 8121908175, 758 Pages

<b>Sr. No.</b>	<b>Examination</b>	<b>Module</b>
1	T-1	Module 1 and 2
2	T-2	Module 3 and 4
3	Final Examination	Module 1 to 5

<b>SEMESTER-II</b>	<b>CLASS: F.Y.B.Tech. (Civil/Mechanical/Electrical)</b>		
<b>CODE: BT206</b>	<b>SUBJECT: Applied Chemistry -II</b>		
Period per week (each of 60 minutes)	Lecture	02	
	Laboratory	---	
	Tutorial	---	
Evaluation system		Hours	Marks
	In Semester	01	20 X 02
	End Semester*	03	75
	Practical	---	---
	Laboratory Work (Journal)	---	---
	<b>TOTAL</b>	<b>---</b>	<b>85</b>

\* 60% Weightage for end semester

## **APPLIED CHEMISTRY – II**

### **Rationale:**

Applied Chemistry deals with industrial applications, engineering & technologies which are related with the basic need of an individual, society & environment so the students should be aware of the basic fundamental as well as relevant up-dates

### **Course Objectives:**

To apply the knowledge of basic science in engineering and technology and also understand the concept of applied chemistry and analyze it with experiments.

### **Course Outcomes:**

After successful completion of this course, the student will able to :

- 1) Illustrate the type of corrosion and its mechanism which will help to develop the corrosion control methods.
- 2) Summarize the classification, preparation, properties and application of non ferrous alloys of aluminum, copper and lead.
- 3) Classify the various types of fuel and their analysis by bomb calorimeter and other techniques.
- 4) Summarize the classification, constitution, characteristics properties and application of composite materials.

**Detailed Syllabus:**

Module No.	Details	Hrs.
1	<b>Corrosion:</b> Definition, Types of corrosion-Dry or Chemical Corrosion, Wet or Electrochemical corrosion, Bi-metallic corrosion, Concentration cell corrosion-differential Aeration corrosion, Pitting Corrosion, Water Line Corrosion, stress Corrosion, Inter-granular Corrosion. Polarization, over voltage, Passivity, Factors affecting rate of corrosion. Electrochemical & Galvanic series.	04
2	<b>Protection from Corrosion</b> - Cathodic and Anodic Protection, Cathodic and Anodic coatings, Galvanising & Tinning, Metal-Cladding, electroplating. Corrosion in electronic devices and photonic devices.	02
3	<b>Composite Materials:</b> Introduction, classification, constitution & characteristic properties of particle, fibre reinforced composites, structural composites. Applications of Composite Materials.	04
4	<b>Alloys:</b> Alloys of Al, Cu and Pb - their composition, properties & uses.	02
5	<b>Powder Metallurgy:</b> Methods of Metal Powder Formation, Cermets-Metal-Ceramic Powders, technology of Powder Metallurgy, applications of Powder Metallurgy.	02
6	<b>Fuel:</b> Calorific Value-Gross and Net Calorific Value, Conversion & numerical problems. Proximate and Ultimate Analysis of Fuels, numerical problems. Combustion-Calculations for given Solid, Liquid, Gaseous Fuel Biodiesel-Methods to obtain Biodiesel. Cracking, Knocking, Octane Value of Petrol, Cetane Value of Diesel, Anti-Knocking Agents. Recent technologies for catalytic converter.	06
7	<b>Green-Chemistry:</b> Goal, Significance and 12-Principles of Green Chemistry with examples, Green Path Green-Reagents, SCFE, SC-CO <sub>2</sub> , green propellant – ultra pure H <sub>2</sub> O <sub>2</sub> . Industrial applications of Green-Chemistry. Numerical problems on percentage atom economy.	04

**Recommended Books:-**

1. P.C.Jain & Monica Jain (2004), 'Engineering Chemistry', Dhanpat Rai publishing company Pvt. Ltd, 15<sup>th</sup> Edition, ISBN 8187433175, 1288 Pages
2. S. S. Dara & Dara (1986), 'Engineering Chemistry', S. Chand & Company Ltd, 12<sup>th</sup> Edition, ISBN 8121903599, 992 Pages
3. Emil Roduner (2006), 'Nano Scopic Materials', RSC Publishing, ISBN 0854048571, 285 Pages

4. VasantGowarikar (1986), 'Polymer science', New Age International Pvt Ltd, ISBN 0852263074, 505 Pages
5. Cotlon (1994), 'Basic Inorganic Chemistry', Wiley India, 3<sup>rd</sup> Edition, ISBN 0471505323, 856 Pages
6. O.P. Khanna (2010), 'Material Science for engineering students', DhanpatRai, Publications (p) Ltd., ISBN 8189928317, 1179 Pages.

<b>Sr. No.</b>	<b>Examination</b>	<b>Module</b>
1	T-1	Module 1 ,2and 4,5
2	T-2	Module 6
3	Final Examination	All Module

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<b>SEMESTER - II</b>	<b>CLASS: - F.Y.B.Tech. (Civil/Mechanical/Electrical)</b>		
<b>CODE: BT207</b>	<b>SUBJECT :- Computer Programming</b>		
Period per week (each of 60 minutes)	Lecture	04	
	Practical	---	
	Tutorial		
Evaluation system		Hours	Marks
	In Semester	01	20 x 02
	End Semester*	03	100
	Practical	---	---
	Laboratory Work (Journal)	---	---
	<b>TOTAL</b>	<b>---</b>	<b>100</b>

\*60% Weightage for end semester

#### Course Objectives:

1. To master basic procedural programming constructs for decision and iteration, to write and debug small programs (20-50 lines)
2. To implement design principles like decomposition, information hiding, use of parameters and return values to create flexible components.
3. To understand major concept of object oriented programming like encapsulation, inheritance and polymorphism.
4. Suggested programming language is C, C++.

#### Course Outcomes:

At the end of this course, students will be able to:

5. Understand fundamentals of programming language .
6. Understand logical reasoning and development of program.
7. Understand the significance of an implementation of a programming language in a compiler or interpreter
8. Understand the features of object oriented programming.

#### Detailed Syllabus

Module No	Details	Hrs
1.	<b>Basics of Programming:</b> Defining problem statement, solution development using Algorithmic approach. Basic concepts of computer structure and program execution	05 03
2	<b>Basic Data Type:</b> Concept of Variables and constants, Data types, expressions, and assignment, Input / Output from console and file.	05
3	<b>Control Structure:</b> Conditional execution – if/else, Switch, Break, Continue. Iteration – Do, for, while	04 03
4	<b>Functions:</b> Defining Functions- Procedural decomposition of problems, localizing variables, parameter passing– value and reference, return values.	08

5	<b>Arrays:</b> Arrays – one-dimensional, Multidimensional Strings	06 03
6	<b>Principles of Object Oriented Programming:</b> Introduction to Object Oriented Language – classes, Constructor and Destructors. Inheritance – Access specifiers, Types of Inheritance	05 04
7	<b>Polymorphism:</b> Compile time polymorphism: Function and operator overloading. Runtime Polymorphism: Virtual Functions.	06
<b>Recommended Books:-</b>		
<ol style="list-style-type: none"> <li>1. Mahesh Bhawe and Sunil Patekar (2012), “Object- Oriented Programming with C++”, Pearson Education, 1<sup>st</sup> Edition, ISBN 8131798585, 688 Pages</li> <li>2. Bjarne Stroustrup (2013), “The C++ Programming Language”, Addison Wesley Publishing Company, 4<sup>th</sup> Edition, ISBN 0321563840, 1368 Pages</li> <li>3. Robert Lafore (2001), “Object-Oriented Programming in C++”, Sams Publishing 4<sup>th</sup> Edition, ISBN 0672323087, 1040 Pages</li> <li>4. Balaguru Swami (2008), “Object Oriented Programming with C++”, Tata McGraw-Hill Publishing Company Ltd., 3<sup>rd</sup> Edition, ISBN 0070669074, 624 Pages</li> </ol>		

Sr. No.	Examination	Module
1	T – I	Module 1 , 2,3
2	T – II	Module 4,5
3	End Semester	All 1 to 7

<b>SEMESTER-II</b>	<b>CLASS: F.Y.B.Tech. (Civil/Mechanical/Electrical)</b>		
<b>CODE: BT252</b>	<b>SUBJECT: Basic Electrical and Electronics II</b>		
Period per week (each of 60 minutes)	Lecture	---	
	Laboratory	02	
	Tutorial	---	
Evaluation system		Hours	Marks
	In Semester	---	---
	End Semester*	---	---
	Practical	--	--
	Laboratory Work (Journal)	---02---	25
	<b>TOTAL</b>	<b>---</b>	<b>25</b>

# Assessment criteria for laboratory/Tutorial work. i.e. weightage for assessment shall be as follows:

- (i) Attendance in Laboratory/Tutorial = 20%,
- (ii) Journal/Drawing sheet/Sketch book = 40%,
- (iii) MCQ/Oral/Test = 40%.

**List of Experiments:**

1. Comparison of characteristics of PN junction diode and Zener diode.
2. Rectifiers and filters (HWR and FWR with C, L, LC, CLC).
3. Zener as a regulator.
4. BJT Characteristics (CE).
5. FET Characteristics.
6. CE amplifier.
7. CS amplifier.
8. Implementing study of gates
9. Implementing basic gates using universal gates
10. Wien Bridge Oscillator.
11. SCR Characteristics.

**Note:** Practical examination will be as follows:

Attendance 20%, Practical performed during semester and graded Journals 40%,  
Practical/Mini Project 40%

<b>SEMESTER-II</b>	<b>CLASS: F.Y.B.Tech. (Civil/Mechanical/Electrical)</b>		
<b>CODE: BT253</b>	<b>SUBJECT: Engineering Graphics-II</b>		
Period per week (each of 60 minutes)	Lecture	---	
	Practical	---	
	Tutorial	02	
Evaluation system		Hours	Marks
	In Semester	---	---
	End Semester*	---	---
	Practical	---	---
	Laboratory Work (Journal)	---	25
	<b>TOTAL</b>		<b>25</b>

# Assessment criteria for laboratory/Tutorial work. i.e. weightage for assessment shall be as follows:

- (i) Attendance in Laboratory/Tutorial = 20%,
- (ii) Journal/Drawing sheet/Sketch book = 40%,
- (iii) MCQ/Oral/Test = 40%.

**Termwork:**

Term work shall comprise of printouts of Autocad drawings consisting of 2 to 3 problems on each module. The class assignments and each Autocad drawing shall have equal weightage in termwork marks.

<b>SEMESTER-II</b>	<b>CLASS: F.Y.B.Tech. (Civil/Mechanical/Electrical)</b>		
<b>CODE: BT255</b>	<b>SUBJECT: Applied Physics -II</b>		
Period per week (each of 60 minutes)	Lecture	---	
	Laboratory	01	
	Tutorial	---	
Evaluation system		Hours	Marks
	In Semester	---	---
	End Semester*	---	---
	Practical	---	---
	Laboratory Work (Journal)	---	15
	<b>TOTAL</b>	<b>---</b>	<b>15</b>

# Assessment criteria for laboratory/Tutorial work. i.e. weightage for assessment shall be as follows:

- (i) Attendance in Laboratory/Tutorial = 20%,
- (ii) Journal/Drawing sheet/Sketch book = 40%,
- (iii) MCQ/Oral/Test = 40%.

**List of Experiments: (Minimum 5 to be performed)**

1. To identify crystal structures: SC, BCC, FCC, Diamond, HCP, NaCl.
2. To identify crystal planes (100), (110) and (111) for SC, BCC and FCC crystal structures.
3. Hall Effect: to find hall voltage of a given semiconductor.
4. Hysteresis: to plot the hysteresis curve for a ferromagnetic material and determine retentivity and coercivity.
5. Introduction to C.R.O: to measure a.c. voltage and frequency.
6. Lissajous figures using a C.R.O.
7. e/m apparatus: to find e/m ratio.

<b>SEMESTER-II</b>	<b>CLASS: F.Y.B.Tech. (Civil/Mechanical/Electrical)</b>		
<b>CODE: BT256</b>	<b>SUBJECT: Applied Chemistry -II</b>		
Period per week (each of 60 minutes)	Lecture	---	
	Laboratory	01	
	Tutorial	---	
Evaluation system		Hours	Marks
	In Semester	---	---
	End Semester*	---	---
	Practical	---	---
	Laboratory Work (Journal)	---	15
	<b>TOTAL</b>	<b>---</b>	<b>15</b>

# Assessment criteria for laboratory/Tutorial work. i.e. weightage for assessment shall be as follows:

- (i) Attendance in Laboratory/Tutorial = 20%,
- (ii) Journal/Drawing sheet/Sketch book = 40%,
- (iii) MCQ/Oral/Test = 40%.

**TERM-WORK: LIST OF EXPERIMENT(ONLY ANY FIVE TO PERFORM)**

**List of Experiments: (Minimum 5 to be performed)**

1. Estimation of Cu iodometrically.
2. Estimation of Zn complexometric titration.
3. Estimation of Ni complexometric titration.
4. Estimation of Al complexometric titration.
5. Calorific value of solid or liquid fuel using Bomb calorimeter.
6. Preparations of membranes for filter any one Demo.
7. CO<sub>2</sub> from air by Orsat's method.
8. Estimation of Fe by gravimetric method.
9. Estimation of Ni by gravimetric method.
10. Estimation of Sn iodometrically.
11. Preparation of biodiesel from edible oil.
12. Synthesis of simple layered materials and their characterization.
13. Preparing simple composites and their characterization.

<b>SEMESTER - II</b>	<b>CLASS :- F.Y.B.Tech. (Civil/Mechanical/Electrical)</b>		
<b>CODE: BT257</b>	<b>SUBJECT :- Computer Programming</b>		
Period per week (each of 60 minutes)	Lecture	---	
	Practical	02 per batch	
	Tutorial		
Evaluation system		Hours	Marks
	In Semester	---	---
	End Semester*	---	---
	Practical	---	---
	Laboratory Work (Journal)	---	25
	<b>TOTAL</b>	---	<b>25</b>

# Assessment criteria for laboratory/Tutorial work. i.e. weightage for assessment shall be as follows:

- (i) Attendance in Laboratory/Tutorial = 20%,
- (ii) Journal/Drawing sheet/Sketch book = 40%,
- (iii) MCQ/Oral/Test = 40%.

**List of experiments: (preferably six to be performed)**

1. Using Operators and Expressions
2. Using If-Else statement
3. Using While, Do-While loops.
4. Using FOR loop
5. Using Functions
6. Using Arrays
7. Using Strings
8. Using classes and objects.
9. Based on Compile time polymorphism
10. Using Inheritance.
11. Based on run time polymorphism

<b>SEMESTER-II</b>	<b>CLASS: F.Y.B.Tech. (Civil/Mechanical/Electrical)</b>		
<b>CODE: BT299</b>	<b>SUBJECT: Workshop - II</b>		
Period per week (each of 60 minutes)	Lecture	---	
	Laboratory	03 per batch	
	Tutorial	---	
Evaluation system		Hours	Marks
	In Semester	---	---
	End Semester	---	---
	Practical	---	---
	Laboratory Work (Journal)	---	50
	<b>TOTAL</b>		<b>50</b>

\* 60% Weightage for end semester

# Assessment criteria for laboratory/Tutorial work. i.e. weightage for assessment shall be as follows:

- (i) Attendance in Laboratory/Tutorial = 20%,
- (ii) Journal/Drawing sheet/Sketch book = 40%,
- (iii) MCQ/Oral/Test = 40%.

**Rationale:**

Workshop forms not an indispensable part of any industry. An engineer working in field must have thorough knowledge of various tools, machines, devices used in engineering practice for creating objects from material. The students of engineering discipline must be conversant with the various operations performed on materials for producing desired shapes with comprehensive knowledge of working principles of machine tools, use of tools and devices with their effective use and application. Basic Workshop Practice is a practical subject which emphasizes on laying basic foundation for an engineering student.

**Course Objectives:**

1. To impart knowledge to students to develop their technical skill sets for creating entities from raw material.
2. To give “hands on” training and practice to students for use of various tools, devices, machines.
3. To develop ability of students to understand, plan and implement various processes and operations to be performed on the raw material to create object of desired shape and size.
4. To give exposure to inter disciplinary domains.

**Course Outcomes:**

1. Thorough knowledge of various tools, machines, devices used in engineering practice for creating objects from material.
2. Thorough knowledge of carrying out various operations in basic engineering shops
3. Ability of interpretation of job drawing, application of processes and operations to produce basic components from raw material.

**Detailed Syllabus:**

Module No.	Details	Hrs.
01	Fitting (Compulsory):- <ul style="list-style-type: none"> <li>Use and settings of fitting hand tools for marking, chipping, cutting, filing, centre punching, hammering, drilling, tapping.</li> <li>Term work to include one job:- Male –female joint involving above operations.</li> </ul>	12
02	Carpentry (Compulsory):- <ul style="list-style-type: none"> <li>Use and setting of carpentry hand tools like hacksaws, jackplanes, chisels and gauges for construction of various joints. Term work to include one job involving a use of tools and operations:- Half Check joint.</li> </ul>	12
03	Carpentry (Demonstration):- <ul style="list-style-type: none"> <li>Wood turning Demonstration.</li> </ul>	03
04	Forging / Smithy (Demonstration):- <ul style="list-style-type: none"> <li>One job: - Lifting Hook and Handle to be demonstrated by instructor to a batch.</li> </ul>	04
05	Welding ( Demonstration):- <ul style="list-style-type: none"> <li>Edge preparation for welding jobs, arc welding, different types of joints such as Lap Welding, Butt Welding etc.</li> <li>One job each involving Lap welding and Butt welding of two plates to be demonstrated by instructor to a batch.</li> </ul>	04
06	Machine Shop (Demonstration):- 10. One turning job to be demonstrated by instructor to a batch.	04
07	Electrical Board Wiring (Demonstration):- 11. House wiring, staircase wiring for fluorescent tube light, go-down wiring and three phase wiring for electrical motors.	03

**Termwork:**

Every student has to perform one job from one compulsory trade and attend demonstration in two trades in each of semester I and II. Term work shall comprise of 01 compulsory job and demonstration jobs (any two) performed in the semester.

The syllabus of Basic Workshop Practice and term work to be done in Semester –I & II are given together. The jobs for practice and demonstration are designed with the work of the subject spread over two semesters. In each semester every student has to perform a job in one compulsory trade and attend demonstrations in other two trades.

<b>Sr. No.</b>	<b>Examination</b>	<b>Module</b>
1	T-1	Module 1 and 2
2	T-2	Module 3 and 4
3	Final Examination	Module 1 to 7

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