

**Avinashilingam Institute for Home Science and Higher Education for Women**

Coimbatore 641 043, Tamil Nadu, India

**I BE Biomedical Instrumentation Engineering**

**Scheme of Instruction & Examination**

(For the students admitted from 2015-16 onwards)

Part	Subject Code	Name of paper/component	Instruction hours/week		Scheme of examination				
			Theory	Tutorial/ Practical	Duration of exam	CIA	CE	Total	Credit
<b>First Semester</b>									
I		<b>Humanities</b>							
	15BEHS01	Professional English	2	0/2	3	50	50	100	3
II		<b>Basic Sciences</b>							
	15BESM01	Engineering Mathematics-I	3	2/0	3	50	50	100	4
	15BESP01	Engineering Physics	3	-	3	50	50	100	3
	15BESC01	Engineering Chemistry	3	-	3	50	50	100	3
	15BESP03	Physics and Chemistry Practicals-I	-	0/2	3	100	-	100	1
III		<b>Engineering Sciences</b>							
	15BEBI01	Problem Solving Using C (CSE)	4	-	3	50	50	100	4
	15BEBI02	C Programming Practicals (CSE)	-	0/2	3	50	50	100	1
	15BEBI03	Engineering Practices Practicals (Civil, FPPT, S&H, ECE and EEE)	-	0/2	3	50	50	100	1
		NSS							
<b>Second Semester</b>									
I		<b>Humanities</b>							
	15BEHS03	Professional English Practices	2	0/2	3	50	50	100	3
II		<b>Basic Sciences</b>							
	15BESM02	Engineering Mathematics- II	3	2/0	3	50	50	100	4
	15BESP02	Materials Science	3	-	3	50	50	100	3
	15BESC02	Applied Chemistry	3	-	3	50	50	100	3
	15BESP04	Physics and Chemistry Practicals-II	-	0/2	3	50	50	100	1
III		<b>Engineering Sciences</b>							
	15BEBI04	Engineering Graphics	3	0/2	3	50	50	100	4
	15BEBI05	Basic Civil and Mechanical Engineering (CE)	4	-	3	50	50	100	4
	15BEBC01	Electron Devices and Applications (BMIE)	4	-	3	50	50	100	4
	15BEBC02	Electron Devices Practicals (BMIE)	-	0/2	3	50	50	100	1
		NSS							

**Avinashilingam Institute for Home Science and Higher Education for Women**  
Coimbatore 641 043, Tamil Nadu, India

**I BE Civil Engineering**

**Scheme of Instruction & Examination**

(For the students admitted from 2015-16 onwards)

Part	Subject Code	Name of paper/component	Instruction hours/week		Scheme of examination				
			Theory	Tutorial/ Practical	Duration of exam	CIA	CE	Total	Credit
<b>First Semester</b>									
I		<b>Humanities</b>							
	15BEHS01	Professional English	2	0/2	3	50	50	100	3
II		<b>Basic Sciences</b>							
	15BESM01	Engineering Mathematics-I	3	2/0	3	50	50	100	4
	15BESP01	Engineering Physics	3	-	3	50	50	100	3
	15BESC01	Engineering Chemistry	3	-	3	50	50	100	3
	15BESP03	Physics and Chemistry Practicals-I	-	0/2	3	100	-	100	1
III		<b>Engineering Sciences</b>							
	15BEVC01	Engineering Graphics	3	0/2	3	50	50	100	4
	15BEVC02	Elements of Town Planning and Architecture (Civil)	4	-	3	50	50	100	4
	15BEVI01	Engineering Practices Practicals (Civil, FPPT, S&H, ECE and EEE)	-	0/2	3	50	50	100	1
		NSS							
<b>Second Semester</b>									
I		<b>Humanities</b>							
	15BEHS03	Professional English Practices	2	0/2	3	50	50	100	3
II		<b>Basic Sciences</b>							
	15BESM02	Engineering Mathematics- II	3	2/0	3	50	50	100	4
	15BESP02	Materials Science	3	-	3	50	50	100	3
	15BESC03	Chemistry for Civil Engineers	3	-	3	50	50	100	3
	15BESP04	Physics and Chemistry Practicals-II	-	0/2	3	50	50	100	1
III		<b>Engineering Sciences</b>							
	15BEVC03	Engineering Mechanics	3	2/0	3	50	50	100	4
	15BEVI02	Basic Electrical and Electronics Engineering (EEE)	4	-	3	50	50	100	4
	15BEVI03	Problem Solving Using C (CSE)	4	-	3	50	50	100	4
	15BEVI04	C Programming Practicals (CSE)	-	0/2	3	50	50	100	1
		NSS							

**Avinashilingam Institute for Home Science and Higher Education for Women**

Coimbatore 641 043, Tamil Nadu, India

**I BE Computer Science and Engineering**

**Scheme of Instruction & Examination**

(For the students admitted from 2015-16 onwards)

Part	Subject Code	Name of paper/component	Instruction hours/week		Scheme of examination				
			Theory	Tutorial/ Practical	Duration of exam	CIA	CE	Total	Credit
<b>First Semester</b>									
I		<b>Humanities</b>							
	15BEHS01	Professional English	2	0/2	3	50	50	100	3
II		<b>Basic Sciences</b>							
	15BESM01	Engineering Mathematics-I	3	2/0	3	50	50	100	4
	15BESP01	Engineering Physics	3	-	3	50	50	100	3
	15BESC01	Engineering Chemistry – I	3	-	3	50	50	100	3
	15BESP03	Physics and Chemistry Practicals–I	-	0/2	3	100	-	100	1
III		<b>Engineering Sciences</b>							
	15BEOC01	Problem Solving Using C (CSE)	4	-	3	50	50	100	4
	15BEOC02	C Programming Practicals (CSE)	-	0/2	3	50	50	100	1
	15BEOI01	Engineering Graphics (Civil)	3	0/2	3	50	50	100	4
		NSS							
<b>Second Semester</b>									
I		<b>Humanities</b>							
	15BEHS03	Professional English Practices	2	0/2	3	50	50	100	3
II		<b>Basic Sciences</b>							
	15BESM02	Engineering Mathematics- II	3	2/0	3	50	50	100	4
	15BESP02	Materials Science	3	-	3	50	50	100	3
	15BESC04	Engineering Chemistry - II	3	-	3	50	50	100	3
	15BESP04	Physics and Chemistry Practicals-II	-	0/2	3	50	50	100	1
III		<b>Engineering Sciences</b>							
	15BEOC03	Object Oriented Programming using C++	4	-	3	50	50	100	4
	15BEOC04	C++ Programming Practicals	-	0/2	3	50	50	100	1
	15BEOI02	Electronic Devices and Circuits (ECE)	4	-	3	50	50	100	4
	15BEOI03	Electronic Devices and Circuits Practicals (ECE)	-	0/2	3	50	50	100	1
		NSS							

## Avinashilingam Institute for Home Science and Higher Education for Women

Coimbatore 641 043, Tamil Nadu, India

**I BE Electronics and Communication Engineering**

**Scheme of Instruction & Examination**

(For the students admitted from 2015-16 onwards)

Part	Subject Code	Name of paper/component	Instruction hours/week		Scheme of examination				
			Theory	Tutorial/Practical	Duration of exam	CIA	CE	Total	Credit
<b>First Semester</b>									
I		<b>Humanities</b>							
	15BEHS01	Professional English	2	0/2	3	50	50	100	3
II		<b>Basic Sciences</b>							
	15BESM01	Engineering Mathematics-I	3	2/0	3	50	50	100	4
	15BESP01	Engineering Physics	3	-	3	50	50	100	3
	15BESC01	Engineering Chemistry – I	3	-	3	50	50	100	3
	15BESP03	Physics and Chemistry Practicals-I	-	0/2	3	100	-	100	1
III		<b>Engineering Sciences</b>							
	15BELI01	Problem Solving Using C (CSE)	4	-	3	50	50	100	4
	15BELI02	C Programming Practicals (CSE)	-	0/2	3	50	50	100	1
	15BELI03	Engineering Practices Practicals (Civil, FPPT, S&H, ECE and EEE)	-	0/2	3	50	50	100	1
		NSS							
<b>Second Semester</b>									
I		<b>Humanities</b>							
	15BEHS03	Professional English Practices	2	0/2	3	50	50	100	3
II		<b>Basic Sciences</b>							
	15BESM02	Engineering Mathematics- II	3	2/0	3	50	50	100	4
	15BESP02	Materials Science	3	-	3	50	50	100	3
	15BESC04	Engineering Chemistry - II	3	-	3	50	50	100	3
	15BESP04	Physics and Chemistry Practicals-II	-	0/2	3	50	50	100	1
III		<b>Engineering Sciences</b>							
	15BELI04	Engineering Graphics	3	0/2	3	50	50	100	4
	15BELI05	Basic Civil and Mechanical Engineering (Civil)	4	-	3	50	50	100	4
	15BELC01	Electric Circuit Analysis (ECE)	2	2/0	3	50	50	100	3
	15BELC02	Electric Circuit Analysis Practicals (ECE)	-	0/2	3	50	50	100	1
		NSS							

**Avinashilingam Institute for Home Science and Higher Education for Women**

Coimbatore 641 043, Tamil Nadu, India

**I BE Electrical and Electronics Engineering**

**Scheme of Instruction & Examination**

(For the students admitted from 2015-16 onwards)

Part	Subject Code	Name of paper/component	Instruction hours/week		Scheme of examination				
			Theory	Tutorial/ Practical	Duration of exam	CIA	CE	Total	Credit
<b>First Semester</b>									
I		<b>Humanities</b>							
	15BEHS01	Professional English	2	0/2	3	50	50	100	3
II		<b>Basic Sciences</b>							
	15BESM01	Engineering Mathematics-I	3	2/0	3	50	50	100	4
	15BESP01	Engineering Physics	3	-	3	50	50	100	3
	15BESC01	Engineering Chemistry – I	3	-	3	50	50	100	3
	15BESP03	Physics and Chemistry Practicals-I	-	0/2	3	100	-	100	1
III		<b>Engineering Sciences</b>							
	15BEEI01	Problem Solving Using C (CSE)	4	-	3	50	50	100	4
	15BEEI02	C Programming Practicals (CSE)	-	0/2	3	50	50	100	1
	15BEEI03	Engineering Graphics	3	0/2	3	50	50	100	4
		NSS							
<b>Second Semester</b>									
I		<b>Humanities</b>							
	15BEHS03	Professional English Practices	2	0/2	3	50	50	100	3
II		<b>Basic Sciences</b>							
	15BESM02	Engineering Mathematics- II	3	2/0	3	50	50	100	4
	15BESP02	Materials Science	3	-	3	50	50	100	3
	15BESC04	Engineering Chemistry - II	3	-	3	50	50	100	3
	15BESP04	Physics and Chemistry Practicals-II	-	0/2	3	50	50	100	1
III		<b>Engineering Sciences</b>							
	15BEEC01	Electron Devices	4	0/0	3	50	50	100	4
	15BEEC02	Electron Devices Laboratory	-	0/2	3	50	50	100	1
	15BEEI04	Basic Civil and Mechanical Engineering (Civil)	4	-	3	50	50	100	4
	15BEEI05	Engineering Practices Practicals (Civil, FPPT, S&H, ECE and EEE)	-	0/2	3	50	50	100	1
		NSS							

**Avinashilingam Institute for Home Science and Higher Education for Women**

Coimbatore 641 043, Tamil Nadu, India

**I BE Food Processing and Preservation Technology**

**Scheme of Instruction & Examination**

(For the students admitted from 2015-16 onwards)

Part	Subject Code	Name of paper/component	Instruction hours/week		Scheme of examination				
			Theory	Tutorial/ Practical	Duration of exam	CIA	CE	Total	Credit
<b>First Semester</b>									
I		<b>Humanities</b>							
	15BEHS01	Professional English	2	0/2	3	50	50	100	3
II		<b>Basic Sciences</b>							
	15BESM01	Engineering Mathematics-I	3	2/0	3	50	50	100	4
	15BESP01	Engineering Physics	3	-	3	50	50	100	3
	15BESC01	Engineering Chemistry	3	-	3	50	50	100	3
	15BESP03	Physics and Chemistry Practicals-I	-	0/2	3	100	-	100	1
III		<b>Engineering Sciences</b>							
	15BEFI01	Problem Solving Using C (CSE)	4	-	3	50	50	100	4
	15BEFI02	C Programming Practicals (CSE)	-	0/2	3	50	50	100	1
	15BEFI03	Engineering Practices Practicals (Civil, FPPT, S&H, ECE and EEE)	-	0/2	3	50	50	100	1
		NSS							
<b>Second Semester</b>									
I		<b>Humanities</b>							
	15BEHS03	Professional English Practices	2	0/2	3	50	50	100	3
II		<b>Basic Sciences</b>							
	15BESM02	Engineering Mathematics- II	3	2/0	3	50	50	100	4
	15BESP02	Materials Science	3	-	3	50	50	100	3
	15BESC05	Chemistry of Food Materials	3	-	3	50	50	100	3
	15BESP04	Physics and Chemistry Practicals-II	-	0/2	3	50	50	100	1
III		<b>Engineering Sciences</b>							
	15BEFC01	Introduction to Food Science and Technology	4	-	3	50	50	100	4
	15BEFC02	Food Science Practicals	-	0/2	3	50	50	100	1
	15BEFI04	Engineering Graphics	3	0/2	3	50	50	100	4
	15BEFI05	Basic Civil and Mechanical Engineering (Civil)	4	-	3	50	50	100	4
		NSS							

**Avinashilingam Institute for Home Science and Higher Education for Women**

Coimbatore 641 043, Tamil Nadu, India

**I BE Information Technology**

**Scheme of Instruction & Examination**

(For the students admitted from 2015-16 onwards)

Part	Subject Code	Name of paper/component	Instruction hours/week		Scheme of examination				
			Theory	Tutorial/ Practical	Duration of exam	CIA	CE	Total	Credit
<b>First Semester</b>									
I		<b>Humanities</b>							
	15BEHS01	Professional English	2	0/2	3	50	50	100	3
II		<b>Basic Sciences</b>							
	15BESM01	Engineering Mathematics-I	3	2/0	3	50	50	100	4
	15BESP01	Engineering Physics	3	-	3	50	50	100	3
	15BESC01	Engineering Chemistry – I	3	-	3	50	50	100	3
	15BESP03	Physics and Chemistry Practicals–I	-	0/2	3	100	-	100	1
III		<b>Engineering Sciences</b>							
	15BEIC01	Problem Solving Using C (CSE)	4	-	3	50	50	100	4
	15BEIC02	C Programming Practicals (CSE)	-	0/2	3	50	50	100	1
	15BEII01	Engineering Graphics	3	0/2	3	50	50	100	4
		NSS							
<b>Second Semester</b>									
I		<b>Humanities</b>							
	15BEHS03	Professional English Practices	2	0/2	3	50	50	100	3
II		<b>Basic Sciences</b>							
	15BESM02	Engineering Mathematics- II	3	2/0	3	50	50	100	4
	15BESP02	Materials Science	3	-	3	50	50	100	3
	15BESC04	Engineering Chemistry - II	3	-	3	50	50	100	3
	15BESP04	Physics and Chemistry Practicals-II	-	0/2	3	50	50	100	1
III		<b>Engineering Sciences</b>							
	15BEIC03	Object Oriented Programming	4	-	3	50	50	100	4
	15BEIC04	Object Oriented Programming Practicals	-	0/2	3	50	50	100	1
	15BEII02	Electrical Circuits and Electron Devices (ECE)	4	-	3	50	50	100	4
	15BEII03	Engineering Practices Practicals (Civil, FPPT, S&H, ECE and EEE)	-	0/2	3	50	50	100	1
		NSS							

**Avinashilingam Institute for Home Science and Higher Education for Women**

Coimbatore 641 043, Tamil Nadu, India

**I BE Printing Technology**

**Scheme of Instruction & Examination**

(For the students admitted from 2015-16 onwards)

Part	Subject Code	Name of paper/component	Instruction hours/week		Scheme of examination				
			Theory	Tutorial/ Practical	Duration of exam	CIA	CE	Total	Credit
<b>First Semester</b>									
I		<b>Humanities</b>							
	15BEHS01	Professional English	2	0/2	3	50	50	100	3
	15BEHS02	Management Information System (PT)	3	2/0	3	50	50	100	4
II		<b>Basic Sciences</b>							
	15BESM01	Engineering Mathematics-I	3	2/0	3	50	50	100	4
	15BESP01	Engineering Physics	3	-	3	50	50	100	3
	15BESC01	Engineering Chemistry – I	3	-	3	50	50	100	3
	15BESP03	Physics and Chemistry Practicals–I	-	0/2	3	100	-	100	1
III		<b>Engineering Sciences</b>							
	15BEPI01	Basic Civil and Mechanical Engineering (Civil and FPPT)	4	-	3	50	50	100	4
	15BEPI02	Engineering Practices Practicals (Civil, FPPT, S&H, ECE and EEE)	-	0/2	3	50	50	100	1
		NSS							
<b>Second Semester</b>									
I		<b>Humanities</b>							
	15BEHS03	Professional English Practices	2	0/2	3	50	50	100	3
	15BEHS04	TQM for Graphic Art Industry (PT)	3	-	3	50	50	100	3
II		<b>Basic Sciences</b>							
	15BESM02	Engineering Mathematics- II	3	2/0	3	50	50	100	4
	15BESP02	Materials Science	3	-	3	50	50	100	3
	15BESC04	Engineering Chemistry - II	3	-	3	50	50	100	3
	15BESP04	Physics and Chemistry Practicals-II	-	0/2	3	50	50	100	1
III		<b>Engineering Sciences</b>							
	15BEPI03	Engineering Graphics	3	0/2	3	50	50	100	4
	15BEPI04	Problem Solving Using C (CSE)	4	-	3	50	50	100	4
	15BEPI05	C Programming Practicals (CSE)	-	0/2	3	50	50	100	1
		NSS							



## Professional English

Semester I  
15BEHS01

Hours of instruction/week:4  
No.of credits : 3

### Objectives:

1. To train learners in organized academic and professional writing.
2. To develop aural competency and oral fluency of learners.
3. To help learners achieve proficiency in the effective use of language in various authentic career, related situations.

### Unit I Language through Reading

12

Skimming, scanning, predicting the content of a given passage, identifying the lexical and contextual meanings, note making (guided & unguided) cloze reading, drawing inferences, separating facts from opinions.

### Unit II Focus on Language

12

Word formation with prefixes and suffixes, synonyms and antonyms, Impersonal passive voice, Tenses, use of prepositions, 'if clauses', use of words as nouns and verbs, subject, verb, agreement, Editing, British and American English.

### Unit III Language through Practice

12

Resume writing, writing instructions and recommendations, preparing checklists, classifying the data, analyzing / interpreting the data, Paragraph writing, Formal letters, writing to officials (leave letter, seeking permission for practical training, asking for Certificates, testimonials), unseen comprehension, creative writing, Framing Agendas, Minutes of the meeting.

### Unit IV Oral Practice(Lab Sessions)

12

#### Pronunciation Techniques:

Phonetics, Stress, Primary and Secondary stress, Neutral Accent, Rising and Falling Tone, Voice Modulation.

#### Public Speaking Skills:

Compeering, Introducing a guest to the audience, Welcome address, Proposing a vote of thanks.

### Unit V (Lab Sessions)

12

#### Justifying and Summarizing Skills:

Emphasizing a point, discussing the pros and cons, focusing on reasons, Summarizing briefly and concisely

#### Designing an Advertisement:

Interpreting advertisements, Slogan/caption writing, creating one's own advertisement for a product.

**Total Hours: 60**

#### Textbook:

*Aysha Viswamohan (2008). English for Technical Communication.* Tata McGraw-Hill Publishing Co Ltd, New Delhi.

#### References:

1. *Dr. S. Sumant, English for Engineers (2005).* Tata McGraw Hill Publishing Co Ltd, New Delhi.
2. *M. Ashref Rizvi (2005). Effective Technical Communication.* Tata McGraw Hill Publishing Co Ltd, New Delhi.
3. *Raymond V Lesikar & Marie E. Flatley (2005). Basic Business Communication.* Tenth Ed. Tata McGraw Hill Publishing Co. Ltd, New Delhi.

# Engineering Mathematics – I

(Common to all branches)

Semester I  
15BESM01

Hours of Instruction/ week: 5  
No.of credits : 4

## Objectives:

To develop skills in diagonalising a matrix, applications of differential calculus and differential equations in various engineering fields.

### Unit I Matrices

15

Characteristic equation, Eigen values and eigenvectors of a real matrix, Properties of eigen values and eigenvectors, Cayley – Hamilton theorem (without proof), Orthogonal matrices, Reduction of quadratic form to canonical form by orthogonal transformation.

### Unit II Geometrical Applications of Differential Calculus

15

Curvature, Cartesian and polar co-ordinates, Centre and radius of curvature, Circle of curvature, Involutives and evolutes, Envelopes of family of curves.

### Unit III Ordinary Differential Equations

15

Simultaneous first order linear equations with constant coefficients, Linear equations of second order with constant and variable coefficients, Homogeneous equations of Euler type, Method of variation of parameters.

### Unit IV Application of Differential Equation

15

Solution of ODE related to electric circuits, motion of a particle in a resisting medium and simple harmonic motion.

### Unit V Functions of Several Variables

15

Functions of two variables, Partial derivatives, Total differential, Maxima & minima, Constrained maxima and minima, Lagrange's Multiplier method, Jacobians.

**Total hours - 75**

## Text Book :

*T.Veerarajan (2011). Engineering Mathematics for semester I and II.* updated second Edition. Tata McGraw,Hill Publishing Co.Ltd, New Delhi.

## References :

1. *Dr. M. Chandrasekaran, Dr. T. Arunachalam ,Dr. Gnanambal Ilango(2006). Engineering Mathematics – I.* Volume I, First Edition. Inder Pub, Coimbatore.
2. *E.Kreyszig (2001). Advanced Engineering Mathematics.* Eighth Edition. John Wiley and Sons (Asia) Ltd, Singapore.
3. *B.S.Grewal (2001). Higher Engineering Mathematics.* Thirty Sixth Edition. Khanna Publishers, Delhi.
4. *P.Kandaswamy K.Thilagavath and K.Gunavathy (2000). Engineering Mathematics.* Volume I. Fourth Revised Edition. S. Chand & Co, New Delhi.

**Engineering Physics**  
(Common to all branches)

**Semester I**  
**15BESP01**

**Hours of instruction/week :3**  
**No.of credits :3**

**Objectives:**

The aims of the course are

- 1.To impart fundamental knowledge in various topics of Physics and Engineering applications.
- 2.To enable the students to correlate the principles with applications.
- 3.To enhance theoretical ideas and introduce modern technological aspects.

**Unit I Ultrasonics**

**9**

Introduction, magnetostriction effect, Production of ultrasonic waves: Magnetostriction generator, Inverse piezoelectric effect, Piezoelectric generator, Detection of ultrasonic waves, Properties, Cavitations, soldering and cleaning, Non Destructive Testing, Pulse echo system, Through transmission and resonance system, Medical application: Ultrasonic Doppler Blood flow meter.

**Unit II Laser technology**

**9**

Principle of spontaneous emission and stimulated emission, Population inversion, Pumping mechanism, Types of lasers, He,Ne, CO<sub>2</sub>, Nd,YAG and Semiconductor laser, Applications: welding, heat treatment, cutting, holography, Medical applications (for eye and cancer treatment) .

**Unit III Fiber optics**

**9**

Principle, Modes of propagation, Crucible,crucible technique, Classification based on materials, refractive index profile, Light sources for fiber optics, Detectors, Fiber optical communication links, Applications: Temperature and displacement sensors,Endoscope

**Unit IV Quantum physics**

**9**

Introduction to Quantum theory, Dual nature of matter and radiation, de Broglie wave length, Uncertainty principle, Schrödinger's equation, Particle in a box, Electron microscope, Scanning electron microscope (SEM), Scanning Transmission Electron Microscope (STEM).

**Unit V Vacuum science**

**9**

Importance of vacuum in industries, Schematic diagram of a vacuum system, Pumping speed and throughput, Types of pumps, Working principle and construction of Rotary pump, Diffusion pump , Measurement of vacuum using pirani and penning Gauges.

**Total Hours: 45**

**Textbook:**

*G.Senthil Kumar ( 2011). Engineering Physics. Chennai Revised Edition. VRP Publisher.*

**References:**

1. *M.Arumugam (2007). Engineering Physics. Anuradha Agencies, Kumbakonam.*
2. *S.Jaya Kumar (2007). Engineering Physics. R.K.Publishers, Coimbatore.*
3. *P.K.Palanisamy (2006). Engineering Physics. Scitech Publications, Chennai.*

**Engineering Chemistry / Engineering Chemistry-I**  
(Common to all Branches)

**Semester I**  
**15BESC01**

**Hours of Instruction/week:3**  
**No.of credits:3**

**Objectives:**

- 1.To develop a sound knowledge of theoretical and modern technological aspects of Chemistry.
- 2.To apply the knowledge of Chemical principles in Engineering.

**Unit I Water Technology**

**10**

Characteristics, alkalinity, types of alkalinity and determination, hardness, types and estimation by EDTA method (problems); Domestic water treatment, disinfection methods (Chlorination, ozonation, UV treatment), Boiler feed water, requirements, disadvantages of using hard water in boilers, internal conditioning (phosphate, calgon and carbonate conditioning methods), external conditioning, demineralization process, desalination and reverse osmosis.

**Unit II Polymers and Composites**

**8**

Polymers, definition, polymerization, types, addition and condensation polymerization, free radical polymerization mechanism, Plastics, classification, preparation, properties and uses of PVC, Teflon, polycarbonate, polyurethane, nylon,6, 6, PET, rubber, vulcanization of rubber, synthetic rubbers, butyl rubber, SBR, composites, definition, types polymer matrix composites, FRP only.

**Unit III Non-Conventional Energy Sources and Storage Devices**

**8**

Nuclear energy, fission and fusion reactions and light water nuclear reactor for power generation (block diagram only ), breeder reactor, solar energy conversion , solar cells, fuel cells, hydrogen, oxygen fuel cell, batteries, alkaline batteries, lead, acid, nickel, cadmium and lithium batteries.

**Unit IV Surface Chemistry and Catalysis**

**9**

Adsorption, types of Adsorption, Adsorption of gases on solids, Adsorption isotherm, Freundlich, Langmuir isotherms, Adsorption of solutes from solutions, applications, role of adsorption in catalytic reactions, ion exchange adsorption, basic principles in adsorption chromatography, catalysis, classification, characteristics of catalysts, auto catalysis, enzyme catalysis, Michaelis , Menton equation, acid base catalysis.

**Unit V Spectroscopy**

**10**

Electromagnetic spectrum, absorption of radiation, electronic transition, vibrational transition, rotational transition, intensities of spectral lines, Beer, Lambert's Law, colorimetric analysis, estimation of concentration of a solution by colorimetry, flame photometry, theory, instrument (block diagram only ) and application, visible & UV spectroscopy, principles, instrument (block diagram only) and simple applications,IR spectroscopy, simple applications only.

**Total Hours : 45**

**Textbooks:**

1. *Jain P.C and Renuka Jain (2002). Engineering Chemistry.* Dhanpat Rai Pub,Co.(P)Ltd, New Delhi.
2. *Combined Authors (2011). Chemistry for Engineers.* First edition. ISBN 978,81,265,1988,0. Wiley, India.

**References:**

1. *B.S.Bhal, G.D.Tuli, and Arun Bhal. Essentials of Physical Chemistry.* S.Chand & Company Ltd, New Delhi.
2. *S.S.Dara (3). A Textbook of Engineering Chemistry.* S.Chand& Company Ltd, New Delhi.
3. *B.R.Puri, L.R.Sharma and Madan S.Pathania (2000). Principles of Physical Chemistry.* Shoban Lal Nagin Chand & Co, Jalandhar.
4. *P.C.Jain and Renuka Jain (2001). Physical Chemistry for Engineers.* Dhanpat Rai & Sons, New Delhi.

## Physics and Chemistry Practicals-I

(Common to all Branches)

Semester I  
15BESP03

Hours of Instruction/week:2  
No.of credits:1

### Part A -Physics

#### Objectives:

- To impart experimental skills on potentially important experiments needed for Engineering.
- To inculcate technical skill in handling of instruments and the calculation methods.

#### List of Experiments

1. LASER- Particle size determination-Grating
2. Ultrasonic interferometer-Determination of compressibility of a liquid
3. Fiber optics – Numerical aperture (It should be moved to I semester from II semester)
4. Melde's apparatus- Frequency of the vibrator
5. Spectrometer- wavelength determination –Grating
6. Torsional Pendulum-Rigidity modulus of wire and moment of inertia of disc

### Part B –Chemistry

#### Objectives:

- To impart hands on experience in the use of analytical equipments
- Should be conversant with the theoretical principles and experimental procedures for quantitative estimation.

#### List of Experiments

1. Determination of total hardness, temporary & permanent hardness of water by EDTA method.
2. Determination of DO content by Winkler's method.
3. Determination of alkalinity in a water sample.
4. Determination of chloride content of water sample by argentometric method.
5. Colorimetry
6. UV Spectrophotometry
7. Flame photometry

A minimum of FIVE experiments each in Physics and Chemistry shall be offered. Laboratory classes on alternate weeks for Physics and Chemistry.

**Total Hours: 30**

# Problem Solving Using C

Semester I  
15BEBI01 / 15BEOC01/  
15BELI01 / 15BEEI01/  
15BEFI01/15BEIC01

Instruction hours/week:4  
No. of credits: 4

## Objectives:

- To understand the fundamentals of Computer and Information Technology
- To understand what an algorithm is and to know how to express solution of a problem using an algorithm
- To learn the concept and coding using C language.

## Unit I Basics of Computer and Problem Solving Methodology

Digital Computer Fundamentals,Block diagram of computer,Components of a computer system,12 Applications of Computers, Hardware and Software definitions, Categories of Software,Booting,Installing and uninstalling Software,Software piracy,Software terminologies,Information Technology Basics,History of Internet,Internet Tools,Problem solving Techniques,Program,Program development cycle,Algorithm, Flow chart, Pseudo Code, Program control structures, Types and generation of programming languages, Development of algorithms for simple problems.

## Unit II Basic Elements of C and Decision Making

Introduction to C, Lexical elements of C, Operators and expressions, Operator precedence and associativity of operators, Input and Output Functions, Simple computational problems, Control 12 statements, Branching, looping, nested control structures, switch, break, continue, go to statements, Problems using control structures.

## Unit III Functions, Program Structures and Arrays

Prototypes and Functions,Declaring, defining and accessing functions,Parameter passing methods,Recursion,Storage classes:auto, extern, static and register,Library functions,Programs 12 using Functions, defining and processing arrays,Passing arrays to functions,Multi,dimensional arrays,Strings and basic operations on strings,Enumerated data types,Programs using simple sorting, searching and merging of arrays

## Unit IV Pointers

Pointer concept,Declaration,Accessing variable through pointer,Initializing pointer variable,Pointers and Functions,Pointers and Arrays,Pointers and Structures,Example programs12 using pointers with function, arrays and structures,Command line arguments, Dynamic memory allocation,Operations on pointers

## Unit V Structures, Union and File Handling

Structures,User defined data types,Union,Nested structure, passing structures to functions, Self referential structures, File pointer,High level File operations,Opening and closing of 12 file,Creating, Processing and Updation on files,Simple file handling programs,Low level Programming,Additional Features of C.

**Total hours: 60**

**Text books:**

1. ***Jeri R. Hanly and Elliot B. Koffman (2005). Problem Solving and Program Design in C. Fourth Edition. Pearson Education India.***
2. ***E.Balagurusamy (2006). Programming in ANSI C. Tata McGraw Hill. Third Edition.***

**Reference:**

1. ***Byron Gottfrie (2006). Programming with C. II Edition. (Indian Adapted Edition). TMH publications.***

## **C Programming Practicals**

**Semester I**

**15BEBI02/15BEOC02/  
15BELI02/ 15BEEI02/  
15BEFI02/ 15BEIC02**

**Instruction hours/week:2**

**No. of credits:1**

### **Objective:**

- To provide hands on training on C language.

### **List of Experiments**

#### **C Programs:**

1. Programs using conditional operator and if statement
2. Programs using Switch .....Case Statements
3. Programs using for, while and do while loops
4. Programs using Arrays
5. Programs using Functions and Recursive Functions
6. Programs using Structures
7. Programs using Pointers
8. Programs using File Operations

**Total hours: 30**



## **Engineering Practices Practicals**

**Semester I**  
**15BEBI03 / 15BELI03/ 15BEFI03**

**Instruction hours/week: 2**  
**No. of credits: 1**

### **Objectives**

- To cater to the needs of the practical application and to help in learning Engineering skills in Civil, Mechanical, Electrical and Electronics
- To provide adequate knowledge in the Plumbing & Pipe fitting, Wiring, Joints type, Simple turning & Drilling and soldering simple electronics components.

### **Part A**

1. Study of Carpentry tools
2. Study of pipeline joints
3. Preparation of Half Lap joint
4. Preparation of T-Lap Joint
5. Household wiring – series and parallel connections with single switch.
6. Household wiring – series and parallel connections with two switches.
7. Stair case light wiring.
8. Safety Measures in the use of electricity.

### **Part B**

1. Simple turning and drilling operations
2. Preparation of Sand Mould
3. Preparation of square butt joint in Arc welding
4. Study of centrifugal pump
5. Soldering simple electronic circuits
6. Assembling electronic components on a small PCB and testing
7. V-I Characteristics of PN Junction Diode
8. V-I Characteristics of Zener Diode
9. Study of telephone, FM radio, Low, voltage power supplies

**Total Hours: 30**

### **Examination Pattern**

**The Examination is to be conducted for both parts A & B, allotting 1 ½ for each part.**

**Engineering Graphics**  
(Common to all branches)

**Semester I**  
**15BEVC01/ 15BEOI01/**

**Instruction hours/week: 5(3+2)**  
**No. of credits: 4**

**15BEEI03/ 15BEII01**

**Objectives**

- To develop in students graphic skill for communication of concepts, ideas
- Design of engineering products and expose them to existing national standards related to technical drawings.

**Unit I Scales, Projection of Points, Lines and Surfaces 15**

Introduction to letter practice, scales used in engineering practice and representative fraction, the principles, construction of plain diagonal vernier scale, orthographic projection of points, Projection of straight lines located in the first quadrant only, determination of true length and true inclination, Projections of plane surfaces like polygonal lamina and circular lamina, located in first quadrant only.

**Unit II Projection of Simple Solids 15**

Projection of simple solids like prism, pyramid, and cylinder, Drawing views when the axis of the solid is inclined to one reference plane.

**Unit III Sectioning of Solids 15**

Sectioning of simple solids like prisms, pyramids, cylinder, cone and sphere. Obtaining sectional views and true shape when the axis of the solid is vertical and cutting plane inclined to one reference plane.

**Unit IV Isometric, Perspective Projection and freehand sketching 15**

Isometric projections, Isometric scale, Isometric views of simple solids, Free hand sketching techniques, sketching of orthographic views from given pictorial views of objects, including freehand dimensioning. Sketching pictorial views from given orthographic views. Perspective projections of solids.

**Unit V Auto CAD 15**

Introduction to drafting software, creation of simple geometric bodies using basic primitives (line, arc, circle) and editing the drawings. Practice in drawing orthographic projection

**Total Hours: 75**

**Text books:**

1. *Venugopal.K (2008). Engineering Graphics.* New Age International (P) Limited.
2. *Natarajan K.V (2008).Engineering drawing and graphics.* 17<sup>th</sup>Edition.Private Publisher, Chennai.
3. *Bhatt N.D (2003). Engineering Drawing.* 46<sup>th</sup> Edition. Charotar Publishing House.

## References:

1. **Kumar M.S (2007). *Engineering Graphics*.** Ninth edition. D.D. Publications, Chennai.
2. **Warren J, Luzadder and John.M.Duff (2007). *Fundamentals of Engineering Drawing*.** Eleventh edition. PrenticeHall of India Pvt., Ltd.,
3. **Gopalakrishnan K.R (2007). *Engineering Drawing (Vol.I& II)*.**Subhass Publications,
4. **Bertoline and Wiebe (2007). *Fundamentals of graphics Communication*.** Third edition. McGrawhill.
5. **DhananjayA.Jolhe (2008). *Engineering Drawing with an introduction to AutoCAD*.** Tata McGraw Hill Publishing Company Limited.



# Engineering Practices Practicals

Semester I  
15BEVI01 / 15BEPI02

Instruction hours/week: 2  
No. of credits: 1

## Objectives

- To cater to the needs of the practical application and to help in learning Engineering skills in Civil, Mechanical, Electrical and Electronics
- To provide adequate knowledge in the Plumbing & Pipe fitting, Wiring, Joints type, Simple turning & Drilling and soldering simple electronics components.

## Part A

1. Study of Carpentry tools
2. Study of pipeline joints
3. Preparation of Half Lap joint
4. Preparation of T-Lap Joint
5. Household wiring – series and parallel connections with single switch.
6. Household wiring – series and parallel connections with two switches.
7. Stair case light wiring.
8. Safety Measures in the use of electricity.

## Part B

1. Simple turning and drilling operations
2. Preparation of Sand Mould
3. Preparation of square butt joint in Arc welding
4. Study of centrifugal pump
5. Soldering simple electronic circuits
6. Assembling electronic components on a small PCB and testing
7. V-I Characteristics of PN Junction Diode
8. V-I Characteristics of Zener Diode
9. Study of telephone, FM radio, Low, voltage power supplies

**Total Hours: 30**

## Examination Pattern

**The Examination is to be conducted for both parts A & B, allotting 1 ½ for each part.**

## Management Information System

**Semester I**  
**15BEHS02**

**Instruction Hours/ week: 5**  
**No. of credits: 4**

### Objectives

To study the organisation system concept with its functional management and managing the database

### Unit I The Organisation & System Concept

Its Manager, Structure and activities, Introduction, The environment of organisations -Information flows,15 Information needs and sources of information, Types of management decisions and information need, Business and Technical Dimensions of information. System classification, System concept, system characteristics, The elements of systems; Input, output, process, feedback control and boundary, System function and operations, Transactions processing Information system. Information system for managers. Intelligence information systems, The meaning and role of MIS.

### Unit II System Analysis and Design

The work of system analyst, The assignment brief and mutual investigation, feasibility study, system15 design, Data collection and preparation, Detailed system Design, Implementation, Evaluation and maintenance of MIS, Pitfalls in mis-development.

### Unit III Functional Management Information Systems

Production information system, Marketing information system, Accounting information system,15 Financial Information System, Personnel Information System. Inter-relationship of Functional Management Information Systems.

### Unit IV Data Base Systems

Information as a resource, meaning of Data base, Components of data base, DBMS, Data base15 Technology, Operations data base/Managerial Database, Comparison of DBMS, Design Principles of data base, Data base administration, Advantages and disadvantages of data base.

### Unit V Computer Power

Source and selection : Computer purchase, Computer rental from the manufacturer, Computer lease from15 a third party, acquisition of a used Computer, Computers, Service centres, Time Sharing Companies, Facilities management Companies, The criteria for choice, Computer System Selection, Acquiring a small business computer, Source selection.

**Total Hours: 75**

### References:

1. *NehaGhai.,Management Information System*, S.K. Kataria& Sons (2012).
2. *Donald Yeates., Sytem Analysis and Design*, Prentice Hall (2003)
3. *AviSliberSchatz., Database System Concepts*, McGraw-Hill Education (2010).
4. **Source from Internet for Unit V**

## Professional English Practices

Semester II  
15BEHS03

Hours of instruction/week:4  
No.of credits: 3

### Objectives:

1. To make learners acquire listening and speaking skills in both formal and informal contexts.
2. To make them acquire language skills at their own pace by using language lab components.
3. To make the students communicate their thoughts, opinions and ideas freely and naturally.

### Exercises:

<b>I</b>	<b>Group Discussion</b>	<b>8</b>
	GD strategies, initiating a discussion, persuasion skills, body language, ways of interrupting (non-offending), summarizing and concluding.	
<b>II</b>	<b>Interview Skills</b>	<b>8</b>
	Introducing oneself, listing one's aspirations and goals, systematically expressing one's achievement (academic as well as professional), listening keenly and gently manipulating the interviewer, e mail etiquette.	
<b>III</b>	<b>Presentation Skills</b>	<b>10</b>
	Business and technical presentation, technical articles (for journals and conferences), business etiquette.	
<b>IV</b>	<b>Active Listening Practices</b>	<b>8</b>
	Speech decoding, comprehending, types of conversation, formal and informal, listening to academic, business and technical speeches.	
<b>V</b>	<b>Online Grammar Exercises</b>	<b>8</b>
	Editing the passage, cloze exercises, jumbled sentences, tag question, usage of tenses, phrasal verbs, sentence patterns.	
<b>VI</b>	<b>Vocabulary Enrichment</b>	<b>8</b>
	Word formation, technical jargon, words often confused and misused, homophones.	
<b>VII</b>	<b>Book Review</b>	<b>10</b>
	Reading inspiring articles, inferring meanings, reading between the lines and beyond the lines, understanding implicit and explicit ideas.	

**Total Hours.:** 60

### References :

1. *Aysha Viswamohan (2008). English for Technical Communication.* Tata McGraw Hill Publishing Co. Ltd, New Delhi.
2. *M. Ashref Rizvi (2005). Effective Technical Communication.* Tata McGraw Hill Publishing Co. Ltd, New Delhi.
3. *Dr.K.Devadoss and P.Malathi (2008). Customize Yourself to Corporate Life.* Inder Publications, Coimbatore.

## TQM for Graphic Art Industry

Semester II  
15BEHS04

Instruction Hours/ week: 3  
No. of credits: 3

### Objective

- To introduce the management methods used to enhance quality and productivity in printing organizations

9

### Unit 1 TQM in Graphic Industry

Introduction of TQM, definition of quality and related terms, basic elements of TQM, characteristics, advantages, holistic features, application of quality concept, quality principles

### Unit II TQM Models

TQM models -Kaizen, European Quality Awards, MalcomBaldrige Award, Indian Quality Awards, Motorola 6 sigma concepts, zero defect quality, quality circles, quality function deployment, quality by design. Quality gurus and their contribution, Deming, Crosby, Taguchi, Ishikkava, Juran.

### Unit III Statistical Process Control for TQM in Graphic Arts Industry

Statistical process control (SPC), purpose of SPC, SPC tools -process maps, Ishikawa diagrams, check sheets, Pareto analysis, histograms, run charts, contact charts, correlation diagrams, monitoring variables –X/R-chart, monitoring print attributer-P-chart, counting defects-C-chart.,

### Unit IV Process Re-engineering and Sustaining Total quality

9

Process re-engineering, principles, requirements, steps in re-engineering, re-engineering and TQM, benefits and limitations. Corporate culture, designing total quality culture, best practices, self-assessment for total quality, total quality environment, implementation and sustaining quality.

### Unit V Certification Process

9

Fine tenets of continual process improvement, supplier certification process. Internal and external suppliers and customers, analysis of present supplier and preferred supplier situation, desired outcomes of the supplier certification process, services offered by the supplier, ISO:9000 (2000), ISO:14000, QS:8000 standards.

**Total Hours: 45**

### References:

- Herschel L.A.(1995). *Implementing TQM in Graphic Art*. PiraandGATF, Pittsburg.
- Arora S.C.(1996). *Applying ISO 9000 Quality Management System*. International Trade Centre, Switzerland.
- Bhat K.S. (2005). *Total Quality Management*. Himalaya Publishing House, Bangalore.



**Engineering Mathematics – II**  
(Common to all branches)

**Semester II**  
**15BESM02**

**Hours of Instruction/ week: 5**  
**No. of credits: 4**

**Objectives:**

1. To enhance knowledge in multiple integrals, Laplace transform and its applications in Engineering.
2. To understand the concepts of complex integration and contour integration.

**Unit I Multiple Integrals** **15**

Double integration, Cartesian and polar coordinates, Change of order of integration, Area as a double integral, Triple integration in Cartesian coordinates, Change of variables between Cartesian and polar coordinates

**Unit II Vector Calculus** **15**

Gradient, divergence and curl, Line, surface and volume integrals, Green's, Gauss divergence and Stoke's theorems (without proof) , Verification of the above theorems and evaluation of integrals using them.

**Unit III Laplace Transform** **15**

Laplace Transform, Sufficient conditions, Transforms of elementary functions, Basic properties, Inverse transforms, Derivatives and integrals of transforms, Transforms of derivatives and integrals, Convolution theorem, Transform of periodic functions, Application to solution of linear ordinary differential equations up to second order with constant coefficients.

**Unit IV Analytic Functions** **15**

Function of a complex variable, Analytic function, Necessary conditions, Cauchy – Riemann equations in Cartesian coordinates, Sufficient conditions (Proof not included), Properties of analytic function, Determination of harmonic conjugate by Milne – Thomson method, Conformal mapping,  $w = z + a, az, \frac{1}{z}$

**Unit V Complex Integration** **15**

Statement and application of Cauchy's theorem and Cauchy's integral formula, Taylor and Laurent expansion, Singularities, Classification, Residues, Cauchy's residue theorem, Contour integration, Unit circle and semi-circular contours (excluding poles on real axis).

**Total hours - 75**

**Text Book :**

**T.Veerarajan (2002). Engineering Mathematics ( for First Year ).**Second Edition. Tata McGraw–Hill Pub. Co. Ltd, New Delhi.

**References:**

- 1.**B.S.Grewal (2001). Higher Engineering Mathematics.** Thirty Sixth Edition. Khanna Publishers,Delhi.
- 2.**P.Kandaswamy,K.Thilagavathi &K.Gunavathi (2003). Engineering Mathematics.** Fifth Edition & sixth Edition .S.Chand & Company Ltd, New Delhi.

**Materials Science**  
(Common to all Branches)

**Semester II**  
**15BESP02**

**Hours of Instruction/week:3**  
**No. of credits: 3**

**Objectives:**

- 1.To understand the properties and applications of different engineering materials.
- 2.To learn the concept of smart and nanomaterials.
- 3.To impart knowledge on advance materials and devices.

**Unit I Semiconducting materials** **9**

Elemental and compound semiconductors, Intrinsic and Extrinsic semiconductors, Properties, Materials preparation: Zone refining technique, Carrier concentration in intrinsic and extrinsic semiconductors, Hall effect, Hall coefficient in extrinsic semiconductors, Experimental determination of Hall coefficient, Application of Hall effect, Semiconductor devices, Solar Cells, LDR and LCD.

**Unit II Magnetic materials** **9**

Classification and Properties, Domain theory of ferromagnetism, Hysteresis, Hard and soft magnetic materials, Ferrites, Applications, Devices: Magneto optical recording, storage of magnetic data, Floppy and magnetic disc drives, Magnetic bubble memory.

**Unit III Dielectric and superconducting materials** **9**

Study of various polarization, Effect of temperature and frequency on dielectric constant, Breakdown mechanisms, Applications, Ferroelectric energy converter, Types of superconductors, Properties, BCS theory (qualitative), High T<sub>c</sub> superconductors, Application of superconductors, SQUID, Cryotron, Magnetic levitation.

**Unit IV Nano and smart materials** **9**

Dimensionality and size dependence, Fabrication methods: Top,down process (ball milling and lithographic process) and Bottom,up process (Physical vapour deposition and sol,gel method), Shape Memory alloys (SMA), Characteristics, Properties of NiTi alloys.

**Unit V Nano structures and devices** **9**

Carbon nanotubes (CNT), Properties, Fabrication (Laser ablation, Electric arc discharge), Applications, Organic light emitting diode (OLED), CNT field effect transistor, fuel cells, Basic Principles of Quantum well, Quantum dot Laser.

**Total Hours: 45**

**References:**

1. *S.Jaya Kumar (2008). Materials Science.* R.K.Publishers, Coimbatore.
2. *P.K.Palanisamy (2003). Materials Science.* 2<sup>nd</sup> Edition. Scitech Publication, Chennai.
3. *M.Arumugam (2003). Material Science.* 4<sup>th</sup> Edition. Anuradha Agencies, Kumbakonam.

**Applied Chemistry  
(BMIE)**

**Semester II  
15BESC02**

**Hours of Instruction/week:3  
No.of credits:3**

**Objectives:**

- 1.To impart knowledge on the fundamental chemical principles.
- 2.To make students competent in application of chemical concepts in the field of bio medical engineering.

**Unit I Photo Chemistry**

**9**

Photochemical reactions, laws of photochemistry, Grothaus- Draper law, Stark- Einstein law, quantum efficiency, photochemical decomposition of HI and HBr, quantum yield determination, chemical actinometer, energy transfer in Photochemical reactions, photosensitization and quenching (example, Photosynthesis in plants), chemiluminescence, photo physical processes, fluorescence, phosphorescence, photo inhibitors, radiation chemistry, radiolysis, principles, radiation dosimetry (units, Fricke dosimeter)

**Unit II Corrosion and its Inhibition**

**9**

Corrosion, causes of corrosion, principles of chemical corrosion, Pilling- Bedworth rule, principles of electrochemical corrosion, factors influencing corrosion, types of corrosion, galvanic corrosion, differential aeration corrosion, stress corrosion, soil corrosion, pitting corrosion, water line corrosion, corrosion control, cathodic protection, sacrificial anode, selection of materials and proper designing, corrosion inhibitors, anodic and cathodic inhibitors, protective coatings, electroplating, electroless plating.

**Unit III Phase Rule**

**9**

Phase rule, introduction, phase, component, degrees of freedom, phase diagrams, applications of phase rule to one component systems and two component systems, phase transformations, basic ideas.

**Unit IV Basic Bio Materials**

**9**

Bulk properties, Surface properties and characterization, polymers, silicone biomaterials, medical fibres and biotextiles, smart polymers, bioresorbable and bioerodible materials, natural materials, metals and ceramics, physicochemical surface modification.

**Unit V Biocompatibility Concepts**

**9**

Introduction to biocompatibility, cell material interaction, types of materials, toxic, inert, bioactive, long term effects of materials within the body, cell response. chemical and biochemical degradation of polymers, degradation of metals and ceramics, calcification of biomaterials.

**Total hours : 45**

**Textbooks:**

1. **P.C. Jain and Renuka Jain (2002). Engineering Chemistry.** Dhanpat Rai Pub,Co.(P)Ltd., New Delhi.
2. **B.R.Puri C.R.Sharma and Madan S.Pathania (2000). Principles of Physical Chemistry.** Shoban Lal Nagin Chand & Co.

**References:**

1. **Jonathan Black (2006). Biological Performance of Materials Fundamentals of Biocompatibility.** 4<sup>th</sup> Edn. CRC Press.
2. **B.S.Bahl G.D.Tuli and Arun Bhal (2003). Essentials of Physical Chemistry.** S.Chan & Co.Ltd, New Delhi.
3. **Buddy D Ratner,Allan S Hoffman (2004). Biomaterials Science An indroduction to materials in Medicine.** Elsevier academic press.
4. **D.John Enderle, M.Susan Blanchard, D.Joseph Bronzino (2005). Introduction to Biomedical Engineering.** 2<sup>nd</sup> Edn. Elsevier AcademicPress.

**Chemistry for Civil Engineers**  
(Civil)

**Semester II**  
**15BESC03**

**Hours of Instruction/week:3**  
**No.of credits:3**

**Objectives:**

- 1.To provide students with a background in important concepts and principles of Chemistry.
- 2.To use the knowledge of Chemistry in describing and solving real technological problems.

**Unit I Corrosion and its Control**

**9**

Chemical corrosion,Pilling,Bedworth rule,electrochemical corrosion,principle,different types,galvanic corrosion,differential aeration corrosion,factors influencing corrosion,corrosion control,selection of materials and proper designing,sacrificial anode and impressed cathodic current methods,corrosion inhibitors.

**Unit II Pollution**

**9**

Air pollution, sources, classification of air pollutants,gaseous pollutants, oxides of carbon,sulphur, nitrogen, hydrocarbons,photochemical smog,particulates,green house effect, ozone depletion,prevention of air pollution, Soil pollution,sources and effects, solid waste management

**Unit III Water Pollution**

**9**

Physical, chemical biological characteristics of water, sources of water pollution,physico chemical analysis of water,colour,turbidity,total solids, BOD,COD,waste water treatment,sewage treatment and disposal, primary, secondary, tertiary treatment

**Unit IV Nano Materials**

**9**

Size dependence of properties, electrical, optical, magnetic and mechanical properties. synthesis of nanomaterials, traditional chemical routes, colloid nanoparticles, self assembly of colloid nanoparticles, eletrodeposition, electrostatic self assembly, Langmuir- Blodgett (LB) technique, organic films in conventional microelectronics and optoelectronic devices. electrical and electrochemical optical sensors, vapour sensors, biosensors.

**Unit V Engineering Materials**

**9**

Refractory, classification, acidic, basic, and neutral refractory, Properties (refractoriness, refractoriness under load, dimensional stability, porosity, thermal spalling), manufacture of alumina, magnesite and zirconia bricks, abrasives, natural and synthetic abrasives,quartz,corundum,emery,garnet,diamond,silicon carbide and boron carbide. Lubricants,properties, viscosity index, flash and fire points, cloud and pour points, oilyness, aniline point, solid lubricants, graphite and molybdenum sulphide, semisolid lubricants,greases.

**Total Hours : 45**

**Textbooks:**

- 1.*P.C Jain & Monika Jain (2002). Engineering Chemistry.* Dhanpat Rai Publishing Co Ltd, New Delhi.
- 2.*T.Ramachandran, H.Venkataraman, P.N.Magudeswaran (2008). Chemistry for Engineers.* Vijay Nicole Imprints Private Ltd, Chennai.

**References:**

- 1.*P.C.Jain .And Renuka Jain (2001). Physical chemistry for engineers.* Dhanpat Rai Publishing Co Ltd, New Delhi.
2. *Lloyd A.Munro (2009). Chemistry in Engineering.* Prentice Hall Inc., London.
3. *B.K.Sharma (2002). Industrial Chemistry.* Goel Publishing house, Meerut.

**Engineering Chemistry-II**  
(Common to CSE, ECE, EEE, IT, PT)

**Semester II**  
**15BESC04**

**Hours of Instruction/week:3**  
**No. of credits: 3**

**Objectives:**

- 1.To provide students with a background in important concepts and principles of Chemistry.
- 2.To use the knowledge of Chemistry in describing and solving real technological problems.

**Unit I Electrochemistry**

**9**

Electrochemical cells, reversible and irreversible cells, EMF, measurement of emf, electrode potential, Nernst equation (problem), Reference electrodes, Standard Hydrogen electrode, Calomel electrode, Ion selective electrode, glass electrode and measurement of pH, electrochemical series, significance, potentiometric titrations (redox,  $\text{Fe}^{2+}$  vs dichromate and precipitation,  $\text{Ag}^+$  vs  $\text{Cl}^-$ ) and conductometric titration (acid, base,  $\text{HCl}$  vs  $\text{NaOH}$ ).

**Unit II Corrosion and its control**

**9**

Chemical corrosion, Pilling-Bedworth rule, electrochemical corrosion, principle, different types, galvanic corrosion, differential aeration corrosion, factors influencing corrosion, corrosion control, selection of materials and proper designing, sacrificial anode and impressed current cathodic protection methods, corrosion inhibitors.

**Unit III Polymers for Electronics**

**9**

Conducting polymers, conducting mechanism, applications, Organic light emitting diodes, sensors, circuit Boards, rechargeable batteries, photoconductive polymers, applications, thermo sensitive polymers, applications.

**Unit IV Nano Materials**

**9**

Size dependence of properties, electrical, optical, magnetic and mechanical properties, synthesis of nanomaterials, traditional chemical routes, colloid nanoparticles, self assembly of colloid nanoparticles, electrodeposition, electrostatic self assembly, Langmuir-Blodgett (LB) technique, organic films in conventional microelectronics and optoelectronic devices, electrical and electrochemical optical sensors, vapour sensors, biosensors.

**Unit V Engineering Materials**

**9**

Refractory, classification, acidic, basic, and neutral refractory, Properties (refractoriness, refractoriness under load, dimensional stability, porosity, thermal spalling), manufacture of alumina, magnesite and zirconia bricks, Abrasives, natural and synthetic abrasives, quartz, corundum, emery, garnet, diamond, silicon carbide and boron carbide. Lubricants, properties, viscosity index, flash and fire points, cloud and pour points, oiliness, aniline point, solid lubricants, graphite and molybdenum sulphide, semisolid lubricants, greases.

**Total Hours: 45**

**Textbooks:**

1. *P.C Jain & Monika Jain (2002). Engineering Chemistry.* Dhanpat Rai Publishing Co Ltd, New Delhi.
2. *T.Ramachandran, H.Venkataraman, P.N.Magudeswaran (2008). Chemistry for Engineers.* Vijay Nicole Imprints Private Ltd, 29, Chennai.

**References:**

1. *P.C.Jain And Renuka Jain (2001). Physical chemistry for engineers.* Dhanpat Rai Publishing Co Ltd, New Delhi.
2. *Organic and Inorganic Nanostructures (2005).* Alexei Nabok. Artech House, Inc.
3. *B.K.Sharma (2002). Industrial Chemistry.* Goel Publishing house, Meerut.
4. *S.S.Dara (2006). A Textbook of Engineering Chemistry.* S.Chand & Company Ltd, New Delhi.

**Chemistry of Food Materials**  
(FPPT)

**Semester II**  
**15BESC05**

**Hours of Instruction/week:3**  
**No.of credits: 3**

**Objectives:**

1. To impart basic knowledge of Chemistry and Biochemistry in food components and their functional properties.
2. To provide an overview of the basic principle, procedures and applications for food analysis in laboratory experiments.

**Unit I Carbohydrates and Proteins**

**9**

Carbohydrates, definition, classification symmetry, isomerism, formulation of monosaccharides, reactions of glycosidic OH group and alcoholic OH group and CHO/CO groups, applications, Proteins, general structure, electrochemical properties, configuration, chemical bonds involved in protein structure, colour reactions for amino acids, applications

**Unit II Lipids and Nucleic Acids**

**9**

Lipids, definition, components of lipids, classification, changes during food processing, rancidity, characterization, acid number, saponification number, iodine number, RM number, biological functions Nucleic acids, definition, components, phosphoric acid, sugar and nitrogenous base, DNA, double helical structure, RNA types, informosome

**Unit III Food Additives**

**9**

Preservatives, sweeteners, food colours, flavouring agents, emulsifying agents, stabilizing and antifoaming agents, Antioxidants, classification and basic concepts.

**Unit IV Instrumentation for Analysis**

**9**

Chromatography, principles and techniques of paper, gas, ion exchange and high performance chromatography, fluorimetry, spectrophotometry, pHmetry, densitometry NMR applications.

**Unit V Pollution Control in Food Industries**

**9**

Industrial waste treatment methods, treatment of dairy wastes, sugar industry wastes, meat and poultry wastes, distillery and brewery wastes, starch industry wastes.

**Total Hours : 45**

**Textbooks:**

1. **R.Fennema Owen (2007). Food chemistry.** Marchel Dekhar, New York.
2. **Lillian Hoagland Meyer (2004). Food Chemistry.** CBS Publishers & Distributors, New Delhi.

**References:**

1. **Clair N.Sawyer and Perry L.McCarty (2003). Chemistry for Environmental Engineering & Science.** McGraw Hill Book Company.
2. **S.N.Mahindru (2004.) Food Additives** Tata Mc Graw Hill Publishing Company Limited, New Delhi.
3. **Rao, M.N. and A.K.Datta (2008). Waste Water treatment.** Oxford and IBH Publishing Co. Pvt. Ltd.
4. **Suzanne Nielson (2002). Introduction to chemical analysis of foods.** Jones and Barlett Publishers, London.

## Physics and Chemistry Practicals-II

(Common to all Branches)

Semester II

15BESP04

Hours of Instruction/week:2

No.of credits:1

### Part A -Physics

#### Objectives:

1. To impart experimental skills on potentially important experiments needed for engineering.
2. To inculcate technical skill in handling of instruments and the calculation methods.

#### List of Experiments

1. LCR Bridge –Dielectric constant of solids
2. Four Probe Apparatus-Bandgap of a semiconductor
3. Hysteresis loop- Hysteresis curve tracer
4. Solar cell-V-I characteristics
5. Hall effect-carrier concentration
6. LASER- wavelength determination-Grating

### Part B-Chemistry

#### pH

- 1.To find out the strength of given hydrochloric acid by sodium hydroxide.

#### Conductometry

- 1.Conductometric titration of mixture of acids.
- 2.Conductometric precipitation titration using  $\text{BaCl}_2$ ,  $\text{Na}_2\text{SO}_4$ .

#### Potentiometry

- 1.Redox titration, Iron Vs. dichromate.

#### Viscometry

- 1.Determination of molecular weight of a polymer.

**Total Hours: 30**

**Engineering Graphics**  
(Common to all branches)

**Semester II**  
**15BEBI04/15BELI04/15BEFI04/15BEPI03**

**Instruction hours/week: 5(3+2)**  
**No. of credits: 4**

**Objectives**

- To develop in students graphic skill for communication of concepts, ideas
- Design of engineering products and expose them to existing national standards related to technical drawings.

**Unit I Scales, Projection of Points, Lines and Surfaces** **15**

Introduction to letter practice, scales used in engineering practice and representative fraction, the principles, construction of plain diagonal vernier scale, orthographic projection of points, Projection of straight lines located in the first quadrant only, determination of true length and true inclination, Projections of plane surfaces like polygonal lamina and circular lamina, located in first quadrant only.

**Unit II Projection of Simple Solids** **15**

Projection of simple solids like prism, pyramid, and cylinder, Drawing views when the axis of the solid is inclined to one reference plane.

**Unit III Sectioning of Solids** **15**

Sectioning of simple solids like prisms, pyramids, cylinder, cone and sphere. Obtaining sectional views and true shape when the axis of the solid is vertical and cutting plane inclined to one reference plane.

**Unit IV Isometric, Perspective Projection and freehand sketching** **15**

Isometric projections, Isometric scale, Isometric views of simple solids, Free hand sketching techniques, sketching of orthographic views from given pictorial views of objects, including freehand dimensioning. Sketching pictorial views from given orthographic views. Perspective projections of solids.

**Unit V Auto CAD** **15**

Introduction to drafting software, creation of simple geometric bodies using basic primitives (line, arc, circle) and editing the drawings. Practice in drawing orthographic projection

**Total Hours: 75**

**Text books:**

1. *Venugopal.K (2008). Engineering Graphics.* New Age International (P) Limited.
2. *Natarajan K.V (2008).Engineering drawing and graphics.* 17<sup>th</sup>Edition.Private Publisher, Chennai.
3. *Bhatt N.D (2003). Engineering Drawing.* 46<sup>th</sup> Edition. Charotar Publishing House.



## References:

1. **Kumar M.S (2007). *Engineering Graphics*.** Ninth edition. D.D. Publications, Chennai. .
2. **Warren J, Luzadder and John.M.Duff (2007). *Fundamentals of Engineering Drawing*.**  
Eleventh edition. PrenticeHall of India Pvt., Ltd.,
3. **Gopalakrishnan K.R (2007). *Engineering Drawing (Vol.I& II)*.**Subhass Publications,
4. **Bertoline and Wiebe (2007). *Fundamentals of graphics Communication*.** Third edition.  
McGrawhill.
5. **DhananjayA.Jolhe (2008). *Engineering Drawing with an introduction to AutoCAD*.** Tata  
McGraw Hill Publishing Company Limited.

**Basic Civil and Mechanical Engineering**  
(Common for BMIE, ECE, EEE, PT)

**Semester II**  
**15BEBI05/15BELI05/15BEFI05/15BEEI04**

**Instruction hours/week:4**  
**No. of credits :4**

**Objectives:**

1. The Subject introduce the characters of common constructive materials such as stones, bricks etc... and basic methods of measuring the field.
2. To provide knowledge about IC engines, boilers and power plant.

**A- Civil Engineering**

**Unit I Surveying and Civil Engineering Materials** **12**

Surveying: Objects, types, classification, principles, measurements of distances, angles, leveling, determination of areas, illustrative examples.

Civil Engineering Materials: Bricks, stones, sand, cement, concrete, steel section.

**Unit II Building Components and Structures** **12**

**Foundations:** Types, Bearing capacity, Requirement of good foundations.

**Superstructure:** Brick masonry, stone masonry, beams, columns, lintels, roofing, flooring, plastering, Mechanics, Internal and external forces, stress, strain, elasticity, Types of Bridges and Dams, Basics of Interior Design and Landscaping.

**B-Mechanical Engineering**

**Unit III Power Plant Engineering** **12**

Introduction, Classification of Power Plants, Working principle of steam, Gas, Diesel, Hydroelectric and Nuclear Power plants, Merits and Demerits, Pumps and turbines, working principle of Reciprocating pumps (single acting and double acting), Centrifugal Pump.

**Unit IV I C Engines** **12**

Internal combustion engines as automobile power plant, Working principle of Petrol and Diesel Engines, Four stroke and two stroke cycles, Comparison of four stroke and two stroke engines , Boiler used in power plant.

**Unit V Refrigeration and Air Conditioning System** **12**

Terminology of Refrigeration and Air Conditioning. Principle of vapour compression and absorption system, Layout of typical domestic refrigerator, Window and Split room Air conditioner.

**Total hours : 60**

**References:**

1. *G.Shanmugam and M.S.Palanichamy (1996).Basic Civil and Mechanical Engineering.* Tata Mc Graw Hill Publishing Co, New Delhi.
2. *S.Ramamrutham (1999).Basic Civil Engineering.* Dhanpat Rai Publishing Co. (P) Ltd.
3. *S.Seetharaman (2005). Basic Civil Engineering.* Anurdha Agencies.
4. *K.Venugopal and V.Prahu Raja (2000). Basic Mechanical Engineering.* Anuradha Publishers, Kumbakonam.
5. *S.S.R.J.Shantha Kumar (2000). Basic Mechanical Engineering.* Hi, tech Publications, Mayiladuthurai.

## **Electron Devices and Applications**

**Semester II**  
**15BEBC01**

**Hours of Instruction / week: 4**  
**No. of credits: 4**

### **Objectives**

1. To impart knowledge on basic semiconductor and diode concepts.
2. To develop competence on transistor theory and its applications.
3. To provide essential concepts of power semiconductor devices.

### **Unit I Diodes**

**12**

Review of the semiconductor theory - Semiconductor materials, The PN junction diode. The open circuited PN junction, The biased PN junction, VI characteristics and Temperature dependence of VI characteristics, Comparison between Ge and Si diodes, Diode large signals & small signal models, Junction diode switching times. The Schoktty barrier diodes. Applications of diode as Rectifiers, Clipping and Clamping, Voltage multipliers.

### **Unit II Bipolar Junction Transistor**

**12**

Theory of BJT operation, CE, CB, CC Characteristics. DC biasing of BJTs, DC load line, Operating point, Fixed bias circuit, Collector to Base bias Emitter stabilized bias circuit, Voltage divider bias, Design of bias circuits based on  $V_{be}$  and Q point.

### **Unit III Field Effect Transistors**

**12**

Construction & Characteristics of JFET's, Construction & Characteristics of depletion & enhancement type MOSFET- MOSFET handling, VMOS, DMOS and CMOS, Transistors. FET biasing, Fixed bias, Self-bias & Voltage divider biasing, Design of FET biasing circuits.

### **Unit IV Special Semiconductor Devices**

**12**

Construction and Principle of working of UJT, Tunnel diode, LED, Photodiode, Phototransistor, Varactor diode. Applications of each device. Zener diode, Application as voltage regulator.

### **Unit V Power Semiconductor Devices**

**12**

SCR – Construction, Switch on and switch off characteristics, Half wave & Full wave power control using SCR, SCS, DIAC, TRIAC, GTO.

**Total Hours: 60**

### **Text Book:**

1. *Robert Boylested & Louis Nashelsky.( 2002). Electronics Devices and Circuits Theory.* Fifth Edition, PHI.

### **Reference Books:**

1. *Jacob Millman & Arvil Grabel.( 2003). Microelectronics.* Second Edition. McGraw Hill
2. *Theodore, F. Bogart.J.R. (2003) . Electronic Devices & Circuits.* Fourth Edition. Prentice Hall.

## **Electron Devices Practicals**

**Semester II**  
**15BEBC02**

**Hours of Instruction/ week: 2**  
**No. of credits: 1**

### **Objectives**

1. To obtain and study the characteristics of signal devices, special devices and semiconductor power devices.
2. To obtain the performance parameters of simple electronic devices.

### **I Experiments to be done using Hardware**

1. Characteristics of PN Junction diode.
2. Regulation Characteristics of Zener Diode
3. Transistor Characteristics in CB
4. Transistor Characteristics in CE and computation of hybrid parameters
5. Characteristics of FET
6. Characteristics of UJT
7. Characteristics of SCR
8. Characteristics of DIAC
9. Full wave Rectifier.

### **II Simulation and testing of the above experiments using simulation software (Multisim)**

**Total Hours: 30**

## Engineering Mechanics

Semester II  
15BEVC03

Instruction hours/ week: 5(3+2)  
No. of credits: 4

### Objective

- To develop capacity to predict the effect of force and motion

### Unit I Basic and Statics of Particles

15

Introduction, Units and Dimensions, Laws of Mechanics, Lame's theorem, Parallelogram and triangular Law of forces, Coplanar forces, Resolution and Composition of forces, Equilibrium of a particle, Forces in space, Equilibrium of a particle in space, Equivalent systems of forces, Principles of transmissibility, Single equivalent force.

### Unit II Equilibrium of Rigid Bodies

15

Free body diagram, Types of supports and their reactions, requirements of stable equilibrium, Moments and Couples, Moment of a force about a point and about an axis, Scalar components of a moment, Varignon's theorem, Equilibrium of Rigid bodies in two dimensions, Equilibrium of Rigid bodies in three dimensions, Examples.

### Unit III Properties of Surfaces and Solids

15

Determination of Area and Volumes, First moment of area and the Centroid of sections, Rectangle, circle, triangle from integration section, I section, Angle section, Hollow section by using standard formula, second and product moments of plane area, Rectangle, triangle, circle from integration, T section, I section, Angle section by using standard formula, second and product moments of plane area, Parallel axis theorem and perpendicular axis theorem, Polar moment of inertia.

### Unit IV Dynamics and Particles

15

Displacements, Velocity and acceleration, their relationship, Relative motion, Curvilinear motion, Newton's law, Work Energy Equation of particles, Impulse and Momentum

### Unit V Friction and Elements of Rigid Body Dynamics

15

Frictional force, Laws of column friction, simple contact friction, Rolling resistance, Belt friction Translation and Rotation of Rigid Bodies, Velocity and acceleration, General plane motion

**Total Hours: 75**

### Text books:

1. *Dr. Bansai R.K (2007). Comprehensive Engineering Mechanics.* Lakshmi Publications.
2. *Kottiswaran N (2007). Engineering Mechanics. Balaji Publications*

### References:

1. *Beer F.P and Johnson Jr.E. R (2006). Vector Mechanics for Engineers.* Vol.I statics and Vol.II Dynamics. McGraw Hill International Edition.
2. *Hibbeler R.C (2006). Engineering Mechanics.* Vol.I statics and Vol.II Dynamics. Pearson Education, Asia Pvt.Ltd.
3. *Irving H.Shames(2006). Engineering Mechanics - Statics and Dynamics.* Fourth Edition. . Pearson Education, Asia Pvt.Ltd.

## Basic Electrical and Electronics Engineering

Semester II  
15BEVI02

Instruction hours/ week : 4  
No..of credits:4

### Objectives:

- To understand the concepts of electrical and electronic devices.

### Unit I Electrical Circuits and Measurements 12

Ohm's Law, Kirchoff's Laws, Steady State Solution of DC Circuits, Introduction to AC Circuits, Waveforms and RMS Value, Power and Power factor, Operating Principles of Moving Coil and Moving Iron Instruments, Dynamometer type Watt meters and Energy meters.

### Unit II Electrical Machines 12

Construction, Principle of Operation, Basic Equations and Applications of DC Generators, DC Motors, Single Phase Transformer, single phase induction Motor.

### Unit III Semiconductor Devices and Applications 12

Characteristics of PN Junction Diode, Zener Effect, Zener Diode and its Characteristics, Half wave and Full wave Rectifiers, Voltage Regulation. Bipolar Junction Transistor, CB, CE, CC Configurations and Characteristics.

### Unit IV Digital Electronics 12

Binary Number System, Logic Gates, Boolean Algebra, Half and Full Adders, Flip,Flops, Registers and Counters, A/D and D/A Conversion (single concepts)

### Unit V Fundamentals of Communication Engineering 12

Types of Signals: Analog and Digital Signals, Modulation and Demodulation:Principles of Amplitude and Frequency Modulations. Communication Systems: Radio, TV, Fax, Microwave, Satellite and Optical Fibre (Block Diagram Approach only).

**Total Periods: 60**

### Text books:

- V.N. Mittle (1990). Basic Electrical Engineering.* Tata McGraw Hill Edition. New Delhi.
- R.S. Sedha (2006). Applied Electronics.* S. Chand & Co.

### Reference books:

- R.Muthusubramanian,S.Salivahanan and K.A.Muraleedharan (2006). Basic Electrical, Electronics and Computer Engineering.*Tata McGraw Hill. Second Edition.
- T.K.Nagsarkar and M.S.Sukhija (2005). Basics of Electrical Engineering.* Oxford Press.
- V.K.Mehta (1994). Principles of Electronics.* S.Chand & Company Ltd.
- Mahmood Nahvi and A.Joseph Edminister (2002) .Electric Circuits* Schaum Outline Series. McGraw Hill.
- N.Premkumar (2003). Basic Electrical Engineering.* Anuradha Publishers.

# Problem Solving Using C

Semester II  
15BEVIO3/ 15BEPI04

Instruction hours/week:4  
No. of credits: 4

## Objectives:

- To understand the fundamentals of Computer and Information Technology
- To understand what an algorithm is and to know how to express solution of a problem using an algorithm
- To learn the concept and coding using C language.

### Unit I Basics of Computer and Problem Solving Methodology

Digital Computer Fundamentals,Block diagram of computer,Components of a computer system, Applications of Computers, Hardware and Software definitions, Categories of Software,Booting,Installing and uninstalling Software,Software piracy,Software terminologies,Information Technology Basics,History of Internet,Internet Tools,Problem solving Techniques,Program,Program development cycle,Algorithm, Flow chart, Pseudo Code, Program control structures, Types and generation of programming languages, Development of algorithms for simple problems. **12**

### Unit II Basic Elements of C and Decision Making

Introduction to C, Lexical elements of C, Operators and expressions, Operator precedence and associativity of operators, Input and Output Functions, Simple computational problems, Control statements, Branching, looping, nested control structures, switch, break, continue, go to statements, Problems using control structures. **12**

### Unit III Functions, Program Structures and Arrays

Prototypes and Functions,Declaring, defining and accessing functions,Parameter passing methods,Recursion,Storage classes:auto, extern, static and register,Library functions,Programs using Functions, defining and processing arrays,Passing arrays to functions,Multi,dimensional arrays,Strings and basic operations on strings,Enumerated data types,Programs using simple sorting, searching and merging of arrays **12**

### Unit IV Pointers

Pointer concept,Declaration,Accessing variable through pointer,Initializing pointer variable,Pointers and Functions,Pointers and Arrays,Pointers and Structures,Example programs using pointers with function, arrays and structures,Command line arguments, Dynamic memory allocation,Operations on pointers **12**

### Unit V Structures, Union and File Handling

Structures,User defined data types,Union,Nested structure, passing structures to functions, Self referential structures, File pointer,High level File operations,Opening and closing of file,Creating, Processing and Updation on files,Simple file handling programs,Low level Programming,Additional Features of C. **12**

**Total hours: 60**

## Text books:

1. *Jeri R. Hanly and Elliot B. Koffman (2005). Problem Solving and Program Design in C. Fourth Edition. Pearson Education India.*
2. *E.Balagurusamy (2006). Programming in ANSI C. Tata McGraw Hill. Third Edition.*

## Reference:

1. *Byron Gottfrie (2006). Programming with C. II Edition. (Indian Adapted Edition). TMH publications.*

## **C Programming Practicals**

**Semester II**  
**15BEVIO4/15BEPI05**

**Instruction hours/week:2**  
**No.of credits:1**

### **Objective:**

- To provide hands on training on C language.

### **List of Experiments**

#### **C Programs:**

1. Programs using conditional operator and if statement
2. Programs using Switch .....Case Statements
3. Programs using for, while and do while loops
4. Programs using Arrays
5. Programs using Functions and Recursive Functions
6. Programs using Structures
7. Programs using Pointers
8. Programs using File Operations

**Total hours: 30**



# Object Oriented Programming using C++

Semester II  
hours/week:4  
15BEOC03

Instruction

No.of credits:4

## Objectives:

- To understand the Object Orientation Concept.
- To study the concepts of object oriented programming

## Unit I Object and Classes

Object oriented programming concepts, objects, classes, methods and messages, abstraction and encapsulation, inheritance, abstract classes, polymorphism. Introduction to C++, classes, access specifiers, function and data members, default arguments, function overloading, friend functions, const and volatile functions, static members, Objects, pointers and objects, constant objects, nested classes, local classes

## Unit II Constructors and Destructors

Constructors, default constructor, Parameterized constructors, Constructor with dynamic allocation, copy constructor, destructors, operator overloading, overloading through friend functions, overloading the assignment operator, type conversion, explicit constructor

## Unit III Inheritance and Polymorphism

Inheritance, public, private, and protected derivations, multiple inheritance, virtual base class, abstract class, composite objects Runtime polymorphism, virtual functions, pure virtual functions, RTTI, type id, dynamic casting, RTTI and templates, cross casting, down casting .

## Unit IV File Handling

Streams and formatted I/O, I/O manipulators, file handling, random access, object serialization, namespaces, std namespace, ANSI String Objects, standard template library.

## Unit V Templates and Exception Handling

Function and class templates, Exception handling, try, catch, throw paradigm, exception specification, terminate and unexpected functions, Uncaught exception.

**Total hours: 60**

## Text books:

1. *B. Trivedi (2007). Programming with ANSI C++*. Oxford University Press.
2. *E. Balagurusamy (2008). Object Oriented Programming with C++*. Tata McGraw Hill. Fourth Edition.

**References:**

1. **Ira Pohl (2004).***Object Oriented Programming using C++*. Pearson Education. Second Edition Reprint.
2. **S. B. Lippman, Josee Lajoie, Barbara E. Moo (2005).** *C++ Primer*. Fourth Edition Pearson Education.
3. **Stroustrup B. (2004).** *The C++ Programming language*. Third edition. Pearson Education

## **C++ Programming Practicals**

**Semester II**  
**15BEOC04**

**Instruction hours/week:2**  
**No.of credits:1**

### **Objective:**

To provide hands-on training on Object Oriented Programming Language

### **List of Exercises**

1. Programs using Classes
2. Programs using Data Encapsulation and Data hiding
3. Programs using Function Overloading
4. Programs using Arrays as data members
5. Programs using Arrays as Objects
6. Programs using Object as Function arguments
7. Programs using Pointers as Objects
8. Programs using Constructors and Destructors
9. Programs using Friend function
10. Programs using Operator Overloading
11. Programs using Inheritance, Single, Multiple, Multilevel and Hybrid
12. Programs using Virtual functions

## Electronic Devices and Circuits

Semester II  
15BEOI02

Instruction hours/week:4  
No. of credits:4

### Objectives

- To make the students understand the basic concepts of electronic devices and its applications.
- To provide understanding of basic analog circuitry.

### Unit I      **Semi Conductor Devices**

Semiconductor, PN Junction diode, BJT,FET,SCR,IV characteristics (qualitative Treatment only) 12

### Unit II      **Amplifiers**

Transistor biasing, self biasing, DC and AC analysis of CE, CB and CC amplifiers, Power amplifiers,Efficiency. Tuned Amplifiers, Frequency Response. 12

### Unit III      **Feed Back Amplifiers and Oscillators**

Negative feed back, Types of feedback with examples for each type, Effect of feedback on characteristic of amplifiers, Positive Feedback, Oscillators, Analysis of RC Phase shift Oscillator and LC oscillators, Hartley and Colpitt's oscillator. 12

### Unit IV      **Multivibrations and Timers**

Bistable, Monostable and Astable multivibrators using Transistors, triggering delay and frequency Calculation, 555 Timer,Internal Block,Application. 12

### Unit V      **Operational Amplifier and Application**

Operational amplifier, Characteristics, Block diagram, application of op,amp,Current to voltage, Voltage to current converters, Arithmetic circuits,Adder, Subtractor, multiplier, differentiator and Integrator, Active Filters, Butter worth and Chebyshev. 12

**Total Hours: 60**

### Textbook :

1. *Floyd (2008). Electronic Devices.* Fifth Edition.Addison Wesley Long man Pt. Ltd. Branch.

### References :

1. *Millman and Halkias (1985). Integrated Electronic Circuits.* McGraw, Hill publishers.
2. *Boylestead Nashelsky. Electronic Devices and Circuit Theory.* Sixth Edition. Prentice Hall of India Pvt.Ltd
3. *A.David Bell (2008). Electronic Devices and Circuits.* Fifth Edition.Prentice Hall of India.

## **Electronic Devices and Circuits Practicals**

**Semester II**  
**15BEOI03**

**Instruction hours/week: 2**  
**No. of credits:1**

### **Objectives:**

- To make students familiar with characteristics of various solid state electronic devices.
- To study the behaviour of simple electronic circuits involving discrete components and ICs.

### **List of Experiments:**

1. PN Junction Diode Characteristics
2. Zener Diode Characteristics
3. Half Wave and Full Wave Rectifier
4. Zener Regulator
5. CE Transistor Characteristics
6. UJT Characteristics
7. FET Characteristics
8. SCR Characteristics
9. Frequency Response of CE, CB, and CC Amplifier with fixed bias and self, bias
10. Applications of 555 Timer
11. Verification of Kirchoff's Laws and Network Theorem
12. Applications of Operational Amplifier
13. RC and LC Oscillators
14. Coupled Circuits

**Total Hours: 30**



**References:**

1. *Joseph Edminister, Mahmood Nahvi(2004).Schaums Outlines Of Electric Circuits*, Tata McGraw Hill Publishing Company Ltd., Dec Edition.
2. *Arumugam, M., Premkumaran, N(2008).Electric Circuit Theory*, Khanna Publisher, Third Edition.

## Electric Circuit Analysis Practicals

Semester II

Instruction hours / Week : 2

15BELC02

No. of credits : 1

### Objectives

- To verify various theorems.
- To analyse the transient behaviour of simple RL, RC circuit.
- To study the frequency response of coupled circuits and Wheatstone's bridge.

### List of Experiments:

1. Verification of Kirchoff's Laws.
2. Verification star to delta and delta to star conversions.
3. Verification of Thevinin's theorem.
4. Verification of Norton's theorem.
5. Verification of Reciprocity theorem.
6. Verification of Superposition theorem
7. Verification of Maximum power transfer theorem.
8. Study of CRO.
9. Frequency response of series and parallel resonance circuits.
10. Transient analysis of RL and RC circuits.
11. Frequency response of single tuned coupled circuits.
12. Study of wheatstone's bridge.

**Total Hours: 30**



**ELECTRON DEVICES**  
**(Electrical & Electronics Engineering)**

**SEMESTER II**

**hours/week: 4**

**15BEEC01**

**Instruction**

**No. of credits : 4**

**Unit I: Theory of PN Junction Diodes**

**12**

Energy band structure of conductors, insulators and semiconductors – Electron hole generation and recombination – Hall effect – Drift and diffusion in semiconductors – PN junction – Open circuited junction – Depletion region – Barrier potential – Diode equation – Forward and reverse characteristics – Transition and Diffusion capacitance – Piecewise linear and switching characteristics.

**Unit II: Theory of Junction Transistors**

**12**

Transistor action - Transistor current components – Continuity equation in the base region – Eber – Moll's equation – Static characteristics of transistors – CE, CB and CC configurations.

**Unit III: Theory of FET, UJT and SCR**

**12**

Junction FET operation – Static characteristics – FET structure – Enhancement and depletion MOSFET – UJT: Operation and static characteristics – SCR : Construction and static characteristics – Application of FET, UJT and SCR.

**Unit IV: Transistor and FET Biasing**

**12**

Transistor biasing: Location of Q point, fixed bias, collector to base and self bias – Graphical DC bias analysis – Design of DC bias circuit – FET biasing: self biasing and voltage feedback biasing.

**Unit V: Special Semiconductor Devices**

**12**

Zener diode – Tunnel Diode – DIAC – TRIAC – Changed coupled devices – Photo diodes – Phototransistors – Solar cells – LED – LCD – Photo couplers – Gunn diodes Varactor diodes.

**Total hours : 60**

**Text Book:**

1.Allen Mottershed, “Electronic Devices and Circuits”, Prentice Hall of India, 1989.

**References:**

1..Millman and Halkias, “Electronic Devices and Circuits”, McGraw Hill, 1988.

2.Mathur, S. P., Kulshresta, D. C. and Chandha, P. R., Electronic Devices, Applications and Integerated Circuits”, Umesh publications, 1988.

## Electron Devices Laboratory

**SEMESTER II**

**Instruction hours/week: 2**

**15BEE C02**

**No. of credits : 1**

1. Zener Diodes as a Voltage Regulator
2. Characteristics of CE, CC, CB configurations of BJT
3. Characteristics of JFET
4. Characteristics of MOSFET
5. Characteristics of UJT
6. Characteristics of SCR
7. Characteristics of DIAC
8. Characteristics of TRIAC
9. Characteristics of LDR
10. Characteristics of LED
11. Half wave and Full wave rectifier
12. Study of CRO.

**Total hours: 30**

## **Engineering Practices Practicals**

**Semester II**  
**15BEEI05**

**Instruction hours/week: 2**  
**No. of credits: 1**

### **Objectives**

- To cater to the needs of the practical application and to help in learning Engineering skills in Civil, Mechanical, Electrical and Electronics
- To provide adequate knowledge in the Plumbing & Pipe fitting, Wiring, Joints type, Simple turning & Drilling and soldering simple electronics components.

### **Part A**

9. Study of Carpentry tools
10. Study of pipeline joints
11. Preparation of Half Lap joint
12. Preparation of T-Lap Joint
13. Household wiring – series and parallel connections with single switch.
14. Household wiring – series and parallel connections with two switches.
15. Stair case light wiring.
16. Safety Measures in the use of electricity.

### **Part B**

10. Simple turning and drilling operations
- 11.** Preparation of Sand Mould
12. Preparation of square butt joint in Arc welding
13. Study of centrifugal pump
14. Soldering simple electronic circuits
15. Assembling electronic components on a small PCB and testing
16. V-I Characteristics of PN Junction Diode
17. V-I Characteristics of Zener Diode
18. Study of telephone, FM radio, Low, voltage power supplies

**Total Hours: 30**

### **Examination Pattern**

**The Examination is to be conducted for both parts A & B, allotting 1 ½ for each part.**

## Introduction to Food Science and Technology

Semester II  
15 BEF C01

Instruction Hours /week: 4  
No. of credits: 4

### Objective

- To enable the students understand the basics of food science and technology
- To make the students appreciate the importance of nutrients and enable them to develop new product of high nutritive value

### Unit I Introduction

12

Introduction to food science, food groups, classification, composition and nutritive value of common foods. Cereals: structure, nutritive value, characteristics, principle of cereal processing. Pulses, composition and nutritive value, principles of pulse processing.

### Unit II Vegetables, Fruits and Milk

12

Vegetables: classification, composition and nutritive value, effects of different methods of processing. Fruits: classification, composition and nutritive value, enzymatic browning. milk and milk products, composition, nutritive value, properties, types of milk products, principle of processing of milk and milk products, handling and storage.

### Unit III Fleshy Foods

12

Egg: structure, composition, nutritive value, measures of quality, storage, use of egg in diet. freshly food, nutritive value of meat, fish and poultry, method of processing, effects of colors, texture and flavor, postmortem changes and factor affecting tenderness of meat.

### Unit IV Sugar, Fats and Oil Seeds

12

Sugar,: nutritive value, properties, sugar processing techniques.

Fats ,nuts and oilseeds :classification, composition, nutritive value, changes during processing and storage, uses of nuts and oilseeds. spices and condiments: types ,functions and uses.

### Unit V Methods of cooking

12

Moist heat , dry heat and fat as a media of cooking, merits and demerits.

Food fortification and enrichment, Food adulteration, detection, control of common food adulterants.

**Total Hours: 60**

### Text Book:

1. *B. Srilakshmi, (2008). Food Science.*New age International P. Ltd, New Delhi.

### Reference Books:

1. *McWilliams(2007). Food Fundamentals,* John willey and sons, New York.
2. *S. N. Mahindru (2009) Food Science and Technology,* Hardbound P.Ltd, New Delhi.
3. *Norman N. Potter (2009) Food Science ,*FifthEdition, Springerlink, Newyork.

## **Food Science Practicals**

**Semester II**  
**15 BEF C02**

**Instruction Hours /week: 2**  
**No. of credits: 1**

### **Objective**

- To enable students understand the concept in food science and technology and apply the basic as Practical

### **List of Experiments**

1. Introduction of food groups
2. Determination of edible portions.
3. Examination of starches under microscope
4. Dry and moist heating characteristics of starch
5. Experiment on germination and malting of pulses
6. Browning reaction: Fruits and Vegetables
7. Testing pectin strength in fruit and vegetables extract
8. Experimental cookery of vegetables
9. Precipitation methods protein in milk
10. Tenderization of meat cuts
11. Effects of temperature on egg proteins
12. Basic experiments in sugar cookery
13. Determination of the best frying temperature for different fats and oils

**Total Hours: 30**