



**AMITY UNIVERSITY**  
— R A J A S T H A N —

**AMITY SCHOOL OF ENGINEERING & TECHNOLOGY  
(ASET)**

**PROGRAM STRUCTURE & SYLLABUS**

**B. Tech. (Electrical & Electronics Engineering)**

**Program Code: BEE**

**12246**

**Duration - 4 Years Full Time**

**2021 - 2025**

## Program Learning Outcomes (PLOs)

### **B.Tech. (Electrical & Electronics Engineering)**

- PLO 1 Ability to apply the knowledge of mathematics, science and engineering principles in Electrical and Electronics Engineering systems.
- PLO 2 Ability to provide solutions for EEE problems by designing and conducting experiments, interpreting and analyzing data, and reporting the results.
- PLO 3 Develop a comprehensive understanding of the entire range of electronic devices, analog and digital circuits with added state-of art knowledge on advanced electronic systems.
- PLO 4 Ability to design different power electronic circuits and drives for industrial applications.
- PLO 5 Develop an in-depth knowledge in transmission and distribution systems, power system analysis and protection systems to pursue a career in the power sector.
- PLO 6 Ability of a good knowledge in microprocessors/microcontrollers, data structures, computer programming and simulation software.
- PLO 7 Ability to develop mathematical modelling, analysis and design of control systems and associated instrumentation for EEE.
- PLO 8 Ability to design and build renewable energy systems for developing clean energy and sustainable technologies.

#### **Credit Summary**

<b>Semester</b>	<b>Core course (CC)</b>	<b>Domain Electives (DE)</b>	<b>Values Added (VAC)</b>	<b>Open Electives</b>	<b>NTCC</b>	<b>Total</b>
I	24	-	4	-	2	30
II	19	-	8	3	2	32
III	21	3	4	3	---	31
IV	18	3	4	3	---	28
V	15	3	4	3	3	28
VI	17	3	4	3	--	27
VII	17	-	4	3	3	27
VIII	6	3	--	--	12	21
<b>Total</b>	<b>137</b>	<b>15</b>	<b>32</b>	<b>18</b>	<b>22</b>	<b>224</b>

## SEMESTER I

<b>Code</b>	<b>Course</b>	<b>Category</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>
AM 101	Applied Mathematics - I	CC	3	1	-	4
AP 102	Applied Physics - I – Fields & Waves	CC	2	1		3
AC 103	Applied Chemistry	CC	2	1		3
BME 104	Element of Mechanical Engineering	CC	2	1		3
BCS 105	Introduction to Computers & Programming in C	CC	2	1		3
BEE 106	Basic Electrical Engineering	CC	2	1		3
<b>Practical Courses</b>						
AP 122	Applied Physics-I – Fields & Waves Lab	CC	-	-	2	1
AC 123	Applied Chemistry lab	CC	-	-	2	1
BME 124	Element of Mechanical Engineering lab	CC	-	-	2	1
BCS 125	Programming in C lab	CC	-	-	2	1
BEE 126	Basic Electrical Engineering lab	CC	-	-	2	1
<b>Value Added</b>						
BCS 101	English	VA	1	-	-	1
BSS 104	Behavioral Science-I Understanding Self For Effectiveness-I		1	-	-	1
FLT 101 FLG 101 FLS 101 FLC 101	Foreign Language - I		2	-	-	2
	French					
	German					
	Spanish					
	Chinese					
<b>Non-Teaching Credit Course (NTCC)</b>						
AND001	Anandam-I	NTCC	-	-	-	2
<b>Total</b>						<b>30</b>

## SEMESTER II

Code	Course	Category	L	T	P	Credits
<b>Core Courses</b>						
AM 201	Applied Mathematics - II	CC	3	1	-	4
AP 202	Applied Physics - II - Modern Physics	CC	2	1		3
BCS 203	Object Oriented Programming using C++	CC	2	1		3
BME 204	Engineering Mechanics	CC	2	1		3
BME 205	Engineering Graphics	CC	1			1
BME 206	Domain Workshop	CC	1	-	-	1
<b>Practical Courses</b>						
AP 222	Applied Physics - II - Modern Physics lab	CC	-	-	2	1
BCS 223	Object Oriented Programming using C++lab	CC	-	-	2	1
BME 224	Engineering Mechanics lab	CC	-	-	2	1
BME 225	Engineering Graphics lab	CC	-	-	2	1
<b>Open Elective</b>						
	OPEN ELECTIVE - I	OE	3	-	-	3
<b>Value Added Courses</b>						
BCS 201	English	VA	1	-	-	1
BSS 204	Behavioral Science-II (Problem Solving & Creation thinking)	VA	1	-	-	1
FLT 201 FLG 201 FLS 201 FLC 201	Foreign Language - II French German Spanish Chinese	VA	2	-	-	2
EVS 001	Environmental Studies	VA	4	-	-	4
<b>Non-Teaching Credit Course (NTCC)</b>						
AND002	Anandan-II	NTCC	-	-	2	2
<b>Total</b>						<b>32</b>

### SEMESTER III

Code	Course	Category	L	T	P	Credit Units
<b>Core Courses</b>						
AM 301	Applied Mathematics – III	CC	3	-	-	3
BEC 302	Analog Electronics-I	CC	3	1	-	4
BEC 303	Circuits & Systems	CC	3	1	-	4
BEE 304	Electrical Machine-I	CC	2	1	-	3
BEC 305	Java Programming	CC	3	-	-	3
<b>Practical Courses</b>						
BEC 322	Analog Electronics-I Lab	CC	-	-	2	1
BEC 323	Circuits & Systems Lab	CC	-	-	2	1
BEE 324	Electrical Machine Lab-I	CC	-	-	2	1
BEC 325	Java Programming Lab	CC	-	-	2	1
<b>Domain Electives: Student must select 1 course from following DE electives</b>						
BEC 304	Signal & Systems	DE	2	1	-	3
BEC 307	Measurements & Instrumentation					
<b>Open Elective 3</b>		OE	-	-	-	3
<b>Value added Courses</b>						
BCS 301	Communication Skills – I	VA	1	-	-	1
BSS 304	Behavioral Science-III (Interpersonal Communication)	VA	1	-	-	1
FLT 301 FLG 301 FLS 301 FLC 301	Foreign Language – III French German Spanish Chinese	VA	2	-	-	2
<b>Total</b>						<b>31</b>

## SEMESTER IV

Code	Course	Category	L	T	P	Credit Units
<b>Core Courses</b>						
BEC401	Digital Circuits & Systems-I	CC	3	-	-	3
BEC 402	Analog Electronics-II	CC	3	-		3
BEE 403	Electric Machine - II	CC	2	1	-	3
BEE 404	Control System	CC	2	1	-	3
BEE 405	Power Plant Engineering	CC	1	1	-	2
<b>Practical Courses</b>						
BEE 421	Digital Circuits & Systems-I Lab	CC	-	-	2	1
BEC 422	Analog Electronics-II Lab	CC	-	-	2	1
BEE 423	Electric Machine Lab - II	CC	-	-	2	1
BEE 424	Control System Lab	CC	-	-	2	1
<b>Domain Electives: Student must select 1 course from following DE electives</b>						
BEC 406	Electromagnetic Field Theory	DE	2	-	-	3
BEE 406	Renewable Energy Technology					
<b>Open Elective 3</b>		OE	-	-	-	3
<b>Value added Courses</b>						
BCS 401	Communication Skills - II	VA	1	-	-	1
BSS 404	Behavioral Science-IV (Relationship Management)	VA	1	-	-	1
FLT 401 FLG 401 FLS 401 FLC 401	Foreign Language - IV French German Spanish Chinese	VA	2	-	-	2
<b>Total</b>						<b>28</b>

## SEMESTER V

Code	Course	Category	L	T	P	Credit Units
<b>Core Courses</b>						
BEC 501	Microprocessor and Microcontroller Systems	CC	3	-	-	3
BEC 502	Digital Circuits & Systems-II	CC	2	1	-	3
BEE 503	Modern & Digital Control Engineering	CC	2	1	-	3
BCS 510	Web Development	CC	2	-	-	2
<b>Practical Courses</b>						
BEE 521	Microprocessor and Micro Controller Lab	CC	-	-	2	1
BEC 522	Digital Circuits & Systems-II Lab	CC			2	1
BEE 528	MATLAB theory and practices	CC	-	-	2	1
BCS 530	Web Development Lab	CC	-	-	2	1
BEE 560	Practical Training (Evaluation)	NTCC	-	-	-	3
<b>Domain Electives: Student must select 1 course from following DE electives</b>						
BEE 505	Computer System Architecture	DE	2	1	-	3
BEE 506	Substation Engineering					
BEE 507	Process Control Engineering					
<b>Open Elective 4</b>		OE	-	-	-	3
<b>Value added Courses</b>						
BCS 501	Communication Skills - III	VA	1	-	-	1
BSS 504	Behavioral Science-V (Understanding self for effectiveness)	VA	1	-	-	1
FLT 501	French	VA	2	-	-	2
FLG 501	German					
FLS 501	Spanish					
FLC 501	Chinese					
<b>Total</b>						<b>28</b>

## SEMESTER VI

Code	Course	Category	L	T	P	Credit Units
<b>Core Courses</b>						
BEE 601	Power Electronics	CC	3	-	-	3
BEE 602	Power System Analysis	CC	2	1	-	3
BEE 603	Transmission and Distribution System	CC	2	1	-	3
BEE 604	Utilization of Electric Power	CC	3	-	-	3
BCS 610	Programming with Python	CC	2	-	-	2
<b>Practical Courses</b>						
BEE 621	Power Electronics Lab	CC	-	-	2	1
BEE 622	Power System Lab	CC	-	-	2	1
BCS 630	Programming with Python Lab	CC	-	-	2	1
<b>Domain Electives: Student must select 1 course from following DE electives</b>						
BEC 606	Data Structures and IT	DE	3	-	-	3
BEE 606	Switch Mode Power Supplies					
BEE 607	Electrical Machine Design					
<b>Open elective 5</b>		OE	-	-	-	3
<b>Value Added Courses</b>						
BCS 601	Communication Skills – IV	VA	1	-	-	1
BSS 604	Understanding self for effectiveness - VI	VA	1	-	-	1
	Foreign Language – VI	VA	2	-	-	2
FLT 601	French					
FLG 601	German					
FLS 601	Spanish					
FLC 601	Chinese					
<b>Total</b>						<b>27</b>

## SEMESTER VII

Course Code	Course	Category	L	T	P	Credit Units
<b>Core Courses</b>						
BEE 701	Power System Engineering	CC	2	1	-	3
BEE 703	Power System Protection	CC	3	-	-	3
BEE 704	Substation Engineering	CC	2	1	-	3
BCS 710	Advanced Programming with Python	CC	2	-	-	2
<b>Practical Courses</b>						
BEE 721	Power System Engg Lab	CC	-	-	2	1
BEE 725	Electrical Simulation Lab	CC	-	-	2	1
BCS 730	Advanced Programming with Python Lab	CC	-	-	2	1
BEE 750	Industrial Training (Evaluation)	NTCC				3
BEE 760	Seminar	CC	-	-	-	3
<b>Open Elective 6</b>		OE	-	-	-	3
<b>Value added Courses</b>						
BCS 701	Communication Skills - V	VA	1	-	-	1
BSS 704	Behavioral Science - VII, Individual Society & Nation	VA	1	-	-	1
	Foreign Language - VII					
FLT701	French					
FLG 701	German	VA	2	-	-	2
FLS 701	Spanish					
FLC 701	Chinese					
<b>Total</b>						<b>27</b>

## SEMESTER VIII

Course Code	Course	Category	L	T	P	Credit Units
<b>Core Courses</b>						
BEE 801	Electrical Drives & Control	CC	2	1	-	3
BEE 802	Flexible AC Transmission Systems	CC	2	1	-	3
BEE 860	Major Project	CC	-	-	-	12
<b>Domain Electives: Student must select 1 course from following DE electives</b>						
BEE 803	Optimization Techniques and Algorithms	DE	2	1	-	3
BEE 804	Smart Grid Technology					
<b>Total</b>						<b>21</b>
Note: CC - Core Course, VA - Value Added Course, OE - Open Elective, DE - Domain Elective, FW - Field Work						
<b>Total Credits</b>						<b>224</b>

# APPLIED MATHEMATICS - I

**Course Code:** AM 101

**CreditUnits:** 04

## Course Objective:

The knowledge of Mathematics is necessary for a better understanding of almost all the Engineering and Science subjects. Here our intention is to make the students acquainted with the concept of basic topics from Mathematics, which they need to pursue their Engineering degree in different disciplines.

## Course Contents:

### Module I: Differential Calculus

Successive differentiation, Leibnitz's theorem (without proof), Mean value theorem, Taylor's theorem (proof), Remainder terms, Asymptote & Curvature, Partial derivatives, Chain rule, Differentiation of Implicit functions, Exact differentials, Tangents and Normals, Maxima, Approximations, Differentiation under integral sign, Jacobians and transformations of coordinates.

### Module II: Integral Calculus

Fundamental theorems, Reduction formulae, Properties of definite integrals, Applications to length, area, volume, surface of revolution, improper integrals, Multiple Integrals-Double integrals, Applications to areas, volumes.

### Module III: Ordinary Differential Equations

Formation of ODEs, Definition of order, degree & solutions, ODE of first order : Method of separation of variables, homogeneous and non homogeneous equations, Exactness & integrating factors, Linear equations & Bernoulli equations, General linear ODE of  $n^{\text{th}}$  order, Solution of homogeneous equations, Operator method, Method of undetermined coefficients, Solution of simple simultaneous ODE.

### Module IV: Vector Calculus

Scalar and Vector Field, Derivative of a Vector, Gradient, Directional Derivative, Divergence and Curl and their Physical Significance, Arc Length, Tangent, Directional Derivative, Evaluation of Line Integral, Green's Theorem in Plane (without proof), Representation of Surfaces, Tangent Plane and Surface Normal, Surface Integral, Stoke's Theorem (without proof), Gauss Divergence Theorem (without proof).

## Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

## Text & References:

Text:

- Differential Calculus by Shanti Narain
- Integral Calculus by Shanti Narain

References:

- Differential Equation by A.R. Forsyth
- Higher Engineering Mathematics by H.K. Dass

# APPLIED PHYSICS - I - FIELDS AND WAVES

**Course Code:** AP 102

**CreditUnits:** 03

## Course Objective:

Aim of this course is to introduce the students to fundamentals of graduate level physics, which form the basis of all applied science and engineering

## Course Contents:

### Module I: Oscillations & Waves Oscillations

Introduction to S.H.M. Damped Oscillations: Differential Equation and its solution, logarithmic decrement, Quality Factor, Different conditions of damping of harmonic oscillations. Forced oscillations: Amplitude and Frequency Response, Resonance, Sharpness of Resonance  
Plane. Progressive Waves: Differential Equation and Solution, Superposition of Progressive Waves stationary waves. Ultrasonics: Generation and application of ultrasonic waves.

### Module II: Wave Nature of Light Interference:

Coherent Sources, Conditions of interference, Interference due to division of wavefront, Fresnel's biprism Interference due to division of amplitude, Newton's rings, Interference due to thin films. Diffraction: Fresnel and Fraunhofer diffraction, Fraunhofer diffraction at a single slit, double slit, N Slits, Transmission grating, Rayleigh criterion and Resolving power of grating. Polarization: Birefringence, Nicol prism, Production and analysis of plane, circularly and elliptically polarized light, Half and quarter wave plates, Optical rotation, Polarimeter.

### Module III: Electromagnetics

Scalar and vector fields, gradient of a scalar field, physical significance of gradient, equipotential surface. Line, surface and volume integrals, Divergence and curl of vector field and mathematical analysis physical significance, Electric flux, Gauss' law, Proof and Applications, Gauss divergence and Stokes theorems. Differential form of Gauss' Law, Ampere's Law, Displacement current, Faraday's Law, Maxwell equations in free space & isotropic media (Integral form & differential form), EM wave propagation in free space, Poynting vector.

## Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

## Text & References:

### Text

- Waves & oscillation, A. P. French
- Physics of waves, W. C. Elmore & M. A. Heald
- Introduction to Electrodynamics, D. J. Griffith

### Reference

- Electrodynamics, Gupta, Kumar & Singh
- Optics, A. K. Ghatak
- Engineering Physics, Satya Prakash

# APPLIED CHEMISTRY

**Course Code:** AC 103

**CreditUnits:** 03

## Course Objective:

Four basic sciences, Physics, Chemistry, Mathematics and Biology are the building blocks in engineering and technology. Chemistry is essential to develop analytical capabilities of students, so that they can characterize, transform and use materials in engineering and apply knowledge in their field. All engineering fields have unique bonds with chemistry whether it is Aerospace, Mechanical, Environmental and other fields the makeup of substances is always a key factor, which must be known. For electronics and computer science engineering, apart from the material, computer modeling and simulation knowledge can be inherited from the molecule designing. The upcoming field of technology like Nanotechnology and Biotechnology depends fully on the knowledge of basic chemistry. With this versatile need in view, course has been designed in such a way so that the student should get an overview of the whole subject.

## Course Contents:

### Module I: Water Technology

Introduction and specifications of water, Hardness and its determination (EDTA method only), Alkalinity, Boiler feed water, boiler problems – scale, sludge, priming & foaming: causes & prevention, Boiler problems – caustic embitterment & corrosion: causes & prevention, Carbonate & phosphate conditioning, colloidal conditioning & calgon treatment Water softening processes: Lime – soda process, Ion exchange method, Water for domestic use.

### Module II: Fuels

Classification, calorific value of fuel, (gross and net), Determination of calorific value of fuels, bomb calorimeter, Solid fuels - Proximate and ultimate analysis, Octane & Cetane No. and its significance. Numericals on combustion.

### Module III: Instrumental Methods of analysis

Introduction; Principles of spectroscopy; Laws of absorbance IR : Principle, Instrumentation, Application UV : Principle, Instrumentation, Application NMR : Principle, Instrumentation, Application

### Module III: Lubricants

Introduction; Mechanism of Lubrication; Types of Lubricants; Chemical structure related to Lubrication; Properties of lubricants; Viscosity and Viscosity Index; Iodine Value; Aniline Point; Emulsion number; Flash Point; Fire Point; Drop Point; Cloud Point; Pour Point. Selection of Lubricants.

### Module VI: Corrosion

Introduction, Mechanism of dry and wet corrosion, Types of corrosion-Galvanic, Concentration cell, soil, pitting, intergranular, waterline. Passivity. Factors influencing corrosion. Corrosion control.

## Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

## Text & References:

Text:

- Engineering Chemistry- Jain and Jain
- Engineering Chemistry - Sunita Rattan
- Engineering Chemistry - Shashi Chawla

References:

- Engineering Chemistry – Dara and Dara
- Spectroscopy- Y.R Sharma
- Corrosion Engineering – Fontenna and Greene

# ELEMENT OF MECHANICAL ENGINEERING

Course Code: BME 104

CreditUnits: 03

## Course Objective:

The objective of this course is to impart the basic knowledge of thermodynamics, stress- strain, materials & their properties and various manufacturing processes to the students of all engineering discipline.

## Course Contents:

### Module I: Fundamental Concepts

Definition of thermodynamics, system, surrounding and universe, phase, concept of continuum, macroscopic & microscopic point of view, Thermodynamic equilibrium, property, state, path, process, cyclic process, Zeroth, first and second law of thermodynamics, Carnot Cycle, Introduction to I.C. Engines-two & four stroke S.I. and C.I. engines. Otto cycle. Diesel cycle.

### Module II: Stress And Strain Analysis

Simple stress and strain: introduction, normal shear, and stresses-strain diagrams for ductile and brittle materials. Elastic constants, one-dimensional loadings of members of varying cross-section, Strain Energy, Properties of material-strength, elasticity, stiffness, malleability, ductility, brittleness, hardness and plasticity etc; Concept of stress and strain stress strain diagram, tensile test, impact test and hardness test.

### Module III: Casting & Forging

Introduction of casting, pattern, mould making procedures, sand mould casting, casting defects, allowances of pattern. Forging-introduction, upsetting & drawing out, drop forging, press forging & m/c forging

### Module IV: Welding & Sheet metal working

Introduction of welding processes, classification, gas welding, arc welding, resistance welding. Introduction to sheet metal shop, Shearing, trimming, blanking, piercing, shaving, notching, stretch forming, nibbling coining, embossing and drawing.

## Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

## Text & References:

### Text

- Engineering thermodynamics, by P.K. Nag, Tata McGraw Hill.
- Thermal Engineering, by D.S. Kumar. S.K. Kataria and Sons.
- Thermal Engineering by PL Ballaney; Khanna Publishers, Delhi.
- Engineering Thermodynamics: Work and Heat Transfer, by Rogers and Mayhew, ELBS Publications

### Reference

- Heine, R.W. C.R. Loper and P.C. Rosenthal, Principles of metal casting McGraw Hill
- Welding Technology by R.S. Parmar, Khanna Publishers.
- Thermodynamics and Heat Engines Volume-I, by R. Yadav: Central Publications.
- Ganesan, V. Internal Combustion Engine, Tata McGraw-Hill.
- Mathur, M.L. and Sharma, R.P. Internal Combustion Engine. Dhanpat Rai Publication

# INTRODUCTION TO COMPUTERS AND PROGRAMMING IN C

Course Code: BCS 104

CreditUnits: 03

## Course Objective:

The objective of this course module is to acquaint the students with the basics of computers system, its components, data representation inside computer and to get them familiar with various important features of procedure oriented programming language i.e. C.

## Course Contents:

### Module I: Introduction

Introduction to computer, history, von-Neumann architecture, memory system (hierarchy, characteristics and types), H/W concepts (I/O Devices), S/W concepts (System S/W & Application S/W, utilities). Data Representation: Number systems, character representation codes, Binary, octal, hexadecimal and their interconversions. Binary arithmetic, floating point arithmetic, signed and unsigned numbers, Memory storage unit.

### Module II: Programming in C

History of C, Introduction of C, Basic structure of C program, Concept of variables, constants and data types in C, Operators and expressions: Introduction, arithmetic, relational, Logical, Assignment, Increment and decrement operator, Conditional, bitwise operators, Expressions, Operator precedence and associativity. Managing Input and output Operation, formatting I/O.

### Module III: Fundamental Features in C

C Statements, conditional executing using if, else, nesting of if, switch and break Concepts of loops, example of loops in C using for, while and do-while, continue and break. Storage types (automatic, register etc.), predefined processor, Command Line Argument.

### Module IV: Arrays and Functions

One dimensional arrays and example of iterative programs using arrays, 2-D arrays Use in matrix computations. Concept of Sub-programming, functions Example of user defined functions. Function prototype, Return values and their types, calling function, function argument, function with variable number of argument, recursion.

### Module V: Advanced features in C

Pointers, relationship between arrays and pointers Argument passing using pointers, Array of pointers. Passing arrays as arguments. Strings and C string library. Structure and Union. Defining C structures, Giving values to members, Array of structure, Nested structure, passing strings as arguments. File Handling.

## Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

## Text & References:

### Text:

- “ANSI C” by E Balagurusamy
- Yashwant Kanetkar, “Let us C”, BPB Publications, 2<sup>nd</sup> Edition, 2001.
- Herbert Schildt, “C:The complete reference”, Osbourne Mcgraw Hill, 4<sup>th</sup> Edition, 2002.
- V. Raja Raman, “Computer Programming in C”, Prentice Hall of India, 1995.

### References:

- Kernighan & Ritchie, “C Programming Language”, The (Ansi C Version), PHI, 2<sup>nd</sup> Edition.
- J. B Dixit, “Fundamentals of Computers and Programming in ‘C’.
- P.K. Sinha and Priti Sinha, “Computer Fundamentals”, BPB publication.

# BASIC ELECTRICAL ENGINEERING

**Course Code: BEE 105**

**CreditUnits: 03**

## Course Objective:

The objective of the course is to provide a brief knowledge of Electrical Engineering to students of all disciplines. This Course includes some theorems related to electrical, some law's related to flow of current, voltages, basic knowledge of Transformer, basic knowledge of electromagnetism, basic knowledge of electrical network.

## Course Contents:

### Module I: Basic Electrical Quantities

Basic Electrical definitions–Energy, Power, Charge, Current, Voltage, Electric Field Strength, Magnetic Flux Density, etc., Resistance, Inductance and Capacitance. Ideal Source, Independent Source and Controlled Source

### Module II: Network Analysis Techniques & Theorems

Circuit Principles: Ohm's Law, Kirchoff's Current Law, Kirchoff's Voltage Law Network Reduction: Star-Delta Transformation, Source Transformation, Nodal Analysis, Loop analysis. Superposition theorem Thevenin's Theorem, Norton's theorem and Reciprocity theorem.

### Module III: Alternating Current Circuits

Peak, Average and RMS values for alternating currents, Power calculation: reactive power, active power, Complex power, power factor, impedance, reactance, conductance, susceptance Resonance: series Resonance, parallel resonance, basic definition of Q factor & Band-width.

### Module IV: Transformers

Basic Transformer Operation principle, Construction, Voltage relations, Current relations, Linear circuit models, Open circuit test, Short circuit test, Transformer Efficiency.

## Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

## Text & References:

### Text

- R.J. Smith, R.C. Dorf: Circuits, devices and Systems
- B.L. Thareja: Electrical Technology : Part -1 & 2

### Reference

- V. Deltoro: Electrical Engineering fundamentals
- Schaum's Series: Electrical Circuits

# APPLIED PHYSICS LAB - I

Course Code: AP 122

CreditUnits: 01

## List of Experiments:

1. To determine the wavelength of sodium light by Newton's rings method.
2. To determine the dispersive power of the material of prism with the help of a spectrometer.
3. To determine the specific rotation of sugar by Bi-quartz or Laurent half shade polarimeter.
4. To determine the speed of ultrasonic waves in liquid by diffraction method.
5. To determine the width of a narrow slit using diffraction phenomena.
6. To determine the temperature coefficient of platinum wire, using a platinum resistance thermometer and a Callender & Griffith's bridge.
7. To determine the value of specific charge (ratio of  $e/m$ ) of an electron by Thomson method.
8. To determine the internal resistance of Leclanche cell with the help of Potentiometer.
9. To determine the resistance per unit length of a Carey Foster's bridge wire and also to find out the specific resistance of a given wire.
10. To plot graph showing the variation of magnetic field with distance along the axis of a circular coil carrying current, and hence estimate the radius of the coil.
11. To determine the value of acceleration due to gravity ('g') in the laboratory using bar pendulum.
12. To determine the moment of inertia of a flywheel about its own axis of rotation.
13. To determine the density of material of the given wire with the help of sonometer.

## Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

# APPLIED CHEMISTRY LAB

Course Code: AC 123

Credit Units: 01

## List of Experiments:

1. To determine the ion exchange capacity of a given cation exchanger.
2. To determine the temporary, permanent and total hardness of a sample of water by complexometric titration method.
3. To determine the type and extent of alkalinity of given water sample.
4. To determine the number of water molecules of crystallization in Mohr's salt (ferrous ammonium sulphate) provided standard potassium dichromate solution (0.1N) using diphenylamine as internal indicator.
5. To determine the ferrous content in the supplied sample of iron ore by titrimetric analysis against standard  $K_2Cr_2O_7$  solution using potassium ferricyanide  $[K_3Fe(CN)_6]$  as external indicator.
6. (a) To determine the surface tension of a given liquid by drop number method.  
(b) To determine the composition of a liquid mixture A and B (acetic acid and water) by surface tension method.
7. To prepare and describe a titration curve for phosphoric acid – sodium hydroxide titration using pH-meter.
8. (a) To find the cell constant of conductivity cell.  
(b) Determine the strength of hydrochloric acid solution by titrating it against standard sodium hydroxide solution conductometrically
9. Determination of Dissolved oxygen in the given water sample.
10. To determine the total residual chlorine in water.
11. Determination of amount of oxalic acid and  $H_2SO_4$  in 1 L of solution using N/10 NaOH and N/10  $KMnO_4$  solution.
12. Determination of viscosity of given oil by means of Redwood viscometer I.
13. To determine flash point and fire point of an oil by Pensky Martin's Apparatus
14. To determine the Iodine value of the oil.

## Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

# ELEMENT OF MECHANICAL ENGINEERING LAB

Course Code: BME 124

Credit Units: 01

## List of Experiments:

1. Welding
  - (a) Arc Welding
    - Butt Joint
    - Lap Joint
    - T Joint
  - (b) Gas Welding
    - Butt Joint
    - Lap Joint
    - Brazing of Broken pieces
2. Foundry
  - Sand mould casting by single piece pattern & Split pattern bracket with cores
3. Sheet Metal
  - Dust Bin
  - Mug
  - Funnel
  - Cylindrical Mug with handle-Rectangular
4. Fitting Shop
  - Male – Female Joint
  - Rectangular piece
  - Filing the job

## Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

# PROGRAMMING IN C LAB

**Course Code: BCS 124**

**Credit Units: 01**

**Software Required:** Turbo C

**List of Experiments:**

1. C program involving problems like finding the nth value of cosine series, Fibonacci series. Etc.
2. C programs including user defined function calls
3. C programs involving pointers, and solving various problems with the help of those.
4. File handling

**Examination Scheme:**

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

# BASIC ELECTRICAL ENGINEERING LAB

Course Code: BEE 125

Credit Units: 01

## List of Experiments:

1. To verify KVL & KCL in the given network.
2. To verify Superposition Theorem.
3. To verify Maximum Power Transfer Theorem.
4. To verify Reciprocity Theorem.
5. To determine and verify  $R_{Th}$ ,  $V_{Th}$ ,  $R_N$ ,  $I_N$  in a given network.
6. To perform open circuit & short circuit test on a single-phase transformer.
7. To study transient response of a given RLC Circuit.
8. To perform regulation, ratio & polarity test on a single-phase transformer.
9. To measure power & power factor in a three phase circuit by two wattmeter method.
10. To measure power & power factor in a three phase load using three ammeter & three voltmeter method.

## Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

# ENGLISH

**Course Code: BCS 101**

**Credit Units: 01**

## **Course Objective:**

The course is intended to give a foundation of English Language. The literary texts are indented to help students to inculcate creative & aesthetic sensitivity and critical faculty through comprehension, appreciation and analysis of the prescribed literary texts. It will also help them to respond from different perspectives.

## **Course Contents:**

Module I: Vocabulary  
Use of Dictionary  
Use of Words: Diminutives, Homonyms & Homophones

### **Module II: Essentials of Grammar - I**

Articles  
Parts of Speech  
Tenses

### **Module III: Essentials of Grammar - II**

Sentence Structure  
Subject -Verb agreement  
Punctuation

Module IV: Communication  
The process and importance  
Principles & benefits of Effective Communication

Module V: Spoken English Communication  
Speech Drills  
Pronunciation and accent  
Stress and Intonation

### **Module VI: Communication Skills - I**

Developing listening skills  
Developing speaking skills

### **Module VII: Communication Skills - II**

Developing Reading Skills  
Developing writing Skills

### **Module VIII: Written English communication**

Progression of Thought/ideas  
Structure of Paragraph  
Structure of Essays

### **Module IX: Short Stories**

Of Studies, by Francis Bacon  
Dream Children, by Charles Lamb  
The Necklace, by Guy de Maupassant  
A Shadow, by R.K.Narayan  
Glory at Twilight, Bhabani Bhattacharya

### **Module X: Poems**

All the Worlds a Stage	Shakespeare
To Autumn	Keats
O! Captain, My Captain.	Walt Whitman
Where the Mind is Without Fear	Rabindranath Tagore
Psalm of Life	H.W. Longfellow

## **Examination Scheme:**

<b>Components</b>	<b>A</b>	<b>CT</b>	<b>HA</b>	<b>EE</b>
<b>Weightage (%)</b>	05	15	10	70

## **Text & References:**

### Text

- Madhulika Jha, Echoes, Orient Long Man
- Ramon & Prakash, Business Communication, Oxford.

### Reference

- Sydney Greenbaum Oxford English Grammar, Oxford.
- Successful Communications, Malra Treece (Allyn and Bacon)
- Effective Technical Communication, M. Ashraf Rizvi.

# BEHAVIOURAL SCIENCE - I (UNDERSTANDING SELF FOR EFFECTIVENESS)

**Course Code: BSS 104**

**CreditUnits: 01**

## **Course Objective:**

This course aims at imparting:

- Understanding self & process of self exploration
- Learning strategies for development of a healthy self esteem
- Importance of attitudes and its effective on personality
- Building Emotional Competence

## **Course Contents:**

### **Module I: Self: Core Competency**

Understanding of Self  
Components of Self – Self identity  
Self concept  
Self confidence  
Self image

### **Module II: Techniques of Self Awareness**

Exploration through Johari Window  
Mapping the key characteristics of self  
Framing a charter for self  
Stages – self awareness, self acceptance and self realization

### **Module III: Self Esteem & Effectiveness**

Meaning and Importance  
Components of self esteem  
High and low self esteem  
Measuring your self esteem

### **Module IV: Building Positive Attitude**

Meaning and nature of attitude  
Components and Types of attitude  
Importance and relevance of attitude

### **Module V: Building Emotional Competence**

Emotional Intelligence – Meaning, components, Importance and Relevance  
Positive and Negative emotions  
Healthy and Unhealthy expression of emotions

### **Module VI: End-of-Semester Appraisal**

Viva based on personal journal  
Assessment of Behavioural change as a result of training  
Exit Level Rating by Self and Observer

## **Examination Scheme:**

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

## **Text & References:**

Text

- Organizational Behaviour, Davis, K.
- Hoover, Judith D. Effective Small Group and Team Communication, 2002, Harcourt College Publishers
- Dick, Mc Cann & Margerison, Charles: Team Management, 1992 Edition, viva books
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressler, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change

## Reference

- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company
- Smither Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers

# FRENCH

**Course Code: FLT 101**

**Credit Units: 02**

## **Course Objective:**

To familiarize the students with the French language

- with the phonetic system
- with the syntax
- with the manners
- with the cultural aspects

## **Course Contents:**

**Module A: pp. 01 to 37: Unités 1, 2, Unité 3 Objectif 1, 2**

Only grammar of Unité 3: objectif 3, 4 and 5

### **Contenu lexical: Unité 1 : Découvrir la langue française : (oral et écrit)**

1. se présenter, présenter quelqu'un, faire la connaissance des autres, formules de politesse, rencontres
2. dire/interroger si on comprend
3. Nommer les choses

### **Unité 2: Faire connaissance**

1. donner/demander des informations sur une personne, premiers contacts, exprimer ses goûts et ses préférences
2. Parler de soi: parler du travail, de ses activités, de son pays, de sa ville.

### **Unité 3: Organiser son temps**

1. dire la date et l'heure

### **Contenu grammatical:**

1. organisation générale de la grammaire
2. article indéfini, défini, contracté
3. nom, adjectif, masculin, féminin, singulier et pluriel
4. négation avec « de », "moi aussi", "moi non plus"
5. interrogation : Inversion, est-ce que, qui, que, quoi, qu'est-ce que, où, quand, comment, quel(s), quelle(s)  
Interro-négatif : réponses : oui, si, non
6. pronom tonique/diśjoint- pour insister après une préposition
7. futur proche

## **Examination Scheme:**

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

## **Text & References:**

- le livre à suivre : Campus: Tome 1

# GERMAN

**Course Code: FLG 101**

**Credit Units: 02**

## Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.

To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

## Course Contents:

### Module I: Introduction

Self introduction: heissen, kommen, wohnen, lernen, arbeiten, trinken, etc.

All personal pronouns in relation to the verbs taught so far.

Greetings: Guten Morgen!, Guten Tag!, Guten Abend!, Gute Nacht!, Danke sehr!, Danke!, Vielen Dank!, (es tut mir Leid!),

Hallo, wie geht's?: Danke gut!, sehr gut!, prima!, ausgezeichnet!,  
Es geht!, nicht so gut!, so la la!, miserabel!

### Module II: Interviewspiel

To assimilate the vocabulary learnt so far and to apply the words and phrases in short dialogues in an interview – game for self introduction.

### Module III: Phonetics

Sound system of the language with special stress on Diphthongs

### Module IV: Countries, nationalities and their languages

To make the students acquainted with the most widely used country names, their nationalities and the language spoken in that country.

### Module V: Articles

The definite and indefinite articles in masculine, feminine and neuter gender. All Vegetables, Fruits, Animals, Furniture, Eatables, modes of Transport

### Module VI: Professions

To acquaint the students with professions in both the genders with the help of the verb “sein”.

### Module VII: Pronouns

Simple possessive pronouns, the use of my, your, etc.

The family members, family Tree with the help of the verb “to have”

### Module VIII: Colours

All the color and color related vocabulary – colored, colorful, colorless, pale, light, dark, etc.

### Module IX: Numbers and calculations – verb “kosten”

The counting, plural structures and simple calculation like addition, subtraction, multiplication and division to test the knowledge of numbers.

“Wie viel kostet das?”

### Module X: Revision list of Question pronouns

W – Questions like who, what, where, when, which, how, how many, how much, etc.

## Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

## Text & References:

Text

- Wolfgang Hieber, Lernziel Deutsch

- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer

Reference

- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

# SPANISH

**Course Code:** FLS 101

**Credit Units: 02**

## **Course Objective:**

To enable students acquire the relevance of the Spanish language in today's global context, how to greet each other. How to present / introduce each other using basic verbs and vocabulary

## **Course Contents:**

### **Module I**

A brief history of Spain, Latin America, the language, the culture...and the relevance of Spanish language in today's global context.

Introduction to alphabets

### **Module II**

Introduction to 'Saludos' (How to greet each other. How to present / introduce each other).

Goodbyes (despedidas)

The verb *llamarse* and practice of it.

### **Module III**

Concept of Gender and Number

Months of the years, days of the week, seasons. Introduction to numbers 1-100, Colors, Revision of numbers and introduction to ordinal numbers.

### **Module IV**

Introduction to *SER* and *ESTAR* (both of which mean To Be).Revision of 'Saludos' and 'Llamarse'. Some adjectives, nationalities, professions, physical/geographical location, the fact that spanish adjectives have to agree with gender and number of their nouns. Exercises highlighting usage of *Ser* and *Estar*.

### **Module V**

Time, demonstrative pronoun (Este/esta, Aquel/aquella etc)

### **Module VI**

Introduction to some key AR /ER/IR ending regular verbs.

## **Examination Scheme:**

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

## **Text & References:**

Text

- Español, En Directo I A

Reference

- Español Sin Fronteras

# CHINESE

**Course Code: FLC 101**

**Credit Units: 02**

## Course Objective:

There are many dialects spoken in China, but the language which will help you through wherever you go is Mandarin, or Putonghua, as it is called in Chinese. The most widely spoken forms of Chinese are Mandarin, Cantonese, Gan, Hakka, Min, Wu and Xiang. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

## Course Contents:

### Module I

Show pictures, dialogue and retell.  
Getting to know each other.  
Practicing chart with Initials and Finals. (CHART – The Chinese Phonetic Alphabet Called “Hanyu Pinyin” in Mandarin Chinese.)  
Practicing of Tones as it is a tonal language.  
Changes in 3<sup>rd</sup> tone and Neutral Tone.

### Module II

Greetings  
Let me Introduce  
The modal particle “ne”.  
Use of Please ‘qing’ – sit, have tea..... etc.  
A brief self introduction – Ni hao ma? Zaijian!  
Use of “bu” negative.

### Module III

Attributives showing possession  
How is your Health? Thank you  
Where are you from?  
A few Professions like – Engineer, Businessman, Doctor, Teacher, Worker.  
Are you busy with your work?  
May I know your name?

### Module IV

Use of “How many” – People in your family?  
Use of “zhe” and “na”.  
Use of interrogative particle “shenme”, “shui”, “ma” and “nar”.  
How to make interrogative sentences ending with “ma”.  
Structural particle “de”.  
Use of “Nin” when and where to use and with whom. Use of guixing.  
Use of verb “zuo” and how to make sentences with it.

### Module V

Family structure and Relations.  
Use of “you” – “mei you”.  
Measure words  
Days and Weekdays.  
Numbers.  
Maps, different languages and Countries.

## Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

## Text & References:

- “Elementary Chinese Reader Part I” Lesson 1-10

# APPLIED MATHEMATICS – II

**Course Code: AM 201**

**Credit Units: 04**

## Course Objective:

The knowledge of Mathematics is necessary for a better understanding of almost all the Engineering and Science subjects. Here our intention is to make the students acquainted with the concept of basic topics from Mathematics, which they need to pursue their Engineering degree in different disciplines.

## Course Contents:

### Module I: Linear Algebra

Hermitian and Skew Hermitian Matrix, Unitary Matrix, Orthogonal Matrix, Elementary Row Transformation, Reduction of a Matrix to Row Echelon Form, Rank of a Matrix, Consistency of Linear Simultaneous Equations, Gauss Elimination Method, Gauss-Jordan Method, Eigen Values and Eigen Vectors of a Matrix, Cayley-Hamilton Theorem, Diagonalization of a Matrix, Vector Space, Linear Independence and Dependence of Vectors, Linear Transformations.

### Module II: Infinite Series

Definition of Sequence, Bounded Sequence, Limit of a Sequence, Series, Finite and Infinite Series, Convergence and Divergence of Infinite series, Cauchy's Principle of Convergence, Positive Term Infinite Series, Comparison test, D'Alembert's Ratio test. Raabe's Test, Cauchy's nth root Test. Logarithmic Test, Alternating Series, Leibnitz's Test, Absolute and conditional convergence, Uniform Convergence, Power Series and its Interval of Convergence.

### Module III: Complex Analysis

De Moivre's Theorem and Roots of Complex Numbers, Logarithmic Functions, Circular, Hyperbolic Functions and their Inverses.

Functions of a Complex Variables, Limits, Continuity and Derivatives, Analytic Function, Cauchy-Riemann Equations (without proof), Harmonic Function, Harmonic Conjugates, Conformal Mapping, Bilinear Transformations, Complex Line Integral, Cauchy Integral Theorem, Cauchy Integral Formula, Derivative of Analytic Function, Power Series, Taylor Series, Laurent Series, Zeros and Singularities, Residues, Residue

Theorem, Evaluation of Real Integrals of the Form  $\int_0^{2\pi} F(\cos\theta, \sin\theta) d\theta$  and  $\int_{\gamma} \frac{f(x)}{F(x)} dx$ .

### Module IV: Statistics and Probability

Moments, Skewness, Kurtosis, Random Variables and Probability Distribution, Mean and Variance of a Probability Distribution, Binomial Distribution, Poisson Distribution and Normal Distribution.

## Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

## Text & References:

### Text

- Engineering Mathematics by Erwin Kreyszig.
- Engineering Mathematics by R.K. Jain and S.R.K. Iyengar.
- Higher Engineering Mathematics by H.K. Dass.

### Reference

- Engineering Mathematics by B.S. Grewal.
- Differential Calculus by Shanti Narain.
- Integral Calculus by Shanti Narain.
- Linear Algebra- Schaum Outline Series.

# APPLIED PHYSICS - II - MODERN PHYSICS

**Course Code: AP 202**

**Credit Units: 03**

## Course Objective:

Aim of this course is to introduce the students to fundamentals of graduate level physics which form the basis of all applied science and engineering

## Course Contents:

### Module I: Special Theory of Relativity

Michelson-Morley experiment, Importance of negative result, Inertial & non-inertial frames of reference, Einstein's postulates of Special theory of Relativity, Space-time coordinate system, Relativistic Space Time transformation (Lorentz transformation equation), Transformation of velocity, Addition of velocities, Length contraction and Time dilation, Mass-energy equivalence (Einstein's energy mass relation) & Derivation of Variation of mass with velocity,

### Module II: Wave Mechanics

Wave particle duality, De-Broglie matter waves, phase and group velocity, Heisenberg uncertainty principle, wave function and its physical interpretation, Operators, expectation values. Time dependent & time independent Schrödinger wave equation for free & bound states, square well potential (rigid wall), Step potential.

### Module III: Atomic Physics

Vector atom model, LS and j-j coupling, Zeeman effect (normal & anomalous), Paschen-Bach effect, X-ray spectra and energy level diagram, Moseley's Law, Lasers – Einstein coefficients, conditions for light amplification, population inversion, optical pumping, three level and four level lasers, He-Ne and Ruby laser, Properties and applications of lasers.

### Module IV: Solid State Physics

Sommerfeld's free electron theory of metals, Fermi energy, Introduction to periodic potential & Kronig-Penny model (Qualitative) Band Theory of Solids, Semi-conductors: Intrinsic and Extrinsic Semiconductors, photoconductivity and photovoltaics, Basic aspects of Superconductivity, Meissner effect.

## Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

## Text & References:

Text

- Concept of Modern Physics, A. Beiser
- Applied Physics II, Agarawal & Goel

Reference

- Solid State Physics, S. O. Pallai
- Physics of Atom, Wehr & Richards

# OBJECT ORIENTED PROGRAMMING USING C++

**Course Code:** BCS 203

**CreditUnits:** 03

## Course Objective:

The objective of this module is to introduce object oriented programming. To explore and implement the various features of OOP such as inheritance, polymorphism, Exceptional handling using programming language C++. After completing this course student can easily identify the basic difference between the programming approaches like procedural and object oriented.

## Course Contents:

### Module I: Introduction

Review of C, Difference between C and C++, Procedure Oriented and Object Oriented Approach. Basic Concepts: Objects, classes, Principals like Abstraction, Encapsulation, Inheritance and Polymorphism. Dynamic Binding, Message Passing. Characteristics of Object-Oriented Languages. Introduction to Object-Oriented Modeling techniques (Object, Functional and Dynamic Modeling).

### Module II: Classes and Objects

Abstract data types, Object & classes, attributes, methods, C++ class declaration, Local Class and Global Class, State identity and behaviour of an object, Local Object and Global Object, Scope resolution operator, Friend Functions, Inline functions, Constructors and destructors, instantiation of objects, Types of Constructors, Static Class Data, Array of Objects, Constant member functions and Objects, Memory management Operators.

### Module III: Inheritance

Inheritance, Types of Inheritance, access modes – public, private & protected, Abstract Classes, Ambiguity resolution using scope resolution operator and Virtual base class, Aggregation, composition vs classification hierarchies, Overriding inheritance methods, Constructors in derived classes, Nesting of Classes.

### Module IV: Polymorphism

Polymorphism, Type of Polymorphism – Compile time and runtime, Function Overloading, Operator Overloading (Unary and Binary) Polymorphism by parameter, Pointer to objects, this pointer, Virtual Functions, pure virtual functions.

### Module V: Strings, Files and Exception Handling

Manipulating strings, Streams and files handling, formatted and Unformatted Input output. Exception handling, Generic Programming – function template, class Template Standard Template Library: Standard Template Library, Overview of Standard Template Library, Containers, Algorithms, Iterators, Other STL Elements, The Container Classes, General Theory of Operation, Vectors.

## Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

## Text & References:

### Text:

- A.R. Venugopal, Rajkumar, T. Ravishanker “Mastering C++”, TMH, 1997
- R. Lafore, “Object Oriented Programming using C++”, BPB Publications, 2004.
- “Object Oriented Programming with C++” By E. Balagurusamy.
- Schildt Herbert, “C++: The Complete Reference”, Wiley DreamTech, 2005.

### References:

- Parsons, “Object Oriented Programming with C++”, BPB Publication, 1999.
- Steven C. Lawlor, “The Art of Programming Computer Science with C++”, Vikas Publication, 2002.
- Yashwant Kanethkar, “Object Oriented Programming using C++”, BPB, 2004

# ENGINEERING MECHANICS

**Course Code: BME 204**

**Credit Units: 03**

## Course Objective:

Objective of this course is to provide fundamental knowledge of force system and its effect on the behaviour of the bodies that may be in dynamic or in static state. It includes the equilibrium of different structures like beams, frames, truss etc and the force transfer mechanism in the different components of a body under given loading condition.

## Course Contents:

### Module I: Force system & Structure

Free body diagram, Equilibrium equations and applications. Plane truss, perfect and imperfect truss, assumption in the truss analysis, analysis of perfect plane trusses by the method of joints, method of section.

### Module II: Friction

Static and Kinetic friction, laws of dry friction, co-efficient of friction, angle of friction, angle of repose, cone of friction, friction lock, efficiency of screw jack, transmission of power through belt

### Module III: Distributed Force

Determination of center of gravity, center of mass and centroid by direct integration and by the method of composite bodies, mass moment of inertia and area moment of inertia by direct integration and composite bodies method, radius of gyration, parallel axis theorem, Pappus theorems and its application, polar moment of inertia.

### Module IV: Work -Energy

Work energy equation, conservation of energy, Virtual work, impulse, momentum conservation, impact of bodies, co-efficient of restitution, loss of energy during impact, D'alembert principle

## Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

## Text & References:

### Text

- S.S. Bhavikatti, Engineering Mechanics, New Age International Ltd
- Timoshenko, Engineering Mechanics, McGraw Hill

### Reference

- R. S. Khurmi, Engineering Mechanics, S. Chand Publication
- I. H. Shames & G. K. M. Rao, Engineering Mechanics, Pearson Education, 2006

# ENGINEERING GRAPHICS

Course Code: BME 205

Credit Units : 01

## Course Contents:

### Module 1:

Scales & Curves: Representative factor, Plain Scales, Diagonal Scales, Comparative Scales and Scale of chords. Construction of ellipse, Parabola, Hyperbola, Cycloid, Epicycloid, Hypocycloid, Involute and Spirals by various methods.

### Module 2:

Projection of Points & Straight lines: Projection of points, Projection of straight lines. True inclinations and true length of straight lines.

### Module 3:

Projection of planes and solids: Projection of circle, triangle, polygons, polyhedrons, pyramids, cylinders and cones in different positions.

### Module 1:

Section of solids and Isometric projections: Section of right solids by normal and inclined planes, Orthographic projection, first angle & third angle projection. Isometric scale, Isometric axes, Isometric projection from orthographic drawing.

### Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

### Text & References:

#### Text

- Engineering Graphics – Basant Agrawal and Dr. C. M. Agrawal, Tata McGraw-Hill Publishing Company Ltd.
- Engineering Drawing – by N. D. Bhatt

#### Reference

- Engineering Drawing and Graphics – by Veenugopal
- Engineering Drawing – by T. Jeyopovan

# ENVIRONMENTAL STUDIES

**Course Code: EVS 001**

**Credit Units: 04**

## **Course Objective:**

The term environment is used to describe, in the aggregate, all the external forces, influences and conditions, which affect the life, nature, behaviour and the growth, development and maturity of living organisms. At present a great number of environment issues, have grown in size and complexity day by day, threatening the survival of mankind on earth. A study of environmental studies is quite essential in all types of environmental sciences, environmental engineering and industrial management. The objective of environmental studies is to enlighten the masses about the importance of the protection and conservation of our environment and control of human activities which has an adverse effect on the environment.

## **Course Contents:**

### **Module I: The multidisciplinary nature of environmental studies**

Definition, scope and importance  
Need for public awareness

### **Module II: Natural Resources**

#### **Renewable and non-renewable resources:**

Natural resources and associated problems

Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.

Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

### **Module III: Ecosystems**

Concept of an ecosystem

Structure and function of an ecosystem

Producers, consumers and decomposers

Energy flow in the ecosystem

Ecological succession

Food chains, food webs and ecological pyramids

Introduction, types, characteristic features, structure and function of the following ecosystem:

- a. Forest ecosystem
- b. Grassland ecosystem
- c. Desert ecosystem
- d. Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries)

### **Module IV: Biodiversity and its conservation**

Introduction – Definition: genetic, species and ecosystem diversity

Biogeographical classification of India

Value of biodiversity: consumptive use, productive use, social, ethical aesthetic and option values

Biodiversity at global, national and local levels

India as a mega-diversity nation

Hot-spots of biodiversity

Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts

Endangered and endemic species of India

Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

### **Module V: Environmental Pollution**

Definition

Causes, effects and control measures of:

- a. Air pollution
- b. Water pollution
- c. Soil pollution
- d. Marine pollution
- e. Noise pollution
- f. Thermal pollution
- g. Nuclear pollution

Solid waste management: Causes, effects and control measures of urban and industrial wastes.

Role of an individual in prevention of pollution.

Pollution case studies.

Disaster management: floods, earthquake, cyclone and landslides.

#### **Module VI: Social Issues and the Environment**

From unsustainable to sustainable development

Urban problems and related to energy

Water conservation, rain water harvesting, watershed management

Resettlement and rehabilitation of people; its problems and concerns. Case studies.

Environmental ethics: Issues and possible solutions

Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.

Wasteland reclamation

Consumerism and waste products

Environmental Protection Act

Air (Prevention and Control of Pollution) Act

Water (Prevention and control of Pollution) Act

Wildlife Protection Act

Forest Conservation Act

Issues involved in enforcement of environmental legislation

Public awareness

#### **Module VII: Human Population and the Environment**

Population growth, variation among nations

Population explosion – Family Welfare Programmes

Environment and human health

Human Rights

Value Education

HIV / AIDS

Women and Child Welfare

Role of Information Technology in Environment and Human Health

Case Studies

#### **Module VIII: Field Work**

Visit to a local area to document environmental assets-river / forest/ grassland/ hill/ mountain.

Visit to a local polluted site – Urban / Rural / Industrial / Agricultural

Study of common plants, insects, birds

Study of simple ecosystems-pond, river, hill slopes, etc (Field work equal to 5 lecture hours)

#### **Examination Scheme:**

<b>Components</b>	<b>A</b>	<b>CT</b>	<b>S/V/Q</b>	<b>HA</b>	<b>EE</b>
<b>Weightage (%)</b>	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;

Att: Attendance.

#### **Text & References:**

Text

- Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
- Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad 380 013, India
- Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
- Clark R.S., Marine Pollution, Clarendon Press Oxford (TB)
- Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p
- De A.K., Environmental Chemistry, Wiley Eastern Ltd.
- Down to Earth, Centre for Science and Environment (R)

- Gleick, H.P. 1993. Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p
- Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
- Heywood, V.H & Waston, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
- Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
- Mckinney, M.L. & School, R.M. 1996. Environmental Science Systems & Solutions, Web enhanced edition. 639p.

#### Reference

- Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB)
- Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
- Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
- Rao M N. & Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p.
- Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut
- Survey of the Environment, The Hindu (M)
- Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science
- Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards, Vol I and II, Enviro Media (R)
- Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (TB)
- Wanger K.D., 1998 Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p

## APPLIED PHYSICS – II-MODERN PHYSICS LAB

Course Code: AP 222

Credit Units: 01

### List of Experiments:

1. To determine the wavelength of prominent lines of mercury spectrum using plane transmission grating.
2. To determine the thickness of a given wire by Wedge method.
3. To determine the wavelength of He-Ne laser light using single slit.
4. To determine the frequency of an electrically maintained tuning fork by Melde's method.
5. To study the variation of magnetic field along the axis of Helmholtz coil and to find out reduction factor.
6. To draw the V – I characteristics of a forward and reverse bias PN junction diode.
7. To determine the frequency of AC mains using sonometer.
8. To determine the energy band-gap of Germanium crystal using four probes method.
9. To draw V – I characteristics of a photocell and to verify the inverse square law of radiation.
10. To determine the acceleration due to gravity ('g') using Kater's reversible pendulum.
11. To study the characteristics of photo voltaic cell (solar cell).

### Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

# OBJECT ORIENTED PROGRAMMING USING C++ LAB

**Course Code:** BCS 223

**CreditUnits: 01**

**Software Required:** Turbo C++

## List of Experiments:

1. Creation of objects in programs and solving problems through them.
2. Different use of private, public member variables and functions and friend functions.
3. Use of constructors and destructors.
4. Operator overloading
5. Use of inheritance in and accessing objects of different derived classes.
6. Polymorphism and virtual functions (using pointers).
7. File handling.

## Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

# ENGINEERING MECHANICS LAB

**Course Code: BME 224**

**Credit Units: 01**

## List of Experiments:

1. To verify the law of Force Polygon
2. To verify the law of Moments using Parallel Force apparatus. (Simply supported type)
3. To determine the co-efficient of friction between wood and various surface (like
4. Leather, Wood, Aluminum) on an inclined plane.
5. To find the forces in the members of Jib Crane.
6. To determine the mechanical advantage, Velocity ratio and efficiency of a screw jack.
7. To determine the mechanical advantage, Velocity ratio and Mechanical efficiency of the Wheel and Axle
8. To determine the MA, VR,  $\eta$  of Worm Wheel (2-start)
9. Verification of force transmitted by members of given truss.
10. To verify the law of moments using Bell crank lever
11. To find CG and moment of Inertia of an irregular body using Computation method

## Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

# ENGINEERING GRAPHICS LAB

**Course Code: BME 225**

**Credit Units: 01**

## **List of Experiments:**

12. Sketching and drawing of scale & Curve.
13. Sketching and drawing of Cycloidal Curve.
14. Sketching and drawing of Involute & Spirals.
15. Sketching and drawing of points & line.
16. Sketching and drawing of projection of planes.
17. Sketching and drawing of projection of solids.
18. Sketching and drawing of intersection of surfaces.
19. Sketching and drawing of development of surfaces.
20. Sketching and drawing of orthographic and isometric projection.

## **Examination Scheme:**

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

# ENGLISH

**Course Code: BCS 201**

**Credit Units: 01**

## **Course Objective:**

The course is intended to give a foundation of English Language. The literary texts are indented to help students to inculcate creative & aesthetic sensitivity and critical faculty through comprehension, appreciation and analysis of the prescribed literary texts. It will also help them to respond form different perspectives.

## **Course Contents:**

### Module I: Vocabulary

Use of Dictionary

Use of Words: Diminutives, Homonyms & Homophones

### Module II: Essentials of Grammar - I

Articles

Parts of Speech

Tenses

### Module III: Essentials of Grammar - II

Sentence Structure

Subject -Verb agreement

Punctuation

### Module IV: Communication

The process and importance

Principles & benefits of Effective Communication

### Module V: Spoken English Communication

Speech Drills

Pronunciation and accent

Stress and Intonation

### **Module VI: Communication Skills - I**

Developing listening skills

Developing speaking skills

### Module VII: Communication Skills - II

Developing Reading Skills

Developing writing Skills

### Module VIII: Written English communication

Progression of Thought/ideas

Structure of Paragraph

Structure of Essays

### Module IX: Short Stories

Of Studies, by Francis Bacon

Dream Children, by Charles Lamb

The Necklace, by Guy de Maupassant

A Shadow, by R.K.Narayan

Glory at Twilight, Bhabani Bhattacharya

### **Module X: Poems**

All the Worlds a Stage

To Autumn

O! Captain, My Captain.

Where the Mind is Without Fear

Psalm of Life

Shakespeare

Keats

Walt Whitman

Rabindranath Tagore

H.W. Longfellow

***Examination Scheme:***

<b>Components</b>	<b>A</b>	<b>CT</b>	<b>HA</b>	<b>EE</b>
<b>Weightage (%)</b>	05	15	10	70

**Text & References:**

Text

- Madhulika Jha, Echoes, Orient Long Man
- Ramon & Prakash, Business Communication, Oxford.

Reference

- Sydney Greenbaum Oxford English Grammar, Oxford.
- Successful Communications, Malra Treece (Allyn and Bacon)
- Effective Technical Communication, M. Ashraf Rizvi.

# BEHAVIOURAL SCIENCE - II (PROBLEM SOLVING AND CREATIVE THINKING)

**Course Code:** BSS 204

**CreditUnits:** 01

## **Course Objective:**

To enable the students:

- Understand the process of problem solving and creative thinking.
- Facilitation and enhancement of skills required for decision-making.

## **Course Contents:**

Module I: Thinking as a tool for Problem Solving

What is thinking: The Mind/Brain/Behaviour

Critical Thinking and Learning:

Making Predictions and Reasoning

Memory and Critical Thinking

Emotions and Critical Thinking

Thinking skills

### **Module II: Hindrances to Problem Solving Process**

Perception

Expression

Emotion

Intellect

Work environment

### **Module III: Problem Solving**

Recognizing and Defining a problem

Analyzing the problem (potential causes)

Developing possible alternatives

Evaluating Solutions

Resolution of problem

Implementation

Barriers to problem solving:

Perception

Expression

Emotion

Intellect

Work environment

### **Module IV: Plan of Action**

Construction of POA

Monitoring

Reviewing and analyzing the outcome

### **Module V: Creative Thinking**

Definition and meaning of creativity

The nature of creative thinking

Convergent and Divergent thinking

Idea generation and evaluation (Brain Storming)

Image generation and evaluation

Debating

The six-phase model of Creative Thinking: ICEDIP model

### **Module VI: End-of-Semester Appraisal**

Viva based on personal journal

Assessment of Behavioural change as a result of training

Exit Level Rating by Self and Observer

## **Examination Scheme:**

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

## **Text & References:**

### Text

- Michael Steven: How to be a better problem solver, Kogan Page, New Delhi, 1999
- Geoff Petty: How to be better at creativity; Kogan Page, New Delhi, 1999
- Richard Y. Chang and P. Keith, Kelly: Wheeler Publishing, New Delhi, 1998.
- Phil Lowe Koge Page: Creativity and Problem Solving, New Delhi, 1996

### Reference

- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 3, Management (1996); Pfeiffer & Company
- Bensley, Alan D.: Critical Thinking in Psychology – A Unified Skills Approach, (1998), Brooks/Cole Publishing Company.

# FRENCH

**Course Code: FLT 201**

**Credit Units: 02**

## Course Objective:

To enable the students to overcome the fear of speaking a foreign language and take position as a foreigner speaking French.

To make them learn the basic rules of French Grammar.

## Course Contents:

**Module A: pp.38 – 47: Unité 3 : Objectif 3, 4, 5, 6**

**Module B: pp. 47 to 75 Unité 4, 5**

### Contenu lexical: Unité 3: Organiser son temps

1. donner/demander des informations sur un emploi du temps, un horaire SNCF – Imaginer un dialogue
2. rédiger un message/ une lettre pour ...
  - i) prendre un rendez-vous/ accepter et confirmer/ annuler
  - ii) inviter/accepter/refuser
3. Faire un programme d'activités  
imaginer une conversation téléphonique/un dialogue  
Propositions- interroger, répondre

### Unité 4: Découvrir son environnement

1. situer un lieu
2. s'orienter, s'informer sur un itinéraire.
3. Chercher, décrire un logement
4. connaître les rythmes de la vie

### Unité 5 : s'informer

1. demander/donner des informations sur un emploi du temps passé.
2. donner une explication, exprimer le doute ou la certitude.
3. découvrir les relations entre les mots
4. savoir s'informer

### Contenu grammatical:

1. Adjectifs démonstratifs
2. Adjectifs possessifs/exprimer la possession à l'aide de :
  - i. « de » ii. A+nom/pronom disjoint
3. Conjugaison pronominale – négative, interrogative - construction à l'infinitif
4. Impératif/exprimer l'obligation/l'interdiction à l'aide de « il faut... »/ «il ne faut pas... »
5. passé composé
6. Questions directes/indirectes

## Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

## Text & References:

- le livre à suivre : Campus: Tome 1

# GERMAN

**Course Code: FLG 201**

**Credit Units: 02**

## **Course Objective:**

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.

To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany. Introduction to Grammar to consolidate the language base learnt in Semester I

## **Course Contents:**

### **Module I: Everything about Time and Time periods**

Time and times of the day.

Weekdays, months, seasons.

Adverbs of time and time related prepositions

### **Module II: Irregular verbs**

Introduction to irregular verbs like to be, and others, to learn the conjugations of the same, (fahren, essen, lessen, schlafen, sprechen und ähnliche).

### **Module III: Separable verbs**

To comprehend the change in meaning that the verbs undergo when used as such

Treatment of such verbs with separable prefixes

### **Module IV: Reading and comprehension**

Reading and deciphering railway schedules/school time table

Usage of separable verbs in the above context

### **Module V: Accusative case**

Accusative case with the relevant articles

Introduction to 2 different kinds of sentences – Nominative and Accusative

### **Module VI: Accusative personal pronouns**

Nominative and accusative in comparison

Emphasizing on the universal applicability of the pronouns to both persons and objects

### **Module VII: Accusative prepositions**

Accusative prepositions with their use

Both theoretical and figurative use

### **Module VIII: Dialogues**

Dialogue reading: 'In the market place'

'At the Hotel'

## **Examination Scheme:**

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

## **Text & References:**

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

# SPANISH

**Course Code:** FLS 201

**Credit Units: 02**

## **Course Objective:**

To enable students acquire more vocabulary, grammar, Verbal Phrases to understand simple texts and start describing any person or object in Simple Present Tense.

## **Course Contents:**

### **Module I**

Revision of earlier modules.

### **Module II**

Some more AR/ER/IR verbs. Introduction to root changing and irregular AR/ER/IR ending verbs

### **Module III**

More verbal phrases (eg, Dios Mio, Que lastima etc), adverbs (*bueno/malo, muy, mucho, bastante, poco*). Simple texts based on grammar and vocabulary done in earlier modules.

### **Module IV**

Possessive pronouns

### **Module V**

Writing/speaking essays like my friend, my house, my school/institution, myself....descriptions of people, objects etc, computer/internet related vocabulary

## **Examination Scheme:**

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>C</b>	<b>I</b>	<b>V</b>	<b>A</b>
<b>Weightage (%)</b>	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

## **Text & References:**

- Español, En Directo I A
- Español Sin Fronteras

# CHINESE

**Course Code: FLC 201**

**Credit Units: 02**

## Course Objective:

Chinese is a tonal language where each syllable in isolation has its definite tone (flat, falling, rising and rising/falling), and same syllables with different tones mean different things. When you say, “ma” with a third tone, it mean horse and “ma” with the first tone is Mother. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

## Course Contents:

### Module I

Drills  
Practice reading aloud  
Observe Picture and answer the question.  
Tone practice.  
Practice using the language both by speaking and by taking notes.  
Introduction of basic sentence patterns.  
Measure words.  
Glad to meet you.

### Module II

Where do you live?  
Learning different colors.  
Tones of “bu”  
Buying things and how muchit costs?  
Dialogue on change of Money.  
More sentence patterns on Days and Weekdays.  
How to tell time. Saying the units of time in Chinese. Learning to say useful phrases like – 8:00, 11:25, 10:30 P.M. everyday, afternoon, evening, night, morning 3:58, one hour, to begin, to end ..... etc.  
Morning, Afternoon, Evening, Night.

### Module III

Use of words of location like-li, wais hang, xia  
Furniture – table, chair, bed, bookshelf,.. etc.  
Description of room, house or hostel room.. eg what is placed where and how many things are there in it?  
Review Lessons – Preview Lessons.  
Expression ‘yao’, “xiang” and “yaoshi” (if).  
Days of week, months in a year etc.  
I am learning Chinese. Is Chinese difficult?

### Module IV

Counting from 1-1000  
Use of “chang-chang”.  
Making an Inquiry – What time is it now? Where is the Post Office?  
Days of the week. Months in a year.  
Use of Preposition – “zai”, “gen”.  
Use of interrogative pronoun – “duoshao” and “ji”.  
“Whose”??? Sweater etc is it?  
Different Games and going out for exercise in the morning.

### Module V

The verb “qu”  
– Going to the library issuing a book from the library  
– Going to the cinema hall, buying tickets  
– Going to the post office, buying stamps  
– Going to the market to buy things.. etc  
– Going to the buy clothes .... Etc.  
Hobby. I also like swimming.  
Comprehension and answer questions based on it.

## Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation  
I – Interaction/Conversation Practice

**Text & References:**

- “Elementary Chinese Reader Part I” Lesson 11-20

# ENVIRONMENTAL STUDIES

**Course Code: EVS 001**

**Credit Units: 04**

## **Course Objective:**

The term environment is used to describe, in the aggregate, all the external forces, influences and conditions, which affect the life, nature, behaviour and the growth, development and maturity of living organisms. At present a great number of environment issues, have grown in size and complexity day by day, threatening the survival of mankind on earth. A study of environmental studies is quite essential in all types of environmental sciences, environmental engineering and industrial management. The objective of environmental studies is to enlighten the masses about the importance of the protection and conservation of our environment and control of human activities which has an adverse effect on the environment.

## **Course Contents:**

### **Module I: The multidisciplinary nature of environmental studies**

Definition, scope and importance

Need for public awareness

### **Module II: Natural Resources**

#### **Renewable and non-renewable resources:**

Natural resources and associated problems

Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.

Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

### **Module III: Ecosystems**

Concept of an ecosystem

Structure and function of an ecosystem

Producers, consumers and decomposers

Energy flow in the ecosystem

Ecological succession

Food chains, food webs and ecological pyramids

Introduction, types, characteristic features, structure and function of the following ecosystem:

- e. Forest ecosystem
- f. Grassland ecosystem
- g. Desert ecosystem
- h. Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries)

### **Module IV: Biodiversity and its conservation**

Introduction – Definition: genetic, species and ecosystem diversity

Biogeographical classification of India

Value of biodiversity: consumptive use, productive use, social, ethical aesthetic and option values

Biodiversity at global, national and local levels

India as a mega-diversity nation

Hot-spots of biodiversity

Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts

Endangered and endemic species of India

Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

### **Module V: Environmental Pollution**

Definition

Causes, effects and control measures of:

- h. Air pollution
- i. Water pollution
- j. Soil pollution
- k. Marine pollution
- l. Noise pollution
- m. Thermal pollution
- n. Nuclear pollution

Solid waste management: Causes, effects and control measures of urban and industrial wastes.

Role of an individual in prevention of pollution.

Pollution case studies.

Disaster management: floods, earthquake, cyclone and landslides.

#### **Module VI: Social Issues and the Environment**

From unsustainable to sustainable development

Urban problems and related to energy

Water conservation, rain water harvesting, watershed management

Resettlement and rehabilitation of people; its problems and concerns. Case studies.

Environmental ethics: Issues and possible solutions

Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.

Wasteland reclamation

Consumerism and waste products

Environmental Protection Act

Air (Prevention and Control of Pollution) Act

Water (Prevention and control of Pollution) Act

Wildlife Protection Act

Forest Conservation Act

Issues involved in enforcement of environmental legislation

Public awareness

#### **Module VII: Human Population and the Environment**

Population growth, variation among nations

Population explosion – Family Welfare Programmes

Environment and human health

Human Rights

Value Education

HIV / AIDS

Women and Child Welfare

Role of Information Technology in Environment and Human Health

Case Studies

#### **Module VIII: Field Work**

Visit to a local area to document environmental assets-river / forest/ grassland/ hill/ mountain.

Visit to a local polluted site – Urban / Rural / Industrial / Agricultural

Study of common plants, insects, birds

Study of simple ecosystems-pond, river, hill slopes, etc (Field work equal to 5 lecture hours)

#### **Examination Scheme:**

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;

Att: Attendance.

#### **Text & References:**

Text

- Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
- Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad 380 013, India
- Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
- Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
- Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p
- De A.K., Environmental Chemistry, Wiley Eastern Ltd.
- Down to Earth, Centre for Science and Environment (R)

- Gleick, H.P. 1993. Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p
- Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
- Heywood, V.H & Waston, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
- Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
- Mckinney, M.L. & School, R.M. 1996. Environmental Science Systems & Solutions, Web enhanced edition. 639p.

#### Reference

- Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB)
- Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
- Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
- Rao M N. & Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p.
- Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut
- Survey of the Environment, The Hindu (M)
- Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science
- Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards, Vol I and II, Enviro Media (R)
- Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (TB)
- Wanger K.D., 1998 Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p

# APPLIED MATHEMATICS – III

**Course Code: AM 301**

**Credit Units: 03**

## **Course Objective:**

The knowledge of Mathematics is necessary for a better understanding of almost all the Engineering and Science subjects. Here our intention is to make the students acquainted with the concept of basic topics from Mathematics, which they need to pursue their Engineering degree in different disciplines.

## **Course Contents:**

### **Module I: Partial Differential Equations**

Formation of PDEs, Solutions of a PDE, Equations solvable by direct integration, Linear equations of the first order, Non-linear equations of the first order, Charpit's method, Homogeneous linear equations with constant coefficients, Non homogeneous linear equations.

### **Module II: Fourier series and Harmonic Analysis**

Euler's formulae, Conditions for a Fourier expansion, Functions having points of discontinuity, Change of interval, Odd and even functions – expansions of odd or even periodic functions, Half-range series, Parseval's formula, Complex form of Fourier series, Practical Harmonic analysis.

### **Module III: Laplace Transformation**

Definition, Transforms of elementary functions, Properties of Laplace transforms, Existence conditions, Transforms of derivatives, Transforms of integrals, Evaluation of integrals by Laplace transform, Inverse transforms, Other methods of finding inverse transforms, Convolution theorem, Application to differential equations, Simultaneous linear equations with constant coefficients, Unit step functions, Periodic functions.

### **Module IV: Linear Programming**

Formulation of the problem, Graphical method, Canonical and standard forms of L.P.P. Simplex method, Artificial variable techniques- M-method, Two phase method, Degeneracy, Dual simplex method.

## **Examination Scheme:**

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

## **Text & References:**

### **Text:**

- Higher Engineering Mathematics by H.K. Dass

### **References:**

- Partial Differential Equations by I. N. Snedon
- Laplace Transformation Schaum outline series
- Advance Engineering Mathematics – Kreszig
- Linear Programming – Hadley

# ANALOG ELECTRONICS – I

**Course Code: BEC 302**

**Credit Units: 04**

## **Course Objective:**

This course builds from basic knowledge of Semiconductor Physics to an understanding of basic devices and their models. This course builds a foundation for courses on VLSI design and analog CMOS IC Design.

## **Course Contents:**

### **Module I: Semiconductor Diode and Diode Circuits**

Drift, Diffusion, Poisson's equation, Solution for E and V and their plots for pn junction, Different types of diodes: Zener, Schottky, LED. Zener as voltage regulator, Diffusion capacitance, Drift capacitance, the load line concept, half wave, full wave rectifiers, clipping and clamping circuits.

### **Module II: Bipolar Junction Transistor**

Bipolar junction transistor: Introduction, Transistor, construction, transistor operations, BJT characteristics, load line, operating point, leakage currents, saturation and cut off mode of operations.

Bias stabilization: Need for stabilization, fixed Bias, emitter bias, self bias, bias stability with respect to variations in  $I_{co}$ ,  $V_{BE}$  &  $\beta$ , Stabilization factors, thermal stability.

### **Module III: Small signal Analysis of transistor and Multistage Amplifier**

Hybrid model for transistors at low frequencies, Analysis of transistor amplifier using h parameters, emitter follower, Miller's theorem, THE CE amplifier with an emitter resistance, Hybrid model, Hybrid Conductances and Capacitances, CE short circuit current gain, CE short circuit current gain with  $R_L$   
Multistage amplifier: Cascading of Amplifiers, Coupling schemes(RC coupling and Transformer coupling)

### **Module IV: Field Effect Transistors**

Field effect transistor (JFET, MOSFET): volt-ampere characteristics, small signal model –common drain, common source, common gate, operating point, MOSFET, enhancement and -depletion mode, Common source amplifier, Source follower

### **Module V: Feedback Amplifiers**

Feedback concept, Classification of Feedback amplifiers, Properties of negative Feedback amplifiers, Impedance considerations in different Configurations, Examples of analysis of feedback Amplifiers.

### **Module VI: Power amplifiers**

Power dissipation in transistors, difference with voltage amplifiers, Amplifier classification (Class A, Class B, Class C, Class AB) class AB push pull amplifier, collector efficiency of each, cross over distortion.

## **Examination Scheme:**

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

## **Text & References:**

### **Text**

- Boylestad: Electronic Devices and Circuits

### **References**

- Robert F. Pierret: Semiconductor Device Fundamentals

- Millman and Halkias: Electronic Devices and circuits

# CIRCUITS & SYSTEMS

**Course Code: BEC 303**

**Credit Units: 04**

## **Course Objective:**

The course intends to make the students proficient in analyzing circuits. At the completion of the course, the student should be able to construct and interpret block diagrams and signal flow graphs of control systems and to use basic methods of determining their stability.

## **Course Contents:**

### **Module I: Graph Theory and Network equations**

Graph of a network, Trees, Co-trees and loops, Cut set matrix, Tie set matrix, number of possible trees of a graph, duality, Loop Analysis and Node Analysis.

### **Module II: Analysis of circuits using classical Method**

Time and Frequency domain analysis of RL, RC and RLC circuits, Linear constant coefficient differential equation.

### **Module III: Signals and Laplace Transforms**

Unit step signal, Ramp signal, impulse signal, Laplace transformations and its properties, Gate function, Inverse Laplace transformations, Application of Laplace Transforms in circuit analysis.

### **Module IV: Network Theorems**

Reciprocity theorem, Superposition theorem, Thevenin's and Norton's theorems, Millman's theorem, Maximum power transfer theorem, Compensation theorem, Tellegan's theorem.

### **Module V: Two port Network & Network Functions**

Introduction, two port z-, y-, T-, h-parameters, Inter-relations among parameters, Condition for reciprocity and symmetry, Interconnections of two port networks, Driving point and transfer functions, Poles, Zeros and necessary condition for driving point and transfer function,.

### **Module VI: Network Synthesis**

Hurwitz polynomial, Positive real functions, synthesis of LC, RC, RL immittance functions.

## **Examination Scheme:**

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

## **Text & References:**

### **Text:**

- M.E. Valkenburg, "Network analysis", PHI.
- D. R. Choudhary, "Networks and Systems", New Age International.
- K.M. Soni, 2009, "Circuits and Systems", VIII Edition, S.K. Kataria & Sons Delhi.

**References:**

- Bhise, Chadda, Kulshreshtha, "Engineering network analysis and filter design", Umesh Publication.
- F.F. Kuo, "Network Analysis and Synthesis", Wiley India Pvt. Ltd.

# ELECTRIC MACHINE - I

**Course Code: BEE 304**

**Credit Units: 03**

## **Course Objective:**

The purpose of this course is to introduce the student to the various types of basic machines used in the industry and its application.

## **Course Contents:**

### **Module I: D. C. Machines**

EMF and Torque equations, Armature windings, Armature Reaction, Demagnetizing and Cross-magnetizing armature MMF, Inter pole and compensating windings, commutation. Characteristics of D.C.generators. D.C. motors and their characteristics

### **Module II : DC MACHINE STARTERS AND SPEED CONTROL**

Starting of D.C.motors. Starter step calculation for a D.C. shunt and series motor. Speed control of D.C. motors. Ward Leonard control. Braking of d.c.motors. Efficiency and testing of d.c. machines, Hopkinson test.

### **Module III:1- Ø Transformers**

Transformer construction and practical considerations. Equivalent circuit, Exact and approximate, per unit values, Phasor diagram, Transformer testing: open circuit test, Short Circuit test, Sumpner's test, Efficiency and voltage regulation, All day efficiency, Auto-transformer.

### **Module IV:3 – Ø Transformer**

Three-phase Bank of Single-phase Transformers, Parallel operations of 1 and 3 phase transformers, 3 to 2 and 6 phase conversion. Load division between transformers in parallel. Three winding transformers, Tertiary winding, Tap Changing, Transformers for special purpose, Welding, Traction, Instruments and pulse Transformers.

## **Examination Scheme:**

<b>Components</b>	<b>A</b>	<b>CT</b>	<b>S/V/Q</b>	<b>HA</b>	<b>EE</b>
<b>Weightage (%)</b>	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

## **Text & References:**

### **Text:**

- Electrical Machines: I. J. Nagrath and D. P. Kothari (Tata McGraw Hill)
- Electrical Machinery: Fitzgerald, Kingsley (McGraw Hill)
- Electrical Machinery: P. C. Sen

# JAVA PROGRAMMING

**Course Code: BEC 305**

**Credit Units: 03**

## **Course Objective:**

The objective is to impart programming skills used in this object oriented language java. The course explores all the basic concepts of core java programming. The students are expected to learn it enough so that they can develop the web solutions like creating applets etc.

## **Course Contents:**

### **Module I**

Concepts of OOP, Features of Java, How Java is different from C++, Data types, Control Statements, identifiers, arrays, operators. Inheritance: Multilevel hierarchy, method overriding, Abstract classes, Final classes, String Class.

### **Module II**

Defining, Implementing, Applying Packages and Interfaces, Importing Packages. Fundamentals, Types, Uncaught Exceptions, Multiple catch Clauses, Java's Built-in Exception.

### **Module III**

Creating, Implementing and Extending thread, thread priorities, synchronization suspending, resuming and stopping Threads, Constructors, Various Types of String Operations. Exploring Various Basic Packages of Java: Java.lang, Java. util, Java.i.o

### **Module IV**

Event handling Mechanism, Event Model, Event Classes, Sources of Events, Event Listener Interfaces  
AWT: Working with Windows, AWT Controls, Layout Managers

### **Module V**

AppletClass, Architecture, Skeleton, Display Methods.  
Swings: Japplet, Icons, labels, Text Fields, Buttons, Combo Boxes.

## **Examination Scheme:**

<b>Components</b>	<b>A</b>	<b>CT</b>	<b>S/V/Q</b>	<b>HA</b>	<b>EE</b>
<b>Weightage (%)</b>	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

## **Text & References:**

### **Text:**

- JAVA The Complete Reference by Patrick Naughton & Herbert Schild, TMH
- Introduction to JAVA Programming a Primar, Balaguruswamy.

### **References:**

- "Introduction to JAVA Programming" Daniel/Young PHI
- Jeff Frentzen and Sobotka, "Java Script", Tata McGraw Hill,1999

# ANALOG ELECTRONICS LAB - I

**Course Code: BEC 322**

**Credit Units: 01**

## **Course Contents:**

1. To study and plot the characteristics of a junction diode.
2. To study Zener diode I-V characteristics.
3. To study diode based clipping and clamping circuits.
4. To study half wave, full wave and bridge rectifier with filters.
5. To study the input and output characteristics of a transistor in its various configurations (CE and CB).
6. To study and plot the characteristics of a JFET in its various configurations.
7. To study and plot the characteristics of a MOSFET in its various configurations.
8. To study various types of Bias Stabilization for a transistor.
9. To study the gain and plot the frequency response of a single stage transistor amplifier.
10. To measure gain and plot the frequency response of double stage RC coupled amplifier.

## **Examination Scheme:**

<b>IA</b>				<b>EE</b>	
<b>A</b>	<b>PR</b>	<b>LR</b>	<b>V</b>	<b>PR</b>	<b>V</b>
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

# CIRCUITS AND SYSTEMS LAB

**Course Code: BEC 323**

**Credit Units: 01**

List of Experiments:

1. To determine the Fourier components of a square wave.
2. To determine the Fourier components of a clipped sine wave.
3. To verify Tellegen's Theorem in a given network.
4. To determine the Y- and Z parameters of a network.
5. To design series-series connections and determine its Z parameters.
6. To design parallel-parallel connections and determine its Y parameters.
7. To design series-parallel connections and determine its h parameters.
8. To design a cascade connection and determine its ABCD (transmission) parameters.
9. To determine the h parameters of a transistor in its various configurations.

## Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

# ELECTRIC MACHINE LAB - I

**Course Code: BEE 324**

**Credit Units: 01**

## List of Experiments:

1. Load test on a single phase transformer.
2. To perform Open circuit and short circuit tests on a single phase transformer and hence find equivalent circuit, voltage regulation and efficiency.
3. To find the efficiency and voltage regulation of single phase transformer under different loading conditions.
4. To perform parallel operation of two single phase transformers.
5. To study the various connections of three phase transformer.
6. To study the constructional details of D.C. machine and to draw sketches of different components.
7. To measure armature and field resistance of D.C. shunt generator and to obtain its open circuit characteristics.
8. To obtain load characteristics of D.C. shunt/series /compound generator.
9. To draw speed-torque characteristics of D.C. shunt/series /compound generator.
10. To study D.C. motor starters.

## Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

# JAVA PROGRAMMING LAB

**Course Code: BEC 325**

**Credit Units: 01**

**Course Contents:**

**Software Required: JDK1.3**

**Assignments will be provided for the following:**

- Java programs using classes & objects and various control constructs such as loops etc, and data structures such as arrays, structures and functions
- Java programs for creating Applets for display of images and texts.
- Programs related to Interfaces & Packages.
- Input/Output and random files programs in Java.
- Java programs using Event driven concept.
- Programs related to network programming.

**Examination Scheme:**

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

# SIGNALS AND SYSTEMS

**Course Code: BEC 304**

**Credit Units: 03**

## **Course Objective:**

The objective of the course is to provide knowledge of Signals and Systems to students of ECE. This Course includes good insight of types of signals and types of systems, various operations performed on them through the use of Fourier series, Fourier transform, z transform.

## **Course Contents:**

### **Module I: Signals and Systems**

Def. of signal, def. of system, classification of signal, continuous time and discrete time signals, operations performed on them, even and odd signals, periodic and non periodic signals, deterministic and random signals, energy signals, power signals, step, impulse, ramp functions, classification of systems.

### **Module II: LTI system**

Impulse response, step response, convolution sum, convolution integral, continuous LTI, discrete LTI, properties of LTI system, LTI system described by differential and difference equation, interconnection of system.

### **Module III: Fourier series**

Representation of continuous time periodic signal, properties of continuous time Fourier series, representation of discrete time periodic signals, properties of discrete time Fourier series.

### **Module IV: Fourier Transform**

Continuous time Fourier transform, properties of continuous time Fourier transform, discrete time Fourier transform, properties of discrete time Fourier transform

### **Module V: Z-Transform**

Region of convergence, first order system, second order system, inverse Z transform, analysis of LTI system using Z transform.

## **Examination Scheme:**

<b>Components</b>	<b>A</b>	<b>CT</b>	<b>S/V/Q</b>	<b>HA</b>	<b>EE</b>
<b>Weightage (%)</b>	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

## **Text & References:**

- A.V Oppenheim, A.S Willsky: Signals and Systems
- Haykins: Signals and Systems

# MEASUREMENTS & INSTRUMENTATION

**Course Code: BEC 307**

**Credit Units: 03**

## Course Objective:

This course deals with the systematic study of the electrical and electronics measurements, their basic features and types. This also describes the basic fundamentals for characterizing all possible types of electrical and electronics measurements.

### Module I :Basics of Measurement Systems:

General concepts and terminology of measurement systems, Basic characteristics of measuring devices, standards and calibration, Accuracy, Precision, Sensitivity, Resolution, Linearity & Errors in measurement.

### Module II :PMMC Instruments:

PMMC meters- construction, torque equation, ammeter shunts, multirange ammeter, voltmeter multiplier, sensitivity, ohmmeters, multimeters; Construction & general equation of moving iron, electro-dynamometer, hot wire instruments,

### Module III: Measurement of Resistance, Inductance and Capacitance:

D.C. Bridges: Wheatstone's bridge, Sensitivity & Limitations; Carey Foster Bridge; Kelvin double bridge; Megaohm Bridge. A.C. Bridges: Maxwell's inductance Capacitance Bridge; Anderson's Bridge; De Sauty's Bridge; Schering Bridge.

### Module IV: Component Measuring Instruments:

Q meter, Vector Impedance meter, RF Power & Voltage Measurements, Introduction to shielding & grounding & Noise problem.

### Module V: Cathode Ray Oscilloscope:

CRT Construction, Basic CRO circuits, CRO Probes, Basic functioning, Techniques of Measurement of Voltage, Current, Phase Angle and Frequency, , Multibeam, multi trace, storage & sampling Oscilloscopes.

## EXAMINATION SCHEME:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

## Text &Reference books:

Text:

- A Course In Electrical & Electronic Measurement & Instrumentation, A.K.Sawhney, Dhanpat Rai

Reference

- Introduction To Measurements And Instrumentation, Arun K. Ghosh, PHI
- Electronic Measurements & Instrumentation, Bernard Oliver, John Cage, TMH
- Elements Of Electronic Instrumentation And Measurement, Carr, Pearson
- Electronic Instrumentation, H S Kalsi, TMH

# COMMUNICATION SKILLS - I

**Course Code: BCS 301**

**Credit Units: 01**

## **Course Objective:**

To form written communication strategies necessary in the workplace

## **Course Contents:**

### **Module I: Introduction to Writing Skills**

Effective Writing Skills  
Avoiding Common Errors  
Paragraph Writing  
Note Taking  
Writing Assignments

### **Module II: Letter Writing**

Types  
Formats

### **Module III**

Memo  
Agenda and Minutes  
Notice and Circulars

### **Module IV: Report Writing**

Purpose and Scope of a Report  
Fundamental Principles of Report Writing  
Project Report Writing  
Summer Internship Reports

## **Examination Scheme:**

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>CAF</b>	<b>V</b>	<b>GD</b>	<b>GP</b>	<b>A</b>
<b>Weightage (%)</b>	20	20	25	10	10	10	5

CAF – Communication Assessment File

GD – Group Discussion

GP – Group Presentation

## **Text & References:**

- Business Communication, Raman – Prakash, Oxford
- Creative English for Communication, Krishnaswamy N, Macmillan
- Textbook of Business Communication, Ramaswami S, Macmillan
- Working in English, Jones, Cambridge
- A Writer's Workbook Fourth edition, Smoke, Cambridge
- Effective Writing, Withrow, Cambridge
- Writing Skills, Coe/Rycroft/Ernest, Cambridge
- Welcome , Jones, Cambridge

# BEHAVIOURAL SCIENCE - III (INTERPERSONAL COMMUNICATION)

**Course Code: BSS 304**

**CreditUnits: 01**

## **Course Objective:**

This course provides practical guidance on

- Enhancing personal effectiveness and performance through effective interpersonal communication
- Enhancing their conflict management and negotiation skills

## **Course Contents:**

### **Module I: Interpersonal Communication: An Introduction**

Importance of Interpersonal Communication  
Types – Self and Other Oriented  
Rapport Building – NLP, Communication Mode  
Steps to improve Interpersonal Communication

### **Module II: Behavioural Communication**

Meaning and Nature of behavioural communication  
Persuasion, Influence, Listening and Questioning  
Guidelines for developing Human Communication skills  
Relevance of Behavioural Communication for personal and professional development

### **Module III: Interpersonal Styles**

Transactional Analysis  
Life Position/Script Analysis  
Games Analysis  
Interactional and Transactional Styles

### **Module IV: Conflict Management**

Meaning and nature of conflicts  
Styles and techniques of conflict management  
Conflict management and interpersonal communication

### **Module V: Negotiation Skills**

Meaning and Negotiation approaches (Traditional and Contemporary)  
Process and strategies of negotiations  
Negotiation and interpersonal communication

### **Module VI: End-of-Semester Appraisal**

Viva based on personal journal  
Assessment of Behavioural change as a result of training  
Exit Level Rating by Self and Observer

## **Examination Scheme:**

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

## **Text & References:**

- Vangelist L. Anita, Mark N. Knapp, Inter Personal Communication and Human Relationships: Third Edition, Allyn and Bacon
- Julia T. Wood. Interpersonal Communication everyday encounter

- Simons, Christine, Naylor, Belinda: Effective Communication for Managers, 1997 1<sup>st</sup> Edition Cassel
- Goddard, Ken: Informative Writing, 1995 1<sup>st</sup> Edition, Cassell
- Harvard Business School, Effective Communication: United States of America
- Foster John, Effective Writing Skills: Volume-7, First Edition 2000, Institute of Public Relations (IPR)
- Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers.

# FRENCH - III

**Course Code:FLT 301**

**Credit Units: 02**

## **Course Objective:**

To provide the students with the know-how

- To master the current social communication skills in oral and in written.
- To enrich the formulations, the linguistic tools and vary the sentence construction without repetition.

## **Course Contents:**

**Module B: pp. 76 – 88 Unité 6**

**Module C: pp. 89 to103 Unité 7**

### **Contenu lexical: Unité 6:se faire plaisir**

1. acheter : exprimer ses choix, décrire un objet (forme, dimension, poids et matières) payer
2. parler de la nourriture, deux façons d'exprimer la quantité, commander un repas au restaurant
3. parler des différentes occasions de faire la fête

### **Unité 7: Cultiver ses relations**

1. maîtriser les actes de la communication sociale courante (Salutations, présentations, invitations, remerciements)
2. annoncer un événement, exprimer un souhait, remercier, s'excuser par écrit.
3. caractériser une personne (aspect physique et caractère)

### **Contenu grammatical:**

1. accord des adjectifs qualificatifs
2. articles partitifs
3. Négations avec de, ne...rien/personne/plus
4. Questions avec combien, quel...
5. expressions de la quantité
6. ne...plus/toujours - encore
7. pronoms compléments directs et indirects
8. accord du participe passé (auxiliaire « avoir ») avec l'objet direct
9. Impératif avec un pronom complément direct ou indirect
10. construction avec « que » - Je crois que/ Je pense que/ Je sais que

## **Examination Scheme:**

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>C</b>	<b>I</b>	<b>V</b>	<b>A</b>
<b>Weightage (%)</b>	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

## **Text & References:**

- le livre à suivre : **Campus: Tome 1**

# GERMAN - III

**Course Code: FLG 301**

**Credit Units: 02**

## **Course Objective:**

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.

To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

## **Course Contents:**

### **Module I: Modal verbs**

Modal verbs with conjugations and usage

Imparting the finer nuances of the language

### **Module II: Information about Germany (ongoing)**

Information about Germany in the form of presentations or “Referat”– neighbors, states and capitals, important cities and towns and characteristic features of the same, and also a few other topics related to Germany.

### **Module III: Dative case:** Dative case, comparison with accusative case

Dative case with the relevant articles

Introduction to 3 different kinds of sentences – nominative, accusative and dative

### **Module IV: Dative personal pronouns :** Nominative, accusative and dative pronouns in comparison

### **Module V: Dative prepositions :** Dative preposition with their usage both theoretical and figurative use

### **Module VI: Dialogues :** In the Restaurant, At the Tourist Information Office, A telephone conversation

### **Module VII: Directions :** Names of the directions Asking and telling the directions with the help of a roadmap

### **Module VIII: Conjunctions :** To assimilate the knowledge of the conjunctions learnt indirectly so far

## **Examination Scheme:**

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>C</b>	<b>I</b>	<b>V</b>	<b>A</b>
<b>Weightage (%)</b>	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

## **Text & References:**

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

# SPANISH – III

**Course Code: FLS 301**

**Credit Units: 02**

## **Course Objective:**

To enable students acquire knowledge of the Set/definite expressions (idiomatic expressions) in Spanish language and to handle some Spanish situations with ease.

## **Course Contents:**

### **Module I**

Revision of earlier semester modules

Set expressions (idiomatic expressions) with the verb *Tener, Poner, Ir....*

Weather

### **Module II**

Introduction to *Gustar...* and all its forms. Revision of *Gustar* and usage of it

### **Module III**

Translation of Spanish-English; English-Spanish. Practice sentences.

How to ask for directions (using *estar*)

Introduction to IR + A + INFINITIVE FORM OF A VERB

### **Module IV**

Simple conversation with help of texts and vocabulary

En el restaurante

En el instituto

En el aeropuerto

### **Module V**

Reflexives

## **Examination Scheme:**

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>C</b>	<b>I</b>	<b>V</b>	<b>A</b>
<b>Weightage (%)</b>	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

## **Text & References:**

- Español, En Directo I A
- Español Sin Fronteras -Nivel EI

# CHINESE – III

**Course Code: FLC 301**

**Credit Units: 02**

## **Course Objective:**

Foreign words are usually imported by translating the concept into Chinese, the emphasis is on the meaning rather than the sound. But the system runs into a problem because the underlying name of personal name is often obscure so they are almost always transcribed according to their pronunciation alone. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

## **Course Contents:**

### **Module I**

Drills  
Dialogue practice  
Observe picture and answer the question.  
Introduction of written characters.  
Practice reading aloud  
Practice using the language both by speaking and by taking notes.  
Character writing and stroke order

### **Module II**

Measure words  
Position words e.g. inside, outside, middle, in front, behind, top, bottom, side, left, right, straight.  
Directional words – beibian, xibian, nanbian, dongbian, zhongjian.  
Our school and its different building locations.  
What game do you like?  
Difference between “hii” and “neng”, “keyi”.

### **Module III**

Changing affirmative sentences to negative ones and vice versa  
Human body parts.  
Not feeling well words e.g. ; fever, cold, stomach ache, head ache.  
Use of the modal particle “le”  
Making a telephone call  
Use of “jiu” and “cal” (Grammar portion)  
Automobiles e.g. Bus, train, boat, car, bike etc.  
Traveling, by train, by airplane, by bus, on the bike, by boat.. etc.

### **Module IV**

The ordinal number “di”  
“Mei” the demonstrative pronoun e.g. mei tian, mei nian etc.  
use of to enter to exit  
Structural particle “de” (Compliment of degree).  
Going to the Park.  
Description about class schedule during a week in school.  
Grammar use of “li” and “cong”.  
Comprehension reading followed by questions.

### **Module V**

Persuasion-Please don't smoke.  
Please speak slowly  
Praise – This pictorial is very beautiful  
Opposites e.g. Clean-Dirty, Little-More, Old-New, Young-Old, Easy-Difficult, Boy-Girl, Black-White, Big-Small, Slow-Fast ... etc.

Talking about studies and classmates  
Use of “it doesn’t matter”  
Enquiring about a student, description about study method.  
Grammar: Negation of a sentence with a verbal predicate.

**Examination Scheme:**

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>C</b>	<b>I</b>	<b>V</b>	<b>A</b>
<b>Weightage (%)</b>	20	20	20	20	15	5

C – Project + Presentation  
I – Interaction/Conversation Practice

**Text & References:**

- “Elementary Chinese Reader Part I, Part-2” Lesson 21-30

# DIGITAL CIRCUITS AND SYSTEMS – I

**Course Code: BEC 401**

**Credit Units: 03**

## **Course Objective:**

This course is an introduction to the basic principles of digital electronics. At the conclusion of this course, the student will be able to quantitatively identify the fundamentals of computers, including number systems, logic gates, logic and arithmetic subsystems, and integrated circuits. They will gain the practical skills necessary to work with digital circuits through problem solving and hands on laboratory experience with logic gates, encoders, flip-flops, counters, shift registers, adders, etc. The student will be able to analyze and design simple logic circuits using tools such as Boolean Algebra and Karnaugh Mapping, and will be able to draw logic diagrams.

## **Course Contents:**

### **Module I: Boolean Functions**

Analog & digital signals, AND, OR, NOT, NAND, NOR, XOR & XNOR gates, Boolean algebra, DeMorgan's theorems, Implementation of logical function using only NAND/NOR gates, 1's complement and 2's complement, BCD to Gray and Gray to BCD code conversion, Standard representation of logical functions (SOP and POS forms), K-map representation and simplification of logical function up to five variables, don't care conditions, XOR & XNOR simplifications of K-maps, Tabulation method.

### **Module II: Combinational Circuits**

Adders, Subtractors, Implementation of full adder using half adder, full subtractor using half subtractor, Multiplexer, de-multiplexer, decoder & encoder, code converters, 1 & 2 bit comparators, BCD to seven segment decoder/encoder, Implementation of logic functions using multiplexer/de-multiplexer and decoder, Implementation of 16×1 MUX using 4×1 MUX, 4×16 decoder using 3×8 decoder etc., logic implementations using PROM, PLA & PAL.

### **Module III: Sequential Circuits**

Difference between combinational and sequential circuits, Latch, Flip-flops: SR, JK, D & T flip flops – Truth table, Excitation table, Conversion of flip-flops, set up and hold time, race around condition, Master Slave flip flop, Shift registers: SIPO, PISO, PIPO, SIPO, Bi-directional, 4-bit universal shift register; Counters: Asynchronous/ripple & synchronous counters – up/down, Ring counter, sequence detector.

### **Module IV: Logic families & data converters**

Logic families: Special characteristics (Fan out, Power dissipation, propagation delay, noise margin), working of RTL, DTL, TTL, ECL and CMOS families; Data converters: Special characteristics, ADC – successive approximation, linear ramp, dual slope; DAC – Binary Weighted, R-2R ladder type.

## **Examination Scheme:**

<b>Components</b>	<b>A</b>	<b>CT</b>	<b>S/V/Q</b>	<b>HA</b>	<b>EE</b>
<b>Weightage (%)</b>	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

## **Text & References:**

- Moris Mano: Digital Design, Pearson Education.
- R. P. Jain: Digital Electronics, Tata McGraw Hill.
- Thomas L. Floyd: Digital Fundamentals, Pearson Education.
- Malvino and Leech: Digital Principles & Applications, Tata McGraw Hill.

# ANALOG ELECTRONICS – II

**Course Code: BEC 402**

**Credit Units: 03**

## **Course Objective:**

The purpose of this course is to introduce the student to the application of semiconductor devices in linear analog circuits. To insure the usefulness of the course material to both computer engineers and electrical engineers, the course stresses circuit designs using the operational amplifier.

## **Course Contents:**

### **Module I: Building Blocks of Analog ICs**

Differential amplifier, Op-amp Model, op-amp DC & AC parameters, virtual ground, Current mirrors, Active loads, Level shifters and output stages.

### **Module II: Operational amplifiers**

Introduction, open loop and closed loop configuration, op-amp parameters (input offset current, output offset current, i/p bias current, CMRR, PSRR, null adjustment range, etc.) Inverting and non-inverting configuration, voltage gain of inverting and non inverting configurations.

### **Module III: Linear & Non Linear Wave shaping**

Adders, Voltage to current, current to voltage Converter, Integrators, Differentiators, Voltage follower (voltage buffer), summer, subtractor, Comparators, log/antilog circuits using Op-amps, precision rectifiers

### **Module IV: Waveform Generations**

Damped and undamped oscillations, Barkhausen criterion for sustained oscillation. Tank circuit generator Astable multi Vibrators, OTA-C Oscillators, Crystal oscillator. Types of oscillators: LC-Hartley and Colpitts, RC-RC phase shift and Wien bridge oscillator, Basics of tuned Amplifiers, Voltage Controlled Oscillator.

### **Module V: Active RC Filters & Applications of Linear Circuits**

Idealistic & Realistic response of filters (LP, BP, and HP), Butter worth & Chebyshev approximation filter functions, LP,BP,HP and All pass, Notch Filter, Operational transconductance amplifier (OTA)-C filters.

### **Module VI: Applications of IC Analog Multiplier & Timer**

IC phase locked loops, 555 Timer, IC voltage regulators-(fixed, variable) 78xx, 79xx series and adjustable.

## **Examination Scheme:**

<b>Components</b>	<b>A</b>	<b>CT</b>	<b>S/V/Q</b>	<b>HA</b>	<b>EE</b>
<b>Weightage (%)</b>	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

## **Text & References:**

- Richard C. Jaeger: Microelectronic Circuit Design
- Adel S. Sedra and K. C. Smith: Microelectronic Circuits
- Ramakant Gaekwad: Operational Amplifiers
- Rolf Schaumann and Mac E. Van Valkenburg: Design of Analog Filters
- D. Roy Choudhury and Shail B. Jain: Linear Integrated Circuits

# ELECTRIC MACHINES - II

**Course Code: BEE 403**

**Credit Units: 03**

## **Course Objective:**

This course deals with the systematic study and application of the AC machines which are widely used in the Industry

## **Course Contents:**

### **Module I: Poly phase Induction Machines – I**

Construction features, production of rotating magnetic field, equivalent circuit, torque and power equations, torque-slip characteristics, no load and blocked rotor tests' efficiency. Induction generator, Starting and speed control, cogging and crawling.

### **Module II: Single- Phase Induction Motor**

Double revolving field theory, equivalent circuit, no load and blocked rotor tests, starting methods, repulsion motor.

**A.C. Commutator Motor:** E.M.F. induced in commutator windings, single phase a.c. series motor, Universal motor

### **Module III: Synchronous Machines – I**

Constructional features, armature windings, E.M.F. equation, winding coefficients, harmonics in the induced E.M.F., armature reaction, O.C. and S.C. tests, voltage regulation-Synchronous impedance method, MMF Method, Potier's triangle method and parallel operation, operation on infinite bus, cooling.

### **Module IV: Synchronous Machines - II**

Two reaction theory, power expressions for cylindrical and salient pole machines, performance characteristics.

**Synchronous Motor :** Principle of operation, starting methods, phasor diagram torque-angle characteristics, V-curves hunting and damping, synchronous condenser, reluctance motor.

## **Examination Scheme:**

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

## **Text & References:**

### **Text:**

- M.G.Say, "Alternating Current machines", Pitman & Sons.
- P.S. Bimbhra, "Electric Machinery", Khanna Publishers.

### **References:**

- P.S. Bimbhra, "Generalized Theory of Electrical Machines", Khanna Publishers.
- I.J. Nagrath and D.P. Kothari, "Electrical Machines", Tata McGraw Hill.
- B.R. Gupta and V. Singhal, "fundamental of Electrical Machines", New Age International

# CONTROL SYSTEM

**Course Code: BEE 404**

**Credit Units: 03**

## **Course Objective:**

The basic objective of this course is to impart to the students, the basic and core knowledge of Linear control system engineering so that the students are able to analyze the linear control systems with the help of time domain and frequency domain tools.

## **Course Contents:**

### **Module I: Introduction**

History and evolution, definition, configuration of a process and control system, classification, open and closed loop systems, merits and demerits, Elements of closed loop systems, importance of feedback, other methods of classification.

### **Module II: Modelling of Control Systems**

Transfer function, block diagram, signal flow graph, Reduction Technique, Mason's Gain Formula. Mathematical modelling and representation of physical systems (Electrical Mechanical and Thermal), derivation of transfer function for different types of systems, Analogous Systems, gear train.

### **Module III: Time – Domain Analysis**

Time domain performance criteria, transient response and steady state response of first, second & higher order systems, steady state errors and static error constants in unity feedback control systems, error criteria, generalized error constants, Sensitivity, Control actions

### **Module IV: Frequency Domain Analysis**

Frequency Domain Analysis frequency domain specifications, Logarithmic plots (Bode Plots), gain and phase margins, relative stability, Correlation with time domain, Polar plots,

### **Module V: Stability**

Stability Concept, Asymptotic stability and conditional stability, Routh – Hurwitz criterion,

### **Module VI: Methods of Analysis**

**Bode Plots:** Drawing and analyzing, gain and phase margin, stability

**Nyquist Criteria:** Mapping of contours in s-plane, Nyquist criteria, plots, stability

**Root Locus plots:** Introduction, concept, procedure and stability.

### **Module VII: Compensation**

Compensation Techniques: Concept of compensation, Lag, Lead and Lag-Lead networks, design of closed loop systems using compensation techniques. P, PI, PID controllers.

## **Examination Scheme:**

<b>Components</b>	<b>A</b>	<b>CT</b>	<b>S/V/Q</b>	<b>HA</b>	<b>EE</b>
<b>Weightage (%)</b>	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

## **Text & References:**

### ***Text:***

- R C Dorf, "Modern Control Systems", Pearson Education
- J. Nagrath & M. Gopal, 2000, "Control System Engineering", New Age International.
- Norman S Nise, "Control system Engineering", Wiley publishers

### ***References:***

- M. K. Ogata, 2002, "Modern Control Engineering, PHI.
- B. C. Kuo, 2001, "Automatic Control system, Prentice Hall of India.

# POWER PLANT ENGINEERING

**Course Code: BEE 405**

**Credit Units: 02**

## **Course Objective:**

The objective of the course is to provide a brief knowledge of power plant economics, types of Energy sources and study of power plants.

## **Course Contents:**

### **Module I: Introduction**

Energy sources, their availability electrical energy demand and growth in India; general state of the energy system; global Energy scenario.

### **Module II: Power Plant Economics**

Types of load; chronological load curves; load duration curve; mass curve; max. Demand; demand factor; load factor; capacity factor; utilization factor; diversity factors; base load and peak load power plants; Capital cost of plants; annual fixed and operating costs of plants; generation cost and depreciation; effect of load factor on unit energy cost; role of load diversity in power system economics; off peak energy utilization; energy cost reduction.

### **Module III: Tariffs**

Objectives of tariffs; general tariff form; flat demand rate; straight meter rate; block meter rate; two part tariffs; power factor dependant tariffs; three parts tariffs; spot (time differentiated) pricing.

### **Module IV: Conventional Energy Sources**

Selection of site; capacity calculations; detailed description and use of different parts; schematic diagram and working of thermal, hydro electric, nuclear power, diesel power and gas turbine power plant.

### **Module V: non-conventional Energy Sources**

Study of wind, solar, tidal, geo-thermal bio-gas sources of energy, fuel cell, magneto hydro dynamic generation system; power crisis; future energy demand; role of private sector in energy management.

## **Examination Scheme:**

<b>Components</b>	<b>A</b>	<b>CT</b>	<b>S/V/Q</b>	<b>HA</b>	<b>EE</b>
<b>Weightage (%)</b>	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

## **Text & References:**

### *Text:*

- Pratab. H. "Art and Science of Utilization of Electrical Energy": Dhanpat Rai & Sons, 2001
- Wadhwa C.L. "Generation, Distribution and Utilization of Electrical Power"; Khanna Publications, 2005
- Gupta. J. B. "A Course of Electric Power", S. K. Kataria & Sons, 2009

### **References:**

- Uppal .S. L. "Electrical Power", Khanna Publisher, 2005
- Dover. A. T. "Electric Traction", Sir Isaac Pitman & Sons Ltd. 1965
- Taylor Open Shaw "Utilization of Electrical Energy", ELBS, 1995

# DIGITAL CIRCUITS AND SYSTEMS LAB - I

**Course Code: BEE 421**

**Credit Units: 01**

List of Experiments:

1. To study the op amp as an inverting ,non inverting amplifier, adder, subtract or, integrator and differentiator
2. To design a ramp and a square wave generator.
3. To study the IC-555 timer as stable and bistable multivibrator
4. To design low pass, high pass and band pass filters using op- amp. and plot their frequency response
5. To design various LC & RC oscillators.
6. To design and study class a power amplifier and class B push pull amplifier.
7. To verify the truth tables of NOT, OR, AND, NOR, NAND, XOR, XNOR gates.
8. To obtain half adder, full adder using gates and verify their truth tables.
9. To obtain half subtractor, full subtractor using gates and verify their truth tables.
10. To verify the truth tables of RS, D, JK and T flip- flops.
11. To implement and verify 3-bit bi-directional shift register.
12. To design and study asynchronous/ripple counter.
13. To design and study synchronous counter.
14. To design and study a sequence detector

## Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

## ANALOG ELECTRONICS – II LAB

**Course Code: BEC 422**

**Credit Units: 01**

### List of Experiments:

1. To studies the various kinds of Printed Circuit Board (PCBs).
2. To study the artwork & drafting for designing of PCB.
3. To study the unregulated power supply & design of adequate circuit diagram.
4. To study the process of manufacturing of PCB.
5. To study the manufacturing & testing of step down transformer of 9V/1A
6. To study soldering of components.
7. To study the regulated power supply & design of adequate circuit diagram

### Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

# ELECTRICAL MACHINE – IILAB

**Course Code: BEE 423**

**Credit Units: 01**

## List of Experiments:

1. To Perform load-test on 3 ph. Induction motor & to plot torque V/S speed characteristics.
2. To Perform no-load & blocked –rotor tests on 3 ph. Induction motor to obtain equivalent ckt. Parameters & to draw circle diagram.
3. To study the speed control of 3 ph. Induction motor by Kramer’s Concept.
4. To study the speed control of 3 ph. Induction motor by cascading of two induction motors, i.e. by feeding the slip power of one motor into the other motor.
5. To study star- delta starters physically and
  - (a) to draw electrical connection diagram
  - (b) to start the 3 ph. Induction motor using it.
  - (c) To reverse the direction of 3 ph. I.M.
6. To start a 3 phase slip –ring induction motor by inserting different levels of resistance in the rotor ckt. And to plot torque –speed characteristics.
7. To perform no-load & blocked –rotor test on 1 ph. Induction motor & to determine the parameters of equivalent ckt. Drawn on the basis of double revolving field theory.
8. To Perform load –test on 1 ph. Induction motor & plot torque –speed characteristics.
9. To Perform no load & short ckt. Test on 3- phase alternator and draw open ckt. And
10. Short ckt. Characteristics.
11. To find voltage regulation of an alternator by zero power factor (z.p.f.) method.
12. To study effect of variation of field current upon the stator current and power factor
13. With synchronous motor running at no load and draw V & inverted V curves of motor.
14. To measure negative sequence & zero sequence reactance of Syn. Machines.

## Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

# CONTROL SYSTEM LAB

**Course Code: BEE 424**

**Credit Units: 01**

## Course Contents:

1. Study and draw
  - a) Step response of open Loop system (linear 1<sup>st</sup> order, 2<sup>nd</sup> order
  - b) Step response of closed loop systems (1<sup>st</sup> order)
2. Study and draw temperature control system the open loop response and closed loop response with different values of gains
3. Study of operations and characteristics of a stepper motor
4. To Study a D.C. motor speed control system.
5. Performance evaluation and design of PID controller.
6. Study of microprocessor control of a simulated linear system.
7. To design a suitable cascade compensator for the given system and verify the resulting improvement.
8. Note: three experiments in MATLAB have to be performed in the slot of MATLAB.

Using MATLAB, obtain the unit-step response and unit impulse response of the following system:

$$\frac{C(s)}{R(s)} = \frac{16}{s^2 + 1.6s + 16}$$

9. For a 2<sup>nd</sup> order transfer function using MATLAB
  - a) Bode Plot
  - b) Root locus plot
  - c) Nyquist plot.

## Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

# ELECTROMAGNETIC FIELD THEORY

Course Code: BEC406

Credit Units: 03

## Course Objective:

This course provides a general introduction to the important physical concepts and mathematical methods used in treating all types of wave phenomena, but stresses electromagnetic signal propagation and issues of central importance in electrical engineering. As a core course in the Electrical Computer and Systems Engineering option of the Engineering Sciences concentration, it provides essential background and basic preparation for more advanced work in device physics, microwave and ultra-fast circuitry, antenna design, optics, optical communication and optoelectronics.

## Course Contents:

### Module I:

#### Mathematical Basics and Electrostatics

Coordinate Systems: Spherical and Cylindrical coordinates, Dirac delta function, Coulomb's law, Gauss's law, Poisson's Equation, Laplace's Equation, Electrostatic Boundary conditions, Work and Energy in Electrostatics, Conductors, Surface charge and force on conductors

### Module II:

#### Magneto statics and Magnetic Fields in matter

Magnetic induction and Faraday's law, Magnetic Flux density, Magnetic Field Intensity, Biot Savart Law, steady currents, Ampere's law, Magneto static Boundary conditions, magnetic field inside matter, magnetic susceptibility and permeability, ferromagnetism, energy stored in a Magnetic field, Magnetic Vector Potential

### Module III:

#### Electrodynamics

Faraday's laws, Maxwell's equations, Maxwell's modification of Ampere's law, continuity equation and Poynting theorem.

### Module IV:

#### Electrodynamic Waves

Wave propagation in unbounded media, Boundary conditions, reflection and transmission, polarization, E.M. waves in vacuum, E. M. waves in matter: reflection and transmission of plane waves.

### Module V:

#### Introduction to Transmission Lines

Transmission Line, Line Parameters, Characteristic Impedance, Image Impedance, HVDC and HVAC Common faults in transmission lines. Skin Effect, Ferranti Effect and Corona.

## Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;

Att: Attendance.

## Text & References:

- Griffiths: Introduction to Electrodynamics
- Fawwaz T. Ulaby: Fundamentals of Applied Electromagnetics
- Hayt, William H., Buck, John A. Hayt, William H., Buck, John A., Engineering Electromagnetics

# COMMUNICATION SKILLS - II

**Course Code: BCS 401**

**Credit Units: 01**

## **Course Objective:**

To teach the participants strategies for improving academic reading and writing. Emphasis is placed on increasing fluency, deepening vocabulary, and refining academic language proficiency.

## **Course Contents:**

### **Module I: Social Communication Skills**

Small Talk  
Conversational English  
Appropriateness  
Building rapport

### **Module II: Context Based Speaking**

In general situations  
In specific professional situations  
Discussion and associated vocabulary  
Simulations/Role Play

### **Module III: Professional Skills**

Presentations  
Negotiations  
Meetings  
Telephony Skills

## **Examination Scheme:**

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>CAF</b>	<b>V</b>	<b>GD</b>	<b>GP</b>	<b>A</b>
<b>Weightage (%)</b>	20	20	25	10	10	10	5

CAF – Communication Assessment File

GD – Group Discussion

GP – Group Presentation

## **Text & References:**

- Essential Telephoning in English, Garside/Garside, Cambridge
- Working in English, Jones, Cambridge
- Business Communication, Raman – Prakash, Oxford
- Speaking Personally, Porter-Ladousse, Cambridge
- Speaking Effectively, Jermy Comfort, et.al, Cambridge
- Business Communication, Raman – Prakash, Oxford

# BEHAVIOURAL SCIENCE - IV (RELATIONSHIP MANAGEMENT)

**Course Code: BSS 404**

**CreditUnits: 01**

## **Course Objective:**

To understand the basis of interpersonal relationship  
To understand various communication style  
To learn the strategies for effective interpersonal relationship

## **Course Contents:**

### **Module I: Understanding Relationships**

Importance of relationships  
Role and relationships  
Maintaining healthy relationships

### **Module II: Bridging Individual Differences**

Understanding individual differences  
Bridging differences in Interpersonal Relationship – TA  
Communication Styles

### **Module III: Interpersonal Relationship Development**

Importance of Interpersonal Relationships  
Interpersonal Relationships Skills  
Types of Interpersonal Relationships

### **Module IV: Theories of Interpersonal Relationships**

Theories: Social Exchange, Uncertainty Reduction Theory  
Factors Affecting Interpersonal Relationships  
Improving Interpersonal Relationships

### **Module V: Impression Management**

Meaning & Components of Impression Management  
Impression Management Techniques (Influencing Skills)  
Impression Management Training-Self help and Formal approaches

### **Module VI: End-of-Semester Appraisal**

Viva based on personal journal  
Assessment of Behavioural change as a result of training  
Exit Level Rating by Self and Observer

## **Examination Scheme:**

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

## **Text & References:**

- Vangelist L. Anita, Mark N. Knapp, Inter Personal Communication and Human Relationships: Third Edition, Allyn and Bacon
- Julia T. Wood. Interpersonal Communication everyday encounter
- Simons, Christine, Naylor, Belinda: Effective Communication for Managers, 1997 1<sup>st</sup> Edition Cassell
- Goddard, Ken: Informative Writing, 1995 1<sup>st</sup> Edition, Cassell

- Harvard Business School, Effective Communication: United States of America
- Foster John, Effective Writing Skills: Volume-7, First Edition 2000, Institute of Public Relations (IPR)
- Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers.

# FRENCH - IV

**Course Code: FLT 401**

**Credit Units: 02**

## **Course Objective:**

To enable students:

- To develop strategies of comprehension of texts of different origin
- To present facts, projects, plans with precision

## **Course Contents:**

**Module C: pp. 104 – 139: Unités 8, 9**

### **Contenu lexical: Unité 8: Découvrir le passé**

1. parler du passé, des habitudes et des changements.
2. parler de la famille, raconter une suite  
d'événements/préciser leur date et leur durée.
3. connaître quelques moments de l'histoire

### **Unité 9: Entreprendre**

1. faire un projet de la réalisation: (exprimer un besoin,  
préciser les étapes d'une réalisation)
2. parler d'une entreprise
3. parler du futur

### **Contenu grammatical:**

1. Imparfait
2. Pronom « en »
3. Futur
4. Discours rapporté au présent
5. Passé récent
6. Présent progressif

## **Examination Scheme:**

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>C</b>	<b>I</b>	<b>V</b>	<b>A</b>
<b>Weightage (%)</b>	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

## **Text & References:**

- le livre à suivre : **Campus: Tome 1**

# GERMAN - IV

**Course Code: FLG 401**

**Credit Units: 02**

## **Course Objective:**

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.

To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany. Introduction to Advanced Grammar Language and Professional Jargon

## **Course Contents:**

### **Module I: Present perfect tense**

Present perfect tense, usage and applicability

Usage of this tense to indicate near past

Universal applicability of this tense in German

### **Module II: Letter writing**

To acquaint the students with the form of writing informal letters.

### **Module III: Interchanging prepositions**

Usage of prepositions with both accusative and dative cases

Usage of verbs fixed with prepositions

Emphasizing on the action and position factor

### **Module IV: Past tense**

Introduction to simple past tense

Learning the verb forms in past tense

Making a list of all verbs in the past tense and the participle forms

### **Module V: Reading a Fairy Tale**

Comprehension and narration

- Rotkäppchen
- Froschprinzessin
- Die Fremdsprache

### **Module VI: Genitive case**

Genitive case – Explain the concept of possession in genitive

Mentioning the structure of weak nouns

### **Module VII: Genitive prepositions**

Discuss the genitive prepositions and their usage: (während, wegen, statt, trotz)

### **Module VIII: Picture Description**

Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;

Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

### Examination Scheme:

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>C</b>	<b>I</b>	<b>V</b>	<b>A</b>
<b>Weightage (%)</b>	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

### Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2

# SPANISH - IV

**Course Code: FLS 401**

**Credit Units: 02**

## **Course Objective:**

To enable students acquire working knowledge of the language; to give them vocabulary, grammar, voice modulations/intonations to handle everyday Spanish situations with ease.

## **Course Contents:**

### **Module I**

Revision of earlier semester modules  
Introduction to Present Continuous Tense (Gerunds)

### **Module II**

Translation with Present Continuous Tense  
Introduction to Gustar, Parecer, Apetecer, doler

### **Module III**

Imperatives (positive and negative commands of regular verbs)

### **Module IV**

Commercial/business vocabulary

### **Module V**

Simple conversation with help of texts and vocabulary  
En la recepcion del hotel  
En el restaurante  
En la agencia de viajes  
En la tienda/supermercado

## **Examination Scheme:**

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>C</b>	<b>I</b>	<b>V</b>	<b>A</b>
<b>Weightage (%)</b>	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

## **Text & References:**

- Español Sin Fronteras (Nivel – Elemental)

# CHINESE – IV

**Course Code: FLC 401**

**Credit Units: 02**

## **Course Objective:**

How many characters are there? The early Qing dynasty dictionary included nearly 50,000 characters the vast majority of which were rare accumulated characters over the centuries. An educate person in China can probably recognize around 6000 characters. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

## **Course Contents:**

### **Module I**

Dialogue Practice  
Observe picture and answer the question  
Pronunciation and intonation  
Character writing and stroke order.  
Electronic items

### **Module II**

Traveling – The Scenery is very beautiful  
Weather and climate  
Grammar question with – “bu shi .... Ma?”  
The construction “yao ... le” (Used to indicate that an action is going to take place)  
Time words “yiqian”, “yiwai” (Before and after).  
The adverb “geng”.

### **Module III**

Going to a friend house for a visit meeting his family and talking about their customs.  
Fallen sick and going to the Doctor, the doctor examines, takes temperature and writes prescription.  
Aspect particle “guo” shows that an action has happened some time in the past.  
Progressive aspect of an actin “zhengzai” Also the use if “zhe” with it.  
To welcome someone and to see off someone .... I cant go the airport to see you off... etc.

### **Module IV**

Shipment. Is this the place to checking luggage?  
Basic dialogue on – Where do u work?  
Basic dialogue on – This is my address  
Basic dialogue on – I understand Chinese  
Basic dialogue on – What job do u do?  
Basic dialogue on – What time is it now?

### **Module V**

Basic dialogue on – What day (date) is it today?  
Basic dialogue on – What is the weather like here.  
Basic dialogue on – Do u like Chinese food?  
Basic dialogue on – I am planning to go to China.

## **Examination Scheme:**

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

## **Text & References:**

“Elementary Chinese Reader, Part-2” Lesson 31-38

# MICROPROCESSOR AND MICROCONTROLLER SYSTEMS

**Course Code: BEC 501**

**Credit Units: 03**

## **Course Objective:**

This course deals with the systematic study of the Architecture and programming issues of 8085-microprocessor family. The aim of this course is to give the students basic knowledge of the above microprocessor needed to develop the systems using it.

## **Course Contents:**

### **Module I: Introduction to Microcomputer Systems**

Introduction to Microprocessors and microcomputers, Study of 8 bit Microprocessor, 8085 pin configuration, Internal Architecture and operations, interrupts, Stacks and subroutines, various data transfer schemes.

### **Module II: ALP and timing diagrams**

Introduction to 8085 instruction set, advance 8085 programming, Addressing modes, Counters and time Delays, Instruction cycle, machine cycle, T-states, timing diagram for 8085 instruction.

### **Module III: Memory System Design & I/O Interfacing**

Memory interfacing with 8085. Interfacing with input/output devices (memory mapped, peripheral I/O), Cache memory system. Study of following peripheral devices 8255, 8253, 8257, 8259, 8251.

### **Module IV: 8051 Microcontroller and Real time Control**

THE 8051 MICROCONTROLLER: Introduction, The 8051 microcontroller hardware, I/O pins, Ports, External memory, Counters and Timers, Serial data,  
8051 ASSEMBLY LANGUAGE PROGRAMMING: Addressing modes, External data moves, Stack, Push and Pop opcodes, Logical operations, Byte level and bit level logical operations. Arithmetic operations, Jump and call instructions, Interrupts & returns.

### **Module V: System Design**

Interrupts, Multiple sources of interrupts, Non maskable sources of interrupts, Interrupt structure in 8051, Timers, Free running counter & Real Time control .Serial I/O interface, Parallel I/O ports interface, Digital and Analog interfacing methods, LED array, keyboard, Printer, Flash memory interfacing.

## **Examination Scheme:**

<b>Components</b>	<b>A</b>	<b>CT</b>	<b>S/V/Q</b>	<b>HA</b>	<b>EE</b>
<b>Weightage (%)</b>	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

## **Text & References:**

- Ramesh. S. Gaonkar, "Microprocessor architecture Programming and Application with 8085" Penram International Publishing, 4<sup>th</sup> Edition
- B.Ram, "Fundamentals of microprocessors and microcomputer" Dhanpat Rai, 5<sup>th</sup> Edition.] Douglas V Hall.
- M. Rafiqzaman, "Microprocessor Theory and Application" PHI – 10<sup>th</sup> Indian Reprint.
- Naresh Grover, "Microprocessor comprehensive studies Architecture, Programming and Interfacing" Dhanpat Rai, 2003.
- Gosh," 0000 to 8085" PHI.

# DIGITAL CIRCUITS AND SYSTEMS - II

**Course Code: BEC 502**

**Credit Units: 03**

## **Course Objective:**

This course builds on the course Digital Circuits and Systems - Hardware development language VHDL is introduced; the usage of the same to implement the systems is dealt in detail.

## **Course Contents:**

### **Module I:**

#### **Design of Sequential circuits**

SR, JK, T and D flip flops and their timing diagrams, characteristic table, characteristic equation and excitation tables. Design of Finite State Machines: Mealy and Moore type using next state tables, state diagrams, state minimization, state encoding: minimum bit change and hot one encodings. Comparative cost and delays of different implementations and their optimization and timing diagrams, Asynchronous and synchronous sequential circuits

Data paths, FSMs with datapaths, ASM charts, synthesis from ASM charts

### **Module II:**

#### **Basics of VHDL**

Writing Entities for Digital circuits like decoders, registers etc, Scalar Data types and Operations: Object types: constants, variables, signal and files. Data Types: scalar, integer, floating, physical, enumeration, type declarations, subtypes, expressions and operators for various types.

Sequential statements: If, case, Null, Loop, Exit, Next statements, while loops, For loops, Assertion and report statements

Composite Arrays: arrays, Array aggregates, unconstrained array types, strings, Bit vectors, Standard Logic Arrays, array operations and records

### **Module III:**

#### **VHDL Programming**

Behavioural Modeling: process statements, variable and signal assignments, inertial and transport delay models, signal drivers, multiple and postponed processes

Dataflow Modeling: Concurrent signal assignment, multiple drivers, block statement

Structural Modeling: component declaration, component instantiation, resolving signal values, and

configuration: basic configuration, configuration for structural modeling, mapping library entities.

Generics, generic (AND, NAND, OR, NOR, XOR and XNOR) gates, functions and subprograms, packages and libraries

### **Module IV:**

#### **Synthesis: mapping statements to gates**

Writing a test bench, converting real and integers to time, dumping and reading from text file

Vhdlmodeling of basic gates, half and full adder AOI, IOA, OAI, multiplexes, decoders (dataflow, behavioural and structural modeling), three state driver, parity checker, D, T, JK and SR flip flops, flip flops with preset and clear, modeling for multiplexer, priority encoder, ALU etc, modeling regular structures, delays, conditional operations, synchronous logic, state machine modeling, Moore and Mealy machines, generic priority encoder, clock divider, shift registers, pulse counter etc

### **Module V:**

#### **Overview of the following**

PLD devices, PROM, PAL, EPLD, GAL, FPGA, FLGA, DRAM etc and their applications, FPGA programming, Design exercises ASIC design using CAD tools

### Examination Scheme:

<b>Components</b>	<b>A</b>	<b>CT</b>	<b>S/V/Q</b>	<b>HA</b>	<b>EE</b>
<b>Weightage (%)</b>	5	15	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
A: Attendance

### Text & References:

- Daniel Gajski: Principles of Digital Design
- Bhasker: A VHDL Primer 3/e
- Pedroni: Circuit Design with VHDL
- Perry: VHDL: Programming by examples K. Skahill, VHDL for programmable Logic

# MODERN AND DIGITAL CONTROL ENGINEERING

**Course Code: BEE 503**

**Credit Units: 03**

## **Course Objective:**

The basic objective of the course is to impart knowledge to the students on modern control theory and design of control systems.

## **Course Contents:**

### **Module I:**

#### **Control System Components**

Basic components, amplifiers, plants, transducers, error detectors, servo systems and regulator, DC and AC position and speed control systems.

#### **Design of Feedback control systems**

Introduction, cascade compensation networks, phase lag and lead design using Bode and Root locus plots

### **Module II:**

#### **Modern theory**

Introduction- State variables, state differential equations( homogeneous and non-homogeneous), Solution, state transition matrix- properties and computation, Laplace solution of state equations, transfer function matrix, representation of state equations in term of state transition matrix, characteristic equation

**Modeling-** state variable modeling, state model signal flow graph, state models-physical, phase, Jordan, similarity transformation, other useful transformation- controllability and observability canonical, diagonal canonical, Jordan canonicalDecomposition- direct, cascade, parallel. Controllability and observability – introduction, definition, tests, theorems, rank of a matrix, output controllability, duality theorem, pole- zero cancellation

Design-state feedback, relationship with closed-loop transfer function, pole placement and assignment, design of controller by transformation, Observer design, Ackerman's formula

### **Module III:**

#### **Discrete time signals and systems**

Introduction, SDC systems, sampling and data reconstruction.

**Transform analysis of discrete systems:** Introduction, linear difference equations, the pulse T.F. and pulse response, Z-transform equivalence of Zdomain to S-domain, stability analysis.

### **Module IV:**

#### **Design of digital controls**

Introduction, design of a positional Servomechanism, digital PID controller, multivariable controllers.

### **Module V:**

**State space models of discrete time systems:** Introduction, discrete time state equation and solution, design examples, concepts of controllability and observability Liapunov stability analysis.

## **Examination Scheme:**

<b>Components</b>	<b>A</b>	<b>CT</b>	<b>S/V/Q</b>	<b>HA</b>	<b>EE</b>
<b>Weightage (%)</b>	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

## **Text & References:**

### ***Text:***

- R C Dorf, “Modern Control Systems”, Pearson Education
- J. Nagrath & M. Gopal, 2000, “Control System Engineering”, New Age International.
- Norman S Nise, “Control system Engineering”, Wiley publishers

### ***References:***

- M, K. Ogata, 2002, “Modern Control Engineering, PHI.
- B. C. Kuo, 2001, “Automatic Control system, Prentice Hall of India

## **WEB DEVELOPMENT**

**Course Code:           BCS 510**

**Credit Units: 02**

### **Course Objective:**

To design web base and context aware systems to acquire, organize process, share and use the knowledge of web sites. The field of web site is multidisciplinary as web sites are amazingly complex systems. The major objective of this course is to provide a sound foundation to the students on the concepts, percepts and practices in a field that is of immense concern to the industry and business.

### **Course Contents:**

#### **Module I: Overview of Internet**

Introduction to Internet and WWW, Concept of Networking and Layers of OSI Model, Internet protocols like TCP/IP, http, telnet and ftp, URL, email, domain name, Web Browsers.

#### **Module II: Principles of Web Design**

Key issues to be considered in web site design. Structure of a Web Page: Introduction to HTML, Elements of HTML syntax, Head and Body sections, Building HTML documents, Inserting text, images, hyperlinks, Backgrounds and Color Control, HTML Editors & Tools: Use of different HTML editors and tools like Netscape Communicator and Microsoft Front Page etc

#### **Module III: HTML Tags**

Use of Different HTML tags in web pages. Table Handling: Table layout & presentation, constructing tables in a web page, developing a web page in a table. Ordered and unordered lists. Frames: Developing Web pages using frames. Advantages and disadvantages of frames. Creating forms, Role of Databases in web applications. Use of at least one graphical and animation tools like Adobe Fireworks, Adobe Photoshop, Gif Animator, Gimp etc.

#### **Module IV: Cascading style-sheet (CSS) in HTML**

Introduction to Cascading Style Sheets (CSS), Types of Style Sheets (Inline, Internal and External), CSS for Website Layout and Print Layout.

Types of various CSS Selectors, CSS properties: Type Properties, Background Properties, Block Properties, Box Model Properties, List Properties, Border Properties, Positioning Properties.

#### **Module V: Introduction to Java Script**

Role of java script in a web page, Script writing basics, Adding interactivity to a web page, creating dynamic web pages, Similarities to java, embedding JavaScript code, embedding java applets in a web page, Form validation using java script

### **Projects:**

Creating a discussion form, creating an online store, creating a job site.

**Examination Scheme:**

<b>Components</b>	<b>A</b>	<b>CT</b>	<b>S/V/Q</b>	<b>HA</b>	<b>EE</b>
<b>Weightage (%)</b>	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

**Text & References:**

*Text:*

- Ramesh Bangia, "Web Technology", Firewall media
- C. Xavier, "World Wide Web Design with HTML", Tata McGraw Hill.
- Unleashed ASP, Techmedia

**References:**

- Rick Dranell, "HTML4 unleashed", Techmedia Publication.
- Shelly Powers, "Dynamic Web Publishing Unleashed", Techmedia.
- Don Gosselin, "JavaScript", Vikas Publication
- Mark Swank & Drew Kittel, "World Wide Web Database", Sams net.

# MICROPROCESSOR AND MICRO CONTROLLER SYSTEMS LAB

**Course Code: BEE 521**

**Credit Units: 01**

## List of Experiments:

1. To load the numbers 49H and 53H in the memory location 9510 and 9511 respectively and add the contents of memory location 9601.
2. To write assembly language programming for 8 bit addition/subtraction with and without carry/borrow
3. To write assembly language programming for 8 bit multiplication and division.
4. To write assembly language programming for sorting an array of numbers in ascending and descending order.
5. To study and program the programmable peripheral interface (8255) board and programmable interval timer (8253) board.
6. To study and program the programmable DMA controller (8257) board and the programmable. Interrupt controller (8259) board.
7. To study 8086 microprocessor kit.
8. To write a program to move a block of data of 10 numbers from location starting from 2050H to Location starting from 2070H.
9. WAP to solve the equation  $(AX) + 7(BX) + 9(DX) \rightarrow SI$ .
10. To write a subroutine in 8086 assembly language that can be called by a main program in a different code segment. The subroutine call will multiply a signed 16 bit number with an 8 bit number. Store the result in two consecutive memory word and stop. Assume SI and DI point to 8 bit & 16 bit data respectively.
11. To write instructions to check the various flags in the flag register of 8086.
12. To write a program based on arithmetic instructions.
13. To write a program for addition of two 16 - bit numbers. If the result is more than 32
14. Bits then store the result in memory or else out it at peripheral device.
15. To write a program for 8086 involving logical & machine control instructions.

## Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

# DIGITAL CIRCUITS AND SYSTEMS – II LAB

**Course Code: BEC 522**

**CreditUnits: 01**

## List of Experiments

To implement VHDL code for

1. 2, 3, 4 inputs AND, OR, XOR and XNOR gates and testing their simulation with signals.
2. Half adder, full adder and full subtractor. Also trying out other simple combinatorial circuits like AOI, IOA, OAI.
3. D and T, flip-flops.
4. JK and SR flip-flops.
5. 2 to 4 and 3 to 8 decoders.
6. 2 to 1, 4 to 1 and 8 to 1 multiplexers.
7. 2 to 1, 4 to 2 and 8 to 3 priority encoders.
8. 8 bit tri state drivers.
9. 9 input parity checker.
10. 1 bit, 4 bit 8 bit comparators.
11. Adding and subtracting 8 bit integers of various types.
12. Clock divider
13. Shift register
14. Pulse counters.
15. VHDL Design examples of Moore machine, Mealy machine, generic gate inputs and delays.
16. VHDL code examples of structural modeling showing binding.

## Experiments based Field Programmable Gate Array (FPGA) Programming

17. Implementation of all the above VHDL experiments using FPGA.

## Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

# MATLAB THEORY AND PRACTICES

**Course Code: BEE 528**

**Credit Units: 01**

## **Course Objective:**

To impart the knowledge on MATLAB software widely used for analysis in Control Systems.

## **Course Contents:**

### **Module I**

Introduction, MATLAB environment- Command, History, Directory, launch pad, Workspace, Array editor and Figure windows

### **Module II**

MATLAB features, variables, keywords, output formats, Help provisions, m-files.

### **Module III**

Input of vectors and matrices, matrix functions, eigen values and eigen vectors, Transfer function and polynomial commands, symbolic math commands and toolbox features

### **Module IV**

MATLAB LTI viewer and Simulink LTI viewer, SISO design tool

## **Examination Scheme:**

<b>Components</b>	<b>A</b>	<b>CT</b>	<b>S/V/Q</b>	<b>HA</b>	<b>EE</b>
<b>Weightage (%)</b>	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

## **Text & References:**

- Chapman- “MATLAB programming for Engineers”, Thomson Learning
- Hanselman and Littlefield- “Mastering MATLAB”, Prentice Hall

# WEB WEVELOPMENT LAB

**Course Code: BCS 530**

**Credit Units: 01**

**Software Required: Java**

## **List of Assignment:**

1. Design a HTML page using all the basic tags.
2. Design a page containing your educational qualification in a table.
3. Design a page containing an ordered list/unordered list.
4. Design a HTML page for your resume.
5. Design a form in HTML to enter different attribute of student information.
6. Design a home page for ASE using Frame.
7. Design another page and connect these to the home page.
8. Write a function in Javascript for input validation.
9. Write a function in Javascript to calculate monthly installation of the loan.
10. Write an input form and save its data in a database using ASP.
11. Display the data stored in database in tabular form on the page.

## **Examination Scheme:**

<b>IA</b>				<b>EE</b>	
<b>A</b>	<b>PR</b>	<b>LR</b>	<b>V</b>	<b>PR</b>	<b>V</b>
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

## PRACTICAL TRAINING(EVALUTION)

**Course Code: BEE 560**

**Credit Units: 03**

### **Methodology:**

Practical training is based on the theoretical subjects studied by students. It can be arranged within the college or in any related industrial unit. The students are to learn various industrial, technical and administrative processes followed in the industry. In case of on-campus training the students will be given specific task of fabrication/assembly/testing/analysis. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

### **Examination Scheme:**

Feedback from industry/work place	20
Training Report	40
Viva	15
Presentation	25
<b>Total</b>	<b>100</b>

# COMPUTER SYSTEM ARCHITECTURE

**Course Code: BEE 505**

**Credit Units: 03**

## **Course Objective:**

This course deals with computer architecture as well as computer organization and design. Computer architecture is concerned with the structure and behaviour of the various functional modules of the computer and how they interact to provide the processing needs of the user. Computer organization is concerned with the way the hardware components are connected together to form a computer system. Computer design is concerned with the development of the hardware for the computer taking into consideration a given set of specifications.

## **Course Contents:**

### **Module I:**

#### **Register Transfer Language**

Register Transfer, Bus and Memory Transfers, Arithmetic Micro-operations, Logic Micro-operations, Shift Micro-operations, Arithmetic Logic shift Unit.

### **Module II:**

#### **Basic Computer Organizations and Design**

Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input-Output and Interrupt, Design of Accumulator Logic. Hardwired and Microprogrammed control: Control Memory, Address Sequencing, Design of Control Unit

### **Module III:**

#### **Central Processing Unit**

Introduction, General Register Organization, Stack Organization, Instruction representation, Instruction Formats, Instruction type, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer RISC and CISC  
Computer Arithmetic: Introduction, Multiplication Algorithms, Division Algorithms, Floating-Point Arithmetic Operations

### **Module IV:**

**Memory and Intrasystem Communication and Input output organization Memory:** Memory types and organization Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware

#### **Intrasystem communication and I/O:** Peripheral Devices, Input-Output

Controller and I/O driver, IDE for hard disk, I/O port and Bus concept, Bus cycle, Synchronous and asynchronous transfer, Interrupt handling in PC, Parallel Port, RS – 232 interface, Serial port in PC, Serial I/O interface, Universal serial bus IEEE 1394, Bus Arbitration Techniques, Uni-bus and multi-bus architectures EISA Bus, VESA Bus.

### **Module V:**

#### **Pipelining, Vector Processing and Multiprocessors**

Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

**Multiprocessors:** Characteristics of Multiprocessors, Interconnection Structures, Interprocessor Arbitration, Interprocessor Communication and Synchronization, Advanced computer architecture, Pentium and Pentium – Pro, Power PC Architecture

**Examination Scheme:**

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

**Text & References:****Text:**

- Morris Mano, Computer System Architecture, 3<sup>rd</sup> Edition – 1999, Prentice-Hall of India Private Limited.
- Harry & Jordan, Computer Systems Design & Architecture, Edition 2000, Addison Wesley, Delhi.

**References:**

- William Stallings, Computer Organization and Architecture, 4<sup>th</sup> Edition-2000, Prentice-Hall of India Private Limited.
- Kai Hwang-McGraw-Hill, Advanced Computer Architecture.
- Kai Hwang & Faye a Briggs, McGraw Hill, inc., Computer Architecture & Parallel Processing.
- John D. Carpinelli, Computer system Organization & Architecture, Edition 2001, Addison Wesley, Delhi
- John P Hayes, McGraw-Hill Inc, Computer Architecture and Organization.
- M. Morris Mano and Charles, Logic and Computer Design Fundamentals, 2<sup>nd</sup> Edition Updated, Pearson Education, ASIA.
- Hamacher, “Computer Organization,” McGraw hill.
- Tennenbaum,” Structured Computer Organization,” PHI
- B. Ram, “Computer Fundamentals architecture and organization,” New age international Gear C. w., “Computer Organization and Programming, McGraw hill

# PROCESS CONTROL ENGINEERING

Course Code: BEE 507

Credit Units: 03

## Course Objective:

The basic objective of this course is to provide the students the core knowledge of control systems, when applied to specific process control. The idea is provide knowledge about feedback control systems, its design and computer process interface.

## Course Contents:

### Module I:

#### Basic Considerations

Introduction to process control system, control loop study- realization with load-changes at arbitrary points in the loop, offset and its analysis, modelling consideration for control purposes, degree of freedom and process controllers, formulating the scope at modelling for process control. Computer simulation and linearization of non linear system transfer function and input output models, Dynamic behaviour of firstorder lag system, process with variable time constant and gain. Dynamic behaviour of second order and higher order system-multicaplacity process, real time process, inverse response process, Introduction to Feedback control and effects P, I & D controllers.

### Module II:

#### Designing feed back controller

Outline of the design problems, Selection of type of feedback controller. Time-Integral performanceCriterion, Process Reaction Curve and frequency response characteristic, Ziegler-Nichol Rule, effect of dead time, dead time compensator and inverse response compensator.

### Module III:

#### Control Systems with Multiple Loops

Cascade, spilt-range feed forward, ratio inferential and adaptive control.

### Module IV:

#### Interaction & De-Coupling of Control Loop

Interaction of control loops, relative gain array and selection of the loops, Design of non-interacting control loop.

### Module V:

#### Computer Process Interface for Data Acquisition & Control

Introduction to digital computer control of processes. Design of control system for complete plant.

## Exa

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

## mination Scheme:

## **Text & References:**

### ***Text:***

- Chemical process Control – George Stephanopoulos. Pub. PHI

### ***References:***

- Digital Computer Process Control-C.L. Smith Pub: Intext Educational Publisher
- Process Control-F.G. Shinskey, Pub. Mc-Graw Hill
- Advanced Process Control-W.H. Ray, Pub. McGraw Hill
- Process system and analysis and control-D.R. Coushanour, TMH
- Process Instrument & Control handbook-D.M. Considins, Pub: McGraw Hill

# COMMUNICATION SKILLS - III

**Course Code: BCS 501**

**Credit Units: 01**

## **Course Objective:**

To equip the participant with linguistic skills required in the field of science and technology while guiding them to excel in their academic field.

## **Course Contents:**

### **Module I**

Reading Comprehension  
Summarising  
Paraphrasing

### **Module II**

Essay Writing  
Dialogue Report

### **Module III**

Writing Emails  
Brochure  
Leaflets

### **Module IV**

#### **Introduction to Phonetics**

Vowels  
Consonants  
Accent and Rhythm  
Accent Neutralization  
Spoken English and Listening Practice

## **Examination Scheme:**

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>CAF</b>	<b>V</b>	<b>GD</b>	<b>GP</b>	<b>A</b>
<b>Weightage (%)</b>	20	20	25	10	10	10	5

CAF – Communication Assessment File

GD – Group Discussion

GP – Group Presentation

## **Text & References:**

- Effective English for Engineering Students, B Cauveri, Macmillan India
- Creative English for Communication, Krishnaswamy N, Macmillan
- A Textbook of English Phonetics, Balasubramanian T, Macmillan

**BEHAVIOURAL SCIENCE - V**  
**(GROUP DYNAMICS AND TEAM BUILDING)**

**Course Code: BSS 504**

**CreditUnits: 01**

**Course Objective:**

To inculcate in the students an elementary level of understanding of group/team functions  
To develop team spirit and to know the importance of working in teams

**Course Contents:**

**Module I:**

**Group formation**

Definition and Characteristics  
Importance of groups  
Classification of groups  
Stages of group formation  
Benefits of group formation

**Module II:**

**Group Functions**

External Conditions affecting group functioning: Authority, Structure, Org. Resources, Organizational policies etc.  
Internal conditions affecting group functioning: Roles, Norms, Conformity, Status, Cohesiveness, Size, Inter group conflict.  
Group Cohesiveness and Group Conflict  
Adjustment in Groups

**Module III:**

**Teams**

Meaning and nature of teams  
External and internal factors effecting team  
Building Effective Teams  
Consensus Building  
Collaboration

**Module IV:**

**Leadership**

Meaning, Nature and Functions  
Self leadership  
Leadership styles in organization  
Leadership in Teams

**Module V:**

**Power to empower: Individual and Teams**

Meaning and Nature  
Types of power  
Relevance in organization and Society

**Module VI:**

**End-of-Semester Appraisal**

Viva based on personal journal  
Assessment of Behavioural change as a result of training  
Exit Level Rating by Self and Observer

**Examination Scheme:**

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

**Text & References:**

- Organizational Behaviour, Davis, K.
- Hoover, Judith D. Effective Small Group and Team Communication, 2002, Harcourt College Publishers
- Dick, Mc Cann & Margerison, Charles: Team Management, 1992 Edition, viva books
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressers, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change
- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company
- Smither Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers

# FRENCH - V

**Course Code: FLT 501**

**CreditUnits: 02**

## **Course Objective:**

To furnish some basic knowledge of French culture and civilization for understanding an authentic document and information relating to political and administrative life

## **Course Contents:**

**Module D: pp. 131 – 156 Unités 10, 11**

**Contenu lexical: Unité 10:** Prendre des décisions

1. Faire des comparaisons
2. décrire un lieu, le temps, les gens, l'ambiance
3. rédiger une carte postale

**Unité 11: faire face aux problèmes**

1. Exposer un problème.
2. parler de la santé, de la maladie
3. interdire/demander/donner une autorisation
4. connaître la vie politique française

**Contenu grammatical:**

1. comparatif - comparer des qualités/ quantités/actions
2. supposition : Si + présent, futur
3. adverbe - caractériser une action
4. pronom "Y"

## **Examination Scheme:**

### **Examination Scheme:**

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>C</b>	<b>I</b>	<b>V</b>	<b>A</b>
<b>Weightage (%)</b>	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

## **Text & References:**

- **le livre à suivre : Campus: Tome 1**

# GERMAN - V

**Course Code: FLG 501**

**Credit Units: 02**

## **Course Objective:**

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.

To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Introduction to Advanced Grammar and Business Language and Professional Jargon

## **Course Contents:**

### **Module I:**

#### **Genitive case**

Genitive case – Explain the concept of possession in genitive

Mentioning the structure of weak nouns

### **Module II:**

#### **Genitive prepositions**

Discuss the genitive prepositions and their usage: (während, wegen, statt, trotz)

### **Module III:**

#### **Reflexive verbs**

Verbs with accusative case

Verbs with dative case

Difference in usage in the two cases

### **Module IV:**

#### **Verbs with fixed prepositions**

Verbs with accusative case

Verbs with dative case

Difference in the usage of the two cases

### **Module V:**

#### **Texts**

A poem 'Maxi'

A text Rocko

### **Module VI:**

#### **Picture Description**

Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;

Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

## **Examination Scheme:**

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>C</b>	<b>I</b>	<b>V</b>	<b>A</b>
<b>Weightage (%)</b>	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

## **Text & References:**

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

# SPANISH - V

**Course Code: FLS 501**

**Credit Units: 02**

## **Course Objective:**

To enable students acquire working knowledge of the language; to give them vocabulary, grammar, voice modulations/intonations to handle everyday Spanish situations with ease.

## **Course Contents:**

### **Module I**

Revision of earlier semester modules

### **Module II**

Future Tense

### **Module III**

Presentations in English on  
Spanish speaking countries'  
Culture  
Sports  
Food  
People  
Politics  
Society  
Geography

### **Module IV**

Situations:  
En el hospital  
En la comisaria  
En la estacion de autobus/tren  
En el banco/cambio

### **Module V**

General revision of Spanish language learnt so far.

## **Examination Scheme:**

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>C</b>	<b>I</b>	<b>V</b>	<b>A</b>
<b>Weightage (%)</b>	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

## **Text & References:**

- Español Sin Fronteras, Greenfield

# CHINESE – V

**Course Code:FLC 501**

**Credit Units: 02**

## **Course Objective:**

What English words come from Chinese? Some of the more common English words with Chinese roots are ginseng, silk, dim sum, fengshui, typhoon, yin and yang, Tai chi, kung-fu. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

## **Course Contents:**

### **Module I**

Drills  
Dialogue practice  
Observe picture and answer the question.  
Pronunciation and intonation.  
Character writing and stroke order

### **Module II**

Intonation  
Chinese foods and tastes – tofu, chowmian, noodle, Beijing duck, rice, sweet, sour...etc. Learning to say phrases like – Chinese food, Western food, delicious, hot and spicy, sour, salty, tasteless, tender, nutritious, good for health, fish, shrimps, vegetables, cholesterol is not high, pizza, milk, vitamins, to be able to cook, to be used to, cook well, once a week, once a month, once a year, twice a week.....  
Repetition of the grammar and verbs taught in the previous module and making dialogues using it.  
Compliment of degree “de”.

### **Module III**

Grammar the complex sentence “suiran ... danshi....”  
Comparison – It is colder today than it was yesterday.....etc.  
The Expression “chule....yiwai”. (Besides)  
Names of different animals.  
Talking about Great Wall of China  
Short stories

### **Module IV**

Use of “huozhe” and “haishi”  
Is he/she married?  
Going for a film with a friend.  
Having a meal at the restaurant and ordering a meal.

### **Module V**

Shopping – Talking about a thing you have bought, how much money you spent on it? How many kinds were there? What did you think of others?  
Talking about a day in your life using compliment of degree “de”. When you get up? When do you go for class?  
Do you sleep early or late? How is Chinese? Do you enjoy your life in the hostel?  
Making up a dialogue by asking question on the year, month, day and the days of the week and answer them.

## **Examination Scheme:**

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>C</b>	<b>I</b>	<b>V</b>	<b>A</b>
<b>Weightage (%)</b>	20	20	20	20	15	5

C – Project + Presentation  
I – Interaction/Conversation Practice

**Text & References:**

- “Elementary Chinese Reader ” Part-II Lesson 39-46

# POWER ELECTRONICS

**Course Code: BEE 601**

**Credit Units: 03**

## **Course Objective:**

The course aims to introduce them to the theory of operation, analytical and circuit models and basic design concepts of Electric Power components and systems.

## **Course Contents:**

### **Module I:**

#### **Characteristics of semiconductor power devices**

Diode, Thyristor, Triac, GTO, MOSFET, IGBT

### **Module II:**

#### **Triggering Devices**

Unijunction Transistor, Characteristics and applications of UJT, Programmable Unijunction Transistor, DIAC, Silicon Controlled Switch, Silicon Unilateral Switch, silicon Silicon bilateral Switch, Shockley diode.

### **Module III:**

#### **Thyristor Firing Circuits, Turn on systems**

Two transistor model of Thyristor, Method of Triggering a thyristor, Thyristor Types, Requirement for triggering circuits, Thyristor Firing Circuits, Fullwave control of Ac with one thyristor, Light activated SCRs (LASCR), Control Circuit,  $dv/dt$  and  $di/dt$  protection of Thyristor, Pulse Transformer triggering, Firing SCR by UJT, TRIAC firing circuit, Phase control of SCR by pedestal and Ramp.

### **Module IV:**

#### **Controlled Rectifiers**

Types of Converters, effect of inductive load, Commutating diode or free wheeling diode, controlled rectifiers, Bi phase half wave, single phase full wave phase controlled converter using bridge principle, Issues of line current harmonics, Power factor, Distortion factor of ac to dc converters.

### **Module V:**

#### **Inverters**

Types of Inverters, Bridge Inverters, Voltage Source Inverters, Sinusoidal Pulse Width Modulation Inverters, Current source Inverters.

### **Module VI:**

#### **AC Voltage Controllers**

Types of AC voltage Controllers, AC Phase Voltage controllers, single Phase Voltage Controller with RL load

### **Module VII:**

#### **DC to DC Converters**

DC choppers, Chopper classification, two quadrant chopper, Four quadrant chopper.

### **Module VIII:**

#### **Industrial Applications**

One shot Thyristor trigger Circuit, over voltage protection, simple battery charger, battery charging regulator, AC static switches, DC static switch.

**Examination Scheme:**

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

**Text & References:*****Text:***

- J. Michael: Power Electronics: Principles and Applications
- M. H. Rashid: Power Electronics circuits

***References:***

- H. C. Rai, "Power Electronics Devices, Circuits, Systems and Application", Galgotia, 3rd Ed.
- P. S. Bimbhara, "Electrical Machinery, Theory Performance and Applications"  
Khanna Publications, 7th Ed

# POWER SYSTEM ANALYSIS

**Course Code: BEE 602**

**Credit Units: 03**

## **Course Objective :**

To provide the knowledge of power system analysis . To blend the students with admittance modelling and impedance modelling and also with the symmetrical components essentials for the power system designing and analysis .

## **Course Contents :**

### **Module I:**

Percent and per unit quantities. Single line diagram for a balanced 3-phase system **Admittance Model:** Branch and node admittances Equivalent admittance network and calculation of Y bus. Modification of an existing Y bus.

**Impedance Model:** Bus admittance and impedance matrices. Thevenin's theorem and Z bus. Direct determination of Z bus. Modification of an existing bus.

### **Module II:**

**Symmetrical fault Analysis:** Transient on a Transmission line, short circuit of a synchronous machine on no load, short circuit of a loaded synchronous machine. Equivalent circuits of synchronous machine under sub transient, transient and steady state conditions. Selection of circuit breakers, Algorithm for short circuit studies. Analysis of three-phase faults.

### **Module III:**

**Symmetrical Components:** Fortes cue's theorem, symmetrical component transformation. Phase shift in star-delta transformers. Sequence Impedances of transmission lines, Synchronous Machine and Transformers, zero sequence network of transformers and transmission lines. Construction of sequence networks of power system.

### **Module IV:**

**Fault Analysis:** Analysis of single line to ground faults using symmetrical components, connection of sequence networks under the fault condition. Unsymmetrical Fault Analysis: (i) Analysis of line-to-line and double line to ground faults using symmetrical components, connection of sequence networks under fault conditions. (ii) Analysis of unsymmetrical shunt faults using bus impedance matrix method.

## **Examination Scheme:**

<b>Components</b>	<b>A</b>	<b>CT</b>	<b>S/V/Q</b>	<b>HA</b>	<b>EE</b>
<b>Weightage (%)</b>	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

## **Text Books**

- J. J. Grainger, William, D. Stevenson Jr.: Power System Analysis, MGH. 2003
- T. K. Nagsarkar & M. S. Sukhija: Power System Analysis, Oxford University Press. 2007

## **Reference Books**

- J. D. Glover, M. S. Sharma & T. J. Overbye: Power System Analysis and Design,

# TRANSMISSION AND DISTRIBUTION SYSTEM

**Course Code: BEE603**

**Credit Units: 03**

## **Course Objective:**

The basic objective of this course is to provide the students the core knowledge of electric power transmission and distribution.

## **Course Contents:**

### **Module I:**

**Supply systems:** Basic network of power system. Transmission and distribution voltage, effect of system voltage on size of conductor and losses. Comparison of DC 2- wire, DC 3-wire, 1-phase AC and 3-phase AC (3-wire and 4-wire) systems.

**Distribution Systems:** Primary and secondary distribution systems, feeder, distributor and service mains. Radial and ring- main distribution systems. Kelvin's law for conductor size.

### **Module II:**

**Mechanical Features of Overhead Lines:** Conductor material and types of conductor. Conductor arrangements and spacing.

Calculation of sag and tension, supports at different levels, effect of wind and ice loading, stringing chart and sag template. Conductor vibrations and vibration dampers.

### **Module III:**

**Parameters of Transmission Lines:** Resistance inductance and capacitance of overheadlines, effect of earth, line transposition. Geometric mean radius and distance.

Inductance and capacitance of line with symmetrical and unsymmetrical spacing Inductance and capacitance of double circuit lines. Skin and proximity effects. Equivalent circuits and performance of short and medium transmission lines.

### **Module IV:**

**Generalized ABCD Line Constants:** equivalent circuit and performance of long transmission line. Ferranti effect. Interference with communication circuits. Power flow through a transmission line.

**Corona:** Electric stress between parallel conductors. Disruptive critical voltage and visual critical voltage, Factors affecting corona. Corona power loss. Effects of corona.

### **Module V:**

**Insulators:** Pin, shackle, suspension, post and strain insulators. Voltage distribution across an insulator string, grading and methods of improving string efficiency.

**Underground Cables:** Conductor, insulator, sheathing and armoring materials. Types of cables. Insulator resistance and capacitance calculation. Electrostatic stresses and reduction of maximum stresses. Causes of breakdown. Thermal rating of cable. Introduction to oil filled and gas filled cables.

## **Examination Scheme:**

<b>Components</b>	<b>A</b>	<b>CT</b>	<b>S/V/Q</b>	<b>HA</b>	<b>EE</b>
<b>Weightage (%)</b>	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

**Text & References:**

- Electric Power System: By – C.L. Wadhwa
- Electric Power System: By - Asfaq Husain
- Elements of Power System Analysis: By – William D. Stevenson
- Power System Analysis & Design: By – B.R. Gupta
- HVDC Transmission: By K.R. Padiyar
- Electric power by Soni, Gupta and Bhatnagar

# UTILIZATION OF ELECTRIC POWER

**Course Code: BEE 604**

**Credit Units: 03**

## **Course Objective:**

This course intends to impart knowledge on the practical and practice aspects of electrical engineering

## **Course Contents:**

### **Module I: Illumination**

Basic laws of illumination; light sources and their characteristics; sources of light; design of lighting schemes; incandescent lamp; sodium lamp; mercury lamp and fluorescent lamp; comparison of various lamps.

### **Module II: Heating and Welding**

Electrical heating-advantages, methods and application, resistance over general construction, design of heating elements, efficiency and losses control. Induction heating: core type furnaces, core less furnaces and high frequency eddy current heating, dielectric heating: principle and special applications, arc furnaces: direct arc furnaces, Indirect arc furnaces, electrodes, power supply and control. Different methods of electrical welding and electrical equipment for them. Arc furnaces transformer and welding transformers.

### **Module III: Traction**

Advantages and disadvantages, system of electric traction, diesel electric locomotives. Mechanics of train movement: simplified speed time curves, average and schedule speed, tractive effort, specific energy consumption, factors affecting specific energy consumption.

### **Module IV: Traction Motors**

DC motors, single phase and three phase motors, starting and control of traction motors, braking of traction motors. Modern 25 KV a.c. single phase traction systems: advantages, equipment and layout of 25 KV, single phase power frequency A.C. traction.

### **Module V: Electric Drives**

Individual and collective drives- electrical braking, plugging, rheostatic and regenerative braking load equalization use of fly wheel criteria for selection of motors for various industrial drives.

## **Examination Scheme:**

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

## **Text & References:**

- Pratab. H. "Art and Science of Utilization of Electrical Energy": Dhanpat Rai & Sons, 2001
- Wadhwa C.L. "Generation, Distribution and Utilization of Electrical Power"; Khanna Publications, 2005
- Gupta. J. B. "A Course of Electric Power", S. K. Kataria & Sons, 2009
- Uppal .S. L. "Electrical Power", Khanna Publisher, 2005
- Dover. A. T. "Electric Traction" , Sir Isaac Pitman & Sons Ltd. 1965

# PROGRAMMING WITH PYTHON

**Course Code:** BCS 610

**Credit Units:** 02

## **Course Objective:**

Objective: Python is next generation multi-purpose programming language that allows different users to create applications of various domains. Students will be able to learn primary fundamentals of python programming and potential of python is to achieve modern computing requirements

Course Outcomes: After completion of this course, student will be able to

- To learn basics of Python.
- To develop console application in python.
- To develop database application in python.
- To develop basic machine learning application.

**Pre-requisite of course:** Object oriented concepts, Programming fundamentals

## **Course Contents:**

### **Module I: Basic of Python Programming**

The concept of data types; variables, assignments; immutable variables; numerical types; arithmetic operators and expressions; comments in the program; understanding error messages.

### **Module II: Conditioning and looping in python**

Conditions, Boolean logic, logical operators; ranges; Control statements: if-else, loops (for, while); lambda function in python.

### **Module III: String, List, Tuple, Set, Dictionary data structure**

String manipulations: subscript operator, indexing, slicing a string; strings and number system: converting strings to numbers and vice versa. Lists, tuples, and dictionaries; basic list operators, replacing, inserting, removing an element; searching and sorting lists; dictionary literals, adding and removing keys, accessing and replacing values, traversing dictionaries.

### **Module IV: Function**

Design with functions: hiding redundancy, complexity; arguments and return values; formal vs actual arguments, named arguments. Program structure and design. Recursive functions.

### **Module V: Basic Python Libraries**

Pandas: creation of dataframe, Manipulation of dataframe, generation of series, iloc and loc function etc. NumPy: creation of arrays (1-D, 2-D and n-D array), random matrix, one's matrix, zero's matrix and all other operation over arrays, matplotlib: plotting of line graph, pi chart and box plot etc.

**Projects:**

Creating a discussion form, creating an online store, creating a job site.

**Examination Scheme:**

<b>Components</b>	<b>A</b>	<b>CT</b>	<b>S/V/Q</b>	<b>HA</b>	<b>EE</b>
<b>Weightage (%)</b>	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

**Text & References:***Text:*

- Ramesh Bangia, “Web Technology”, Firewall media
- C. Xavier, “World Wide Web Design with HTML”, Tata McGraw Hill.
- Unleashed ASP, Techmedia

*References:*

- Rick Dranell, “HTML4 unleashed”, Techmedia Publication.
- Shelly Powers, “Dynamic Web Publishing Unleashed”, Techmedia.
- Don Gosselin, “JavaScript”, Vikas Publication
- Mark Swank & Drew Kittel, “World Wide Web Database”, Sams net.

# POWER ELECTRONICS LAB

**Course Code: BEE 621**

**Credit Units: 01**

## **Course Objective:**

The course aims to introduce them to the theory of operation, analytical and circuit models and basic design concepts of Electric Power components and systems.

## **Course Contents:**

1. Study of VI Characteristics of SCR at different gate currents.
2. Study of VI characteristics of DIAC.
3. Static characteristics of IGBT and MOSFET
4. RC and UJT triggering of SCR.
5. Different types of commutation..
6. Single phase half and full controlled wave converter.
7. Step up and step down choppers.
8. a. Single phase series inverter.  
b. Single phase parallel inverter.
9. Speed control of universal motor.

## **Examination Scheme:**

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

## **Reference/Suggested Books**

1. O. P. Arora: Power Electronics Laboratory-Experiments and Organization, Narosa Pub.
2. P. B. Zbar: Industrial Electronics- A Text-Lab Manual, MGH.

# POWER SYSTEM LAB

Course Code: BEE 622

Credit Units: 01

## List of Experiments:

1. To study the performance of a transmission line. Also compute its ABCD parameters.
2. Study of Characteristics of over current and earth fault protection.
3. To study the operating characteristics of fuse. (HRC or open type)
4. To find the earth resistance using three spikes
5. To study over current static relay.
6. To study the different types of faults on transmission line demonstration panel/model.
7. To study the radial feeder performance when
  - (a) Fed at one end.
  - (b) Fed at both ends
8. To study the performance of under voltage and over voltage relay.
9. To study the characteristics of bimetal mini circuit breakers.
10. To study the characteristics of Distance Relay.
11. To find the breakdown strength of transformer oil.

## Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

# PROGRAMMING WITH PYTHON LAB

Course Code: BCS 630

Credit Units: 01

Software Required: Java

## List of Assignment:

1. Write a program to demonstrate basic data type in python.
2. Write a program to compute distance between two points taking input from the user.
3. Write a program add.py that takes 2 numbers as command line arguments and prints its sum.
4. Write a Program for checking whether the given number is an even number or not. Using a for loop, write a program that prints out the decimal equivalents of  $1/2$ ,  $1/3$ ,  $1/4$ , . . . ,  $1/10$ .
5. Write a Program to demonstrate list and tuple in python.
6. Write a program using for loop that loops over a sequence.
7. Write a program using a while loop that asks the user for a number, and print countdown from that number to zero
8. WAP to find the sum of the even-valued terms.
9. Write a program to count the numbers of characters in the string and store them in a dictionary data structure.
10. Write a program to use split and join methods in the string and trace a birthday of a person with a dictionary data structure.
11. Write a program to print each line of a file in reverse order.
12. Write a program to compute the number of characters, words and lines in a file.
13. Write a function nearly equal to test whether two strings are nearly equal. Two strings a and b are nearly equal when a can be generated by a single mutation.
14. Write function to compute gcd, lcm of two numbers. Each function shouldn't exceed one line

## Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

# DATA STRUCTURES AND IT

**Course Code: BEC 606**

**CreditUnits: 03**

## **Course Objective:**

Data structure deals with organizing large amount of data in order to reduce space complexity and time requirement. This course gives knowledge of algorithms, different types of data structures and the estimation space and time complexity.

## **Course Contents:**

### **Module I: Introduction to Data structures**

**Data structures:** Definition, Types. Algorithm design, Complexity, Time-Space Trade offs. Use of pointers in data structures. Array Definition and Analysis, Representation of Linear Arrays in Memory, Traversing of Linear Arrays, Insertion And Deletion, Single Dimensional Arrays, Two Dimensional Arrays, Multidimensional Arrays, Function Associated with Arrays, Character String in C, Character String Operations, Arrays as parameters, Implementing One Dimensional Array, Sparse matrix.

### **Module II: Introduction to Stacks and queue**

**Stack:** Definition, Array representation of stacks, Operations Associated with Stacks- Push & Pop, Polish expressions, Conversion of infix to postfix, infix to prefix (and vice versa), Application of stacks recursion, polish expression and their compilation, conversion of infix expression to prefix and postfix expression, Tower of Hanoi problem.

**Queue:** Definition, Representation of Queues, Operations of queues- QInsert, QDelete, Priority Queues, Circular Queue, Deque.

### **Module III: Dynamic Data Structure**

**Linked list:** Introduction to Singly linked lists: Representation of linked lists in memory, Traversing, Searching, Insertion into, Deletion from linked list, doubly linked list, circular linked list, generalized list. Applications of Linked List-Polynomial representation using linked list and basic operation. Stack and queue implementation using linked list.

### **Module IV: Trees and Graphs**

**Trees:** Basic Terminology, Binary Trees and their representation, expression evaluation, Complete Binary trees, extended binary trees, Traversing binary trees, Searching, Insertion and Deletion in binary search trees, General trees, AVL trees, Threaded trees, B trees.

**Graphs:** Terminology and Representations, Graphs & Multigraphs, Directed Graphs, Sequential representation of graphs, Adjacency matrices, Transversal Connected Component and Spanning trees.

### **Module V: Sorting and Searching and file structures**

**Sorting:** Insertion Sort, Bubble sort, Selection sort, Quick sort, two-way Merge sort, Heap sort, Partition exchange sort, Shell sort, Sorting on different keys, External sorting.

**Searching:** Linear search, Binary search

**File structures:** Physical storage media, File Organization, Linked organization of file, Inverted file, Organization records into blocks, Sequential blocks, Hash function, Indexing & Hashing, Multilevel indexing, Tree Index, Random file, Primary Indices, Secondary Indices, B tree index files.

**Examination Scheme:**

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

**Text & References:****Text:**

- Horowitz and Sahani, “Fundamentals of Data structures”, Galgotia publications
- Tannenbaum, “Data Structures”, PHI
- R.L. Kruse, B.P. Leary, C.L. Tondo, “Data structure and program design in C” PHI
- “Data structures and algorithms” – Schaum Series.
- File Structures An object-Oriented Approach with C++ by Michael J. Folk, Bill Zoellick, Breg Riccardi, Published by Addison Wesley (1<sup>st</sup> ISE Reprint,1999).

**References:**

- J. P. Tremblay and P. G. Sorenson, Introduction to Data Structures with Applications, McGraw – Hill Computer Science Series, Mc-Graw – Hill New York, 1984
- Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Published by Prentice-Hall India (1999).
- Data Structures Using C and C++ second edition by Yeddidyah Langsam, Moshe J.Augenstein, Aaron M. Tenen Baum, Published by Prentice-Hall India
- Data Structures and Algorithm analysis in C++ by Mark Allen Weiss, Published by Addison Wesley (3<sup>rd</sup> Indian Reprint 2000).
- “Data Structures” – R. S. Salaria

# SWITCHED MODE POWER SUPPLIES

**Course Code: BEE 606**

**Credit Units: 03**

## **Course Objective:**

To understand the ability to utilize or specify a modern power processing system more effectively, the user should be familiar with the advantages and limitations of the many techniques available. With this information, the system engineer can specify the power supply requirements so that the most cost-effective and reliable system may be designed to meet these needs. Very often a small change in specification or rearrangement of the power distribution system will allow the power supply designer to produce a much more reliable and cost-effective solution to the user's needs. Hence, to produce the most reliable and cost-effective design, the development of the specification should be an interactive exercise between the power supply designer and the user.

## **Course Contents:**

### **Module I: Common Requirements: An overview**

Introduction, input transient voltage protection, Electromagnetic capability, Start-up methods, soft start, start-up overvoltage prevention, output overvoltage protection, output under voltage protection, output current limiting.

### **Module II: AC Power line surge protection**

Introduction, location categories, likely rate of surge occurrences, surge voltage waveforms, transient suppression devices. Transient protection diodes. Gas filters surge arresters. Line filters Transient suppression combinations, a case study.

### **Module III: EMI in SMPS**

EMI/RFI propagation Modes, Power line filters, Line impedance stabilization networks, line filter design.

### **Module IV: Fuse Selection**

Fuse parameters, types of fuse, selection of fuses, SCR crowbar fuses, Transformer Input Fuses.

## **Examination Scheme:**

<b>Components</b>	<b>A</b>	<b>CT</b>	<b>S/V/Q</b>	<b>HA</b>	<b>EE</b>
<b>Weightage (%)</b>	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

## **Text & References:**

### **Text:**

- Higher Engineering Mathematics by H.K. Dass

### **References:**

- Partial Differential Equations by I. N. Snedon
  - Laplace Transformation Schaum outline series
  - Advance Engineering Mathematics - Kreszig
- Linear Programming – Hadley

# COMMUNICATION SKILLS - IV

**Course Code: BCS 601**

**Credit Units: 01**

## **Course Objective:**

To enhance the skills needed to work in an English-speaking global business environment.

## **Course Contents:**

### **Module I: Business/Technical Language Development**

Advanced Grammar: Syntax, Tenses, Voices  
Advanced Vocabulary skills: Jargons, Terminology, Colloquialism  
Individualised pronunciation practice

### **Module II: Social Communication**

Building relationships through Communication  
Communication, Culture and Context  
Entertainment and Communication  
Informal business/ Technical Communication

### **Module III: Business Communication**

Reading Business/ Technical press  
Listening to Business/ Technical reports (TV, radio)  
Researching for Business /Technology

### **Module IV: Presentations**

Planning and getting started  
Design and layout of presentation  
Information Packaging  
Making the Presentation

## **Examination Scheme:**

<b>Components</b>	<b>A</b>	<b>CT</b>	<b>S/V/Q</b>	<b>HA</b>	<b>EE</b>
<b>Weightage (%)</b>	5	15	5	5	70

CAF – Communication Assessment File

GD – Group Discussion

GP – Group Presentation

## **Text & References:**

- Business Vocabulary in Use: Advanced Macmillan, Cambridge
- Business Communication, Raman – Prakash, Oxford
- Business Communications, Rodgers, Cambridge
- Working in English, Jones, Cambridge
- New International Business English, Jones/Alexander, Cambridge

# BEHAVIOURAL SCIENCE - VI (STRESS AND COPING STRATEGIES)

**Course Code: BSS 604**

**CreditUnits: 01**

## **Course Objective:**

To develop an understanding the concept of stress its causes, symptoms and consequences.  
To develop an understanding the consequences of the stress on one's wellness, health, and work performance.

## **Course Contents:**

### **Module I: Stress**

Meaning & Nature  
Characteristics  
Types of stress

### **Module II: Stages and Models of Stress**

Stages of stress  
The physiology of stress  
Stimulus-oriented approach.  
Response-oriented approach.  
The transactional and interact ional model.  
Pressure – environment fit model of stress.

### **Module III: Causes and symptoms of stress**

Personal  
Organizational  
Environmental

### **Module IV: Consequences of stress**

Effect of stress on performance  
Individual and Organizational consequences with special focus on health

### **Module V: Strategies for stress management**

Importance of stress management  
Healthy and Unhealthy strategies  
Peer group and social support  
Happiness and well-being

### **Module VI: End-of-Semester Appraisal**

Viva based on personal journal  
Assessment of Behavioural change as a result of training  
Exit Level Rating by Self and Observer

## **Examination Scheme:**

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

## **Text & References:**

- Blonna, Richard; Coping with Stress in a Changing World: Second edition
- Pestonjee, D.M, Pareek, Udai, Agarwal Rita; Studies in Stress And its Management
- Pestonjee, D.M.; Stress and Coping: The Indian Experience
- Clegg, Brian; Instant Stress Management – Bring calm to your life now

# FRENCH - VI

**Course Code:** FLT 601

**Credit Units:** 02

## **Course Objective:**

To strengthen the language of the students both in oral and written so that they can:

- i) express their sentiments, emotions and opinions, reacting to information, situations;
- ii) narrate incidents, events ;
- iii) perform certain simple communicative tasks.

## **Course Contents:**

**Module D: pp. 157 – 168 – Unité 12**

### **Unité 12: s'évader**

1. présenter, caractériser, définir
2. parler de livres, de lectures
3. préparer et organiser un voyage
4. exprimer des sentiments et des opinions
5. téléphoner
6. faire une réservation

### **Contenu grammatical:**

1. proposition relative avec pronom relatif "qui", "que", "où" - pour caractériser
2. faire + verbe

## **Examination Scheme:**

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>C</b>	<b>I</b>	<b>V</b>	<b>A</b>
<b>Weightage (%)</b>	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

## **Text & References:**

- le livre à suivre : Campus: Tome 1

# GERMAN - VI

**Course Code: FLG 601**

**Credit Units: 02**

## **Course Objective:**

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.

To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Introduction to Advanced Grammar and Business Language and Professional Jargon

## **Course Contents:**

### **Module I: Adjective endings**

Adjective endings in all the four cases discussed so far

Definite and indefinite articles

Cases without article

### **Module II: Comparative adverbs**

Comparative adverbs as and like

### **Module III: Compound words**

To learn the structure of compound words and the correct article which they take

Exploring the possibility of compound words in German

### **Module IV: Infinitive sentence**

Special usage of 'to' sentences called zu+ infinitive sentences

### **Module V: Texts**

A Dialogue: 'Ein schwieriger Gast'

A text: 'Abgeschlossene Vergangenheit'

### **Module VI: Comprehension texts**

Reading and comprehending various texts to consolidate the usage of the constructions learnt so far in this semester.

### **Module VII: Picture Description**

Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;

Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

## **Examination Scheme:**

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>C</b>	<b>I</b>	<b>V</b>	<b>A</b>
<b>Weightage (%)</b>	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

## **Text & References:**

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmoe, Deutsch als Fremdsprache 1A, Grundkurs

## SPANISH – VI

**Course Code:** FLS 601

**Credit Units: 02**

### **Course Objective:**

To enable students acquire working knowledge of the language; to give them vocabulary, grammar, voice modulations/intonations to handle everyday Spanish situations in Present as well as in Present Perfect Tense with ease.

### **Course Contents:**

#### **Module I**

Revision of the earlier modules

#### **Module II**

Present Perfect Tense

#### **Module III**

Commands of irregular verbs

#### **Module IV**

Expressions with **Tener que** and **Hay que**

#### **Module V**

En la embajada

Emergency situations like fire, illness, accident, theft

### **Examination Scheme:**

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>C</b>	<b>I</b>	<b>V</b>	<b>A</b>
<b>Weightage (%)</b>	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

### **Text & References:**

- Español, En Directo I A
- Español Sin Fronteras

# CHINESE – VI

**Course Code: FLC 601**

**Credit Units: 02**

## **Course Objective:**

Chinese emperor Qin Shi Huang – Ti who built the great wall of China also built a network of 270 palaces, linked by tunnels, and was so afraid of assassination that he slept in a different palace each night. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

## **Course Contents:**

### **Module I**

Drills  
Dialogue practice  
Observe picture and answer the question.  
Pronunciation and intonation.  
Character writing and stroke order.

### **Module II**

Going out to see a science exhibition  
Going to the theatre.  
Train or Plane is behind schedule.  
Indian Economy-Chinese Economy  
Talking about different Seasons of the Year and Weather conditions. Learning to say phrases like-spring, summer, fall, winter, fairly hot, very cold, very humid, very stuffy, neither hot nor cold, most comfortable, pleasant .... etc.

### **Module III**

Temperature – how to say – What is the temperature in May here?

- How is the weather in summer in your area?
- Around 30 degrees
- Heating, air-conditioning
- Is winter in Shanghai very cold?

Talking about birthdays and where you were born?

The verb “shuo” (speak) saying useful phrases like speak very well, do not speak very well, if speak slowly then understand if speak fast then don't understand, difficult to speak, difficult to write, speak too fast, speak too slow, listen and can understand, listen and cannot understand ... etc.

Tell the following in Chinese – My name is .... I was born in ... (year). My birthday is ..... Today is ... (date and day of the week). I go to work (school) everyday. I usually leave home at . (O'clock). In the evening, I usually ..... (do what)? At week end, I ..... On Sundays I usually ..... It is today..... It will soon be my younger sister's birthday. She was born in ..... (year). She lives in ..... (where). She is working (or studying)..... where... She lives in.....(where.)

## **Examination Scheme:**

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>C</b>	<b>I</b>	<b>V</b>	<b>A</b>
<b>Weightage (%)</b>	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

## **Text & References:**

- Elementary Chinese Reader Part-2, 3; Lesson 47-54

# POWER SYSTEM ENGINEERING

**Course Code: BEE 701**

**Credit Units: 03**

## **Course Objective :**

To blend the knowledge of Power system stability for power system operations and control. Also, to provide knowledge of Economics of power system and load flow analysis.

## **Course Content:**

### **Module I: Economic Operation of Power Systems:**

Introduction, system constraints, optimal operation of power systems. Input output, heat rate and incremental rate curves of thermal generating units. Economic distribution of load between generating units within a plant. Economic distribution of load between power stations, transmission loss equation. Introduction to unit commitment and dynamic programming

### **Module II: Power System Stability-I:**

Power angle equations and power angle curves under steady state and transient conditions. Rotor dynamics and swing equation (solution of swing equation not included). Synchronizing power coefficient. Introduction to steady state and dynamic stabilities, steady state stability limit.

### **Module III: Power System Stability-II:**

Introduction to transient stability. Equal area criterion and its application to transient stability studies under basic disturbances. Critical clearing angle and critical clearing time. Factors affecting stability and methods to improve stability.

### **Module IV: Load Flow Analysis:**

Load flow problem, development of load flow equations, bus classification Gauss Seidel, Newton Raphosn, decoupled and fast decoupled methods for load flow analysis. Comparison of load flow methods.

## **Examination Scheme:**

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

C – Project + Presentation

I – Interaction/Conversation Practice

## **Text & References:**

- Elementary Chinese Reader Part-2, 3; Lesson 47-54

# POWER SYSTEM PROTECTION

**Course Code: BEE 703**

**Credit Units: 03**

## **Course Objective:**

The basic objective of the course is to impart knowledge to the students on power system protection

## **Course Contents:**

### **Module I: Neutral Earthing**

Introduction, Terms and definition, Disadvantages of ungrounded Systems, Advantages of neutral grounding, Types of grounding, Ungrounded system, Connection of arc suppression coil, Neutral point earthing of transformer LV circuits, Neutral grounding practice, Earthing transformer, Station earthing system, Resonant grounding - Methods of neutral grounding.

### **Module II: Protective Relaying**

Introduction, Importance, Protective zones, primary and backup protection, desirable quantities of protective relaying, Some terms in protective relaying, Basic operation of relay, Classification of relays, Buchholz's relay, Induction relays, Directional relays, Distance relays- impedance relay, admittance relay, classification of distance relays and distance protection, Differential relays

### **Module III: Static Relays**

Introduction, Static relay techniques using semi conductors,: Phase and amplitude comparators, Duality between phase and amplitude comparators, general equation for comparators, Basic elements of a static relay, over-current relays, differential protection, static distance protection

### **Module IV: Apparatus Protection**

Alternator protection- types of faults, Stator protection, differential protection, rotor protection, over load protection, loss of excitation protection, un balanced loading protection, prime mover protection, over speed protection, over voltage protection, Transformer protection-, nature, faults in auxiliary equipment, winding faults, over load and external short circuits, differential protection of transformers, over current and earth fault protection, tank leakage protection, restricted earth fault protection, gas relays, transformer feeder protection, Induction Motor Protection: Abnormal operating conditions, Contactors and circuit breakers for motors, Under voltage protection, phase and Earth fault protection, Overload protection, Unbalanced voltage protection, Single phasing preventer, Phase reversal protection.

## **Examination Scheme:**

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

## **Text & References:**

- Electric Power System: By – C.L.Wadhwa
- Electric Power System: By - Asfaq Husain
- Elements of Power System Analysis: By – William D.Stevenson
- Power System Analysis & Design: By – B.R.Gupta
- HVDC Transmission: By K.R. Padiyar

# SUBSTATION ENGINEERING

**Course Code: BEE704**

**Credit Units: 03**

## **Course Objective:**

The purpose of this course is to provide a thorough introduction to Substation engineering with an in depth study of various components that make a complete Substation.

## **Course Contents:**

### **Module I**

Introduction Functions of a substation, Classification, Layout, Design and Construction of Bus Bar and earth wire in substation.

Jumpering of conductors, Factors affecting layout of substation, Testing of substation. Reactive power management, Fundamentals of earthing

### **Module II**

Load Management, Causes and effect of low power factor; advantages of power factor improvement; PF improvement using shunt capacitors and synchronous condensers; calculation of most economic pf when (a) kw demand is constant (b) KVA demand is constant. importance of capacitor banks,

### **Module III**

Computer applications, SCADA subsystem, Data acquisition and data processing, supervisory control , voltage control and voltage stability, Protection using circuit breakers, fuse and protection against overvoltage. Bus bar protection.

### **Module IV**

Technical standards for construction of sub stations, Substation automation system. Gas insulated substations,.

### **Module V**

Air and water pollution by thermal power plants and its control; acid rains; thermal pollution by thermal and nuclear power plants; radio-active pollution of environment by nuclear power plants; noise pollution and noise control; methods suggested to reduce the pollution. pollution flashover mechanism in insulators, basics of current transformers and voltage transformers. Economic operation of power system.

## **Examination Scheme:**

<b>Components</b>	<b>A</b>	<b>CT</b>	<b>S/V/Q</b>	<b>HA</b>	<b>EE</b>
<b>Weightage (%)</b>	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;

Att: Attendance.

## **Text & References:**

- Substation Engineering by Er. R.S. Dahiya (KATSON BOOKS)
- EHV AC and DC by S.Rao

# ADVANCED PROGRAMMING WITH PYTHON

**Course Code:** BCS 710

**Credit Units: 02**

## **Course Objective:**

The course should enable the students:

- Describe the semantics of Python programming language and illustrate the process of structuring the data using lists, dictionaries, tuples, strings and sets.
  - Illustrate the Object-oriented Programming concepts in Python.
  - Demonstrate the basic database design for storing data as part of a multi-step data gathering, analysis, and processing.
  - Familiarize the basics of machine learning using an approachable, and also understand the advantage of using Python libraries for implementing Machine Learning models
- Course Outcomes: After completion of this course, student will be able to:

## **Course Outcomes:**

- Interpret the basic principles of Python programming language.
- Articulate the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python.
- Identify the commonly used operations involving file systems and regular expressions.
- Implement Machine Learning algorithms.

## **Course Contents:**

### **Module-I:**

Introduction to Python, use IDLE to develop programs, Basic coding skills, working with data types and variables, working with numeric data, working with string data, Python functions, Boolean expressions, selection structure, iteration structure, working with lists, work with a list of lists, work with tuples, work with dates and times, get started with dictionaries

### **Learning Outcome:**

At the end of this Unit the student will be able to

- Solve, test and debug basic problems using python script.
- Manipulate python programs by using the python data structures like lists, dictionaries, tuples, strings and sets.

### **Module -II**

Classes in Python: OOPS Concepts, Classes and objects ,Classes in Python, Constructors, Datahiding, Creating Classes, Instance Methods, Special Methods, Class Variables, Inheritance, Polymorphism, Type Identification, Custom Exception Classes, Iterators, generators and decorators.

Learning Outcome:At the end of this Unit the student will be able to

- Design object-oriented programs with Python classes.
- Usage of inheritance and polymorphism for reusability.

### **Module -III**

I/O and Error Handling In Python :Introduction, Data Streams, Creating Your Own Data Streams, Access Modes, Writing Data to a File, Reading Data From a File, Additional File Methods, Handling IO Exceptions, Errors, Run Time Errors, The Exception Model, Exception Hierarchy, Handling Multiple Exceptions, Working with Directories.

Learning Outcome: At the end of this Unit the student will be able to

- Identify the commonly used operation involved in files for I/O processing.
- Familiarize the handling of I/O Exception sand usage of Directories.

#### **Module -IV**

Implement Machine Learning algorithms:Usage of Numpy for numerical Data,Usage of Pandas for Data Analysis, Matplotlib for Python plotting, Seaborn for Statically plots, interactive Dynamic visualizations, SciKit for Machine learning.

Learning Outcome: At the end of this Unit the student will be able to

Understand the advantage of using Python libraries for implementing Machine Learning models.

#### **Projects:**

Creating a discussion form, creating an online store, creating a job site.

#### **Examination Scheme:**

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

#### **Text & References:**

1. Michael Urban and Joel Murach, Python Programming, Shroff/Murach, 2016.
2. Haltermanpython.
3. Mark Lutz, Programming Python, O'Reilly, 4th Edition, 2010ONLINE

#### **RESOURCES:**

4. <https://www.w3schools.com/python>.
5. <https://docs.python.org/3/tutorial/index.html>.
6. [https://www.python-course.eu/advanced\\_topics.ph](https://www.python-course.eu/advanced_topics.ph)

# POWER SYSTEM ENGINEERING LAB

**Course Code: BEE 721**

**Credit Units: 01**

## **Course Objective:**

The aim of this course is to make the students learn about the theory and engineering behind load flow and digital techniques in short circuit studies.

## **Course Contents:**

1. Simulate swing equation in simulink (matlab)
2. Economic load dispatch in power system
3. Formation of bus impedance & admittance matrix
4. Simulate simple circuits using circuit breaker.
5. (a) modeling of synchronous machine with pss (b) simulation of synchronous machine With facts device.
6. (a) modeling of synchronous machine with facts device (b) simulation of synchronous Machine with facts devices.
7. Facts controller designs with fact devices for smib system.

## **Examination Scheme:**

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

# Electrical Simulation Lab

**Course Code: BEE 725**

**Credit Units: 01**

**Course Objective:** The course is aimed:

1. To understand basic block sets of different simulation platform used in electrical /electronic circuit design.
2. To understand use and coding in different software tools used in electrical/ electronic circuit design

**Course Contents:**

- 1 Analysis of Electrical Networks
- 2 Network Theorems (Thévenin and Norton Theorem)
- 3 Solution of Network Problems (Solution of Linear Differential Equations)
- 4 Characteristics of Different types of Diode
- 5 Diode Circuits and Rectifiers
- 6 SCR based Circuits
- 7 Simulation of Battery Charge
- 8 Simulation of DC-AC Inverters
- 9 AC Voltage Controllers
- 10 Neuro / Fuzzy applications and simulation

**Examination Scheme:**

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

## ADVANCED PROGRAMMING WITH PYTHON LAB

Course Code: BCS 730

Credit Units: 01

### List of Assignment:

- Practice Assignment based on string data, Python functions, and Boolean expressions.
- Practical based on iteration, working with lists, tuples and dictionaries.
- Practical based on class, objects, constructor, method in side class.
- Practical questions based on Inheritance, Polymorphism, Type Identification, Custom Exception Classes.
- Handling Errors using Python.
- Practical Assignment based on Usage of Numpy for numerical Data,
- Practical Assignment based on Usage of Usage of Pandas for Data Analysis.
- Practical Assignment based on Usage of Matplotlib for Python plotting.
- Practical Assignment based on Usage of Seaborn for Statically plots.
- Practical Assignment based on Usage of Interactive Dynamic visualizations.
- Practical Assignment based on Usage of SciKit for Machine learning.

### Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

## **INDUSTRIAL TRAINING (Evaluation)**

**Course Code: BEE 750**

**Credit Units: 03**

### **Methodology:**

Practical training is based on the theoretical subjects studied by students. It can be arranged within the college or in any related industrial unit. The students are to learn various industrial, technical and administrative processes followed in the industry. In case of on-campus training the students will be given specific task of fabrication/assembly/testing/analysis. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

### **Examination Scheme:**

Feedback from industry/work place	20
Training Report	40
Viva	15
Presentation	25
<b>Total</b>	<b>100</b>

## SEMINAR

**Course Code: BEE 760**

**Credit Units: 03**

### **Methodology:**

The objectives of the course 'seminar' are:

- To provide students with a comprehensive experience for applying the knowledge gained so far by studying various courses.
- To develop an inquiring aptitude and build confidence among students by working on solutions of small industrial problems.
- To give students an opportunity to do something creative and to assimilate real life work situation in institution.
- To adapt students for latest developments and to handle independently new situations.
- To develop good expressions power and presentation abilities in students.
- The focus of the 'seminar' is on preparing a working system or some design or understanding of a complex system using system analysis tools and submit it the same in the form of a write-up i.e. detail seminar report.
- The student should select some real-life problems for their seminar and maintain proper documentation of different stages of seminar such as need analysis, market analysis, concept evaluation, requirement specification, objectives, work plan, analysis, design, implementation and test plan.
- Each student is required to prepare a seminar report and present the same with a demonstration of the working system (if any).
- The faculty and student should work according to following schedule: i) Each student undertakes substantial and individual project/Topic in an approved area of the subject and supervised by a member of staff. ii) The student must submit outline and action plan for the project execution (time schedule) and the same be approved by the concerned faculty. iii) At all the steps of the seminar, students must submit a written report of the same.

### **Examination Scheme:**

Feedback from industry/workplace	20
Training Report	40
Viva	15
Presentation	25
<b>Total</b>	<b>100</b>

# COMMUNICATION SKILLS - V

**Course Code: BCS 701**

**Credit Units: 01**

## **Course Objective:**

To facilitate the learner with Academic Language Proficiency and make them effective users of functional language to excel in their profession.

## **Course Contents:**

### **Module I**

Introduction to Public Speaking  
Business Conversation  
Effective Public Speaking  
Art of Persuasion

### **Module II: Speaking for Employment**

Types of Interview  
Styles of Interview  
Facing Interviews-Fundamentals and Practice Session  
Conducting Interviews- Fundamentals and Practice Session  
Question Answer on Various Dimensions

### **Module III**

Resume Writing  
Covering Letters  
Interview Follow Up Letters

### **Module IV: Basic Telephony Skills**

Guidelines for Making a Call  
Guidelines for Answering a Call

### **Module V: Work Place Speaking**

Negotiations  
Participation in Meetings  
Keynote Speeches

## **Examination Scheme:**

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File

GD – Group Discussion

GP – Group Presentation

## **Text & References:**

- Jermy Comfort, Speaking Effectively, et.al, Cambridge
- Krishnaswamy, N, Creative English for Communication, Macmillan
- Raman Prakash, Business Communication, Oxford.

# **BEHAVIOURAL SCIENCE - VII (INDIVIDUAL, SOCIETY AND NATION)**

**Course Code: BSS 704**

**CreditUnits: 01**

## **Course Objective:**

This course aims at enabling students towards:  
Understand the importance of individual differences  
Better understanding of self in relation to society and nation  
Facilitation for a meaningful existence and adjustment in society  
Inculcating patriotism and national pride

## **Course Contents:**

### **Module I: Individual differences& Personality**

Personality: Definition& Relevance  
Importance of nature & nurture in Personality Development  
Importance and Recognition of Individual differences in Personality  
Accepting and Managing Individual differences (adjustment mechanisms)  
Intuition, Judgment, Perception & Sensation (MBTI)  
BIG5 Factors

### **Module II: Managing Diversity**

Defining Diversity  
Affirmation Action and Managing Diversity  
Increasing Diversity in Work Force  
Barriers and Challenges in Managing Diversity

### **Module III: Socialization**

Nature of Socialization  
Social Interaction  
Interaction of Socialization Process  
Contributions to Society and Nation

### **Module IV: Patriotism and National Pride**

Sense of pride and patriotism  
Importance of discipline and hard work  
Integrity and accountability

### **Module V: Human Rights, Values and Ethics**

Meaning and Importance of human rights  
Human rights awareness  
Values and Ethics- Learning based on project work on Scriptures like- Ramayana, Mahabharata, Gita etc.

### **Module VI: End-of-Semester Appraisal**

Viva based on personal journal  
Assessment of Behavioural change as a result of training  
Exit Level Rating by Self and Observer

**Examination Scheme:**

<b>Components</b>	<b>SAP</b>	<b>A</b>	<b>Mid Term Test (CT)</b>	<b>VIVA</b>	<b>Journal for Success (JOS)</b>
<b>Weightage (%)</b>	20	05	20	30	25

**Text & References:**

- Davis, K. Organizational Behaviour,
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressler, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change

## FRENCH - VII

**Course Code: FLT 701**

**Credit Units: 02**

### **Course Objective:**

Revise the portion covered in the first volume, give proper orientation in communication and culture.

### **Course Contents:**

**Module A: Unités 1 – 3: pp. 06 - 46**

**Contenu lexical: Unité 1:** Rédiger et présenter son curriculum vitae

- Exprimer une opinion
- Caractériser, mettre en valeur
- Parler des rencontres, des lieux, des gens

**Unité 2:** Imaginer - Faire des projets

- Proposer - conseiller
- Parler des qualités et des défauts
- Faire une demande écrite
- Raconter une anecdote
- Améliorer son image

**Unité 3:** Exprimer la volonté et l'obligation

- Formuler des souhaits
- Exprimer un manque/un besoin
- Parler de l'environnement, des animaux, des catastrophes naturelles

**Contenu grammatical:**

1. Le passé : passé composé/imparfait
2. Pronoms compléments directs/indirects, y/en (idées/choses)
3. Propositions relatives introduites par qui, que, où
4. Comparatif et superlatif
5. Le conditionnel présent
6. Situer dans le temps
7. Féminin des adjectifs
8. La prise de paroles : expressions
9. Le subjonctif : volonté, obligation

### **Examination Scheme:**

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>C</b>	<b>I</b>	<b>V</b>	<b>A</b>
<b>Weightage (%)</b>	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

### **Text & References:**

- le livre à suivre : **Campus: Tome 2**

# GERMAN - VII

**Course Code: FLG 701**

**Credit Units: 02**

## **Course Objective:**

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.

To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Introduction to Advanced Grammar and Business Language and Professional Jargon

## **Course Contents:**

### **Module I: Dass- Sätze**

Explain the use of the conjunction “-that”, where verb comes at the end of the sentence

### **Module II: Indirekte Fragesätze**

To explain the usage of the “Question Pronoun” as the Relative Pronoun in a Relative Sentence, where again the verb falls in the last place in that sentence.

### **Module III: Wenn- Sätze**

Equivalent to the conditional “If-” sentence in English. Explain that the verb comes at the end of the sentence.

### **Module IV: Weil- Sätze**

Explain the use of the conjunction “because-” and also tell that the verb falls in the last place in the sentence.

### **Module V: Comprehension texts**

Reading and comprehending various texts to consolidate the usage of the constructions learnt so far in this semester.

### **Module VI: Picture Description**

Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;

Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

## **Examination Scheme:**

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>C</b>	<b>I</b>	<b>V</b>	<b>A</b>
<b>Weightage (%)</b>	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

## **Text & References:**

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant - 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

## SPANISH - VII

**Course Code: FLS 701**

**Credit Units: 02**

### **Course Objective:**

To enable students acquire working knowledge of the language; to give them vocabulary, grammar, expressions used on telephonic conversation and other situations to handle everyday Spanish situations with ease.

### **Course Contents:**

#### **Module I**

Revision of earlier semester modules

#### **Module II**

Zodiac signs. More adjectives...to describe situations, state of minds, surroundings, people and places.

#### **Module III**

Various expressions used on telephonic conversation (formal and informal)

#### **Module IV**

Being able to read newspaper headlines and extracts (Material to be provided by teacher)

#### **Module V**

Negative commands (AR ending verbs)

#### **Module VI**

Revision of earlier sessions and introduction to negative ER ending commands, introduction to negative IR ending verbs

### **Examination Scheme:**

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>C</b>	<b>I</b>	<b>V</b>	<b>A</b>
<b>Weightage (%)</b>	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

### **Text & References:**

- Español En Directo I A, 1B
- Español Sin Fronteras
- Material provided by the teacher from various sources

## CHINESE – VII

**Course Code: FLC 701**

**Credit Units: 02**

### **Course Objective:**

The story of Cinderella first appears in a Chinese book written between 850 and 860 A.D. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

### **Course Contents:**

#### **Module I**

Drills  
Dialogue practice  
Observe picture and answer the question.  
About china part –I Lesson 1, 2.

#### **Module II**

Pronunciation and intonation  
Character Writing and stroke order.

#### **Module III**

Ask someone what he/she usually does on weekends?  
Visiting people, Party, Meeting, After work....etc.

#### **Module IV**

Conversation practice  
Translation from English to Chinese and vice-versa.  
Short fables.

#### **Module V**

A brief summary of grammar.  
The optative verb “yuanyi”.  
The pronoun “ziji”.

### **Examination Scheme:**

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>C</b>	<b>I</b>	<b>V</b>	<b>A</b>
<b>Weightage (%)</b>	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

### **Text & References:**

- “Kan tu shuo hua” Part-I Lesson 1-7

# ELECTRICAL DRIVE AND CONTROL

**Course Code: BEE 801**

**Credit Units: 03**

## **Course Objective :**

The course is aiming to give a thorough understanding of converter topologies and control principles used in modern electrical motor drives.

## **Course Contents:**

### **Module I: Dynamics of Electric Drives:**

Fundamental torque equations, speed-torque conventions and multi-quadrant operation, Nature and classification of load torques, steadystate stability, load equalization, close loop configurations of drives.

### **Module II: DC Drives:**

Speed torque curves, torque and power limitation in armature voltage and field control, Starting, Braking: Regenerative Braking, dynamic braking and plugging. Speed Control-Controlled Rectifier fed DC drives, Chopper Controlled DC drives.

### **Module III: Induction Motor Drives :**

Starting, Braking- Regenerative braking, plugging and dynamic braking.

**Speed Control:** Stator voltage control, variable frequency control from voltage source, Voltage Source Inverter (VSI) Control. Cycloconverter Control, Static rotor resistance control, Slip Power Recovery- Stator Scherbius drive, Static Kramer drive.

### **Module IV: Synchronous Motor Drive:**

Control of Synchronous Motor-Separately Controlled and VSI fed Self-Controlled Synchronous Motor Drives.

## **Examination Scheme:**

<b>Components</b>	<b>A</b>	<b>CT</b>	<b>S/V/Q</b>	<b>HA</b>	<b>EE</b>
<b>Weightage (%)</b>	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

## **Text Books**

- G. K. Dubey: Fundamentals of Electrical Drives, Narosa Publishing House, New Delhi. 2002
- B. K. Bose: Power Electronics and Motor Drives, Elsevier. 2010

## **Reference Books**

- V. Subrahmanyam: Electric Drives- Concepts and Applications, MGH. 2011
- Theodore Wildi: Electrical Machines, Drives and Power Systems, Pearson 2007
- S. K. Pillai: A First Course on Electrical Drives, Wiley Eastern limited, India. 1989

# FLEXIBLE AC TRANSMISSION SYSTEMS

**Course Code: BEE 802**

**Credit Units: 03**

## **Course Objective:**

The course gives an opportunity to attendees to understand more fully the technicalities of steady state, dynamic and transient stability and to be fully aware of the types and functionality of equipment available today in the FACTS artillery.

## **Course Contents:**

### **Module 1 : Introduction**

Basics of Power Transmission networks, control of power flow in AC Transmission line, Flexible AC transmission system controllers Application of FACTS controllers in distribution systems.

### **Module 2: AC Transmission line and Reactive Power compensation**

Analysis of Uncompensated AC line, Passive Reactive Power Compensations, Compensation by a Series Capacitor Connected at the Mid- point of the Line, Shunt Compensation Connected at the Midpoint of the Line, Comparison between Series and Shunt Capacitor and SSSC.

### **Module 3: Static Var Compensator**

Static Var Compensator, Analysis of SVC, Configuration of SVC, SVC Controller, Harmonics and Filtering, Applications of SVC.

### **Module 4: Static Synchronous Compensator (STATCOM)**

Introduction, Principle of Operation of STATCOM, Simplified Analysis of a Three Phase Six Pulse STATCOM, Analysis of a Six Pulse VSC Using Switching Functions, Harmonic Transfer and Resonance in VSC, Applications of STATCOM, Compensation by STATCOM.

### **Module 5: Unified Power Flow Controller and other Multi-Converter Devices**

Introduction, Operation of a UPFC, Control of UPFC, Protection of UPFC, Interline Power Flow Controller, Convertible Static Compensator, SSR Characteristics of UPFC, Applications of UPFC.

## **Examination Scheme:**

<b>Components</b>	<b>A</b>	<b>CT</b>	<b>S/V/Q</b>	<b>HA</b>	<b>EE</b>
<b>Weightage (%)</b>	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

## **Text & References:**

- K. R. Padiyar: Flexible AC Transmission Systems, 2009

## MAJOR PROJECT

**Course Code: BEE 860**

**Credit Units: 12**

### **Methodology**

Topics of project are to be based on the latest trends, verifying engineering concepts /principals and should involve elementary research work. The projects may involve design, fabrications, testing, computer modelling, and analysis of any engineering problem. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

### **Examination Scheme:**

Literature study/ Fabrication/ Experimentation	40
Written Report	20
Viva	15
Presentation	25
<b>Total</b>	<b>100</b>

# OPTIMIZATION TECHNIQUES AND ALGORITHMS

**Course Code: BEE 803**

**Credit Units: 03**

## **Course Objective:**

To impart the knowledge of optimization techniques used in the industries and research projects for product development and applications.

## **Course Contents:**

### **Module I: Introduction**

Engineering application of Optimization, Formulation of design problems as mathematical programming problems, classification of optimization problems.

### **Module II : optimization techniques**

Classical optimization, multivariable with no constraints, unconstrained minimization techniques, Penalty function techniques, Lagrange multipliers and feasibility techniques.

### **Module III: Linear Programming**

Graphical method, Simplex method, Duality in linear programming (LP), Sensitivity analysis, Applications in civil engineering.

### **Module IV: Non Linear Programming Techniques/Method**

Unconstrained optimization, one dimensional minimization, golden section, elimination, quadratic and cubic, Fibonacci, interpolation Direct search, Descent, Constrained optimization, Direct and indirect, Optimization with calculus, Khun-Tucker conditions.

### **Module V: Constrained Optimization Techniques**

Direct, complex, cutting plane, exterior Penalty function methods for structural engineering problems.

## **Examination Scheme:**

<b>Components</b>	<b>A</b>	<b>CT</b>	<b>S/V/Q</b>	<b>HA</b>	<b>EE</b>
<b>Weightage (%)</b>	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

## **Text Books**

- Rao S. S.: Engineering Optimization- Theory and Practice, New Age International. 2009
- Hadley. G.: Linear programming, Narosa Publishing House, New Delhi. 2003

## **Reference Books**

- Deb. K.: Optimization for Engineering Design\_ Algorithms and Examples, PHI. 2012

- Bhavikatti S. S.: Structural Optimization Using Sequential Linear Programming, Vikas Publishing House, New Delhi. 2003
- Spunt: Optimum Structural Design, Prentice Hall. 1971

# SMART GRID TECHNOLOGY

**Course Code: BEE 804**

**Credit Units: 03**

## **Course Objective:**

The course discusses the international and national development towards the future renewable electric energy system, and the concept known as Smart Grid. The starting point is the understanding of how design, operation and control of power systems traditionally have been considered. Integration of distributed and intermittent renewable energy requires a new paradigm, and the course gives a basis to understand and contribute to this development. Power systems, power electronics and renewable energy merge, for example in micro grids. A major part of the course concerns electric energy production with photovoltaic (solar) cells. The solar resource and photovoltaic materials and their electrical characteristics are discussed, followed by the treatment of photovoltaic systems, including economic considerations and energy storage. Also other renewable resources are mentioned. In addition, the course discusses the interaction between the power grid and flexible resources, and smart meters.

## **Course Contents:**

### **Module I: Introduction to Smart Grid:**

Evolution of Electric Grid, Concept, Definitions and Need for Smart Grid, Smart grid drivers, functions, opportunities, challenges and Benefits Difference between conventional & Smart Grid, Concept of Resilient & Self-Healing Grid, Present development & International policies in Smart Grid, Diverse perspectives from experts and global Smart Grid initiatives.

### **Module II: Smart Grid Technologies:**

Technology Drivers, Smart energy resources, Smart substations, Substation Automation, Feeder Automation, Transmission systems: EMS, FACTS and HVDC, Wide area monitoring,

**Protection and Control, Distribution Systems:** DMS, Volt/Var control, Fault Detection, Isolation and service restoration, Outage management, High-Efficiency Distribution Transformers, Phase Shifting Transformers, Plug in Hybrid Electric Vehicles (PHEV).

### **Module III: Smart Meters and Advanced Metering Infrastructure:**

Introduction to Smart Meters, Advanced Metering infrastructure (AMI) drivers and benefits, AMI protocols, standards and initiatives, AMI needs in the smart grid, Phasor Measurement Unit (PMU), Intelligent Electronic Devices (IED) & their application for monitoring & protection.

### **Module IV: Power Quality Management in Smart Grid:**

Power Quality & EMC in Smart Grid, Power Quality issues of Grid connected Renewable Energy Sources, Power Quality Conditioners for Smart Grid, Web based Power Quality monitoring, Power Quality Audit.

**Examination Scheme:**

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;  
Att: Attendance.

**Text and References:****Text:**

- Vehbi C. Güngör, Dilan Sahin, Taskin Kocak, Salih Ergüt, Concettina Buccella, Carlo Cecati, and Gerhard P. Hancke: Smart Grid Technologies- Communication Technologies and Standards IEEE Transactions on Industrial Informatics, Vol. 7, No.4, November 2011.
- Xi Fang, Satyajayant Misra, Guoliang Xue, and Dejun Yang: Smart Grid – The New and Improved Power Grid- A Survey, IEEE Transaction on Smart Grids, 2011

**Reference:**

- Stuart Borlase: Smart Grid-Infrastructure, Technology and Solutions, CRC Press 2012