**Bachelor of Technology**
**(Mechanical & Automation Engineering)**

**Programme Code: BTM**

**Duration – 4 Years Full Time**

**Programme Structure**
**And**
**Curriculum & Scheme of Examination**

**2017-21**

# AMITY UNIVERSITY
R A J A S T H A N

# PROGRAMME STRUCUTRE

**FIRST SEMESTER**

| Code | Title | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| 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 | Elements of Mechanical Engineering | CC | 2 | 1 | - | 3 |
| BCS 105 | Introduction to Computers & Programming in C | CC | 2 | 1 | - | 3 |
| BEE 106 | Electrical Science | CC | 2 | 1 | - | 3 |
| AP 122 | Applied Physics-I – Fields & Waves Lab | CC | - | - | 2 | 1 |
| AC 123 | Applied Chemistry Lab | CC | - | - | 2 | 1 |
| BME 124 | Elements of Mechanical Engineering Lab | CC | - | - | 2 | 1 |
| BCS 125 | Programming in C Lab | CC | - | - | 2 | 1 |
| BEE 126 | Electrical Science Lab | CC | - | - | 2 | 1 |
| **Value Added** | | | | | | |
| BCS 101 | English | VA | 1 | - | - | 1 |
| BSS 104 | Understanding Self for Effectiveness | VA | 1 | - | - | 1 |
| | Foreign Language - I | VA | 2 | - | - | 2 |
| FLT 101 | French | | | | | |
| FLG 101 | German | | | | | |
| FLS 101 | Spanish | | | | | |
| FLC 101 | Chinese | | | | | |
| **TOTAL** | | | | | | **28** |

**SECOND SEMESTER**

| Code | Title | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| **Core Courses** | | | | | | |
| 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 |
| 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 |
| **Open Elective** | | | | | | |
| | Open Elective-1 | OE | 3 | - | - | 3 |
| **Value Added** | | | | | | |
| BCS 201 | English | VA | 1 | - | - | 1 |
| BSS 204 | Behavioural Science – II | VA | 1 | - | - | 1 |
| <br>FLT 201<br>FLG 201<br>FLS 201<br>FLC 201 | Foreign Language – II<br>French<br>German<br>Spanish<br>Chinese | VA | 2 | - | - | 2 |
| EVS 001 | Environmental Studies | VA | 3 | 1 | - | 4 |
| **TOTAL** | | | | | | **29** |

**THIRD SEMESTER**

| Code | Title | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| BTM 301 | Numerical Analysis & Programming | CC | 3 | - | - | 3 |
| BTM 302 | Thermodynamics | CC | 2 | 1 | - | 3 |
| BTM 303 | Mechanics of Solids | CC | 2 | 1 | - | 3 |
| BTM 304 | Mechanics of Fluids | CC | 2 | 1 | - | 3 |
| BTM 305 | Electronics | CC | 2 | - | - | 2 |
| BTM 320 | Machine Drawing Lab | CC | - | - | 2 | 1 |
| BTM 321 | Numerical Analysis & Programming Lab | CC | - | - | 2 | 1 |
| BTM 322 | Thermodynamics Lab | CC | - | - | 2 | 1 |
| BTM 323 | Mechanics of Solids Lab | CC | - | - | 2 | 1 |
| BTM 324 | Mechanics of Fluids Lab | CC | - | - | 2 | 1 |
| BTM 325 | Electronics Lab | CC | - | - | 2 | 1 |
| **DE Electives 1: Student has to select 1 course from the list of following DE electives** | | | | | | |
| BTM 306 | Material Science & Metallurgy | DE | 2 | - | - | 2 |
| BTM 307 | Compressible flow | DE | 2 | - | - | |
| Open Elective | | | | | | |
| | Open Elective-2 | OE | 3 | - | - | 3 |
| **Value Added** | | | | | | |
| BCS 301 | Communication Skills – I | VA | 1 | - | - | 1 |

| | | | | | | |
|---|---|---|---|---|---|---|
| BSS 301 | Behavioral Science – III | VA | 1 | - | - | 1 |
| FLF 301<br>FLG 301<br>FLS 301<br>FLC 301 | Foreign Language - III<br>French<br>German<br>Spanish<br>Chinese | VA | 2 | - | - | 2 |
| **TOTAL** | | | | | | **29** |

**FOURTH SEMESTER**

| Code | Title | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| BTM 401 | Kinematics of Machines | CC | 3 | - | - | 3 |
| BTM 402 | Computer Networks | CC | 3 | - | - | 3 |
| BTM 403 | Heat & Mass Transfer | CC | 2 | 1 | - | 3 |
| BTM 404 | Manufacturing Machines | CC | 3 | - | - | 3 |
| BTM 405 | Principles of Computer Graphics | CC | 2 | - | - | 2 |
| BTM 421 | Kinematics of Machines Lab | CC | | | 2 | 1 |
| BTM 422 | Manufacturing Machines Lab | CC | | | 2 | 1 |
| BTM 423 | Principles of Computer Graphics Lab | CC | | | 2 | 1 |
| **DE Electives 2: Student has to select 1 course from the list of following DE electives** | | | | | | |
| BTM 406 | Metrology | DE | 2 | - | - | 3 |
| BTM 424 | Metrology Lab | DE | - | - | 2 | |
| BTM 407 | Quality control & Quality Assurance | DE | 3 | - | - | |
| **Open Elective** | | | | | | |
| | Open Elective-3 | OE | 3 | - | - | 3 |
| **Value Added** | | | | | | |
| BCS 401 | Communication Skills - II | VA | 1 | - | - | 1 |
| BSS 401 | Behavioural Science – IV | VA | 1 | - | - | 1 |
| FLF 401<br>FLG 401<br>FLS 401<br>FLC 401 | Foreign Language - IV<br>French<br>German<br>Spanish<br>Chinese | VA | 2 | - | - | 2 |
| **TOTAL** | | | | | | **27** |

**INDUSTRIAL TRAINING – I: 6-8 Weeks**

**FIFTH SEMESTER**

| Code | Title | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| BTM 501 | Machine Design – I | CC | 3 | - | - | 3 |
| BTM 502 | Relational Database Management System | CC | 2 | - | - | 2 |
| BTM 503 | Measurements & Controls | CC | 2 | - | - | 2 |
| BTM 504 | Dynamics of Machines | CC | 2 | 1 | - | 3 |
| BTM 521 | Machine Design – I Lab | CC | | | 2 | 1 |
| BTM 522 | Relational Database Management System Lab | CC | | | 2 | 1 |
| BTM 523 | Measurements & Controls Lab | CC | | | 2 | 1 |
| BTM 524 | Programming Lab - II (MAT Lab) | CC | - | - | 2 | 1 |
| BTM 525 | Computer Aided Drafting & Design Lab | CC | - | - | 2 | 1 |
| BTM 550 | Practical Training (Evaluation) | CC | - | - | - | 6 |
| **DE Electives 3: Student has to select 1 course from the list of following DE electives** | | | | | | |
| BTM 505 | Theory of Metal Forming | DE | 2 | - | - | 2 |
| BTM 506 | Management of Manufacturing Systems | DE | 2 | - | - | |
| **Open Elective** | | | | | | |
| | Open Elective-4 | OE | 3 | - | - | 3 |
| **Value Added** | | | | | | |
| BCS 501 | Communication Skills - III | VA | 1 | - | - | 1 |
| BSS 501 | Behavioural Science –V | VA | 1 | - | - | 1 |
| | **Foreign Language – V** | VA | 2 | - | - | 2 |
| FLF 501 | French | | | | | |
| FLG 501 | German | | | | | |
| FLS 501 | Spanish | | | | | |
| FLC 501 | Chinese | | | | | |
| **TOTAL** | | | | | | **30** |

**SIXTH SEMESTER**

| Code | Title | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| BTM 601 | Machine Design – II | CC | 3 | 0 | - | 3 |
| BTM 602 | Microprocessor System | CC | 2 | - | - | 2 |
| BTM 603 | Fluid Power System | CC | 2 | 1 | - | 3 |
| BTM 604 | Metal Cutting & Tool Design | CC | 3 | - | - | 3 |
| BTM 605 | Internal Combustion Engines | CC | 3 | - | - | 3 |
| BTM 621 | Machine Design – II Lab | CC | - | - | 2 | 1 |
| BTM 622 | Microprocessor System Lab | CC | - | - | 2 | 1 |
| BTM 623 | Fluid Power System Lab | CC | - | - | 2 | 1 |
| BTM 624 | Metal Cutting & Tool Design Lab | CC | - | - | 2 | 1 |
| **DE Electives 4: Student has to select 1 course from the list of following DE electives** | | | | | | |
| BTM 606 | Power Plant Practices | DE | 3 | - | - | 3 |
| BTM 607 | Industrial Automation & Control | DE | 3 | - | - | |
| **Open Elective** | | | | | | |
| | Open Elective-5 | OE | 3 | - | - | 3 |
| **Value Added** | | | | | | |
| BCS 601 | Communication Skill – IV | VA | 1 | - | - | 1 |
| BSS 601 | Behavioural Science – VI | VA | 1 | - | - | 1 |
| | **Foreign Language - VI** | VA | 2 | - | - | 2 |
| FLF 601 | French | | | | | |
| FLG 601 | German | | | | | |
| FLS 601 | Spanish | | | | | |
| FLC 601 | Chinese | | | | | |
| **TOTAL** | | | | | | **28** |

**INDUSTRIAL TRAINING – II: 6-8 Weeks**

**SEVENTH SEMESTER**

| Code | Title | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| BTM 701 | Operations Research | CC | 3 | - | - | 3 |
| BTM 702 | Mechatronics | CC | 3 | - | - | 3 |
| BTM 703 | Electrical Machines | CC | 2 | - | - | 2 |
| BTM 721 | Operations Research Lab | CC | - | - | 2 | 1 |
| BTM 722 | Mechatronics Lab | CC | - | - | 2 | 1 |
| BTM 723 | Electrical Machines Lab | CC | - | - | 2 | 1 |

| | | | | | | |
|---|---|---|---|---|---|---|
| BTM 750 | Industrial Training (Evaluation) | CC | - | - | - | 6 |
| BTM 760 | Seminar | CC | - | - | - | 3 |
| **DE Electives 5: Student has to select 1 course from the list of following DE electives** | | | | | | |
| BTM 704 | Automotive Engineering | DE | 3 | - | - | 4 |
| BTM 724 | Automotive Engineering Lab | DE | - | - | 2 | |
| BTM 705 | Robotics | DE | 3 | - | - | |
| BTM 725 | Robotics Lab | DE | - | - | 2 | |
| **Open Elective** | | | | | | |
| | Open Elective-6 | OE | 3 | | | 3 |
| **Value Added** | | | | | | |
| BCS 701 | Communication Skills – V | VA | 1 | - | - | 1 |
| BSS 701 | Behavioural Science – VII | VA | 1 | - | - | 1 |
| | **Foreign Language – VII** | VA | 2 | - | - | 2 |
| FLF 701 | French | | | | | |
| FLG 701 | German | | | | | |
| FLS 701 | Spanish | | | | | |
| FLC 701 | Chinese | | | | | |
| **TOTAL** | | | | | | **31** |

**EIGHTH SEMESTER**

| Code | Title | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| **Core Courses** | | | | | | |
| BTM 801 | Refrigeration & Air-conditioning | CC | 3 | - | - | 3 |
| BTM 802 | Computer Aided Manufacturing | CC | 3 | - | - | 3 |
| BTM 821 | Refrigeration & Air-conditioning Lab | CC | - | - | 2 | 1 |
| BTM 822 | Computer Aided Manufacturing Lab | CC | - | - | 2 | 1 |
| BTM 860 | Project | CC | - | - | - | 12 |
| **DE Electives 6: Student has to select 1 course from the list of following DE electives** | | | | | | |
| BTM 803 | Gear Technology | DE | 2 | - | - | 2 |
| BTM 804 | Mathematical Modeling | DE | 2 | - | - | |
| BTM 805 | Advanced manufacturing machines | DE | 2 | - | - | |
| **TOTAL** | | | | | | **22** |

# APPLIED MATHEMATICS – I

## Course Code: AM 101 L:3 T:1 C:4

**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 $n^{th}$ order, Solution of homogeneous equations, Operator method, Method of undetermined coefficients, Solution of simple simultaneous ODE.

## Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

### 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 L:2 T:1 C:3

**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 ultrasonicwaves.

### Module II: Wave Nature of Light

Interference: Coherent Sources, Conditions of interference, Interference due to division of wavefront, Fresnelsbiprism 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 polarizedlight, 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, Amperes' Law, Displacement current, Faradays Law, Maxwell equations in freespace & isotropic media (Integral form & differential form), EM wave propagation in free space, Poynting vector.

## Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

### Text & References:


- Waves & oscillation, A. P. French
- Physics of waves, W. C. Elmore & M. A. Heald
- Introduction to Electrodynamics, D. J. Griffith
- Electrodynamics, Gupta, Kumar & Singh
- Optics, A. K. Ghatak
- Engineering Physics, Satya Prakash

# APPLIED CHEMISTRY

## Course Code: AC 103 L:02 T:01 C: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 embrittlement & corrosion : causes & prevention,
Carbonate & phosphate conditioning, colloidal conditioning & calgon treatmentWater 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 IV: 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; FlashPoint; Fire Point; Drop Point; Cloud Point; Pour Point.
Selection of Lubricants.

### Module V: Corrosion

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

Corrosion control.

# Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| **Weightage (%)** | 10 | 5 | 15 | 70 |

## 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

# ELEMENTS OF MECHANICAL ENGINEERING

## Course Code: BME 104 L:02,T:01,C: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: Materials:** Classification of engineering material, composition of cast iron and carbon steels on iron- carbon diagram and their mechanical properties; Alloy steel and their applications; stress-strain diagram, Hooks law and modulus of elasticity. Tensile, shear, hardness and fatigue testing of materials.

**Module II: Measurement:**

Temperature, pressure, velocity, flow, strain, force and torque measurement, measurement by Vernier caliper, micrometer, dial gauges, slip gauges, sine-bar and combination set;

**Module III: Mechanical Machines:**

Introduction to Lathe, Drilling, Milling and Shaping machines, NC machine, CNC machine and DNC machine..

**Module IV: Fluids:** Fluid properties, pressure, density and viscosity; pressure variation with depth, static and kinetic energy; Euler and Bernouli's equation for incompressible fluids, viscous and turbulent flow, working principle of pumps, compressors and turbines,

**Module V: Thermodynamics:**

First and second law of thermodynamics; Formation of steam, steam properties, classification and working of boilers, efficiency & performance analysis, natural and induced draught, Refrigeration, vapor absorption & compression cycles, coefficient of perform (COP), Refrigerants

**Module VI: I. C. Engines**:

Construction, Nomenclature; working of two stroke & four stroke petrol & diesel IC engines, Carnot cycle and ideal efficiency; Otto and diesel cycles;

**Module VII: Introduction to Fabrication Processes**

Casting Process, Welding & allied process, Forging process.

## Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

### Text & References:


- S Trymbaka Murthy (2011) Elements of Mechanical Engineering- I K International Publishing House Pvt. Ltd;
- R.K. Rajput (, 2005) Elements of Mechanical Engineering- Firewall Media
- P.K. Nag,( 2005) Engineering thermodynamics- Tata McGraw-Hill Education,
- Automation, Productions systems, and computer Integrated manufacturing by Mikell P. Groover

# INTRODUCTION TO COMPUTERS AND PROGRAMMING IN C

## Course Code: BCS 105 L:02 T:01 C: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 andoutput 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.), predefinedprocessor, 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. Passingarrays 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.

## Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

**Text & References:**

**Text:**

- "ANSI C" by E Balagurusamy
- Yashwant Kanetkar, "Let us C", BPB Publications, 2nd Edition, 2001.
- Herbert Schildt, "C: The complete reference", Osbourne McGraw Hill, 4th 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, 2nd Edition.
- J. B Dixit, "Fundamentals of Computers and Programming in 'C'.
- P.K. Sinha and Priti Sinha, "Computer Fundamentals", BPB publication.

# ELECTRICAL SCIENCE

## Course Code: BEE 106 L:02,T:01,C: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, susceptanceResonance: 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.

## Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

### Text & References:


- R.J. Smith, R.C. Dorf: Circuits, devices and Systems
- B.L. Thareja: Electrical Technology : Part -1 & 2
- V. Deltoro: Electrical Engineering fundamentals
- Schaum's Series: Electrical Circuits

# APPLIED PHYSICS LAB - I

## Course Code: AP 122 P:02,C: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 & Griffth'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 aixs 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 | 10 | 10 | 5 | 35 | 35 |

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

# APPLIED CHEMISTRY LAB

## Course Code: AC 123 P:02,C:01

**Course Contents:**

## List of Experiments:

**(Any 10 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. To determine the surface tension of a given liquid by drop number method.
7. To determine the composition of a liquid mixture A and B (acetic acid and water) by surface tension method.
8. To prepare and describe a titration curve for phosphoric acid – sodium hydroxide titration using pH-meter.
9. To find the cell constant of conductivity cell.
10. Determine the strength of hydrochloric acid solution by titrating it against standard sodium hydroxide solution conduct metrically
11. Determination of Dissolved oxygen in the given water sample.
12. To determine the total residual chlorine in water.
13. 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.
14. Determination of viscosity of given oil by means of Redwood viscometer I.
15. To determine flash point and fire point of an oil by Pensky Martin's Apparatus
16. To determine the Iodine value of the oil.

## Examination Scheme:

| IA | | | | EE | |
|---|---|---|---|---|---|
| **A** | **PR** | **LR** | **V** | **PR** | **V** |
| 5 | 10 | 10 | 5 | 35 | 35 |

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

# ELEMENTS OF MECHANICAL ENGINEERING LAB

## Course Code: BME 124 P:02,C:01

### Course Contents:

- Tensile testing of standard mild steel specimen.
- To verify Bernoulli's theorem.
- Flow measurements by venturi and orifice meters.
- Linear and angular measurement using, Vernier; Micrometer, slip gauge, dial gauge and sine-bar.
- Study of different types of boilers and mountings.
- Study of 4 – Stroke Petrol and Diesel Engines
- Study of 2 – Stroke Petrol and Diesel Engines
- To find COP of a Vapour Compression Refrigeration system
- To perform various operations on Lathe and Study of Lathe.

- **Welding:**

  Introduction of welding processes, classification, gas welding, arc welding, resistance welding.

- **Sheet metal working:**

  Introduction to sheet metal shop, Shearing, trimming, blanking, piercing, shaving, notching, stretchforming, nibbling coining, embossing and drawing.

- **Casting**:

  Introduction of casting, pattern, mould making procedures, sand mould casting, casting defects,allowances of pattern.

- **Forging:**

  Forging-introduction, upsetting & drawing out, drop forging, press forging & m/c forging

- Carpentry shop

## Examination Scheme:

| IA | | | | EE | |
|---|---|---|---|---|---|
| **A** | **PR** | **LR** | **V** | **PR** | **V** |
| 5 | 10 | 10 | 5 | 35 | 35 |

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

# PROGRAMMING IN C LAB

## Course Code: BCS 125 P:02,C:01

**Software Required:** Turbo C

## Course Contents:

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

## Examination Scheme:

| IA | | | | EE | |
|---|---|---|---|---|---|
| **A** | **PR** | **LR** | **V** | **PR** | **V** |
| 5 | 10 | 10 | 5 | 35 | 35 |

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

# ELECTRICAL SCIENCE LAB

## Course Code: BEE 126 P:02, C: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 RTh, VTh, RN, IN 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 | 10 | 10 | 5 | 35 | 35 |

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

# ENGLISH

## Course Code: BCS 101 C: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
SpeechTenses

### Module III: Essentials of Grammar - II

Sentence Structure
Subject -Verb
agreementPunctuation

### Module IV: Communication

The process and importance
Principles & benefits of Effective Communication

### Module V: Spoken English Communication

Speech Drills
Pronunciation and
accentStress and
Intonation

**Module VI: Communication Skills-I**

Developing listening skills
Developing speaking skills

### Module VII: Communication Skills-II

Developing Reading
SkillsDeveloping
writing Skills

### Module VIII: Written English communication

Progression of
Thought/ideasStructure of
Paragraph Structure of
Essays

### Module IX: Short Stories

Of Studies, by Francis Bacon
Dream Children, by Charles
Lamb
The Necklace, by Guy de
MaupassantA 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 |
| TagorePsalm of Life | H.W. Longfellow |

## Examination Scheme:

| Components | A | CT | HA | EE |
|---|---|---|---|---|
| Weightage (%) | 05 | 15 | 10 | 70 |

### Text & References:


- Madhulika Jha, Echoes, Orient Long Man
- Ramon & Prakash, Business Communication, Oxford.
- Sydney Greenbaum Oxford English Grammar, Oxford.
- Successful Communications, Malra Treece (Allyn and Bacon)
- Effective Technical Communication, M. Ashraf Rizvi.


*** 30 hrs Programme to be continued for Full year**

# BEHAVIOURAL SCIENCE - I
# (UNDERSTANDING SELF FOR EFFECTIVENESS)

## Course Code: BSS 104 C: 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 identitySelf 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 RelevancePositive 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 trainingExit 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:


- Organizational Behaviour, Davis, K.
- Hoover, Judhith 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

- 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 - I

## Course Code: FLF 101 C: 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 Object if 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/disjoint- 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 - I

## Course Code: FLG 101 C: 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 opportunitiesavailable in Germany

## Course Contents:

### Module I: Introduction

Self introduction: heissen, kommen, wohnwn, 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!, (estut 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 Dipthongs

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

To make the students acquainted with the most widely used country names, their nationalitie and the languagespoken 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 totest 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:

- 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 – I

## Course Code: FLS 101 C: 02

**Course Objective:**
To enable students acquire the relevance of the Spanish language in today's global context, how to greet eachother. 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 intoday'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 numbersand 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:

- Español, En Directo I A
- Español Sin Fronteras

# JAPANESE - I

## Course Code: FLJ 101 C: 02

**Course Objective:**
To enable the students to learn the basic rules of grammar and Japanese language to be used in daily life thatwill later help them to strengthen their language.

## Course Contents:

**Module I: Salutations**
Self introduction, Asking and answering to small general questions

**Module II: Cardinal Numbers**
Numerals, Expression of time and period, Days, months

**Module III: Tenses**
Present Tense, Future tense

**Module IV: Prepositions**
Particles, possession, Forming questions

**Module V: Demonstratives**
Interrogatives, pronoun and adjectives

**Module VI: Description**
Common phrases, Adjectives to describe a person

**Module VII: Schedule**
Time Table, everyday routine etc.

**Module VIII: Outings**
Going to see a movie, party, friend's house etc.

## Learning Outcome

- Students can speak the basic language describing above mentioned topics

## Methods of Private study /Self help

- Handouts, audio-aids, and self-do assignments and role-plays will support classroom teaching

## 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:**

- Teach yourself Japanese

**References:**

- Shin Nihongo no kiso 1

# CHINESE – I

## Course Code: FLC 101 C: 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 practicalskills 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" inMandarin Chinese.)
Practicing of Tones as it is a tonal language.Changes in 3rd 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 L:03 T:01 C: 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, Caley- 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 conditioinal 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 Functionsand their Inverses.
Functions of a Complex Variables, Limits, Continuity and Derivatives, Analytic Function, Cauchy-RiemannEquations (without proof), Harmonic Function, Harmonic Conjugates, Conformal Mapping, Bilinear Transformations, Complex Line Integral, Cauchy Integral Theorem, Cauchy Integral Formula, Derivative ofAnalytic Function, Power Series, Taylor Series, Laurent Series, Zeroes and Singularities, Residues, Residue Theorem, Evaluation of Real Integrals of the Form $\int_0^{2\pi} F(\cos\theta, \sin\theta)\, d\theta$ and $\int_{-\infty}^{\infty} f(x)\, dx$.

**Module IV: Statistics and Probability**

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

## Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

### Text & References:


- Engineering Mathematics by Erwin Kreyszig.
- Engineering Mathematics by R.K. Jain and S.R.K. Iyengar.
- Higher Engineering Mathematics by H.K. Dass.
- 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 L:02 T:01 C: 03

**Course Objective:**

Aim of this course is to introduce the students to fundamentals of graduate level physics which form the basis ofall 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, Zeceman effect (normal & anomalous), Paschen-Bach effect, X-ray spectra and energy level diagram, Moseleys 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**

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

## Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

**Text & References:**


- Concept of Modern Physics, A. Beiser
- Applied Physics II, Agarawal & Goel
- Solid State Physics, S. O. Pallai
- Physics of Atom, Wehr & Richards

# OBJECT ORIENTED PROGRAMMING USING C++

**Course Code: BCS 203 L:02 T:01 C: 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 approacheslike 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 hiérarchies, 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.

## Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

### 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:**


- Parasons, "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 L:02 T:01 C: 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, Ratio of tension, centrifugal tension, condition of maximum power transmission., Initial tension

**Module III: Distributed Force**

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

**Module IV: Stress Strain Analysis**

Simple stress and strain: introduction, normal shear, and stresses-strain diagrams for ductile and brittle materials. Elastic constants, Strain Energy, Properties of material-strength, elasticity, stiffness, malleability, ductility, brittleness, hardness and plasticity etc; Concept of stress and strain.

## Examination Scheme:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

**MTE- Mid-term Examination**

## Text & References:


- D.S. Kumar (2009) Engineering Mechanics – S. K. Kataria & Sons
- Dr. R.K. Bansal (2008) Engineering Mechanics – Laxmi Publication
- J. L. Meriam, L. G. Kraige (2012) Engineering Mechanic-Don Fowley
- Timoshenko, Engineering Mechanics, McGraw Hill
- R. S. Khurmi, Engineering Mechanics, S. Chand Publication
- H. Shames & G. K. M. Rao, Engineering Mechanics, Pearson Education, 2006

# ENGINEERING GRAPHICS

**Course Code: BME 205 L:01 C: 01**

Course Contents:

## Module 1: Scales & Curves

Representative factor, Plain Scales, Diagonal Scales, Comperative Scales and Scale of chords. Construction of ellipse, Parabola, Hyperbola, Cycloid, Epicycloid, Hypocycloid, Involutes 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 | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

**MTE- Mid-term Examination**

## Text & References:


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

# APPLIED PHYSICS LAB - II

## Course Code: AP 222 P:02 C: 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 tunning 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 Keter'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 | 10 | 10 | 5 | 35 | 35 |

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

# OBJECT ORIENTED PROGRAMMING USING C++ LAB

## Course Code: BCS 223 P:02 C: 01

**Software Required:** Turbo C++

## Course Contents:

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

## Examination Scheme:

| IA | | | | EE | |
|---|---|---|---|---|---|
| **A** | **PR** | **LR** | **V** | **PR** | **V** |
| 5 | 10 | 10 | 5 | 35 | 35 |

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

# ENGINEERING MECHANICS LAB

## Course Code: BME 224 P:02 C: 01

Course Contents:

- To verify the law of Force Polygon.
- To verify the law of Moments using Parallel Force apparatus. (Simply supported type)
- To determine the co-efficient of friction between wood and various surface (like Leather, Wood, Aluminum) on an inclined plane.
- To find the forces in the members of Jib Crane.
- To determine the mechanical advantage, Velocity ratio and efficiency of a screw jack.
- To determine the mechanical advantage, Velocity ratio and Mechanical efficiency of the Wheel and Axle
- To determine the MA, VR, ∟ of Worm Wheel (2-start)
- Verification of force transmitted by members of given truss.
- To verify the law of moments using Bell crank lever
- 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 | 10 | 10 | 5 | 35 | 35 |

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

# ENGINEERING GRAPHICS LAB

## Course Code: BME 225 P:02 C: 01

**List of Experiments:**

- Sketching and drawing of scale & Curve
- Sketching and drawing of Cycloidal Curve
- Sketching and drawing of Involute & Spirals
- Sketching and drawing of points & line
- Sketching and drawing of projection of planes
- Sketching and drawing of projection of solids
- Sketching and drawing of intersection of surfaces
- Sketching and drawing of development of surfaces
- Sketching and drawing of orthographic and isometric projection

## Examination Scheme:

| IA | | | | EE | |
|---|---|---|---|---|---|
| **A** | **PR** | **LR** | **V** | **PR** | **V** |
| 5 | 10 | 10 | 5 | 35 | 35 |

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

## Text & References:


- M.B. Shah & B.C. Rana, Engineering Drawing, Pearson Education, 2007
- PS Gill, Engineering Drawing, Kataria Publication
- ND Bhatt, Engineering Drawing, Charotar publications
- N Sidheshwar, Engineering Drawing, Tata McGraw Hill
- CL Tanta, Mechanical Drawing, “Dhanpat Rai”

# ENGLISH

## Course Code: BCS 201 C: 03

**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
SpeechTenses

### Module III: Essentials of Grammar - II

Sentence Structure
Subject -Verb
agreementPunctuation

### Module IV: Communication

The process and importance
Principles & benefits of Effective Communication

### Module V: Spoken English Communication

Speech Drills
Pronunciation and
accentStress and
Intonation

### Module VI: Communication Skills - I

Developing listening skills
Developing speaking skills

### Module VII: Communication Skills - II

Developing Reading
SkillsDeveloping
writing Skills

### Module VIII: Written English communication

Progression of
Thought/ideasStructure of
Paragraph Structure of
Essays

### Module IX: Short Stories

Of Studies, by Francis Bacon
Dream Children, by Charles
Lamb
The Necklace, by Guy de
MaupassantA 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 |
| TagorePsalm of Life | H.W. Longfellow |

## Examination Scheme:

| Components | A | CT | HA | EE |
|---|---|---|---|---|
| Weightage (%) | 05 | 15 | 10 | 70 |

## Text & References:


- Madhulika Jha, Echoes, Orient Long Man.
- Ramon & Prakash, Business Communication, Oxford.
- 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 C: 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
ReasoningMemory and Critical
Thinking Emotions and Critical
Thinking Thinking skills

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

Perceptio
n
Expressio
nEmotion
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:
Perceptio
n
Expressio
nEmotion
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
trainingExit 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 |

**FRENCH - II**

## Course Code: FLF 201 C: 02

**Course Objective:**
To enable the students to overcome the fear of speaking a foreign language and take position as a foreignerspeaking French.
To make them learn the basic rules of French Grammar.

## Course Contents:

**Module A: pp.38 – 47: Unité 3: Object if 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 dialoguePropositions- 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 – II

## Course Code: FLG 201 C: 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 opportunitiesavailable 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 suchTreatment of such verbs with separable prefixes

**Module IV: Reading and comprehension**

Reading and deciphering railway schedules/school time
tableUsage 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 propositions 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 – II

## Course Code: FLS 201 C: 02

**Course Objective:**
To enable students acquire more vocabulary, grammar, Verbal Phrases to understand simple texts and startdescribing 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:

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

C – Project + Presentation
I – Interaction/Conversation Practice

## Text & References:

- Español, En Directo I A
- Español Sin Fronteras

CHINESE – II

**Course Code: FLC 201 C: 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, xiaFurniture – 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

# NUMERICAL ANALYSIS AND PROGRAMMING

**Course Code: BTM 301 L:03 C: 03**

## Course Objective:

This course deals with the techniques of numerical analysis, which gives the solution to applied problem when ordinary analytical method fails. Emphasis is given on computer programming also so that the given techniques can be used in design of engineering and scientific problems.

## Course Contents:

**Module I: Solution of Algebraic and Transcendental Equation**
Error in a series approximation, Bisection Method, Iteration method, Method of false position, Newton-Raphson method
**Solutions of Simultaneous equation**
Gauss elimination method, Jacobi iteration method, Gauss Seidal method

**Module II: Interpolation**
Finite Differences, Difference tables
Polynomial Interpolation**:** Newton's forward and backward formula
Central Difference Formulae: Gauss forward and backward formula.
Interpolation with unequal intervals: Lagrange's Interpolation, Newton Divided difference formula

**Module III: Numerical Integration and Differentiation**
Introduction, Numerical differentiation Numerical Integration: Trapezoidal rule, Simpson's 1/3 and 3/8 rules.

**Module IV: Solution of differential Equations**
Euler's Method, Runga-Kutta Methods.

**Module V: Statistical Computation**
Frequency chart, Curve fitting by method of least squares, fitting of straight lines, polynomials, exponential curves etc, Data fitting with Cubic splines.

## Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

## Text & References:

***Text:***

- Rajaraman V, "Computer Oriented Numerical Methods", Pearson Education
- Gerald & Whealey, "Applied Numerical Analyses", AW
- Jain, Iyengar and Jain, "Numerical Methods for Scientific and Engineering Computations", New Age Int.
- Grewal B S, "Numerical methods in Engineering and Science", Khanna Publishers, Delhi

***References:***

- T Veerarajan, T Ramachandran, "Theory and Problems in Numerical Methods, TMH
- Pradip Niyogi, "Numerical Analysis and Algorithms", TMH

# THERMODYNAMICS

**Course Code: BTM 302** **L:2,T:1, C:03**

## Course Objective:

Objective of this course is to impart in depth understanding of the principles of thermodynamics and heat transfer. This course also helps students understand the application of basic fluid mechanics, thermodynamic, and heat transfer principles and techniques, including the use of empirical data, to the analysis of representative fluid and thermal energy components and systems encountered in the practice of electrical, electronic, industrial, and related disciplines of engineering.

## Course Contents:

**Module I: Basic concepts of thermodynamics**

Thermodynamic system, intensive and extensive properties, cyclic process, Zeroth Law of Thermodynamics, Work and heat, Flow work,First law of thermodynamics, Mechanical equivalent of heat, internal energy, Analysis of non-flow system, flow process and control volume, steady flow, energy equation, flow processes

**Module II: Second Law of Thermodynamics and Entropy**

Heat Engine, heat pump, Kelvin Planck and Clausius statement of Second Law of Thermodynamics, Perpetual motion machine, Reversible cycle- Carnot Cycle, Clausius inequality, entropy, Principle of entropy increase, concepts of availability, irreversibility,Carnot theorem, Max-well-relation,

**Module III: Air-Standard Cycles**

Carnot cycle, Otto cycle, Diesel cycle, Dual cycle, Stirling cycle, Erricsson cycle, Brayton cycle; Reversed Carnot cycle.

**Module IV: Steam**

Use of steam tables, wet steam, superheat steam, different processes of vapour, Mollier Diagram,steam Nozzle, calorimeter.

**Module V : Compressors**

Introduction,Types of compressors, Isothermal efficiency, adiabatic efficiency, clearance volume, volumetric efficiency, and multi-stage compression with intercooling.

## Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

## Text & References:

***Text:***

- P.K. Nag, “Engineering Thermodynamics”, Tata McGraw Hill
- Incropera, “Engineering Thermodynamics”, John Willy

***References:***

- Engel, T. and Reid, P., Thermodynamics, Statistical Thermodynamics & Kinetics, Pearson Education, 2006
- Cengel & Boles, “Thermodynamics”, Tata McGraw Hill.
- Sonntag/Vanhylene, Fundamentals of Thermodynamics, Wiley
- Rahul Gupta, Engineering Thermodynamics, Asian Books P. Ltd.
- Y.V.C. Rao, Engineering Thermodynamics, Khanna Publications
- Onkar Singh, Applied Thermodynamics, New Age Publications.
- Dhomkundwar Kothandaraman, “A Course in Thermal Engineering”, Dhanpat Rai Publications

# MECHANICS OF SOLIDS

**Course Code: BTM 303 L:02,T:01,C:03**

## Course Objective:

The objective of this course is to make the students understand the concept of stress and strain in different types of structure/machine under different loading conditions. The course also covers the simple and compound stresses due to forces, stresses and deflection in beams due to bending, torsion in circular section, strain energy, different theories of failure, stress in thin cylinder thick cylinder and spheres due to external and internal pressure.

## Course Contents:

**Module I: Simple stresses and strains:**

Concept of stress and strain; Hooke's law, Young's modulus, Poisson ratio, stress at a point, stress and strains in bars subjected to axial loading. Modulus of elasticity, stress produced in compound bars subject to axial loading. Temperature stress and strain calculations due to applications of axial loads and variation of temperature in single and compound walls.

**Module II: Compound stress and strains:**

The two dimensional system; stress at a point on a plane, principal stresses and principal planes; Mohr's circle of stress. Graphical and Analytical methods for stresses on oblique section of body. Shear force and bending moment diagrams for cantilever, simply supported and overhanging beams.

**Module III: Bending &Shear Stress:**

Theory of bending stresses in beams due to bending, assumptions in the simple bending theory, derivation of formula: its application to beams of rectangular, circular and channel sections, composite beams, Shear stress in symmetric and Unsymmetric sections, bending and shear stresses in composite beams.

**Module IV: Torsion& Spring:**

Derivation of torsion equation and its assumptions. Applications of the equation of the hollow and solid circular shaft torsional rigidity, combined torsion and bending of circular shafts, principal stress and maximum shear stress under combined loading of bending and torsion, analysis of close-coiled-helical springs.

**Module V: Thin cylinders and spheres:**

Derivation of formulae and calculation of hoop stress, longitudinal stress in a cylinder and sphere subjected to internal pressure.

**Module VI: Columns and struts:**

Columns and failure of columns, Euler's formulas; Rankine-Gordon's formula, Johnson's empirical formula for axially loaded columns and their applications.

**Module VII: Slope and deflection:**

Relationship between moment, slope and deflection, Mohr's theorem; Moment area method; method of integration; Macaulay's method,Calculate slope and deflection for the Cantilever beams, Simply supported beams with or without overhanging under concentrated loads, uniformly distributed loads or combination of concentrated and uniformly distributed loads by using these three methods.

## Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weight age (%) | 10 | 5 | 15 | 70 |

## Text & References:


- Jindal U.C., "Strength of Materials", Galgotia Publication, New Delhi, 1998.
- Ryder G.H., "Strength of Materials", Macmillan, Delhi, 2003.
- R.K. Bansal, "Strength of Materials", Laxmi Publication, New Delhi, 2001.
- Sadhu Singh, "Strength of Materials", Khanna Publishers, New Delhi, 2000.
- Timoshenko S.P., "Elements of Strength of Materials", East-West affiliated, New Delhi, 2000.

- Hibbler R.C., “Mechanics of Materials”, Prentice Hall, New Delhi, 1994.
- Popov Eger P., “Engg. Mechanics of solids”, Prentice Hall, New Delhi, 1998.
- Fenner, Roger. T, “Mechanics of Solids”, U.K. B.C. Publication, New Delhi, 1990.
- Srinath L.S. et.al., “Strength of Materials”, McMillan, New Delhi,2001

# FLUID MECHANICS

**Course Code: BTM 304 L:02,T:01,C:03**

## Course Objective:

The objective of Fluid Mechanics subject is that students should understand the, properties of fluids, pressure measurement devices, hydraulic forces on surfaces, bouncy and flotation in fluids, kinematics and static behaviour of fluids, dimension and model analysis, laminar and turbulent flow, flow through pipes and orifices, boundary layer theory.

**Course Contents:**

**Module I: Fluid Properties and Fluid Statics**

Newtonian and Non-Newtonian Fluids; Viscosity; Incompressible and compressible fluids, compressibility. Forces on plane surfaces, forces on curved surfaces, buoyant forces, and stability of floating bodies, metacentre and metacentre height.

**Module II: Kinematics of Fluid Motion**

Steady and unsteady flow; uniform and non-uniform flow; Laminar and turbulent flow; streamline, path line and streak line; continuity equation, irrotational and rotational flow, velocity potential and stream function, vortex flow, free and forced vortex, sink and source flow.

**Module III: Dynamics of Fluid Flow**

Euler's equation of motion and its integration to yield Bernoulli's equation, its practical applications – Pilot tube, Venturi meter; steady flow momentum equation, force exerted on a pipe bend. Measurement of flow using Venturi meter, orifice meter, Pitot tube, measurement of flow in open channels – rectangular, triangular

**Module IV: Dimensional Analysis and Principles of Similarity**

Buckingham $\pi$-Theorem and its applications, Geometric, Kinematics and Dynamic similarity; Dimensionless numbers-Reynolds, Froude, Euler, Mach, Weber Number and their significance.

**Module V: Laminar and Turbulent Flow**

Reynold's experiment, critical velocity, steady laminar flow through a circular tube, flow between parallel plates. Transition from laminar to turbulent flow, courses of turbulence, velocity distribution law near a solid boundary, velocity distribution in rough pipes, Hazen – Williams's formula. Boundary layer theory.

**Module VI: Analysis of Pipe Flow**

Energy losses, minor losses in pipe lines, concept of equivalent length, flow between two reservoirs, and multiple pipe systems – in series and parallel, siphon.

## Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weight age (%) | 10 | 5 | 15 | 70 |

## Text & References:

***Text:***


- R.K. Bansal, "Fluid Mechanics & Hydraulic Machines", Laxmi Publications (P) Ltd., 2002.
- Gupta, S. C., Fluid Mechanics and Hydraulic Machines, Pearson Education, 2007
- D.S. Kumar, "Fluid Mechanics and Fluid Power Engineering", S.K. Kataria & Sons, 2000.


***References:***


- F. M. White, Introduction to Fluid Mechanics, McGraw Hill
- I.H. Shames, "Mechanics of Fluids", Tata McGraw Hill
- Douglas, J. F., Gasiorek, J.M. and Swaffield, J., Fluid Mechanics, Pearson Education, 4/e, 2006
- V.L. Streeter and E.B. Wylie, "Fluid Mechanics", Tata McGraw Hill
- Massey B S, Mechanics of Fluids, Van Nostrand Reinhold Co

# ELECTRONICS

**Course Code: BTM 305 L:02, C:02**

## Course Objective:

Basic knowledge of Electronics is very essential for an engineer, it will help in building up the electronics & automation skills in Mechanical Engineers.

## Course Contents:

**Module I**
Review of Diodes LED, Zener and Tunnel Diode and their characteristics, Applications of diodes-Rectifiers (Half and full wave, Bridge).

**Module II**
BJT-construction and characteristics, Transistor as an amplifier, CE, CB and CC configurations, Introduction to MOSFET.

**Module III**
Coupling, RC coupled Amplifiers, Transformer coupling,, Introduction to feedback-Positive and negative, Introduction to oscillators.

**Module IV**
Introduction to OPAMP characteristics and specifications, OPAMP as adder, subtractor. Integrator, differentiator.

**Module V**
Introduction to digital electronics, logic gates, basic laws and theorems of Boolean algebra, Introduction to Combinational Circuits, Concept of memory cell and introduction to Flip-flops R S, J K, D and T.

## Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| **Weight age (%)** | 10 | 5 | 15 | 70 |

## Text & References:

***Text:***
- Boylestead & Neshlesky, “Electronics Devices & Circuits”. PHI
- Millman & Halkias, “Integrated Electronics”, TMH.

***References:***
- Schilling & Belove “Electronics”.
- R P Jain, Digital Electronics.

## MACHINE DRAWING LAB

**Course Code:** **BTM 320** **P:02, C:01**

**Course Contents:**

**Free-Hand Sketching & Shaft Scale Drawing**

Isometric views from Orthographic Projections of Machine Components. Components like cotter joint, knuckle joint; rivets and riveted joints; couplings; flywheels, pulleys, bush bearings, pedestal and footstep bearings,

Assembly Machine Drawing: Basic concept, plotting technique, assembly and blow up of parts, bill of materials, product data. Assembly of IC engine parts - piston and connecting rods; lath machine parts.

**Examination Scheme:**

| IA | | | | EE | |
|---|---|---|---|---|---|
| **A** | **PR** | **LR** | **V** | **PR** | **V** |
| 5 | 10 | 10 | 5 | 35 | 35 |

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

**Text & References:**


- Pohit, G and Gosh, G., Machine Drawing with Auto CAD, Pearson Education, 2007
- PS Gill, Machine Drawing, S. Chand.
- ND Bhatt, Machine Drawing, Charotar publications
- N Sidheshwar, Machine Drawing , Tata McGraw Hill
- CL Tanta, Mechanical Drawing , “Dhanpat Rai”

## PROGRAMMING LAB – I (NUMERICAL ANALYSIS)

**Course Code:** **BTM 321** **P:02 C:01**

**Software Required:** Turbo C/C++

### Course Contents:

### Assignments will be provided for the following:

1. Analysis of various numerical and statistical techniques

### Examination Scheme:

| IA | | | | EE | |
|---|---|---|---|---|---|
| **A** | **PR** | **LR** | **V** | **PR** | **V** |
| 5 | 10 | 10 | 5 | 35 | 35 |

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

# THERMODYNAMICS LAB

**Course Code: BTM 322 P:2, C:01**

**Course Contents:**

- To study about the different Boilers.
- To study different types of Boilers mountings.
- To study different boilers accessories.
- To study two-stroke and four stroke petrol engine.
- To study two-stroke and four storke diesel engine.
- To study air reciprocation compressor unit.
- To determine the CV of fuel using bomb calorimeter.

**Examination Schedule:**

| IA | | | | EE | |
|---|---|---|---|---|---|
| **A** | **PR** | **LR** | **V** | **PR** | **V** |
| 5 | 10 | 10 | 5 | 35 | 35 |

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

# MECHANICS OF SOLIDS LAB

**Course Code: BTM 323 P:02 C:01**

**Course Contents:**
Experimental work will be based on the paper of Mechanics of Solids.

**List of Experiments:**

**MECHANICS OF SOLIDS LAB**

1. Tensile Test (MS)
2. Double Shear Test (MS)
3. Compression Test (CI)
4. BrinellHardness No.
5. Izod Impact
6. Testing Machine
7. Rockwell Hardness Tester
8. Spring Stiffness (Spring Compression Testing machine)
9. Torsion testing machine

**Examination Scheme:**

| IA | | | | EE | |
|---|---|---|---|---|---|
| **A** | **PR** | **LR** | **V** | **PR** | **V** |
| 5 | 10 | 10 | 5 | 35 | 35 |

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

# FLUID MECHANICS LAB

**Course Code: BTM 324 P:02 C:01**
**Course Contents:**

**FLUID MECHANICS LAB**

1. Verification of Bernoulli's Theorem
2. Experiment using Venturimeter
3. Determination of coefficient of Discharge $C_d$, $C_c$, $C_!$ Using
4. Circular/triangular/rectangular orifice
5. To find major head losses in a pipe line
6. To find minor head losses in a pipe line (sudden expansion/contraction/bend)

## Examination Scheme:

| IA | | | | EE | |
|---|---|---|---|---|---|
| **A** | **PR** | **LR** | **V** | **PR** | **V** |
| 5 | 10 | 10 | 5 | 35 | 35 |

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

# ELECTRONICS LAB

**Course Code: BTM 325** **P:02 C:01**

## Course Contents:

## List of Experiments:

1. To study the VI characteristic of a diode.
2. To study Zener breakdown.
3. To study the characteristics of a CE Transistor.
4. To study the VI characteristic of CB &CC Transistor
5. To study transistor as an a amplifiers
6. To study the Truth Table of Universal gates
7. To study OP Amp. As inverting and non-inverting Amp.
8. To study OP Amp in open loop and close loop.

## Examination Scheme:

| IA | | | | EE | |
|---|---|---|---|---|---|
| **A** | **PR** | **LR** | **V** | **PR** | **V** |
| 5 | 10 | 10 | 5 | 35 | 35 |

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

# MATERIAL SCIENCE AND METALLURGY

**Course Code: BTM 306 L:02 C:02**

**Course Objective:**

Metallurgy and Materials deal with the structure and properties of all materials, which have engineering applications. Metallurgists and Materials Engineers are responsible for designing, producing, examining and testing materials as diverse as metallic engineering alloys, semiconductors and superconductors, ceramics, plastics and composites. This course will help students understand the properties of different types of materials and their applications.

## Course Contents:

**Module I**

Crystal Atoms of Solid: Structure of atom binding in solids metallic, Vander walls, ionic and covalent, Space lattice and crystal system arrangement of atoms in BCC, FCC and HCP crystal. Manufacture of Refractory and Ferrous Metals: Properties uses and selection of acid, basic and natural refractory, metallurgical coke, Properties, types, uses and brief description of the manufacturing processes for iron and steel making.

**Module II**

Plastic deformation of Metals: Point and line defects in crystals, their relation to mechanical properties, deformation of metal by slip and twinning stress strain curves of poly crystalline materials viz. mild steel cast iron and brass yield point phenomenon. Cold and hot working of metals and their effect on mechanical properties, annealing of cold worked metals, principles of re-crystallization and grain growth phenomenon, fracture in metal and alloys, ductile and brittle fracture, fatigue failure

**Module III**

Alloy Formation and Binary Diagram: Phase in metal system solution and inter-metallic compounds. Hume-Rottery's rules, solidification of pure metals and alloy equilibrium diagrams of isomorphous, eutectic peritectic and eutectoid system, non-equilibrium cooling and coring iron, iron carbon equilibrium diagram.

**Module IV**

Principles and applications of heat treatment processes viz. annealing, normalizing hardening, tempering; harden ability & its measurement, surface hardening processes. Defects in heat treatment and their remedies; effects produced by alloying elements on the structures and properties of steel. Distribution of alloying elements (Si, Mn. Ni. Cr. Mo. TL. Al) in steel.

**EXAMINATION SCHEME:**

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

## Text & References:

*Text:*


- V. Raghavan, "Material Science & Engineering", Prentice Hall India Ltd., 2001.
- Shackelford, J.F. and Muralidhara, M.K., Introduction to Material Science for Engineers (6/e), Pearson Education, 2007
- S.K. Hazra Chaudhuri, "Material Science & Processes", Indian Book Publishers, Calcutta, 1983.
- R.B. Gupta, "Material Science Processes", Satya Prakashan, New Delhi, 2000.

***References:***


- Degarmo E. Paul et.al, “Materials & Processes in Manufacture”, Prentice Hall India, New Delhi, 2001.
- Raymond A Higgim., “Engineering Metallurgy Part 1”, Prentice Hall India, New Delhi, 1998.
- L. Krishna Reddi, “Principles of Engineering Metallurgy”, New Age Publication, New Delhi, 2001.
- Buduisky et al, “Engineering Materials & Properties”, Prentice Hall India, New Delhi, 2004.
- Peter Haasten, “Physical Metallurgy”, Cambridge Univ. Press, 1996.

# MARKETING MANAGEMENT

**Course Code: MBA104** **L:2, T:0, P/FW:2 C:03**

## Course Objective:

The objective of this course is to To familiarize the students with the basic concepts and principles of marketing and to develop their conceptual and analytical skills to be able to manage marketing operations of a business firm.

## Course Contents:

Module I: Introduction
Nature and Scope of Marketing; Core Marketing Concepts; Evolution of modern marketing concept; Modern marketing concepts; Marketing Mix; emerging trends in marketing, Environmental Scanning.

**Module II: Product and Pricing Decisions**
Product - concept and classification; Major product decisions; New product development; Product life cycle – concept and appropriate strategies adopted at different stages, Pricing policies and strategies.

**Module III: Distribution Decisions**
Channels of distribution – concept and importance; Role of Channel intermediaries and their functions; Channel management; Distribution logistics – concept, importance and major logistics decisions; Channel integration and systems

**Module IV: Differentiation Segmentation Targeting and Positioning**
Differentiation, Market Segmentation, Targeting and Positioning: Bases for segmenting a consumer market; Levels of market segmentation; Factors influencing selection of market segments; Criteria for effective market segmentation; Target market selection and strategies; Positioning – concept, bases and process

**Module V: Consumer Behavior**
Consumer vs. business buying behavior; Consumer buying decision process and influences

**Module VI: Integrated Marketing Communication**
Integrated Marketing Communication – Concept; Communication process and promotion; determining promotion mix; Factors influencing promotion mix; Ethical issues in promotion decisions.

## Evaluation:

| Components | CPA | T | Q/S/CA | A | ME | EE |
|---|---|---|---|---|---|---|
| Weightage (%) | 5 | - | 5 | 5 | 15 | 70 |

## Text & References:


- Kotler, P., Keller, K. L., Koshy, A. & Jha, M. (2013), Marketing Management– A South Asian Perspective, 14th Ed, Pearson India
- Lamb, C. W., Hair, J. F., & McDaniel, C. (2015). Mktg, 8th Ed, Cengage Learning.
- Etzel, M. J., Walker, B. J., Staton, W. J., & Pandit, A. (2008). Marketing Concepts and Cases, 13th Ed, Tata McGraw Hill (Special Indian Edition).
- Czinkota, M. (2012). Marketing Management, 10th Ed, Cengage Learning.
- Kazmi, S. H. H. (2007). Marketing Management – Text and Cases, 1st Ed, Excel Books.
- Kumar, A., & Meenakshi, N. (2010). Marketing Management, 2nd Ed, Vikas Publishing House.
- Zikmund, W. G., & D'Amico, M. (1998). Marketing: Creating and Keeping Customers in an Ecommerce World, 6th Ed, South-Western College Publication

# COMMUNICATION SKILLS - I

**Course Code: BCS 301 P:02 C: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:

| 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:


- 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 301 P:02 C: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 1st Edition Cassel
- Goddard, Ken: Informative Writing, 1995 1st 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: FLF 301 L:02 C: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:

| 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 - III

**Course Code: FLG 301 L:02 C: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:

| 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 – III

**Course Code: FLS 301 L:02 C: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:

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

C – Project + Presentation
I – Interaction/Conversation Practice

## Text & References:

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

# CHINESE – III

**Course Code: FLC 301 L:02 C: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 pronciation 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:

| 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, Part-2" Lesson 21-30

# KINEMATICS OF MACHINES

**Course Code: BTM 401 L:03 C:03**

## Course Objective:

The objective of this course is to identify the alternatives to satisfy the needs of the customer and to quantify and evaluate the alternatives. It includes an introduction to the study of motion of constrained mechanism in machine systems. The objective is to develop the students understanding of basic machine design. The overall objective of this course is to learn how to analyze the motions of mechanisms, design mechanisms to have given motions.

## Course Contents:

**Module I: Mechanisms and Machines:**

Mechanism, machine, plane and space mechanisms, kinematic pairs, kinematic chains and their classification, degrees of freedom, Grubler's criterion, kinematic inversions of four bar mechanism and slider crank mechanism, equivalent linkages, pantograph, straight line motion mechanisms, Davis and Ackermann's steering mechanisms, Hooke's joint.

**Module II: Kinematic analysis of plane mechanisms using graphical and Cartesian vector notations**:

Planar kinematics of a rigid body, rigid body motion, translation, rotation about a fixed axis, absolute general plane motion. General case of plane motion, relative velocity method, velocity and acceleration analysis, instantaneous center and its application, Kennedy's theorem, relative motion, Coriolis component of acceleration.

**Module III: Friction**

Surface contacts, Types of friction, Friction in screws with square thread and V threads, Pivot and collar friction, Friction clutches-single, multi-plate, cone clutch, Film friction, greasy friction. Friction aspects in Brakes, Different types of brakes, rope belt and chain drive.

**Module IV: Gyroscope**

Angular velocity and acceleration, gyroscopic torque/couple; gyroscopic effect on naval ships; stability of two and four wheel vehicles. .

**Module V: Cams and Followers**

Classification of followers and cams, radial cam nomenclature, analysis of follower motion (uniform, modified uniform, simple harmonic, parabolic, cycloidal), pressure angle, radius of curvature, synthesis of cam profile by graphical approach, cams with specified contours.

## Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weight age (%) | 10 | 5 | 15 | 70 |

## Text & References:


- Rattan SS; Theory of machines; TMH
- Ambekar AG; Mechanism and Machine Theory; PHI.
- Sharma CS; Purohit K; Theory of Mechanism and Machines; PHI.
- Thomas Bevan; Theory of Machines; Pearson/ CBS PUB Delhi.
- Rao JS and Dukkipati; Mechanism and Machine Theory; NewAge Delhi.
- Dr.Jagdish Lal; Theory of Machines; Metropolitan Book Co; Delhi –
- Ghosh,A,.Mallik,AK; Theory of Mechanisms & Machines, 2e,;East West Press, Delhi.
- Khurmi RS, Theory of Machines, S Chand.

# COMPUTER NETWORKS

## Course Code: BTM 402 L:03 C:03

### Course Objective:

The objective of this course is to gain an understanding of the fundamentals of data communications networks. The course provides a unified and fundamental view of the broad field of data communications networks. The major areas are covered: 1) Introduction to computer networks 2) Data transmission, 3) Data Communication, 4) Network layer 5) Application layer and Advanced N/w.

### Course Contents:

**Module I: Introduction**
Introduction to Computer Networks. Computer Networks: evolution, uses, hardware and software. OSI & TCP/IP reference models, with functionality and design issues of all layers presented in the models. Different topologies.

**Module II: Data Transmission**
Analog and Digital transmission, transmission media, line configuration, data communications codes, error detection and correlation methods. Multiplexing techniques (TDM, FDM). Data encoding methods: analog to digital, digital to analog etc.

**Module III: Data Communication Methods**
Data communication interface, line control unit, UART, USRT, Serial interface, terminal types. SDLC, HDLC, Addressing Switched networks, circuit switching, packet switching, broadcast networks. IEEE 802 LAN Standards, framing, error control, flow control.

**Module IV: Network layer and Transport Layer**
Design issues of Network Layer and Transport Layer, Routing algorithms, Virtual circuit and datagram. TCP, UDP, Ip4, ICMP, introduction of Ip6. Subnet, Virtual Private Networks, Repeaters, Hub, Routers, diff. types of Bridges, Switches, Gateways etc

**Module V: Application Layers and Advanced N/w**
Application layers: DNS, E-Mail, HTTP, WWW.
Advanced N/w: ATM, Frame relay, ISDN, Bluetooth.

### Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

### Text & References:

***Text:***

- William Stallings, "Data & Computer Communications", 6th Edition, PHI, 2000.
- Forouzan, "Data Communication & Networking", 2nd Edition, McGraw Hill, 2003.

***References:***

- W. Tomasi, "Advanced Electronic Communication Systems", 2000
- James Martin, "Telecommunications & The Computer", 3rd Edition, PHI. 2001
- P. C. Gupta, "Data Communications, PHI, 2001.

# HEAT AND MASS TRANSFER

**Course Code: BTM 403 L:02,T:01, C:03**

## Course Objective:

The main objective of the course to understand the behaviour of thermal systems. To illustrate the development of the governing differential, algebraic and finite difference equations associated with thermal systems. To introduce the possible methods of solution to the governing equation. To investigate the influences of boundary and initial conditions and system parameters on the resulting steady or transient response of the system. To provide the basic tools those are used in thermal system design. To expose students to heat transfer applications in industry.

## Course Contents:

**Module I Conduction**

One-dimensional steady-state conduction through homogeneous and composite plane walls, cylinders and spheres, critical thickness of insulation; heat transfer from fins of uniform cross section.

**Module II Free convection**

Introduction, Laminar Boundary Layer Equations of Free convection on a vertical flat plate, Integral method for Free convection on a vertical flat plate, Empirical correlations for Natural convection, Free convection under uniform heat flux, free convection caused by centrifugal forces.

**Module III Forced convection** Introduction, Parllel flow over a flat plate, flow over Cylinders and Spheres, Fully developed Laminar flow in circular Tubes, Flow of Liquid Mettals, Combined free and forced convection

**Module IV Radiation**

Thermal radiation; Kirchoff's law; Planck's distribution law, Wien's displacement law; Stefan-Boltzmann's relation, Configuration factors; radiant interchange between black and grey surfaces; radiation shielding solar radiation.

**Module V Heat exchangers**

Combined heat transfer analysis; overall heat transfer co-efficient; types of heat exchangers; LMTD methods of heat exchanger design; simple heat exchanger calculations.

**Module VI Mass transfer**

Steady state moleculer diffusion in fluids, Mass heat momentum transfer analysis, unsteady state diffusion, diffusion in solids,Ficks law of diffusion, interface mass transfer

## Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

## Text & References:


- Incropera, F.P. and DeWitt, D.P. (2002). Fundamentals of Heat and Mass Transfer, John Willy & Sons, New York, NY.
- Nag, P.K. (2002). Heat and Mass Transfer, TMH.
- John R.Howell & Richrd O Buckius, Fundamentals of Engg. Thermodynamics, McGraw Hill International.
- Holman, J.P. (1997). Heat Transfer, 9th edition, McGraw-Hill.
- Mills, A.F. (1999). Basic Heat and Mass Transfer. Prentice-Hall.
- Thirumaleshwar, M. (2006). Fundamentals of Heat and Mass Transfer, Pearson education.
- Ghoshdastidar, P.S. (2004). Heat Transfer. Oxford University Press.
- Arora, Domkundwar, S. and Domkundwar, A. (1988). A Course in Heat & Mass Transfer, Dhanpat Rai & Co.

# MANUFACTURING MACHINES

**Course Code: BTM 404 L:03 C:03**

## Course Objective:

This is a new developmental graduate course for students interested in learning various types of manufacturing machines and various operations that can be possible on machine to make a desired shape to the components. It anticipated that this course would become part of the new manufacturing emphasis area in mechanical engineering.

## Course Contents:

**Module I: Introduction to Machine Tools**
Classification of machine tools, kinds of motion in machine tool operations, definition of cutting speed, feed and depth of cut

**Module II: Lathe**
Classification and various parts of Lathe, specification, Description of important mechanism viz. apron, tail stock, head stock, work holding, devices and operations, e.g. taper, turning, eccentric turning and screw-cutting, Geometry of a single point cutting tool. Capstan and turret lathe, cutting speed, feed, depth of cut and calculation machining time in lathe machine

**Module III: Drilling Machine**
Geometry and nomenclature of a twist drill, specification and classification of drilling machines, tool holding devices, work holding devices, different types of operations performed on a drilling machine, cutting speed, feed, depth of cut and calculation machining time in drilling

**Module IV: Milling Machine**
Working principle, milling methods, classification of milling machines, different types of operations e.g. slab, face, Angular, form, straddle, gang, end, T-slot, saw milling operations, Dividing Head e.g. Plain, universal and optical, Indexing methods e.g. simple, compound and differential indexing

**Module V: Shaper, Slotter & Planer**
Principal part of a shaper, classification, Quick Return mechanism, table feed mechanism of a shaper, Operations, e.g. horizontal, vertical and inclined shaping, Principal part of a Planer, Types of planer, Planer Operations, Principal part of a Slotter, Types of slotter, Difference between a shaper, planer and slotter.

**Module VI: Grinding Machines**
Abrasive machining, surface finishing parameters, grinding wheels selection parameters, wheel turning and dressing, Types of grinding machines e.g. Rough grinders, Cylindrical grinders, Internal grinders, surface grinder, Tool and cutter grinder, special purpose grinding machines.

**Module VII: Special Machines**
Introduction of NC, DNC and CNC machines, Broaching machines, Gear hobbing machine, Lapping, honing and super finishing processes.

## EXAMINATION SCHEME:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

**MTE:**Mid-term Examination, **ESE**: End Semester Examination**; A:** Attendance

## Text & References:

***Text:***

- P.N. Rao, "Manufacturing Technology: Metal Cutting & Machine Tools", Tata McGraw Hill, Delhi, 2004.
- B.S. Raghuwanshi, "Workshop Technology", Vol.2, Dhanpat Rai & Sons, 2003.
- Hazra Chandhari S.K., "Elements of Workshop Technology", Vol.2, Media Promoters, 2003.

***References:***

- P.C. Sharma, "A Text Book of Production. Engineering", S. Chand, New Delhi, 2004.
- Bawa H.S., "Workshop Technology", Vol.2, Tata McGraw Hill, 2004.
- Juneja & Shekhon, "Fundamental of Metal Cutting", New Age Publications
- S.F. Krar Stevan F. and Check A.F., "Technology of M/C Tools", McGraw Hill Book Co., 1986.

- Kibbe Richard et al, “M/c Tool practices”, Prentice Hall India, 2003.
- Bangalore HMT, “Production Technology”, Tata McGraw Hill, 1980.
- R.K. Jain, “Production Technology”, Khanna Publishers

Gerling Heinrich, “All about Machine Tools”, New Age Publication, 2003.

# PRINCIPLES OF COMPUTER GRAPHICS

**Course Code: BTM 405 L:02 C:02**

## Course Objective:

The objective of the course is to provide the understanding of the fundamental graphical operations and the implementation on computer, the mathematics behind computer graphics, including the use of spline curves and surfaces. It gives the glimpse of recent advances in computer graphics, user interface issues that make the computer easy, for the novice to use.

## Course Contents:

**Module I: Introduction to Graphics and Graphics Hardware System**

Video display devices, CRT, LCD Display devices Raster scan displays, Random scan displays, Raster scan systems, Random scan Systems.

Input devices, keyboard, mouse, Trackball and spaceball, Joystick, Data glove, Digitizers, Image scanners, Touch panels, Light pens, Voice systems.

Hardcopy devices, Printers, Plotters.

**Module II: Output Primitives and Clipping operations**

Algorithms for drawing 2D Primitives lines (DDA and Bresenham's line algorithm),circles (bresenham's and midpoint circle algorithm),ellipses(midpoint ellipse algorithm),other curves(conic sections, polynomials and spline curves).

Antialiasing and filtering techniques

Line clipping (cohen-sutherland algorithm), clip windows, circles, ellipses, polygon, clipping with Sutherland Hodgeman algorithm.

**Module III: Geometric transformation**

2D Transformation: Basic transformation, Translation, Rotation, scaling, Matrix Representations and Homogeneous coordinates, window to viewport transformation.

3D Concepts: Parallel projection and Perspective projection, 3D Transformation.

**Module IV: 3D object Representation, Colour models and rendering**

Polygon meshes in 3D, Spheres, Ellipsoid, Bezier curves and Bezier surfaces, Bspline curves and surfaces, solid modeling, sweep representation, constructive solid geometry methods. Achromatic and color models.

Shading ,rendering techniques and visible surface detection method: Basic illumination, diffuse reflection, specular reflection. Polygon rendering method, Gouraud & Phong shading. Depth-buffer method, A-buffer method, Depth-sorting method(painter's algorithm).

**Module V: Introduction to multimedia**

File formats for BMP, GIF, TIFF, IPEG, MPEG-II, Animation techniques and languages.

## Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

## Text & References:

***Text:***


- Foley et. al., "Computer Graphics Principles & practice", 2nd ed. AWL., 2000.
- D. Hearn and P. Baker, "Computer Graphics", Prentice Hall, 1986.
- R. Plastock and G. Kalley, "Theory and Problems of Computer Graphics", Schaum's Series, McGraw Hill, 1986


***References:***


- R.H. Bartels, J.C. Beatty and B.A. Barsky, "An Introduction to Splines for use in Computer Graphics and Geometric Modeling", Morgan Kaufmann Publishers Inc., 1987.
- C.E. Leiserson, T.H. Cormen and R.L. Rivest, "Introduction to Algorithms", McGraw-Hill Book Company, 1990.
- W. Newman and R. Sproul, "Principles of Interactive Computer Graphics, McGraw-Hill, 1973.
- F.P. Preparata and M.I. Shamos, "Computational Geometry: An Introduction", Springer-Verlag New York Inc., 1985.
- D. Rogers and J. Adams, "Mathematical Elements for Computer Graphics", McGraw-Hill International Edition, 1989

# KINEMATICS OF MACHINES LAB

**Course Code: BTM 421** **P:02 C:01**

## Course Contents:
## List of Experiments:

1. To study inversion of 3 R-IP Kinematics chain
2. To study inversions of 2R-2P Kinematics Chain
3. To carry out computer implementable kinematics analysis of 4 R mechanisms
4. To carry out computer implementable kinematics analysis of slider bar mechanism
5. To study gearbox, clutch and differential gear
6. To find the coefficient of friction for clutch plate
7. To determine gear ratio for an epicyclical gear train and verify it by analytical method
8. To study different types of Cam follower systems
9. To verify Gyroscopic Law
10. To determine and verify the whirling speed of a shaft-disc system
11. To determine the damping factor for a given horizontal vibration set up
12. To obtain dynamic balance for an unbalanced system with revolving masses

**Examination Scheme:**

| IA | | | | EE | |
|---|---|---|---|---|---|
| **A** | **PR** | **LR** | **V** | **PR** | **V** |
| 5 | 10 | 10 | 5 | 35 | 35 |

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

# MANUFACTURING MACHINES LAB

**Course Code: BTM 422** **P:02 C:01**

## Course Contents:

1. Operations on the Lathe Machine.
2. Operations on the Shaper Machine.
3. Operations on the Planner Machine.
4. Operations on the Drilling Machine.
5. Operations on the Grinding Machine.
6. Operations on the Milling Machine.
7. To make a Single point cutting tool

## Examination Scheme:

| IA | | | | EE | |
|---|---|---|---|---|---|
| **A** | **PR** | **LR** | **V** | **PR** | **V** |
| 5 | 10 | 10 | 5 | 35 | 35 |

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

# PRINCIPLES OF COMPUTER GRAPHICS LAB

**Course Code: BTM 423 P:02 C:01**

**Software Required:** Turbo C/C++

## Course Contents:

## Assignments will be provided for the following:

1. Geometrical shapes based on graphics algorithms
2. 2D Geometric transformation translation, rotation, scaling, reflection.
3. Clipping
4. Animation

## Examination Scheme:

| IA | | | | EE | |
|---|---|---|---|---|---|
| **A** | **PR** | **LR** | **V** | **PR** | **V** |
| 5 | 10 | 10 | 5 | 35 | 35 |

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

# METROLOGY

**Course Code: BTM 406 L:02 C:02**

**Course Objective:**

The main objective of this course is to give the student: a basic understanding of the physical loss governing metrology and tolerance design. Gain and appreciation for the capabilities and applications of metrology through hands own experiences.

**Course Contents:**

**Module I: Principles of measurement**
Definition of Metrology, difference between precision and accuracy. Sources of errors: Controllable and Random Errors, Effects of Environment and Temperature, Effects of support, alignment errors.
**Length Standards:** Line standards, end standards and wavelength standards, transfer from line standards to end standards. Numerical based on line standards. Slip gauges – its use and care, methods of building different heights using different sets of slip gauges.
**Limits, fits and tolerances:** Various definitions, different types of fits and methods to provide these fits. Numerical to calculate the limits, fits and tolerances, ISO system of limits and fits; Gauges and its types, limit gauges – plug and ring gauges. Gauge Design – Taylor's Principle, wear allowance on gauges.

**Module II: Comparators**
Principles and working of Mechanical, Electrical, Optical and Pneumatic Comparators.
**Angular Measurement:** Sine Bar – different types of sine bars, use of sine bars in conjunction with slip gauges, Use of angle gauges, spirit level, errors in use of sine bars. Numericals.Principle and working of autocollimator.

**Module III: Straightness and flatness**
Definition of Straightness and Flatness error.Numericals based on determination of straightness error of straight edge with the help of spirit level and auto collimator
**Screw Thread Measurement:** Errors in threads, Measurement of elements of screw threads – major diameter, minor diameter, pitch, flank angle and effective diameter (Two and three wire methods). Effect of errors in pitch and flank angles
**Gear Measurement:** Measurement of tooth thickness – Gear tooth vernier caliper, Constant chord method, base tangent method and derivation of mathematical formulae for each method.Parkinson Gear Tester.
**Module IV**
Coordinate measuring machine (CMM)- Constructional features – types, applications – digital devices- computer aided inspection.
**Surface texture:** Introduction, types of irregularities, Elements of surface Texture, Measurement of surface finish, Examination of surface Roughness.

**EXAMINATION SCHEME:**

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

**MTE:**Mid-term Examination, **ESE**: End Semester Examination**; A:** Attendance

**Text and Reference Books:**

1. Engineering Metrology and Measurement, N V Raghavendra and Krishnamurthy, Oxford University Press,

2. Engineering Metrology and Measurements, Bentley, Pearson Education
3. Theory and Design for Mechanical Measurements, 3 rd Edition,Richard S Figliola, Donald E Beasley, Wiley India
4. Metrology and Measurement, AnandBewoor&VinayKulkarni McGraw-Hill
5. Doebelin's Measurement Systems Ernest Doebelin, DhaneshManik McGraw-Hill
6. A Text book of Engineering Metrology, I C Gupta, DhanpatRai Publications 8. A course in Mechanical Measurements and Instrumentation, A K Sawhney, DhanpatRai Publications
7. Mechanical Measurements and Instrumentations, Er. R K Rajput, Kataria Publication(KATSON)
8. Mechanical Measurement and Metrology by R K Jain, KhannaPublisherMechanical Measurement & Control by D.S. Kumar.
9. Industrial Instrumentation & Control by S K Singh, McGrawHill
10. Mechanical Measurements by Beckwith & Buck, Narosa publishing House

# METROLOGY LAB

**Course Code: BTM 424 P:02 C:01**

## Name of Experiments:

1 Set up a dimension by slip gauges (example 36.936; 14.727…..) Measure this set up by micrometer (least count 0.01) several times and read dimensions. Find statistical mean and record the expected variation between the actual dimension and dimension measured by micrometer.

2 To check the roundness of a circular bar with the help of dial gauge.

3 To calibrate the micrometer using slip gauges.

4 Check the bore in a component by a bore-indicator. Set the bore indicator by micrometer and measure the deviation in the bore. Measure several times and obtain the mean value at three positions along the length of the bore.

5 Set – up a sine bar for measuring the angle of an inclined surface (of a bracket, milling cutter arbor with 7/24 taper, ….). Measure the angle several times and record the mean value. Use height gauge wherever necessary.

6 Performance on angular measurement using angular measuring instruments.

7 Measure the straightness of a surface (surface plate; guide way of machine tool) by using straight edge and dial gauge and dial gauge stand.

10 To machine a given surface and study its roughness characteristics

11 Measure the dimensions of a mechanical component using profile projector

12 Measure the dimensions of a mechanical component using tool maker's microscope.

13. Measurement of Temperature with different devices.

### Open ended Problem:

Students will work on an industrial based problem on measurement.

## Examination Scheme:

| IA | | | | EE | |
|---|---|---|---|---|---|
| **A** | **PR** | **LR** | **V** | **PR** | **V** |
| 5 | 10 | 10 | 5 | 35 | 35 |

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

# QUALITY CONTROL AND QUALITY ASSURANCE

**Course Code: BTM 407 L:03 C:03**

## Course Objective:

In engineering and manufacturing, **quality control** and **quality assurance** is a set of measures taken to ensure that defective product or services are not produced, and that the design meets performance requirements. Course includes the regulation of the quality of raw materials, assemblies, products and components; services related to production; and management, production, and inspection processes.

## Course Contents:

**Module I: Introduction**

Meaning of Quality and quality improvement, need of Quality, Statistical methods for quality control, Process capability.

**Module II: Quality Control**

Statistical Quality Control, control charts, Control charts for attributes & variables, Moving average chart.

**Module III: Production Control**

Acceptance Sampling, OC curve, Sampling Plan, Producer' risk, Consumer's risk, Average Quality Level, AOQL, Design of Single & double sampling plan.

**Module IV: Quality Assurance**

Need of Quality Assurance, Quality Audit, Concept of Zero defect, ISO 9000 quality systems, total quality management.

## EXAMINATION SCHEME:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

**MTE:**Mid-term Examination, **ESE**: End Semester Examination**; A:** Attendance

## Text & References:

***Text:***

- EL Grant & RS Leavenworth, "Statistical Quality Control", McGraw Hill & Co.
- M. Mahajan, "Statistical Quality Control", Dhanpat Rai & Co.
- O.P. Khanna, "Statistical Quality Control", Dhanpat Rai & Co.
- R.C. Gupta, "Statistical Quality Control", Khanna Pulishers

***References:***

- Amitav Mitra, "Fundamentals of Quality Control", Pearson Education
- Feigenbaum, "Total Quality Control", McGraw Hill & Co.
- Suresh Dalela, "Quality Systems", Standard Publishers & Distributors
- Montgomery DC, "Introduction to Statistical Quality Control", John Wiley & Sons Inc.
- Stephan B. Vardeman, J Marcus Jobe, "Statistical QA Methods for Engineers", John Wiley & Sons Inc.
- Taylor J.R., "Quality Control systems", McGraw Hill Int. Education
- K.C. Arora, "Total Quality Management", S.K. Kataria & Sons.

# COMMUNICATION SKILLS - II

**Course Code: BCS 401 L:01 C: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:

| 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:


- 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 401 L :01 C: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 1st Edition Cassell
- Goddard, Ken: Informative Writing, 1995 1st 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: FLF 401 L:02 C: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:

| 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 - IV

**Course Code: FLG 401 L:02 C: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 propositions 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:

| 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 - IV

**Course Code: FLS 401 L:02 C: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 eaSrlier 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:

| Components | CT1 | CT2 | C | I | V | A |
|---|---|---|---|---|---|---|
| Weightage (%) | 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 L:02 C: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

# MACHINE DESIGN - I

**Course Code: BTM 501 L:03 C:03**

**Course Objective:**

The objective of this course is to help students apply concepts learned in the mechanics, structure, material and manufacturing courses. This course offers working knowledge in the use of proper failure theories under steady and variable loading, design of mechanical elements, such as shaft, coupling, power screws, and detachable, permanent and welded connections.

**Course Contents:**

**Module I: Variable stresses in Machine Parts**

Fatigue and Endurance Limit, Factor of Safety for Fatigue Loading, Stress concentration, Notch sensitivity, Gerber Method, Goodman Method and Soderberg Method for a combination of stresses.

**Module II: Power Screws**

Types of screw threads, Torque required to raise and lower the load, Efficiency of square threaded screw, overhauling and self locking screw, stresses in power screw, design of screw jacks.

**Module III: Shaft, Keys and Couplings**

Design of shaft, Types of Keys, Splines, Strength of Sunk Key, types of shaft coupling, Sleeve and muff coupling, Flange coupling, Flexible coupling, Oldham coupling, Universal coupling.

**Module IV: Cotter and Knuckle Joints**

Types of cotter joints, design of socket and spigot joint, design of sleeve and cotter joint, design of jib and cotter joint, Design procedure of Knuckle joint.

**Module V: Drives**

Types of Belt drives, Flat Belt drives, Velocity ratio, Sleep, Creep of Belt, Length of open Belt, length of cross belt, power transmission by belt, Maximum tension in the belt. Types of V belt and Pulleys, advantages and disadvantages of V belt over Flat Belt, Ratio of Driving tensions for V belt, Rope drives. Chain drives, advantages and disadvantages of Chain drives.

**Module VI: Riveted and Welded Joint**

Types of Riveted joint, Lap joint, Butt Joint, Caulking and Fullering, Failure of Riveted joint, Strength of Riveted joint, Efficiency of Riveted joint. Advantages and Disadvantages of welded joint over Riveted joint, Strength of Fillet joint, strength of Butt joints.

**Examination Scheme:**

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weight age (%) | 10 | 5 | 15 | 70 |

**Text & References:**


- J.E. Shigley, Mechanical Engineering Design.
- Sadhu Singh, Machine Design
- R.S. Khurmi & J.K. Gupta, Machine design
- D.K. Aggarwal & P.C. Sharma, Machine Design

# RELATIONAL DATABASE MANAGEMENT SYSTEM

**Course Code: BTM 502 L:02 C:02**

## Course Objective:

Database applications have grown enormously in number and importance in the past two decades. They are used to store, manipulate and retrieve data in nearly every type of organization. The applications are used by individuals on PCs, by workgroups on network servers and by all employees using enterprise-wide distributed systems. Database technology will assume even greater importance in the future due to the highly competitive environment and the explosive use of the internet in Business-to-Client and Business-to-Business applications and the need to store more data. That is why a course database management is a core course in the CS&IT curriculum.

## Course Contents:

**Module I: Introduction**
Concept and goals of DBMS, Database Languages, Database Users, Database Abstraction.
Basic Concepts of ER Model, Relationship sets, Keys, Mapping, Design of ER Model

**Module II: Hierarchical model & Network Model**
Concepts, Data definition, Data manipulation and implementation.
Network Data Model, DBTG Set Constructs, and Implementation

**Module III: Relational Model**
Relational database, Relational Algebra, Relational & Tuple Calculus.

**Module IV: Relational Database Design and Query Language**
SQL, QUEL, QBE, Normalization using Functional Dependency, Multivalued dependency and Join dependency.

## Examination Scheme:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weight age (%) | 10 | 5 | 15 | 70 |

## Text & References:

***Text:***

- Korth, Silberschatz, "Database System Concepts", 4th Ed., TMH, 2000.
- Steve Bobrowski, "Oracle 8 Architecture", TMH, 2000

***References:***

- Date C. J., "An Introduction to Database Systems", 7th Ed., Narosa Publishing, 2004
- Elmsari and Navathe, "Fundamentals of Database Systems", 4th Ed., A. Wesley, 2004
- Ullman J. D., "Principles of Database Systems", 2nd Ed., Galgotia Publications, 1999

# MEASUREMENTS AND CONTROLS

**Course Code: BTM 503 L:02 C:02**

## Course Objective:

Knowledge of Measurement & Control in any engineering branch is vital in designing and industrial production/application. The course covers the characteristics and classifications of measurement related to mechanical & automation as well as recent development in measurement & control engineering applications. Successful completion of this course will be very helpful for the students who wish to join challenging industry.

## Course Contents:

**Module I**

Introduction to generalized measurement system and their functional elements. Basic characteristics of measuring devices, Standards & Calibration. Accuracy, Precision, Sensitivity, Resolution, Linearity & Errors in measurement.

**Module II**

Transducers, Stages & their classification, Resistive transducers, Strain gauges, Rosettes, Inductive transducers, Displacement measurement, LVDT.

Measurement of viscosity & flow, Transient Time & Doppler's flow meter, Measurement of liquid level, humidity, hair hygrometers.

**Module III**

Control engineering applications, Introduction to type of control Systems, Open loop & close loop Control Systems; Examples & their block diagrams. Transfer function.

**Module IV: Modes of Control & Controller Mechanism**

P, PI and PID Controller. Pneumatic & Hydraulic Controller, General Pr. of generating various Control Actions. Concept of Control Valves.

## Examination Scheme:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weight age (%) | 10 | 5 | 15 | 70 |

## Text & References:

***Text:***


- Sawhney A. K 2000, "A course in Electrical & Electronics Measurement & Instrumentation", Dhanpat Rai & Son's.
- B.C Nakra, K K Chaudhary. 2004,"Instrumentation, Measurement & Analysis". TMH.
- M Ogata, "Modern Control Engineering" PHI.


***References:***


- H.S Kalsi, 1999, Electronic Instrumentation", TMH.
- B. C Kuo, "Automatic Control System", Prentice Hall.

# DYNAMICS OF MACHINES

**Course Code: BTM 504 L:02 T:01 C:03**

## Course Objective:

The objective of this course is to identify the alternatives to satisfy the needs of the customer and to quantify and evaluate the alternatives. The study of kinematics and dynamics of machines is an applied field of mechanical engineeringthat is concerned with understanding the relationship between the geometry and the motions of the parts of a machine and the forces that produce this motion. The overall objective of this course is to learn how to analyze the motions of mechanisms, design mechanisms to have given motions, and analyze forces in machines.

## Course Contents:

**Module I:Gears**

Classificationofgears,nomenclature,involutesandcycloidaltoothprofileproperties,synthesisoftoothprofileforspurgears,toothsystem,conjugateaction,velocityofsliding,arcofcontact,pathofcontact,contactratio,interferenceandundercutting,helical,spiral,bevelandwormgears.
GearTrains:Simple,compound, epicyclic gear trains; determination of gear speeds using vector, analytical and tabular method; torque calculations in simple, compound and epicyclic gear trains.

**Module II:Governors**
Introduction, Function and types of governors, Centrifugal governors, Watt governor, Porter governor, Proell governor,Hartnell governor, characteristics of governor- stability, Sensitivity, isochronism, Hunting controlling forces and stability, Effort and power of governor, Inertia governor.

**Module III:Flywheel**
Function, construction, Flywheel's rim and dimensions, Operation of flywheel in a punching Machine, turning moment diagram, Fluctuation of energy and fluctuation of speed of crank shaft, Coefficient of fluctuation of energy and speed.

**Module IV: Balancing**
Static and dynamic balancing, balancing of revolving and reciprocating masses, single and multi-cylinder engines, tractive force, swaying couple, hammer blow.

**Module V: Natural Vibrations**
Elements of vibratory system; lumped and distributed parameter systems. Undamped Free Vibrations: Derivation of differential equation of motion: the energy method, the method based on Newton's second law of motion, and Rayleigh's method. Solution of differential equation of motion, Natural frequency of vibration. Damped Free Vibrations: Viscous damping: coefficient of damping; damping ratio; under damped, over damped and critically damped systems; logarithmic decrement; frequency of damped free vibration

**Module VI: Forced Vibrations**
Harmonically excited Vibration: One degree of freedom- forced harmonic vibration; vector representation of forces; excitation due to rotating and reciprocating unbalance; vibration Isolation, force and motion transmissibility, Whirling Motion and Critical Speed

## Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weight age (%) | 10 | 5 | 15 | 70 |

## Text & References:


- RattanSS;Theoryofmachines;TMH
- AmbekarAG;MechanismandMachineTheory;PHI.
- SharmaCS;PurohitK;TheoryofMechanismandMachines;PHI.
- ThomasBevan;TheoryofMachines;Pearson/CBSPUBDelhi.
- RaoJSandDukkipati;MechanismandMachineTheory;NewAgeDelhi.
- Dr.JagdishLal;TheoryofMachines;MetropolitanBookCo;Delhi–
- Ghosh,A,.Mallik,AK;TheoryofMechanisms&Machines,2e,;EastWestPress,Delhi.
- Khurmi RS, Theory of Machines, S Chand.

# MACHINE DESIGN-I LAB

**Course Code: BTM 521** **P:02 C:01**

**Course Contents:**
**Design of:**
(i) Cotter Joint
(ii) Knuckle Joint
(iii) Pipe Joint
(iv) Screw Jack
(v) Rigid and Flexible coupling
(vi) ~~Spur Gear Train~~

**Examination Scheme:**

| IA | | | | EE | |
|---|---|---|---|---|---|
| **A** | **PR** | **LR** | **V** | **PR** | **V** |
| 5 | 10 | 10 | 5 | 35 | 35 |

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

# RELATIONAL DATABASE MANAGEMENT SYSTEM LAB

**Course Code: BTM 522 P:02 C:01**

**Software Required:** Oracle 9i

## Course Contents:

**Topics covered in Lab will include:**

1. Database Design
2. Data Definition (SQL)
3. Data Retrieval (SQL)
4. Data Modification (SQL)
5. Views
6. Triggers and Procedures

## Examination Scheme:

| IA | | | | EE | |
|---|---|---|---|---|---|
| **A** | **PR** | **LR** | **V** | **PR** | **V** |
| 5 | 10 | 10 | 5 | 35 | 35 |

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

# MEASUREMENT AND CONTROL LAB

**Course Code: BTM 523** **P:02 C:01**

## Course Contents:

## List of Experiments:

1. Measurement of resolution and sensitivity of thermocouple (study of various thermocouples J, K, T, etc.) (Calibration)
2. Measurement of resolution, sensitivity and non linearity of termistor. (termistor instability)
3. Measurement of thickness of LVDT.
4. Measurement of resolution of LVDT (and displacement measurement)
5. Study of proportional control and offset Problems.
6. Study of proportional integral control.
7. Study of proportional integral derivative (PID) control.
8. Vibration measurement by stroboscope (natural frequency of a cantilever)
9. Angular frequency (speed of rotating objects) measurement by stroboscope.
10. Pressure transducer study and calibration.
11. Proving ring (force measurement)
12. Torque cell.
13. Closed loop study of an electric circuit.
14. Young's modulus of a cantilever.
15. Young's modulus and poison's ratio of tensile test piece of M.S.

## Examination Scheme:

| IA | | | | EE | |
|---|---|---|---|---|---|
| **A** | **PR** | **LR** | **V** | **PR** | **V** |
| 5 | 10 | 10 | 5 | 35 | 35 |

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

# PROGRAMMING LAB - II (MAT LAB)

**Course Code:** **BTM 524** **C:01 P:02**

## Course Objective:

It is matrix based simulation software which works on algorithms. It carries various tool boxes which is helpful for day -to-day accessibility to real world. It helps in designing graphic user interface, provides tools for neural network. Hardware which are not economical for general purpose, this software tool box helps to minimize the cost ability.

## Course Contents:

## Software Requirement: MAT LAB 6.5

## Name of Experiments:

1 To draw the time response for first order transfer function

$$H(S)=\frac{6}{S+9}$$

second order transfer function

$$H(S)=\frac{45}{S^2+6S+49}$$

third order transfer function

$$H(S)=\frac{8S}{S(S+2)(S+3)}$$

2 To realize the time response in simulink by importing the system parameters from the work window for given transfer function

$$H(S)=\frac{4S}{S(S+9)(S+5)}$$

3 To draw the bode plot for following function

$$H(S)=\frac{46S}{(S+2)(S+4)(S^2+2S+4)}$$

and draw the bode plot using input arguments that represents the continuous state space system:

$$\begin{bmatrix}\dot{x}_1\\ \dot{x}_2\end{bmatrix}=\begin{bmatrix}0 & 1\\ -3 & -4\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix}+\begin{bmatrix}0\\ 1\end{bmatrix}u$$

$$y=\begin{bmatrix}10 & 0\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix}+[0]u$$

4 To draw the Nyquist plot for following function

$$H(S)=\frac{46S}{(S+2)(S+4)(S^2+2S+4)}$$

and draw the Nyquist plot using input arguments that represents the continuous state space system:

$$\begin{bmatrix}\dot{x}_1\\ \dot{x}_2\end{bmatrix}=\begin{bmatrix}0 & 1\\ -3 & -4\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix}+\begin{bmatrix}0\\ 1\end{bmatrix}u$$

$$y=\begin{bmatrix}10 & 0\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix}+[0]u$$

5 To draw the root locus plot for following transfer function

$$H(S)=\frac{45}{S(S+2)(S+4)^2}$$

6 Write a program to determine the values of the DTFT of a real sequence described as a rational function in $e^{-j\omega}$

$$X\left(e^{-j\omega}\right)=\frac{0.008-0.033e^{-j\omega}+0.05e^{-j2\omega}-0.033e^{-j3\omega}+0.033e^{-j4\omega}}{1+2.37e^{-j\omega}+2.7e^{-j2\omega}+1.6e^{-j3\omega}+0.41e^{-j4\omega}}$$

where K= 256

7 Write a program to determine the M-point DFT $u[k]$ of the following N-points sequence

$$u[n]=\begin{cases}1, & 0\le n\le N-1\\ 0, & \text{Otherwise}\end{cases}$$

here N=8 and M=16

8 Express the following Z- transform in factored form , plot its poles and zeros, and then determine its ROCs

$$G(Z)=\frac{2z^4+16z^3+44z^2+56z+32}{3z^4+3z^3-15z^2+18z-12}$$

9 Write a program to test the stability of the transfer function

$$H(Z)=\frac{1}{4z^4+3z^3+2z^2+z+1}$$

10 Design a DAS of given four signals with signal conditioning equipments in SIMULINK

## Examination Scheme:

| IA | | | | EE | |
|---|---|---|---|---|---|
| **A** | **PR** | **LR** | **V** | **PR** | **V** |
| 5 | 10 | 10 | 5 | 35 | 35 |

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

# COMPUTER AIDED DRAFTING AND DESIGN LAB

**Course Code: BTM 525 P:02 C:01**

**Course Contents:**

1. Basics of Auto CAD
2. Modeling of machine Components such as Connecting Rod, Piston etc.
3. Introductory exercise for 3-D modeling.
4. Exercise for advanced 3-D modeling.
5. Exercise for 3-D editing options.
6. Exercise for Assembly modeling.
7. Exercise for surface modeling.
8. Using Any One (From CREO, Unigraphics, CATIA, Solid Edge, Inventor) Parametric Software.
    a. Prepare solid models of dismantled parts of an assembly.
    b. Assemble the parts.
    c. Get orthographic projection of solid models prepared at "a" above.
    d. Get orthographic projection of an assembly model prepared at "b" above.
    e. Prepare the bill of material (BOM).
    f. Prepare a power point presentation of the work.

**Examination Scheme:**

| IA | | | | EE | |
|---|---|---|---|---|---|
| **A** | **PR** | **LR** | **V** | **PR** | **V** |
| 5 | 10 | 10 | 5 | 35 | 35 |

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

# PRACTICAL TRAINING - I

**Course Code: BTM 550 C:06**

## 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 |
| **Total** | **100** |

# THEORY OF METAL FORMING

## Course Code: BTM 505 L:02 C:02

### Course Objective:

The objective of this course is to introduce the fundamentals of basic manufacturing processes (solidification process, heat treatment, deformation processes, material removal processes, and joining processes). The students are expected to be able to select, analyze and design basic manufacturing processes for product development.

### Course Contents:

**Module I: Introduction**

Review of tensile test, True stress and true strain, Yielding criteria for ductile metals, Yield locus, Plastic stress-strain relations-Levymises equation, prandtl-Reuss equations.

**Module II: Plastic deformation**

Crystal Geometry, Lattice defects, Deformation by slip, Shear Stress required to cause slip in a perfect Crystal, Deformation by twinning, Fracture, Types of Fracture, Creep Failure.

**Module III: Introduction to metal working Processes**

Classification of metal working processes-Cold working, Hot working, Effect of variables on metal working processes, Forging Processes, Forging equipment, Open die forging, Closed die forging, Load calculation in Plane strain forging, Forging defects. Rolling Mills, Hot rolling, Cold rolling, Forces and Geometrical Relationships in Rolling, Rolling load & torque, rolling defects. Methods of Extrusion, Hot Extrusion, Cold Extrusion, Analysis of Extrusion processes, Effect of Variables on Extrusion pressure, Extrusion defects.

**Module IV: Sheet metal forming**

Forming Methods, Forming Operations-Shearing, Blanking, Bending, Stretch Forming, Deep Drawing, Stresses developed in Deep Drawing, Defects in Formed Parts.

### Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

### Text & References:


- Mechanical Metallurgy by George E. Dieter: McGraw-Hill Book Company
- Metal working by Surinder Kumar, DhanpatRai& Sons

# MANAGEMENT OF MANUFACTURING SYSTEMS

**Course Code: BTM 506 L:02 C:02**

## Course Objective:

The overall objective of this course is to provide high caliber engineering students with an in-depth understanding of strategic, tactical and operational issues relating to manufacturing industries worldwide. On completion of the course the students will be equipped with the state-of-the-art concepts, methods, techniques and tools to allow them to contribute towards the competitiveness of manufacturing organizations.

## Course Contents:

**Module I: Introduction**

Production functions, Plant Organization: Principles of organization, Organization structure-line and staff Organization

Plant Location, Layout: Process layout product layout and combination layout – methods of layout, economics of layout.

**Module II: Production Planning & Control**

Types of products, demand, demand forecasting, marketing strategies, scheduling and control of scheduling, production control.

**Module III: Work and method study**

Definition and concepts, method study procedures, symbols, advantages, Flow process charts, Motion study, micro motion, SIMO charts, system concepts, classification, analysis techniques.

**Module IV: Industrial maintenance**

Types, organization for maintenance department, Breakdown and preventive maintenance.

**Module V: Inventory control and replacement analysis**

Introduction replacement policy and method adopted, EOQ.

**Module VI: Management concepts**

Development of management principles, scientific management, human relation aspects. Project Management – CPM and PERT.

## Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

## Text & References:

***Text:***

- S.K. Sharma, "Industrial Engg. & Operation Management", S.K. Kataria & Sons.
- Dr. Ravi Shankar, "Industrial Engg. & Management", Galgotia Publications
- M. Mahajan, "Industrial Engg. & Production Management", Dhanpat Rai & Co.
- J Moore, Manufacturing Management, Prentice Hall
- Buffa, Modern production and operations management, E.S. Wiley eastern.

***References:***

- Joseph S. Martinich, "Production & Operation Management", John Wiley & Sons.

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# COMMUNICATION SKILLS - III

**Course Code: BCS 501 L:01 C: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:

| 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:


- 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 501 L :01 C :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 |

## Text & References:


- Organizational Behaviour, Davis, K.
- Hoover, Judhith 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: FLF 501 L:02 C: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:

| 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 - V

**Course Code: FLG 501 L:02 C: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 propositions 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:

| 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 - V

**Course Code: FLS 501 L:02 C: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:

| Components | CT1 | CT2 | C | I | V | A |
|---|---|---|---|---|---|---|
| Weightage (%) | 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 L :02 C:02**

## Course Objective:

What English words come from Chinese? Some of the more common English words with Chinese roots areginseng, silk, dim sum, fengshui, typhoon, yin and yang, T'al 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, god 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 usingit.
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 abut 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:

| 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-II Lesson 39-46

## MACHINE DESIGN – II

**Course Code: BTM 601 L:3, C:3**

**Course Objective:**
The course aims at developing concepts as to how to analyze mechanical systems and select proper machine elements (bearing, gears, belts, chains). It prepares the students how to design machine element by specifying their type, geometry, material and how to integrate these elements to build a mechanical systems.
**Course Contents:**

**Module I: Gears**
Selection of transmission, spur, helical, bevel and worm gears,
**Module II: Friction Clutches & Brakes**
Materials for friction surface, uniform pressure and uniform wear theories, Design of friction clutches: Disk , plate clutches, cone & centrifugal clutches.

**Design of brakes:** Band & block brake, Internal expending brakes, Disk brakes.

**Module III: Bearings and Lubrication**
Types of lubrication, viscosity, hydrodynamic theory, design factors, temperature and viscosity considerations, Reynold's equation, stable and unstable operation, heat dissipation and thermal equilibrium, boundary lubrication, dimensionless numbers, Design of journal bearings, Rolling-element Bearings: Types of rolling contact bearing, bearing friction and power loss, bearing life; Radial, thrust & axial loads; Static & dynamic load capacities; Selection of ball and roller bearings; lubrication and sealing.
**Module IV**: Springs
Design of helical compression and tension springs, consideration of dimensional and functional constraints, leaf springs and torsion springs; fatigue loading of springs, surge in spring; special springs.

**Module V:** Design of I.C. Engine components

Selection of type, general design consideration, design of cylinder, cylinder liner, cylinder head, pistons, connecting rod, crank shaft, valves gears mechanism, flywheel.

**Examination Scheme:**

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weight age (%) | 10 | 5 | 15 | 70 |

**Text & References:**
***Text:***
- Maleeve Hartman and O.P. Grover, "Machine Design", CBS Publication & Publishers.
- V.B Bhandari, "Machine Design", Tata McGraw Hill.
- P.C. Sharma and D.K Aggarwal., "Machine Design", S.K. Kataria & Sons.

***References:***
- Mahadevan, "Design Data Book", CBS Publication & Publisher

# MICROPROCESSOR SYSTEMS

## Course Code: BTM 602 L:02 C:02

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

**Module IV: Architecture of 16-Bit Microprocessor**
Difference between 8085 and 8086, Block diagram and architecture of 8086 family, pin configuration of 8086, Minimum mode & Maximum mode Operation. Internal architecture of 8086, Bus Interface Unit, Register Organization, Instruction Pointer, Stack & Stack pointer, merits of memory segmentation, Execution Unit, Register Organization.

## Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

## Text & References:

***Text:***

- Ramesh. S. Gaonkar, "Microprocessor architecture Programming and Application with 8085" Penram International Publishing, 4th Edition
- B.Ram, "Fundamentals of microprocessors and microcomputer" Dhanpat Rai, 5th Edition.
- Douglas V Hall.

***References:***

- M. Rafiquzzaman, "Microprocessor Theory and Application" PHI – 10th Indian Reprint.
- Naresh Grover, "Microprocessor comprehensive studies Architecture, Programming and Interfacing" Dhanpat Rai, 2003.
- Gosh," 0000 to 8085" PHI.

# FLUID POWER SYSTEMS

**Course Code: BTM 603 L:2,T:1, C:3**

## Course Objective:

Fluid power systems cover generation, transmission, and control applications of power by using pressurized fluids. This course imparts the knowledge of different fluid power systems (pneumatic and hydraulic) which are used in industries and hydro power plants.

## Course Contents:

**Module I: Introduction**

Euler's equations for turbo machines; impulse and reaction forces due to fluid systems on stationery and moving system of vanes; jet propulsion.

**Module II: Water & Gas Turbines**

Classification: Pelton, Francis, Propeller and Kaplan turbines; velocity triangles; efficiency; draft tubes, governing.

General aspect of gas turbine, Jules cycle, Brayton cycle, classification, merits of gas turbine, open- cycle gas turbine, closed cycle gas turbine, Inter cooling, Reheating, Re-generation in gas turbine.

**Module III: Pumps**

Centrifugal pumps, velocity triangles, efficiency, turbine pumps, axial and mixed flow pumps.

**Module IV: Fluid Machines**

Similarity laws applied to roto dynamic machines; specific speed, unit quantities; characteristic curves; use of models; cavitations and attendant problems in turbo machines; selection of turbines hydroelectric plants.

**Module V: Hydraulic Power Transmission**

Transmission of hydraulic power through pipe lines; water hammer; precautions against water hammer in turbine and pump installations.

**Module VI: Fluid Systems**

Hydraulic press, hydraulic accumulator, Hydraulic intensifier, Hydraulic ram, Hydraulic lift, Hydraulic crane, Positive pumps ,gear , fluid coupling and torque converter,

Pneumatic Power: comparison of pneumatic and hydraulic Systems.

## Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

**Text & References:**

***Text:***


- Gupta, S. C., Fluid Mechanics and Hydraulic Machines, Pearson Education, 2007
- R.K. Bansal, "Fluid Mechanics & Hydraulic Machines", Laxmi Publications (P) Ltd., 2002.


***References:***


- Dr. D.S. Kumar, "Fluid Mechanics & Fluid Power Engineering", S.K. Kataria & Sons,2001
- D.R. Malhotra & N.K. Malhotra, "The Fluid Mech. & Hydraulics", Satya Prakashan, 2001
- V.P. Gupta, Alam Singh, Manish Gupta, "Fluid Mechanics, Fluid Mechanics & Hydraulics", CBS Publishers; 1999.

# METAL CUTTING AND TOOL DESIGN

**Course Code: BTM 604 L:03 C:03**

## Course Objective:

Metal cutting involves removing metal through machining operations. Machining traditionally takes place on lathes, drill presses, and milling machines with the use of various cutting tools. Successful machining also requires knowledge about the material being cut. This course is designed in such way that it explains all aspects (process and tools) of metal cutting. The course also covers the common tooling setups and operations as well as specialized applications for the more experienced users.

## Course Contents:

**Module I: Introduction**

Basic shape of cutting tools, Function of different angles of cutting tools, tool geometry and Nomenclatures-ASA, ORS systems, Conversion of angles, Tool Materials.

**Module II: Mechanism of chip formation**

Fracture & yielding mechanism, Types of chips, Factors involved in chip formation analysis, shear plane in flat chips, chip formation in drilling and milling.

**Module III: Mechanism of metal cutting**

Force system during turning, merchant circle diagram, velocity relationship, stress in conventional shear plane, Energy of cutting process, Ernst& merchant angle relationship, Lee-Shafer relationship, measurement of forces, Heat generation and temperature distribution in metal cutting.

**Module IV: Theory of Tool wears**

Criteria of wear, machinability and tool life, Flank wear, Crater wear, Taylor's tool life equation, causes and mechanism of tool failure, cutting fluid, Economics of metal machining.

**Module V: Design for sheet metal works**

Press working Terminology, press operation, types of dies, clearance, cutting forces, methods of reducing cutting forces, minimum diameter of piercing, center of pressure, Drawing dies-blank diameter, drawing force.

**Module VI: Jigs and Fixture design**

Important considerations in jig and fixture design, Locating and clamping, principles for location purposes, principles for clamping purposes, design principles for jigs and fixtures.

## Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

## Text & References:

***Text:***

- A Bhattacharya , "Metal cutting theory& practice", C.B. Publication

***References:***

- Geoffrey Boothroyd, "Fundamentals of Metal Machining & Machine Tools", Tata McGraw Hill Kogakusha Ltd.
- P.N. Rao, "Manufacturing Technology", Tata McGraw Hill Publication Ltd.
- Dr. P.C. Pandey & C.K. Singh, "Production Engg. Sciences", Standard Publisher. Distributors.
- Dr. B.J. Ranganath, "Metal Cutting & Tool Design" Vikas Publishing House Pvt. Ltd.

# IC ENGINES

**Course Code: BTM 605 L:03 C:03**

## Course Objective:

This course provides an in-depth knowledge of the functioning of IC Engine & Gas Turbine, and also deals with the combustion techniques used for various fuels. This course finds immense application in automobile industry and gas-operated power plants.

## Course Contents:

**Module I: Fundamentals**
Development of IC engine, Classification, Working Cycles, Indicator diagram, comparison of SI Engine and CI Engine, two stroke and four-stroke engine, Valve timing diagram of SI and CI engine.

**Module II: Air Standard Cycle**
Assumptions in air standard cycle & fuel-air cycle, fuel-air cycle calculations, factors influencing fuel-air cycle, effects of variable specific heats, dissociation.

**Module III: Fuel and Combustion**
Combustion of SI engine, ignition limits, normal combustion, abnormal combustion, effect of engine Variable in ignition lag, spark advance and factors affecting ignition timing, pre-ignition, theory, and factors affecting detonation, PN, HUCR. Combustion in CI engine, fundamentals of combustion process in Diesel engine, delay period, diesel knock, and cold starting of CI engine. IC engine Fuel, combustion equations, theoretical air and excess air, stoichiometric air fuel ratio, desirable Properties of good IC engine fuels knock rating of SI engine fuel.

**Module IV: Performance & Testing**
Testing and performance of IC engine, performance parameters, basic measurement, engine Performance curve, fuel consumption, load outputs, engine power, heat balance.

## Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

## Text & References:

***Text:***

- Ganesan, V. Internal Combustion Engine, Tata McGraw-Hill.
- Mathur, M.L. and Sharma, R.P. Internal Combustion Engine. Dhanpat Rai Publication
- Vladimir Leonidas Maleev. Internal-combustion Engines, Theory and Design. McGraw-Hill.

***References:***

- Lester Clyde Lichty, Robert Leroy Streeter. Internal Combustion Engines, McGraw-Hill
- Wallace Ludwig Lind. Internal-combustion Engines: Their Principles and Applications to Automobile, Aircraft, Ginn.
- Edward Frederic Obert, Burgess Hill Jennings, Internal Combustion Engines: Analysis and Practice
- Joseph Albert Polson. Internal Combustion Engines, Chapman & Hall, limited
- Rolla Clinton Carpenter, Herman Diederichs. Internal Combustion Engines, Their Theory Construction and Operation. Van Nostrand companies
- John Benjamin Heywood. Internal Combustion Engine Fundamentals. McGraw-Hill

## MACHINE DESIGN-II LAB

**Course Code: BTM 621 P:2 C:1**

**Course Contents:**

Design and drawing based upon the course Machine Design II such as automotive transmission, brakes, clutches connecting rod, I.C. engine piston, connecting rod, ~~hydraulic rivet, mechanical hoist~~ etc.

**Examination Scheme:**

| IA | | | | EE | |
|---|---|---|---|---|---|
| **A** | **PR** | **LR** | **V** | **PR** | **V** |
| 5 | 10 | 10 | 5 | 35 | 35 |

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

# MICROPROCESSOR SYSTEMS LAB

## Course Code: BTM 622 P:02C:01

### Course Contents:

### Name of Experiments:

1 Set up a dimension by slip gauges (example 36.936; 14.727…..) Measure this set up by micrometer (least count 0.01) several times and read dimensions. Find statistical mean and record the expected variation between the actual dimension and dimension measured by micrometer.

2 To check the roundness of a circular bar with the help of dial gauge.

3 Mill a component to dimension (23, 57.6,…). Set up a comparator by slip gauge set to this dimension. Check component deviation by the comparator and record the deviation. Measure several times and obtain the mean value.

4 Check the bore in a component by a bore-indicator. Set the bore indicator by micrometer and measure the deviation in the bore. Measure several times and obtain the mean value at three positions along the length of the bore.

5 Set – up a sine bar for measuring the angle of an inclined surface (of a bracket, milling cutter arbor with 7/24 taper, ….). Measure the angle several times and record the mean value. Use height gauge wherever necessary.

6 Check angular dimension of a dovetail guide way by measuring across rollers.
Check the included angle of a V – block (90º, 60º, …) / or a machined groove by measuring over a roller using height gauge and parallel blocks/slip gauges.

7 Measure the straightness of a surface (surface plate; guide way of machine tool) by using straight edge and dial gauge and dial gauge stand. Set up straight edge on jacks such that dial reading at each end coincide. Move the dial stand along the straight edge. Record readings at 50 mm interval and draw a plot. Obtain maximum deviation which is the straightness.

8 Measure straightness using a spirit level. Place spirit level at an initial position and note level reading. Move the level on a straight line and take readings at 50 mm intervals. Plot the difference from the original reading and obtain the straightness value.

9 Draw a trapezoidal and any other profile in AutoCAD to 1:1 scale. On a steel plate make the profile by fitting and filing. Set up the drawing on profile projector. Check the component and note deviations. Correct the profile and recheck. Make the profile as close to the required one.

10 To machine a given surface and study its roughness characteristics

11 To measure the geometry of a screw using profile projector

12 To study the cutting tool geometry using tool makers microscope

### Examination Scheme:

| IA | | | | EE | |
|---|---|---|---|---|---|
| **A** | **PR** | **LR** | **V** | **PR** | **V** |
| 5 | 10 | 10 | 5 | 35 | 35 |

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

# FLUID POWER SYSTEMS LAB

**Course Code: BTM 623** **P:2, C:01**

**Course Contents:**

- To conduct a test on Centrifugal Pump and plot its characteristics
- To Plot the characteristics of Pelton turbine.
- To conducts an experiment on Francis turbine.
- To study the effect of a draft tube on reaction turbines.
- To find the friction factor for flow through pipes
- To study the hydraulic controls rig.
- To conduct an experiment for verifying model laws.
- To study the cavitations phenomenon in turbines.
- Study of hydraulic couplings and torque converters.

**Examination Scheme:**

| IA | | | | EE | |
|---|---|---|---|---|---|
| **A** | **PR** | **LR** | **V** | **PR** | **V** |
| 5 | 10 | 10 | 5 | 35 | 35 |

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

# METAL CUTTING AND TOOL DESIGN LAB

**Course Code: BTM 624 P:02 C:01**

## Course Contents:

## Name of Experiments:

1. Step and taper turning on lathe machine
2. To make a hexagonal headed bolt on a milling machine.
3. To make a job on a shaper.
4. To study the Kinematics design of workshop machines.
5. To make a job on drilling machine as per given specifications.
6. To measure cutting forces on a single point cutting tool
7. To measure cutting parameters for multipoint cutting tool.
8. Study of a punch and die set.
9. Study of a jig and fixture.
10. Fixture fabrication with case study.
11. Study of formation of chips during turning and shaping operations on samples of C.I., M.S., Brass, Cu & aluminum.
12. Determination of the life of the cutting tool used on lathe for various cutting speeds, feeds and different work piece materials.

## Examination Scheme:

| IA | | | | EE | |
|---|---|---|---|---|---|
| **A** | **PR** | **LR** | **V** | **PR** | **V** |
| 5 | 10 | 10 | 5 | 35 | 35 |

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

# POWER PLANT PRACTICES

**Course Code: BTM 606** **L:03 C:03**

## Course Objective:

The objective of this course is that the students come to know different ways of producing energy such as thermal energy from gas and steam, hydraulic energy nuclear energy, non conventional source of energy from wind, solar and tidal. And their different uses in productive works.

**Course Contents:**

**Module I: Steam Generator Plant**

Fuel handling systems, Indian coals, combustion of coal in furnaces; fluidized bed combustion, economizer; dust collectors; ash disposal, fans and draft systems.

**Module II: Turbine Plant**

Layout of turbine plant room, corrosion in condensers and boilers, feed water treatment; feed heating ; cooling water systems and cooling towers.

**Module III: Control**

Important instruments on steam generator and turbine; drum water level control, combustion control and super heat temperature control; testing of power plants and heat balance.

**Module IV: Other Power Plant**

General layout of turbine power plants, Nuclear power plants, power reactors and nuclear steam turbines; handling of nuclear waste and safety measures, peak load power generation methods.

**Module V: Economics**

Planning for power generation in India, super thermal power plants, estimation of cost of power generation; choice of plant site.

## Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

**Text & References:**

***Text &References:***


- Arora & Domkundwar, “A course in Power Plant Engineering”, Dhanpat Rai & Sons
- Black Veatch, “Power Plant Engineering”, CBS Publisher

# INDUSTRIAL AUTOMATION AND CONTROL

## Course Code: BTM 607 L:03 C:03

### Course Objective:

The objective of this course to identify potential areas for automation and justify need for automation and to select suitable major control components required to automate a process or an activity.

### Course Contents:

**Unit I**

Introduction: Automation in Production System, Principles and Strategies of Automation, Basic Elements of an Automated System, Advanced Automation Functions, Levels of Automations. Flow lines & Transfer Mechanisms, Fundamentals of Transfer Lines.

**Unit II**

Material handling and Identification Technologies: Overview of Material Handling Systems,Principles and Design Consideration, Material Transport Systems, Storage Systems, Overview of Automatic Identification Methods, Automated Manufacturing Systems.

**Unit III**

Quality Control Systems: Traditional and Modern Quality Control Methods, SPC Tools,Inspection Principles and Practices, Inspection Technologies.

**Unit IV**

Control Technologies in Automation: Industrial Control Systems, Process Industries versusDiscrete-Manufacturing Industries, Continuous Versus Discrete Control, Computer Process and its Forms.

**Unit V**

Modeling and Simulation for Plant Automation: Introduction, need for system Modeling,Building Mathematical Model of a Plant, Modern Tools & Future Perspective. Industrial Control Applications: Cement, Thermal, Water Treatment & Steel Plants

### Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

### Text &reference book


- M.P.Groover(2009),"Automation, Production Systems and Computer Integrated manufacturing", Pearson Education.5th edition.
- Krishna Kant(2010),"Computer Based Industrial Control", EEE-PHI, 2nd edition.
- Viswanandham (2013), Performance Modeling of Automated Manufacturing Systems" PHI, 1st edition.

# COMMUNICATION SKILLS - IV

**Course Code: BCS 601 L:01 C: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:

| 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:


- Business Vocabulary in Use: Advanced Mascull, 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 601 L:01 C: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 on behaviour and personality
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: FLF 601 L:02 C: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:

| 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 - VI

**Course Code: FLG 601 L:02 C: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:

| 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 – VI

**Course Code: FLS 601 L:02 C: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:

| Components | CT1 | CT2 | C | I | V | A |
|---|---|---|---|---|---|---|
| Weightage (%) | 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** **L:02 C: 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 is 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 sisters birthday. She was born in ….. (year). She lives in ……. (where). She is working (or studying)…… where… She lives in …….. (where.)

## 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, 3; Lesson 47-54

# OPERATIONS RESEARCH

**Course Code: BTM 701** **L:3 C:3**

**Course Objective**: In a rapidly changing environment an understanding is sought which will facilitate the choice and the implementation of more effective solutions, which, typically, may involve complex interactions among people, materials and money. Organizations may seek a very wide range of operational improvements - for example, greater efficiency, better customer service, higher quality or lower cost. Whatever the business, engineering aim, Operation Research can offer the flexibility and adaptability to provide objective help. This course introduces students to the principles of operational research.

Course Contents:

**Module I:** Introduction, Definition of operation Research, Characteristics and limitations of operation Research, Applications, advantages and disadvantages of operation Research, Linear Programming Formulation of problem. Graphical and Simplex method for maximization and minimization, Big M Method, Duality Theory and Sensitivity Analysis

**Module II:** Transportation Models, NWCR Method, Least Cost Method, Row Minima And Column Minima Method, Stepping Stone Algorithm, MODI Method And Vogel'S Approximation Method (VAM), Balanced, Unbalanced Transportation Problems and Problems of Degeneracy and Maximization.

**Module III:** Assignment Models, Hungarian Method, Assignment model for maximization and traveling salesman problems, Industrial Problems

**Module IV:** Queuing Theory Basic structured, Terminology, classification, (M/M/I) :(FCFS/∞/∞) Model, Birth and death process. Sequencing: Processing in jobs through machines with the same processing order. Processing of 2 jobs through machines with each having different processing order.

**Module V:** Network Models Introduction to PERT and CPM, Fundamental Concept of Network Models and Construction of Network Diagrams, PERT Activity, Time Estimates, Critical Path and Project Time Duration, Probability of Completing The Project On Or Before Specified Time, Float Of An Activity.

**Module VI:** Games Theory Zero Sum Two Person Competitive Games, Minimax And Maximini Principle Arithmetic, Algebraic, Matrix Algebra Method, Solution By Dominance, Sub Game, Graphical And Linear Programming Method.

**EXAMINATION SCHEME:**

| **Components** | **Other Components** | **Attendance** | **MTE** | **ESE** |
|---|---|---|---|---|
| **Weightage (%)** | 10 | 5 | 15 | 70 |

**Text & References:**


- HM Wagner, Principles of Operations Research, Prentice Hall
- Heizer, J. & Render B., Operations Management, Pearson Education (8/e), 2006
- PK Gupta and DS Hira, Operations Research, S. Chand & Co.
- Taha, Introduction to Operation Research, TMH
- F.S. Hiller and G.I. Libermann, Introduction to Operation Research, Holden Ray.

# MECHATRONICS

**Course Code: BTM 702 L:03 C:03**

## Course Objective:

Mechatronics is basically combination of mechanical and electronics engineering. With growing demands of automation of different mechanical operation this subject fulfills the needs. Main objective of this course is to provide knowledge of different combinations of mechanical and electronics processes and various software used in it.

## Course Contents:

**Module I: Introduction**
Measurement systems, control systems, Microprocessor-based controllers, Sensors and tranducers, Signal conditioning processes.

**Module II: Actuation Systems**
Pneumatic and hydraulic actuation systems, Directional control valves, pressure control valves, process control valves.

**Module III: System Models**
Mathematical models, Mechanical system building blocks, modeling dynamic systems, First order systems, Second order systems.

**Module IV: Principles of Feedback & Intelligent Control**
Control Systems, Open & Closed loop control Systems, Controllers, Artificial Neural Network.

## EXAMINATION SCHEME:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

## Text & References:

***Text:***

- W. Bolton, "Mechatronics", Pearson Education Ltd., 2003.

***References:***


- Mohammad Ali Mazidi Janice Gillispier Mazidi, "The 8051 Microcontroller", Pearson Education Inc., 2004.
- Gary Dunning, "Introduction to Programmable Logic Controllers", Thomson Asia P. Ltd., Singapore, 1998.
- Gopal K. Dubey, "Fundamentals of Electrical Drives", Narosa Publishing House, 2001.
- Charles H. Roth, "Jr. Fundamentals of Logic Design", Jaico Publishing House, 2001.
- "HMT Mechatronics", Tata McGraw Hill Publishing Co. Ltd., 2001.
- Devdas Shetty, Richard A. Kolk "Mechatronics System Design", Thomson Asia Pvt. Ltd., Singapore, 2001.
- A.K. Tayal, "Instrumentation & Mechanical Measurements", Galgotia Publication Pvt. Ltd., 2003.
- D. Rana Durgaiah, "Fluid Mechanics & Machinery", New Age Int. Publishers, 2004.
- Nitaigour Premchand Mahalik, "Mechatronics Principles, Concepts & Application", Tata McGraw Hill Publishing Co.Ltd, 2003.
- Mikell P. Groover, "Automation, Production Systems and Computer-Integrated Manufacturing", 2nd Edition, Prentice Hall, 2001.

# ELECTRICAL MACHINES

## Course Code: BTM 703 L:02 C:02

### Course Objective:

Electrical Machines provides the backbone for successful and uninterrupted smooth functioning of any industry. Knowledge of this subject in any engineering branch is vital in process industry. The course covers the machines e.g. Motors & generators characteristics and classifications related to mechanical & automation as well as recent development engineering applications. Successful completion of this course will be very helpful for the students who wish to join challenging industry.

### Course Contents:

**Module I**

Introduction to Subject, Some important fundamentals, Electrical Power generation, D C Machines, Construction Features, Principle of Operation.

**Module II**

DC Generator Analysis & DC Motor, Classification & Characteristics & Analysis. Speed Torque Characteristics, Speed control of D C Motor. Application of D C Motor. Starters.

**Module III**

A C Machines, 3 phase IM, Revolving Magnetic field theory, IM as a transformer, Equivalent Circuit. 3 phase Synchronous Machines, Synchronous Motor, Synchronous Generator, Equivalent Ckt.

**Module IV**

Single phase Induction Motor and classification, Double Revolving Field theory, Characteristics & typical Applications. Fractional Kilo Watt Hour Motor, Stepper Motor.

### EXAMINATION SCHEME:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

### Text & References:

***Text:***

- I J Nagrath & D P Kothari. “Electrical Machines”. TMH
- Irvin Kosow, “Electrical Machines & Transformers”, PHI.

***References:***

- B L Theraja “Electrical Engineering”.

# OPERATIONS RESEARCH LAB

## Course Code: BTM 721 C:01 P:02

**Course Contents:**

1. Program on C or C++ for Linear Programming.
2. Program on C or C++ for Simplex Problem.
3. Program on C or C++ for Assignment Problem.
4. Program on C or C++ for Transportation Problem.
5. Program on C or C++ for PERT, CPM Problem.
6. Program on C or C++ for Sequencing Problem.

**Examination Scheme:**

| IA | | | | EE | |
|---|---|---|---|---|---|
| **A** | **PR** | **LR** | **V** | **PR** | **V** |
| 5 | 10 | 10 | 5 | 35 | 35 |

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

# MECHATRONICS LAB

**Course Code: BTM 722 P:02 C:01**

## Course Contents:

## Name of Experiments:

1. To make the sequential operation
   $A^+ B^+ A^- B^-$ ; $A^+, B^+, B^- A^-$ using Pneumatic trainer

2. For the above write a ladder logic giving time delays

3. Design a Pneumatic Circuit for clamping type & operated by PLC

4. To make the sequential operation
   $A^+, B^+, A^-, B^-$ ; $A^+, B^+, B^- A^-$ using Hydraulic trainer kit.

5. For the above write a ladder logic giving time delays

6. Design a Hydraulic Circuit for clamping type & operated by PLC

7. To make the ladder logic for water level control & reaction vessel to detect different levels of water and switch off the water supply.

8. Starter Control & Star Delta Starter for ¼ HP AC. Motor to demonstrate the use of PLC Motor Starting

9. Design Fan operation using PLC

10. Design n a Lift Control

11. Design a pick & Place

12 Design Sequential Switching Motors

## Examination Scheme:

| IA | | | | EE | |
|---|---|---|---|---|---|
| **A** | **PR** | **LR** | **V** | **PR** | **V** |
| 5 | 10 | 10 | 5 | 35 | 35 |

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

# ELECTRICAL MACHINES LAB

## Course Code: BTM 723 P:02 C:01

### Course Contents:

| S. NO. | NAME OF THE EXPERIMENTS |
|---|---|
| 1. | Speed Control of DC Shunt Motor |
| 2. | To obtain magnetization characteristics of<br>1) Separately excited DC Generator<br>2) Shunt Generator |
| 3. | To obtain the load characteristics<br>1) DC Shunt Motor<br>2) Cumulative Compound generator |
| 4. | To conduct Swinburne Test on a DC. Shunt Motor and hence obtain its efficiency at full load. |
| 5. | To perform No Load Test and blocked rotor test on a three phase Induction motor and hence determine its equivalent circuit parameters. |
| 6. | To perform load test on a three phase Induction Motor and obtain its various performance characteristics. |
| 7. | Retardation Test on a three phase induction motor and calculate its moment of inertia. |
| 8. | To perform No Load and Blocked Rotor Test on a single phase Induction motor and hence determine its equivalent circuit parameters. |
| 9. | To perform open circuit and short circuit test on a three phase alternator and hence determine its voltage regulation by synchronous Impedance Method. |
| 10. | To obtain V curves of a three phase synchronous motor at no load. |

### Examination Scheme:

| IA | | | | EE | |
|---|---|---|---|---|---|
| **A** | **PR** | **LR** | **V** | **PR** | **V** |
| 5 | 10 | 10 | 5 | 35 | 35 |

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

# INDUSTRIAL TRAINING EVALUATION

## Course Code: BTM 750 C:06

### 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 |
| **Total** | **100** |

# SEMINAR

## Course Code: BTM 760 C:03

### Methodology:

Topics of project are to be based on the latest trends, verifying engineering concepts /principle and should involve elementary research work. For that, students need to select their project title and basic requirements to accomplish their project. The projects may involve design, fabrications, testing, computer modeling, and analysis of any engineering problem. At last, the students have to submit a report and give presentation the methodology used to accomplish their project.

### Examination Scheme:

| | |
|---|---|
| Synopsis Report | 50 |
| Viva | 25 |
| Synopsis Presentation | 25 |
| **Total** | **100** |

# AUTOMOTIVE ENGINEERING

## Course Code: BTM 704 L:03 C:03

### Course Objective:

This course emphasizes on constructional details of automotive vehicles which includes – Basic structure, engine, transmission systems, suspension systems, steering system, braking systems and wheels&tyres.

### Course Contents:

**Module I**

Introduction, Components of an automobile, basic engine terminology, engine cycles, working of an IC engine. Basic engine design considerations, constructional details of C.I. and S.I. engines. crank shafts, connecting rod, piston, values, cams, manifolds, air cleaners, mufflers, radiators, and oil filters.

**Module II: Transmission System**

Description and working of manually operated gearboxes like sliding mesh, constant mesh, synchromesh and epicycle; hydraulic torque convertor and its construction working and performance, sem-automatic and fully automatic transmission, Hydramatic transmission, analysis of differentials, live axles, construction working and requirements of overdrive.

**Module III:Steering System**

Introduction, Front axle, wheel alignment, Steering geometry, steering mechanisms, Ackerman steering, center point steering, power steering.

**Module IV: Suspension**

Objective, requirement, function, types Shock absorbers, Independent suspension, Stabilizer, air suspension, Hydroelastic suspension, Hydragas interconnected suspension.

**Module V**

Principle, braking requirements, brake efficiency, fading of brakes, types of brakes, bleeding of brakes, brake fluid.

### Examination:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

### Text & References:


- Kirpal Singh, “Automobile Engg.”, Vol. I & II, Standard Publishers, 2004
- N.K. Giri, “Automotive Mechanics”, Khanna Publishers
- Narang G.B.S., “Automobile Engg.”, Khanna Publishers
- Srinivasan, “Automotive Engines”, Tata McGraw Hill
- K.K. Jain & R.B. Asthana, “Automobile Engineering”, Tata McGraw Hill
- James D. Halderman and Chase D. Mitchell Jr., Automotive Engines- Theory and Servicing, Pearson Education, 2007

# AUTOMOTIVE ENGINEERING LAB

**Course Code: BTM 724** **P:02 C:01**

## Course Contents:

## List of Experiments:

1. Drawing Valve Timing Diagram
2. Determination of Firing Order of engine
3. Specification of engine
4. Study of different parts of engine
5. Study of Clutch
6. Study of Hydraulic Brake System
7. Study of Carburetor
8. **Study of various parts of Auxiliary systems**
9. **Study of Wheel**
10. **Study of emission system**
11. **Study of steering system**

## Examination Scheme:

| IA | | | | EE | |
|---|---|---|---|---|---|
| **A** | **PR** | **LR** | **V** | **PR** | **V** |
| 5 | 10 | 10 | 5 | 35 | 35 |

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

# ROBOTICS

**Course Code: BTM 705** **L: 03, C: 03**

**Course Objectives:**

- To understand the basic concepts associated with the design and functioning and applications of Robots.
- To study about the drives and sensors used in Robots
- To learn about analysing robot kinematics and robot programming

**Module I: Fundamentals of Robot**

Robot definition, Robot Anatomy, Co-ordinate Systems, Work Envelope, types and classification, Specifications Pitch, Yaw, Roll, Joint Notations, Speed of Motion, Pay Load Robot Parts and Functions –Need for Robots – Different Applications

**Module II: Robot Kinematics**

Forward Kinematics, Inverse Kinematics and Differences; Forward Kinematics and Reverse Kinematics of Manipulators with Two, Three Degrees of Freedom (In 2 Dimensional), Four Degrees of Freedom (In 3 Dimensional) –Deviations and Problems.

**Module III: Robot drive systems and End effectors**

Pneumatic Drives, Hydraulic Drives, Mechanical Drives, Electrical Drives, D.C. Servo Motors, Stepper Motor, A.C. Servo Motors – Salient Features, Applications and Comparison of Drives

End Effectors –Grippers – Mechanical Grippers, Pneumatic and Hydraulic Grippers, Magnetic Grippers, Vacuum Grippers; Two Fingered and Three Fingered Grippers; Internal Grippers and External Grippers; Selection and Design Considerations

**Module IV: Robot Sensing & Vision**

Various Sensors and their Classification, Use of Sensors and Sensor Based System in Robotics, Machine Vision System, Description, Sensing, Digitizing, Image Processing and Analysis and Application of Machine Vision System, Robotic Assembly Sensors and Intelligent Sensors.

**UNIT IV Robot Programming**

Teach Pendant Programming, Lead through programming, Robot programming Languages – VAL Programming – Motion Commands, Sensor Commands, End effecter commands, and Simple programs

**Module V: Industrial Applications**

Objectives, Automation in Manufacturing, Robot Application in Industry, Task Programming, Basics of AI, Goals of AI Research, AI Techniques, Robot Intelligence and Task Planning, Modern Robots, Future Application and Challenges and Case Studies.

**Evaluation:**

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

**Text & References:**


1. M.P.Groover,"Industrial Robotics Technology, Programming and Applications", McGraw-Hill, 2001
2. Fu.K.S. Gonzalz. R.C., and Lee C.S.G., "Robotics Control, Sensing, Vision and Intelligence", McGraw-Hill Book Co., 1987
3. Yoram Koren, "Robotics for Engineers", McGraw-Hill Book Co., 1992
4. Janakiraman. P.A.,"Robotics and Image Processing", Tata McGraw-Hill, 1995

# ROBOTICS Lab

**Course Code: BTM 725** **P: 02, C: 01**

1. Study of different type of links and joints used in robots
2. Study of components of robots with drive system and end effectors.
3. Determination of maximum and minimum position of links.
4. Demonstration of Cartesian/ cylindrical/ spherical robot.
5. Demonstration of Articulated/ SCARA robot.
6. To study the theory of sensory integration
7. verification of transformation (Position and orientation) with respect to gripper and World coordinate system
8. Virtual modelling for kinematic and dynamic verification any one robotic. Structure using suitable software.

**Examination Scheme:**

| **IA** | | | | **EE** | |
|---|---|---|---|---|---|
| A | PR | LR | V | PR | V |
| 5 | 10 | 10 | 5 | 35 | 35 |

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

# COMMUNICATION SKILLS - V

**Course Code: BCS 701 L:01 C: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.
- Taylor, Conversation in Practice,

# BEHAVIOURAL SCIENCE - VII
# (INDIVIDUAL, SOCIETY AND NATION)

**Course Code: BSS 701 L :01 C :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:

| Components | SAP | A | Mid Term Test (CT) | VIVA | Journal for Success (JOS) |
|---|---|---|---|---|---|
| Weightage (%) | 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
- 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.
- Robbins O.B.Stephen;. Organizational Behaviour

# FRENCH - VII

**Course Code: FLF 701 L:02 C: 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. Propositons 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:

| 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 2

# GERMAN - VII

**Course Code: FLG 701 L:02 C: 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:

| 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 - VII

**Course Code: FLS 701 L:02 C: 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:

| Components | CT1 | CT2 | C | I | V | A |
|---|---|---|---|---|---|---|
| Weightage (%) | 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 L:02 C: 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 vise-versa.
Short fables.

**Module V**
A brief summary of grammar.
The optative verb "yuanyi".
The pronoun "ziji".

## 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:

- "Kan tu shuo hua" Part-I Lesson 1-7

# REFRIGERATION AND AIR CONDITIONING

**Course Code: BTM 801** **L:3 C:3**

**Course Objective:** The aim of this course is to provide the students with the understanding of the basic principles of Refrigeration and Air Conditioning such that they could build simple mathematical models representing the conditioned space and its components used to control environmental conditions. The application of thermodynamics, heat transfer, and fluid mechanics includes an understanding of refrigerants and refrigeration systems, psychometrics, human comfort and air quality, calculation of heating and cooling loads, and heat and mass transfer processes and associated R & AC components and systems.

Course Contents:

**Module I:Introduction**

Refrigeration, Second law of thermodynamics, Unit of Refrigeration, Reversed Carnot Cycle, Bell Coleman Cycle, Necessity of cooling an aircraft, types of air refrigeration systems, Basic Cycle, Boot Strap Cycle, Regenerative cycle of air refrigeration of aircraft,

**Module II: Vapour compression Refrigeration system**

Vapour Compression Refrigeration System, various compression refrigeration cycles, and basic components of the plant, factors affecting COP of VCRS, Multiple Compression and Evaporation System, Cascading of VCRS

**Module III**: **Refrigerants**

Refrigerants, Classification of Refrigerants, Nomenclature of Refrigerants, Azeotropes, Secondary Refrigerants, Properties and choice of refrigerants, Eco-friendly Refrigerants

**Module IV:Vapour Absorption Refrigeration system**

Vapour Absorption Cycle, Electrolux System, Steam Jet Refrigeration, Vortex Tube, Application of Refrigeration Systems Cascading, Introduction to Cryogenics

**Module V:Psychrometrics**

Psychrometrics, Psychrometrics processes, Basic Components of Air conditioning system, comfort air-conditioning, ventilation requirements, cooling and dehumidification system, estimation of cooling and heating loads, air handling, air distribution, duct design, industrial air conditioning.

**EXAMINATION SCHEME:**

| **Components** | **Other Components** | **Attendance** | **MTE** | **ESE** |
|---|---|---|---|---|
| **Weightage (%)** | 10 | 5 | 15 | 70 |

Text & References:


- CP Arora, Refrigeration and Conditioning, Tata McGraw Hill
- Manohar Prasad, Refrigeration and Conditioning , Wiley Eastern Limited
- Jordan and Priester, Refrigeration and Conditioning, Prentice Hall of India
- WF Stoecker, Refrigeration and Conditioning, McGraw Hill.
- RS Rajput, Refrigeration and Air Conditioning, S K Kataria And Sons New Delhi

# COMPUTER AIDED MANUFACTURING

**Course Code: BTM 802** **L: 03, C: 02**

## Course Objective:

The aim of the course is to impart the students the basic and essential concepts in using Computer Assisted Manufacturing (CAM) and Computer Numerical Control (CNC) machines. Students will learn the basic concepts of manufacturing planning and control. They will be offered hands on experience in using CAM software to design, simulate and write CNC programs.

## Course Contents:

**Module I: Fundamental of CAM:**

CAM - concept and definition,NC (Numerical Control), CNC (Computerized Numerical Control) and DNC (Direct Numerical Control) - concept, features and differences, Advantages and limitations of CNC, Selection criteria for CNC machines.

**Module II:CNC Machines:**

CNC machines: Types, classification, working and constructional features, Spindle drives and axes drives on CNC machines, working and importance of Slide ways, Re-circulating ball screw, Feedback devices (transducers, encoders), Automatic tool changer (ATC), Automatic pallet changer (APC),CNC axes and motion nomenclature CNC tooling :Tool presetting,Tool holders- types and applications.

**Module III: CNC Turning & Machining Centers**

CNC turning & machining centers:Types, Features, Axes nomenclature, Specification, Work holding devices - types, working and applications, Tool holding and changing devices - types, working and applications.

**Module IV: CNC Part Programming:**

Programming format and structure of part programme, ISO G & M codes for turning and milling-applications of important codes, Simple part programming for turning using ISO format having straight turning, taper turning (linear interpolation) and convex/concave turning (circular interpolation), Simple part programming for milling using ISO format. Importance, types, applications and format for: Canned cycles, Macro, Do loops, Subroutine, importance of various compensations:Tool length compensation, Tool radius compensation, Tool offset, APT Programming, Example APT Part Programming(2D Machining only).

**Module V:Recent Trends in CAM:**

Flexible Manufacturing System (FMS) - concept, evaluation, main elements and their functions, layout and its importance, applications, Computer Integrated Manufacturing (CIM) - Concept, definition, benefits, Robotics-definition, terminology, classification and types, elements and applications.

## Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

## Text & References:

**Text:**


- Mikell P. Groover, "Automation, Production Systems and Computer-Integrated Manufacturing", 2nd Edition, Pentice Hall, 2001.
- Rao, Kundra&Tiwari, "Computer aided Manufacturing" Tata McGraw Hill, 2007.
- Numerical Control: by Koren, Khanna Publisher.


**References:**


- Mikell P. Groover, Emory W.Zimmers, "CAD/CAM", Pearson Education, 2006.
- P.N. Rao, "CAD/CAM Principles and Applications", Tata McGraw Hill, 2006.

# REFRIGERATION AND AIR-CONDITIONING LAB

**Course Code: BTM 821** **P:2, C:01**

Course Contents:

List of Experiments:

1. Study of refrigeration testing.
2. Study of Air-Conditioning testing.
3. To calculate the COP of Refrigerator.
4. Study of Ice Making Plant
5. Study of Water Cooler.
6. To calculate total Heat Load for Air-Conditioning unit.
7. To calculate the COP of Heat Pump

**EXAMINATION SCHEME:**

| IA | | | | EE | |
|---|---|---|---|---|---|
| **A** | **V** | **LR** | **TA** | **PR** | **V** |
| **5** | **5** | **10** | **10** | **35** | **35** |

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

# COMPUTER AIDED MANUFACTURING LAB

**Course Code: BTM 822** **P: 02, C: 01**

## Course Contents:

1. To conduct briefly study into various aspects of CNC machines.
2. To Study the preparatory and miscellaneous function of CNC codes.
3. Study exercise on Milling operations:
   - Circular Pocketing
   - Rectangular pocketing
   - Peck Drilling cycle
   - Boring operation
   - End drilling operation

4. Study exercise on Turning operations:
   - Simple facing
   - Simple turning operation
   - Step turning operation Circular Pocketing
   - Rectangular pocketing
   - Peek Drilling cycle
   - Boring operation
   - End drilling operation

5. Study the work holding and tool holding devices in the CNC lathe and machining centre and draw up their specifications and capacities.

## Examination Scheme:

| IA | | | | EE | |
|---|---|---|---|---|---|
| **A** | **PR** | **LR** | **V** | **PR** | **V** |
| 5 | 10 | 10 | 5 | 35 | 35 |

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

# PROJECT

**Course Code: BTM 860 C: 12**

## Methodology

Topics of project are to be based on the latest trends, verifying engineering concepts /principle and should involve elementary research work. The projects may involve design, fabrications, testing, computer modeling, 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 |
| **Total** | **100** |

# GEAR TECHNOLOGY

**Course Code: BTM 803 L:02, C:02**

## Course Objective:

The objective of gear technology is to provide information on gears, gear manufacturing, and the gear industry in general. This course includes information about hobbing, shaping, shaving, broaching and other gear manufacturing processes. It also covers gear design, gear engineering and related topics

## Course Contents:

**Module I: Introduction to gears**

Types of gears, Geometric and Kinetics characteristics, Undercutting and interference-correction, Non-Circular gears.

**Module II: Gear design**

Design of tools to make gear teeth, Kinds and cases of gear failures, Special Design Problems; Center distance problem, profile modification.

**Module III: Gear trains**

Problem Combined bending and Torsion of pinions with large length to diameter ratio, high speed gearing. Geneva Mechanisms (Analysis & Synthesis),

Gear Trains (Analysis & Synthesis)

**Module IV: Gear Set design**

Some example of optimal kinematics system Design; Gear Set design Design of sub-system consisting of Geneva wheel and elliptical gears for reduction of maximum acceleration of the wheel.

## Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

## Text & References:

***Text:***

- D.W. Dudley, “Practical Gear Design”, Tata McGraw Hill Co. Inc.
- S.S. Rattan, “Theory of Machines”, Tata McGraw Hill, 2000

***References:***

- AGMA (American Gear Manufacturing Association) Standards

# MATHEMATICAL MODELING

**Course Code: BTM 804 L:02, C:02**

**Module 1**

Modeling of macro and microscopic engineering (mechanical, electrical, electronics and chemical engineering) based advanced case studies (ultra rigorous) problems using first order and second order differential equations, Newton's law of cooling, simultaneous ODEs. Laplace Transforms.

**Module 2**

Application of complex algebra in computing advanced transient microscopic problems using analytic functions complex variable and Cauchy's theorem, Laurent's expansion, and theory of residues, Contour integration.

**Module 3**

Rugged Application of Bromwich's integral formula in mathematical modeling. Modeling using error function, gamma and beta function, Definite integrals by contour integration.

**Module 4**

Multi parameter based independent variable modeling and its effect on dependent variable using Laplace transform method, Separation of variables method, Wave equation, Heat and laplace equations, Orthogonal functions and Sturm-Liouville conditions under steady and unsteady state engineering based applications

## Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

## Text & References:


1. Edward A. Bender.. An Introduction to Mathematical Modeling.
2. A. C. Fowler.. Mathematical Models in Applied Sciences, Cambridge University Press.
3. J. N. Kapoor.. Mathematical Modeling, Wiley eastern Limited.
4. S.M. Ross ..Simulation, India Elsevier Publication.
5. A.M.Law and W.D.Kelton.. Simulation Modeling and Analysis, T.M.H. Edition.
6. Kreyszig, E., "*Advanced Engineering Mathematics*," 8th ed., John Wiley & Sons, 2000.
7. Gupta, S. K., "*Numerical Methods for Engineers*," New Age International Ltd., New Delhi, 1995.
8. Rice, R. G. and Do, D. D., "*Applied Mathematics and Modeling for Chemical Engineers*", John Wiley & Sons, New York, 1995.

# ADVANCED MANUFACTURING MACHINES

**Course Code: BTM 805 L:02, C:02**

### Module – I Machines based on Mechanical Process

Abrasive jet machine, Abrasive water jet machine, Ultrasonic machine.

### Module – II Machines based on Electrical & Chemical Process

Electrical discharge machine, Chemical machine, Electro chemical machine. .

### Module – III Machines based on Thermal Process

Laser beam machine, Plasma arc machine, Electron beam machine.

### Evaluation:

| Components | Other Components | Attendance | MTE | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 5 | 15 | 70 |

### Text & References:


- V. K. Jain, "Advanced machining process" allied publication pvt. Ltd., new delhi (2002), ISBN 81-7764-294-4.
- Pandey P. C. and Shan H. S., "Modern Machining processes", Tata Mcgraw-hill, New delhi (1980)
- Mc geough, "advanced methods of machining" chapman and hall. London, (1998)