Bansilal Ramnath Agarwal Charitable Trust's

# Vishwakarma Institute of Information Technology

Kondhwa Bk., Pune- 411048, Maharashtra, India

An Autonomous Institute affiliated to Savitribai Phule Pune University


# Curriculum for
# F. Y. B. Tech.
# (Common to all Branches)

## Department of
## Engineering and Applied Sciences

**Disclaimer:*

*The Academic board of VIIT shall reserve the right to modify the academic calendar, structure and curriculum, as and when required. Students are requested to be in constant touch with the department for any updation in academic calendar, structure and curriculum*

## VISION:

- Excellence in Technical Education

## MISSION:

- Make competent engineers with spirit of professionalism and responsible citizenship.
- Impart knowledge and technical skills of the highest standard.
- Prepare engineers to respond to the current and future needs of the industry higher studies as well as research.

## OBJECTIVE OF THE DEPARTMENT:

- To lay a strong foundation of basic and engineering sciences in First Year students of all programs.

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**Department of Engineering & Applied Sciences**

# ACADEMIC CALENDAR OF F. Y. B. TECH. FOR A. Y. 2017-18 SEMESTER I & II*

| Sr. No. | Activity | F.Y. B. Tech. | |
|---|---|---|---|
| | | Period of Activity | |
| | | Semester I | Semester II |
| 1 | Semester Registration | 25th – 29th July 2017 | 2nd -5th Jan 2018 |
| 2 | Address to F.Y. B. Tech. Students | 31st July 2017 | - |
| 3 | Induction Program | 1st – 14th Aug 2017 | - |
| 4 | Commencement of teaching | 16th Aug 2017 | 8th Jan 2018 |
| 5 | In Semester Examination T1 | 18th to 22nd Sept 2017 | 19th to 23rd Feb 2018 |
| 6 | In Semester Examination T2 | 24th to 28th Oct 2017 | 26th to 30th March 2018 |
| 7 | Conclusion of teaching | 29th Nov 2017 | 5th May 2018 |
| 8 | End semester examination | 1st to 8th Dec 2017 | 7th to 11th May 2018 |
| 9 | Oral/Practical examination | - | - |
| 10 | Provisional results and open house | 20th Dec 2017 | 28th May 2018 |
| 11 | Exam Grievances | 21st to 23rd Dec 2017 | 29th to 31st May 2018 |
| 12 | Revaluation | 26th to 28th Dec 2017 | 4th to 8th June 2018 |
| 13 | Revaluation results | 2nd Jan 2018 | 13th June 2018 |
| 14 | Re-exam registration | 3rd to 5th Jan 2018 | 14th to 16th June 2018 |
| 15 | Re-examination | 8th to 12th Jan 2018 | 18th to 22nd June 2018 |
| 16 | Final Results | 22nd Jan 2018 | 6th July 2018 |

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# Vishwakarma Institute of Information Technology, Pune-48

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## Department of Engineering & Applied Sciences

## Structure for First Year B. Tech. common to all branches with effect from academic year 2017 – 2018*

## First Year - Semester I

| Course Code | Course | Teaching Scheme | | | Examination Scheme | | | | | Total | Credits |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Formative Assessment | | | Summative Assessment | | | |
| | | L | T | P | ISE T1 | ISE T2 | CE | ESE | PR/ OR | | |
| ES11171 | Engineering Mathematics – I | 4 | | - | 15 | 15 | 20 | 50 | - | 100 | 4 |
| ES11172 | Mathematics Practice-I | - | 1 | - | - | - | 50 | - | - | 50 | 1 |
| CV11173 | Basic Civil Engineering | 3 | - | 2 | 15 | 15 | 20 | 50 | - | 100 | 4 |
| ET10174A/ ET10174B | Basic Electronics Engineering/Basic Electrical Engineering | 3 | - | 2 | 15 | 15 | 20 | 50 | - | 100 | 4 |
| ES10175A/ ES10175B | Engineering Physics / Engineering Chemistry | 3 | - | 2 | 15 | 15 | 20 | 50 | - | 100 | 4 |
| ME11176 | Engineering Graphics | 3 | - | 2 | 15 | 15 | 20 | 50 | - | 100 | 4 |
| ES11177 | English for Engineers – I | - | - | 2 | - | - | 50 | - | - | 50 | 1 |
| ME10178A/ CS10178B | Workshop practice#/Basics of Computer Programming | -/1 | - | 2 | - | - | 50 | - | - | 50 | 2 |
| A1 | Audit Course (Induction Program of two weeks) | - | - | - | - | - | - | - | - | - | - |
| | **Total** | **16/17** | **1** | **12** | **75** | **75** | **250** | **250** | **-** | **650** | **24** |

***Theory: 1Hr. = 1 Credit, Practical: 2 Hrs. = 1 Credit, #1 hr. = 1 Credit, Audit Course: No Credits***

***L= Lecture, T = Tutorial, P = Practical, PR = Practical Examination, OR = Oral Examination***

***ISE= In Semester Examination, ESE = End Semester Examination, CE = Continuous Evaluation***

***T 1= In Semester Examination 1, T 2= In Semester Examination 2***

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# Vishwakarma Institute of Information Technology, Pune-48

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## Department of Engineering & Applied Sciences

## Structure for First Year B. Tech. common to all branches with effect from academic year 2017 – 2018*

## First Year – Semester II

| Course Code | Course | Teaching Scheme | | | Examination Scheme | | | | | Total | Credits |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Formative Assessment | | | Summative Assessment | | | |
| | | L | T | P | ISE | | CE | ESE | PR/ OR | | |
| | | | | | T1 | T2 | | | | | |
| ES12171 | Engineering Mathematics – II | 4 | - | - | 15 | 15 | 20 | 50 | - | 100 | 4 |
| ES12172 | Mathematics Practice-II | - | 1 | - | - | - | 50 | - | - | 50 | 1 |
| ME12173 | Basic Mechanical Engineering | 3 | - | 2 | 15 | 15 | 20 | 50 | - | 100 | 4 |
| ET10174A/ ET10174B | Basic Electronics Engineering/Basic Electrical Engineering | 3 | - | 2 | 15 | 15 | 20 | 50 | - | 100 | 4 |
| ES10175A/ ES10175B | Engineering Physics / Engineering Chemistry | 3 | - | 2 | 15 | 15 | 20 | 50 | - | 100 | 4 |
| CV12176 | Engineering Mechanics | 3 | - | 2 | 15 | 15 | 20 | 50 | - | 100 | 4 |
| ES12177A/ ES12177B/ ES12177C | English for Engineers II / Foreign Language : German Foreign Language : French | - | - | 2 | - | - | 50 | - | - | 50 | 1 |
| ME10178A/ CS10178B | Workshop practice# /Basics of Computer Programming | -/1 | - | 2 | - | - | 50 | - | - | 50 | 2 |
| | **Total** | **16/17** | **1** | **12** | **75** | **75** | **250** | **250** | **-** | **650** | **24** |

***Theory: 1Hr. = 1 Credit, Practical: 2 Hrs. = 1 Credit, #1 hr. = 1 Credit, Audit Course: No Credits***

***L= Lecture, T = Tutorial, P = Practical, PR = Practical Examination, OR = Oral Examination***

***ISE= In Semester Examination, ESE = End Semester Examination, CE = Continuous Evaluation***

***T 1= In Semester Examination 1, T 2= In Semester Examination 2***

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# Semester – I

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## Department of Engineering & Applied Sciences

# Engineering Mathematics – I (ES11171)

**Teaching Scheme**
Credits : 4
Lectures : 4 Hrs/week

**Examination Scheme**
F. A. : 50 Marks
S. A. : 50 Marks

**Course objectives**

1. To develop the ability, to know the concepts of Engineering Mathematics and to apply these to solve engineering problems in various fields. The Tutorial sessions and assignments will help the students to practice more problems on all the topics mentioned in the course contents.

**Course Outcomes**

After successful completion of the course, student will be able to

1. Understand the concepts of matrices that serve as an essential basis for several computational techniques & the Vector approach with the help of Matrices.
2. Evaluate higher degree algebraic and transcendental equations and all integral roots of complex numbers.
3. Evaluate $n^{th}$ order derivatives & Apply Mean value theorems.
4. Select appropriate analytic techniques to test Convergence & divergence of Infinite Series. & apply Taylor's and Maclaurin's theorems for Expansions of functions.
5. Evaluate Partial derivatives of First & higher order.
6. Use knowledge of partial differentiation to evaluate the maxima and minima of two variables, Error analysis and approximations.

**Unit I - Linear Algebra**

**Self-Study components:** "Definition, Types of Matrices, Algebra of matrices, Elementary row and column operations, Inverse of matrix by Adjoint method".

Rank of a matrix, System of linear equations –consistency and inconsistency, Linear independence and dependence of vectors, linear transformation, Eigen values and Eigen vectors of a matrix, Cayley-Hamilton's Theorem

**Unit II - Complex Numbers**

**Self-Study components:** "Definition of complex number, modulus, argument. Algebra of complex numbers, Trigonometric formulae".

Argand's diagram, Polar and exponential forms, De Moivre's Theorem, Roots of complex number, Solution of algebraic equations, Hyperbolic functions, Logarithm of complex number.

**Unit III –Calculus of Functions of One Variable**

**Self-Study components:** "Derivatives and Trigonometric formulae".

Successive differentiation, Leibnitz's theorem, Mean value theorem (Lagrange's Theorem, Rolle's theorem, and Cauchy's Theorem).

| |
|---|
| **Unit IV -Infinite Series** |
| **Self-Study components:** "Sequences and standard limits".<br>Convergence and divergence of infinite series, comparison test, ratio test, Raabe's test, $n^{th}$root test, Leibnitz's test, absolute and conditional convergence.<br>Expansions of functions using Taylor's and Maclaurin's series. |
| **Unit V - Partial Differentiation** |
| **Self-Study components:** "Concepts of derivatives and derivative formulae".<br>Partial Derivatives, Partial Derivatives of composite functions, Euler's Theorem on Homogeneous Functions, Implicit functions, Total Derivatives, Change of Independent Variables. |
| **Unit VI - Application of Partial Differentiation** |
| **Self-Study components:** "Determinants, maxima and minima of functions of single variable".<br>Jacobians and their applications. Errors and Approximations, Maxima and Minima of Functions of two variables, Lagrange's method of undetermined multipliers |
| **Text Books** |
| 1. Higher Engineering Mathematics Dr. B. S. Grewal, Khanna Publications<br>2. Applied Engineering Mathematics by P. N. Wartikar and J. N. Wartikar, Pune Vidyarthi Griha Prakashan. |
| **Reference books:** |
| 1. Advanced Engineering Mathematics By Erwin Kreyszig, Wiley Publications.<br>2. Advanced Engineering Mathematics By O'Neil, Cengage India. |

## Department of Engineering & Applied Sciences

# Mathematics Practice– I (ES11172)

**Teaching Scheme**
Credits : 1
Lectures: N.A.
Tutorial Work : 1Hr/week

**Examination Scheme**
F. A. : 50 Marks
S. A. : -

| |
|---|
| **Course objectives**<br>1. To develop the ability to solve engineering problems in various fields. |
| **Course Outcomes**<br>After successful completion of the course, student will be able to<br>1. Apply the concepts of matrices that serve as an essential basis for several computational techniques & the Vector approach with the help of Matrices.<br>2. Solve higher degree algebraic and transcendental equations and all integral roots of complex numbers.<br>3. Apply Mean value theorems& Evaluate $n^{th}$ order derivatives.<br>4. Select appropriate analytic techniques to test Convergence & divergence of infinite series& apply Taylor's and Maclaurin's theorems for Expansions of functions. |
| **Tutorial 1** |
| Rank of a matrix, System of linear equations –consistency and inconsistency |
| **Tutorial 2** |
| Linear independence and dependence of vectors, linear transformation, Eigen values and eigenvectors of a matrix |
| **Tutorial 3** |
| Argand's diagram, Polar and exponential forms, De Moivre's Theorem, Root of complex number |
| **Tutorial 4** |
| Successive differentiation, Leibnitz's theorem |
| **Tutorial 5** |
| Mean value theorem ( Roll's theorem, Lagrange's Theorem, , Cauchy's Theorem) |
| **Tutorial 6** |
| Infinite series |
| **Assignment on Matrices and complex numbers** |
| **Assignment on successive derivatives, infinite series and mean value theorems.** |
| **Text Books** |
| 1. Higher Engineering Mathematics Dr. B. S. Grewal, Khanna Publications<br>2. Applied Engineering Mathematics by P. N. Wartikar and J. N. Wartikar, Pune Vidyarthi Griha Prakashan. |
| **Reference books:** |
| 1. Advanced Engineering Mathematics By Erwin Kreyszig, Wiley Publications.<br>2. Advanced Engineering Mathematics By O'Neil, Cengage India. |

## Department of Engineering & Applied Sciences

# Basic Civil Engineering (CV11173)

**Teaching Scheme**
Credits : 4
Lectures : 3Hrs/week
Laboratory Work : 2Hrs/week

**Examination Scheme**
F. A. : 50 Marks
S. A. : 50 Marks

**Course Objectives**

To introduce to the students –

1. Basic construction materials, field survey techniques and components of building.
2. Principles of building planning and building bye laws
   Infrastructure development, modes of transport systems and water supply and sewage treatment methods.

**Course Outcomes:**

Upon completion of this Course, the students will be able to –

1. **Relate** Civil engineering with other Engineering branches
2. **Identify** and **describe** the components of a building
3. **Demonstrate** simple and differential levelling work and **calculate** reduced levels of stations
4. **Interpret** principles of planning buildings, building bye laws, etc. and **study** building plans
5. **Examine** components of various transportation systems and **compare** modes of transportation
6. **Understand** types of dam, components of water supply scheme, water conservation and rainwater harvesting
7. **Discuss** significance of air pollution, noise pollution, water pollution, e-waste management, and sewage treatment system

**Unit I - Introduction to Civil Engineering**

a. Role of civil engineer in the construction of various infrastructure projects for 21st century. Importance of interdisciplinary approach in engineering
b. Introduction to major areas of Civil Engineering: Surveying and Planning, Structural Engineering, Hydraulics and Hydrology, Geotechnical and Foundation Engineering, Environmental Engineering, Transportation Engineering, Construction Technology and Management.

**Unit II - Materials and Components of Buildings**

a. Use of basic materials: cement, bricks, stone, natural and artificial sand, reinforcing steel-Mild steel, High Yield Strength Deformed Bars, FRP, cast-in-situ concrete, PCC, RCC, pre-stressed and pre-cast concretes, smart and eco-friendly materials.
b. Substructure- Bearing capacity of soil, Concept of settlement, functions of foundation, types of shallow foundation and introduction to pile foundation. (End Bearing and Friction)
c. Superstructure - Types of loads: - DL and LL, wind loads, earthquake considerations. Types of construction-load bearing and framed.

**Unit III - Field surveys**

a. Principles of surveying, classification of surveys, nominal scale and R.F., ranging, chaining and offsetting, location sketch, various types of surveying instruments and their uses.
b. Terms used in levelling, use of Dumpy level and Auto Level, temporary adjustments. Methods of reduction of levels, types of levelling, contours, characteristics of contours, use of contour maps.

c. Introduction and use of Digital Planimeter, GPS and Total Station.1

**Unit IV – Built Environment**

a. Principles of planning, viz. aspect, prospect, roominess, grouping, privacy, circulation, sanitation, orientation, economy.
b. Introduction to building bye laws and role of by-laws in regulating the environment. Concepts of Built up area, Carpet Area and F.S.I., Concept of green building. Smart City guidelines.

**Unit V - Introduction to Infrastructural Engineering**

a. Significance of Infrastructural Engineering, transportation modes: roadways, railways (metro rail, monorail, bullet train etc.), airways and waterways (sea and river).
b. Introduction to bridges, airports, docks and harbours. Factors affecting site selection.
c. Introduction to intelligent transport systems- Interdisciplinary applications

**Unit VI - Environmental Engineering**

a. Sources, causes, effects and control measures associated with Air pollution, Noise pollution and water pollution.
b. Types of Dams (Earthen and Gravity Dam), Introduction to physical, chemical and biological characteristics of water and waste water. Components of Water Supply Scheme and Sewage Treatment Plant for a town (flow diagram)
c. Solid waste management and E- Waste management.
d. Rain water harvesting and water conservation

**List of experiments**

Experimental work comprises of **any 6** exercises out of the following. (Readings in the field book, files and sheets)

1. Simple levelling exercise with dumpy/auto level.
2. Differential levelling exercise (at least 2 change points) with dumpy/auto level and obtaining RLs by using Collimation Plane and Rise and Fall Method.
3. Measurement of area of irregular figures by Digital Planimeter.
4. Drawing of plan elevation and section for a residential building, single storeyed framed or load bearing structure. Preparing schedule of wall openings [On half imperial sheet]
5. Determination of coordinates of a traverse using Global Positioning system (GPS)
6. Measurement of distance by Total Station
7. Poster presentation on Water Supply Scheme/ Sewage Treatment Plant/ Solid Waste Management/E-waste Management
8. Measurement of ambient noise by using noise meter.

**Text Books**

1. Surveying- N.N. Basak, Tata Mc-Graw Hill
2. Basic Civil Engineering- G. K. Hiraskar, Dhanapat Rai Publications.
3. Building Construction and Drawing- Bindra and Arora, Dhanapat Rai Publications.

**Reference Books :**

1. Building Construction and Drawing- Sushil Kumar, Standard Publications, Delhi.
2. Surveying and Levelling- Kanetkar and Kulkarni, PVG Publications.
3. Water Supply Engineering- S.K. Garg, Khanna Publishers, Delhi
4. Sewage Disposal and Air Pollution Engineering, S.K. Garg, Khanna Publishers, Delhi
5. Irrigation Engineering- B. C. Punmia, Dhanapat Rai Publications

## Department of Engineering & Applied Sciences

# Basic Electronics Engineering (ET10174A)

**Teaching Scheme**
Credits : 4
Lectures : 3Hrs/week
Laboratory Work : 2Hrs/week

**Examination Scheme**
F. A. : 50 Marks
S. A. : 50 Marks

**Course Objectives:**

1. To impart knowledge of semiconductor devices, their characteristics & applications.
2. To familiarize the students with different types of transducers & their practical applications.
3. To expose the student to various measuring instruments & their usage in analysis and testing electronic circuits.
4. To introduce basic logic gates & simple building blocks of digital electronics.

**Course Outcomes**

Students should be able to -

1. Identify basic electronic components and devices.
2. Illustrate, explain and demonstrate working of simple electronic circuits based on Diodes, BJTs, FETs and SCR.
3. Illustrate, explain and demonstrate working of simple Linear Integrated circuits using OP-AMPs.
4. Compare functioning of logic gates based on truth tables and to build basic combinational and sequential circuits.
5. Demonstrate familiarity with concepts of various transducers and their applications.

**Unit I –Introduction to Electronics Engineering and Circuits**

Introduction to different areas of Electronics and their applications in Engineering, Characteristics of P-N Junction Diode, Diode applications- Half-wave rectifier, Full-wave rectifiers(center tapped ,Dual complementary bridge rectifier), Capacitor Filters, Zener diode- working, Characteristics, & its applications, Light Emitting Diodes (LED) and Photodiodes & their application.

**Unit II - Bipolar Junction Transistor (BJT) Circuits**

BJT types, structure, operation and Characteristics, Transistor in Common-Emitter CE, Common Base CB, Common Collector CC configuration, DC load line, Transistor as a CE amplifier, Transistor as a switch.

**Unit III -Field-Effect Transistor (FET) & Power Devices**

Construction, working and Characteristics of Metal–oxide–semiconductor field-effect transistor (E-MOSFET) Power Devices- Construction, working, characteristics and applications of Silicon-Controlled Rectifier (SCR), TRIAC.

**Unit IV - Linear Integrated Circuits**

Introduction to operational amplifiers, Block diagram of OP-AMP, Ideal parameters of OP-AMP, Negative feedback, Inverting & Non inverting Amplifier, Comparators, Summing amplifier, Difference amplifier.
Voltage Regulator – 3 terminal Fixed & variable.

**Unit V - Digital Electronics**

Introduction, Basic Logic Gates-AND, OR, NOT, NAND, NOR, EX-OR, Boolean algebra, , Half adder, Full adder, Multiplexers, De-multiplexers, Flip-Flops – SR-FF, D-FF & their applications.

**Unit VI - Transducers**

Introduction to Transducer, Characterstics of Transducer, Types of transducer-Active &Passive, Temprature Transducer RTD & thermistor, Pressure Transducer-Strain Gauge, pizoelectric, Displacement Transducer- Linear variable differential Transducer (LVDT), Flow measurement.

**List of Experiments (Any Six)**

1. **Identify different electronic components and compare its values (if applicable) by using DMM and colour codes.**
   a. Resistors (Carbon Film, Metal Film, Wire Wound, Variable )
   b. Capacitors (Electrolytic, Mica , Ceramic , Variable)
   c. Inductors, Transformers
   d. Connectors, Switches
2. **Demonstration of CRO for its usage in test and measurements.**
   To study and set up CRO for demonstrating its use in the test and measurement of frequency, phase, AC & DC Voltages.
3. **Demonstration of DMM & Function generator for its usage in test and measurements.**
   a. Study and use of DMM for the measurement of electrical parameters like AC and DC voltage /current.
   b. To use various controls of a signal generator for generating different types of signals at different frequencies and observe it on CRO.
4. **Single Stage BJT Common Emitter amplifier circuit.**
   For a given BJT CE Amplifier circuit,
   a. Identify pins of a BJT (such as BC547) and study of its data sheet specifications.
   b. To measure voltages and observe waveforms at input and output terminals of Single stage BJT Common Emitter amplifier circuit.
   c. Calculate voltage gain and plot frequency response of the amplifier and calculate the band width.-
5. **Op-amp based amplifiers circuits.**
   a. Identify pins of an Op-amp (such as LM741).
   b. Implement Inverting & Non inverting DC Amplifiers.
6. **Digital circuits.**
   a. Identify pins of Digital Logic Gates ICs such as AND, OR, NOT, ex-OR, NAND (TTL Logic family) & verify truth-table of AND gate and OR gate.
   b. Implement Half and Full Adder circuit with basic logic gate ICs.
7. **Observe the given AC voltage and its rectified output and measure Load Regulation of FWR with variable resistive load (rheostat).**
8. **Demonstration of working of transducer (Thermistor) and its applications.**

**Text Books**

1. Floyd, "Electronic Devices and Circuits", Pearson Education.

2. Robert L. Boylestad, Louis Nashelsky-"Electronic Devices and Circuit Theory" -Prentice Hall
3. Floyd, "Digital Fundamentals", Pearson Education
4. H.S. Kalasi "Electronic Instrumentation", Tata McGraw Hill

**Reference Books**

1. Albert Malvino, "Electronic principles", 7th Ed, TataMc-Graw-Hill.
2. John G. Webster, "The Measurement, Instrumentation & sensors Handbook", CRC Press.
3. Ramakant Gaikwad, "Linear Integrated Circuits", Pearson Education.
4. C S Rangan, G R Sharma , VSV Mani, "Instrumentation Devices and systems", 2nd edition Tata McGraw Hill

## Department of Engineering & Applied Sciences

# Basic Electrical Engineering (ET10174B)

**Teaching Scheme**
Credits : 4
Lectures : 3Hrs/week
Laboratory Work : 2Hrs/week

**Examination Scheme**
F. A. : 50 Marks
S. A. : 50 Marks

**Course Objectives:**
To enable the learner to understand and apply basic concepts of electrical engineering.

**Course Outcomes:**
After completion of this course students will be able to
1. Understand concepts and apply theorems to D.C. Circuits.
2. Understand concepts of single phase ac circuits.
3. Understand concepts of three phase ac circuits.
4. Understand working of the single phase transformer.
5. Understand working, characteristics and applications of DC and AC motors.
6. Understand importance of energy conservation.

**Unit I – DC Circuits**

Overview of electrical engineering and its scope, Ohm's law, Classification of electrical networks, Source transformation, Star-Delta conversions, Kirchhoff's laws, Superposition theorem, Thevenin's theorem.

**Unit II – Single phase AC Circuits**

Fundamentals of AC circuits: Average value, RMS value, peak factor, form factor, AC applied to pure R, L, C circuits, R-L, R-C, R-L-C series circuits with phasor diagrams and series resonance. Concept of power factor. Active, reactive and apparent power in series circuits.

**Unit III – Three phase AC Circuits**

Concept of three phase supply and phase sequence, Balanced load and unbalanced load, Voltage, current and power relations in three phase star connected and delta connected balanced loads along with phasor diagram, Power measurement in balanced load using two wattmeter method.

**Unit IV –Single Phase Transformers**

Faraday's laws of electromagnetic induction, Construction, principle of working, e.m.f. equation, transformation ratio, losses, calculation of voltage regulation and efficiency. Descriptive treatment of autotransformers and instrument transformers (CT/PT).

**Unit V - DC Machines**

Working principle: generating and motoring action, constructional features, action of commutator and types of dc machines. Concept of back e.m.f., Characteristics and applications of dc motors. Necessity of starters, Three point and four point starters.

**Unit VI - AC Machines**

Concept of rotating magnetic field, Construction and working principle of three phase induction motor, Concept of slip, Reversal of direction of Induction motor, torque- slip characteristics and applications of three phase induction motor. Working principle, types and applications of single phase induction motor.

**List of Experiments: ( experiments 1 and 9 are compulsory, any 4 from rest of the experiments)**

1. Study of safety precautions, Earthing and Megger.
2. Wiring Exercise and study of various types of lamps.
3. Verification of Kirchhoff's laws and Superposition theorem for D.C. circuits.
4. Study of single phase series R-L-C circuit.
5. Verification of current and voltage relations in three phase balanced star and delta connected loads.
6. Measurement of active and reactive power in three phase balanced load using two wattmeter method.
7. Direct loading test on a single phase transformer.
8. Study of DC motor starters(Three point and four point starters).
9. Study of energy conservation and visit to substation.

**Text Books**

1. A Textbook of Electrical Technology Volume- I and volume II –B. L. Theraja, S. Chand and Company Ltd., New Delhi.
2. Basic Electrical Engineering - V. K. Mehta, S. Chand and Company Ltd., New Delhi.
3. Basic Electrical and Electronics Engineering - S. K. Bhattacharya, Pearson Education.

**Reference Books**

1. Electrical Technology- Edward Hughes, Seventh Edition, Pearson Education.
2. Theory and problems of Basic Electrical Engineering- I. J. Nagrath and Kothari, Prentice-Hall of India Pvt. Ltd.
3. Principles of Electrical Engineering - Del. Toro, Prentice-Hall.
4. Electric Machines - I.J. Nagrath and D.P. Kothari, Third Edition, McGraw-Hill.
5. Electrical Machines - R.K. Rajput 4th Edition, Laxmi Publications.

## Department of Engineering & Applied Sciences

# Engineering Physics (ES10175A)

**Teaching Scheme**
Credits : 4
Lectures : 3Hrs/week
Laboratory Work : 2Hrs/week

**Examination Scheme**
F. A. : 50 Marks
S. A. : 50 Marks

**Course Objectives**

To teach fundamental principles in Physics and relate the understanding to applications and laboratory experiments

**Course Outcomes**

The student will be able to

1. Explain basic principles of sound and ultrasound, use them in simple engineering applications and be aware of harmful effects of sound pollution and its mitigation
2. Explain basics of wave optics (interference and diffraction) and use them in engineering applications
3. Explain basics of Semiconductor Physics and use them in understanding working of diodes
4. Explain the basics and relevance of solar energy applications
5. Explain the basics of lasers, working of $CO_2$ and diode lasers and their applications
6. Explain the basics and relevance of nuclear energy
7. Relate laboratory experiments to theory
8. Gather technical information and collate and give a presentation/ make a working or display model

**Unit I - Sound and Ultrasound**

(a) Definitions of Intensity, Loudness (Weber Fechner's Law), intensity level, pitch and timbre of sound, Reflection of sound, echo. Numericals on intensity, intensity level and echo. Reverberation, absorption of sound, absorption coefficient of materials, Sabine's formula for reverberation time (qualitative only), noise and its types, Numericals on reverberation time. Factors affecting the acoustics of auditorium and remedies

(b) Effect of noise pollution on humans and mitigation

(c) Non-destructive testing (NDT) using Ultrasonic waves: Piezo-electric materials, generation of ultrasound (schematic electronic circuit) by Piezo-electric oscillator, Propagation of ultrasound and detection of echo, velocity of ultrasound in different materials, fault detection. Numericals on Ultrasound NDT

Self study (any one):
1) Physics of human ear and sound level meter
2) Basic Principles of Music
3) Choice of frequency for Ultrasonic applications
4) Music Synthesizer
5) Public Address system
6) Dissipation of sound &Ultrasound in propagation media
7) Stereoscopic sound system
8) Career opportunities in NDT

**Unit II - Wave Optics**

(a) Interference – Conditions for steady interference pattern, Temporal coherence for division of amplitude, spatial coherence for division of wave front, concept of thin film, interference due to thin film of uniform(with derivation), applications: in-situ thickness measurement and anti-reflection coating using interference of light, Numericals on uniform thin film. Interference due to wedge shaped film (qualitative discussion), band width (derivation).Applications: Flatness of surface, thickness of film on substrate. Numericals on band width, wedge angle, etc.
(b) Diffraction – Definition, types of diffraction, Fraunhofer's diffraction at single slit, conditions for maxima and minima, intensity pattern (derivation using phasor diagram), Rayleigh's criterion for resolution of 2 point objects, resolving power of slit and aperture. Numericals on diffraction from slit and aperture. Fraunhofer diffraction from a diffraction grating, Conditions for Principal Maxima, minima, intensity pattern (derivation), resolving power and dispersion of diffraction grating. Numericals on grating.
UV-Vis-IR Spectrometer using diffraction grating, Source of light, Collimator, Grating, Focusser, Array light detector, Numericals on spectrometer.

Self-study (any one): 1) Physics of human eye and camera
2) Thirty meter Telescope/GMRT
3) Charge Coupled Device (CCD) for monochrome and colour images
4) CMOS Array device for monochrome and colour images
5) Non-reflection coating
6) Career opportunities in Ray, Wave or Quantum Optics

**Unit III - Semiconductor Physics**

Free electron theory, opening of band gap due to internal electron diffraction from lattice, band theory, Density of states, Fermi-Dirac distribution function, Carrier density in intrinsic semiconductors, position of Fermi energy, Effective density of states, Carrier density in extrinsic semiconductor, position of Fermi energy, Effective density of states, Numericals on carrier density, Fermi Dirac Distribution, etc.
p-n junction diode. Charge density, potential and electric around the junction, and band structure of unbiased diode. Barrier potential, Working of p-n junction diode in the forward and reverse bias on the basis band structure, Ideal diode equation, Numericals on barrier potential, transport, ideal diode equation, etc. Zener/ Avalanche mechanisms on the basis of band picture

Self Study (any one): 1) Lithography technique for fabrication of electronic device
2) Ion Implantation and annealing for doping
3) Single crystal growth of Silicon by Czokralski method
4) Opto-electronic properties of nano-materials and photonics
5) Miniaturization and speed of electronic devices
6) Heating problem in electronic devices and mitigation
7) Career opportunities in VLSI

**Unit IV – Solar Energy**

Solar electromagnetic spectrum, Air Mass, Solar radiation at mean sea level for AM1 and AM1.5, Variation of solar radiation within a day, within a year, with latitude and altitude. Solar technologies: (i) Solar Photovoltaic (PV) and (ii) Solar thermal.
Solar PV Cell, I-V characteristics, Deviation from ideal due to Series resistance, parallel resistance, Fill factor, Numericals on IV characteristics related parameters. Comparison between Mono-crystalline and poly-crystalline Si cells, Maximum power point, Quantum efficiency of a PV cell,
Design strategies to increase efficiency: (i) Anti-reflection coating (ii) surface texturing (iii) light trapping (iv) metal contact design to decrease shading losses. PV panel - series and parallel connections, hot spot and bypass diode, fabrication of a solar panel, panel specifications, Maximum power point variation due to change in intensity of light and temperature, Electrical energy storage in batteries, inverter and overall efficiency. Numericals on parallel, series combinations of solar cells. Futuristic DC micro-grid. Pros and Cons of Solar energy.

Self study (any one):
1) How green is Solar PV electricity?
2) Use of UV-Vis-IR Spectrometer for selection of solar PV materials
3) Review of solar cells discovered till now
4) Review of renewable energy sources
5) Career opportunities in renewable energy sector
6) Net metering, existing laws for use of solar PV power
7) Return on investment and pay-back time

**Unit V - Lasers**

Understanding working of laser in terms of meta stable state, pumping, population inversion, spontaneous emission, stimulated emission and resonance cavity, Typical lasers like Ruby, Nd: YAG, fibre, He-Ne, $CO_2$, Diode, etc. and their pumping mechanisms. Construction and working of $CO_2$ laser, $CO_2$ laser parameters: divergence, power, intensity, monochromaticity, coherence Numericals on population inversion, resonance cavity, divergence, intensity, etc. Industrial applications of $CO_2$ laser like metal sheet cutting, drilling, welding etc. Construction and working of hetero-structure diode laser, Intensity versus threshold current, ac operation for generation of digital data. Numericals on intensity, etc. Optical fibre communication: Basics of propagation of light through Optical fibre, Coupling of light source to optical fibre, and converting light from optical fibre to electrical signal, Comparison of optical fibre communication with wired and Radio communication.Numericals on NA, total internal reflection, etc. Bio-medical applications of lasers

Self study (any one):
1) Review of lasers discovered till now
2) Use of diode laser in ranging
3) Use of diode laser in CD/DVD
4) Use of diode laser in colour Laser printer
5) Important factors for use of lasers in bio-medical application
6) Career opportunities in Lasers
7) Research Institutes developing lasers in India
8) Industries manufacturing lasers in India

**Unit VI - Nuclear Energy**

Quantum Mechanics of Nucleus. Schrodinger time independent equation. Particle in a rigid box

(quantitative), Particle in a semi-rigid box and tunnelling effect (qualitative). Approximation of nuclear potential energy curve. Activation energy for fission of heavy nucleus and energy gain. Binding energy curve and energy generated by fission of U. Numericals on energy generated.Isotopes of Uranium. Neutron interaction with $U^{235}$ and $U^{238}$. Neutron as provider of activation energy and destabilizer of nucleus. Multiplication factor k, chain reaction and critical mass. Neutron cycle affecting criticality of thermal fission reactor with natural Uranium. Numericals on chain reaction.Role of moderator. Selection of moderator. Reactor poisoning. Coolant, heat exchanger and turbine (qualitative). Reactor power and fuel consumption. Numericals on power and fuel consumption. Breeder reactors (qualitative). Hazards and safety norms. Pros and cons of different energy sources and the future of energy requirement

Self study (any one):
1) Review of career opportunities in Nuclear establishments in India
2) Comparison of Fission and Fusion as energy sources
3) Role of Nuclear Supplier Group in nuclear energy sector
4) Survey of Nuclear reactors in India and the world
5) Comparative study of all forms of energy used by mankind
6) Importance of energy in the human civilization
7) Nuclear proliferation and dangers to mankind

**Laboratory Work**

**A) List of experiments (6 out of the following experiments)**

1. To determine band gap of a semiconductor from temperature dependence of its electrical resistance
2. To determine the Photoconductivity of Si and Ge
3. To determine the Planck's constant using photocell
4. To determine the I-V characteristics and parameters of a Solar cell
5. To determine the Hall coefficient and number density of charge carriers of a semiconductor
6. To determine thermal expansion of a given material
7. To determine the beam profile and divergence of a laser beam
8. To determine the Thermal conductivity of a bad and good conductor by Lee's and Sear's method, respectively
9. To determine radius of curvature of plano-convex lens by Newton's rings method
10. To determine the temperature using Pt100 and/or semiconductor temperature sensor and calibrate a carbon resistor
11. To determine the wavelength of light using diffraction grating and compare diffraction pattern for green and red laser
12. To determine the concentration of sugar in solution using a Polarimeter
13. To determine the ultrasonic velocity in a liquid using Ultrasonic interferometer
14. To find a fault in a solid using ultrasonic echo technique
15. To determine thermal diffusivity in a ceramics material
16. To record and render 3D image using polarization
17. To determine sound absorption coefficient of materials
18. To determine sound pressure level.

**B)Project based learning**

**Text Books**

1. A text Book of Engineering Physics – M N Avadhanulu and P G Kshirsagar, S Chand & Co. Ltd.
2. Sears and Zemansky's University Physics – Hugh D Young and Roger A Freedman, Pearson Education
3. A Textbook of Optics – N Subrahmanyam and BrijLal, S Chand Publications

**Reference Books**

1. Fundamentals of Physics – Halliday, Resnick and Walker, Wiley Publications
2. Acoustics – S N Sen, New Age International Publisher
3. Introduction to Acoustics – R D Finch, Prentice-Hall of India
4. Acoustics – Heinrich Kuttruff, CRC Press
5. Optics – AjoyGhatak, Tata McGraw Hill
6. Fundamentals of Optics – Jenkins and White, Tata McGraw Hill
7. Concepts of Modern Physics – Arthur Bieser, Tata McGraw Hill
8. Perspectives of Modern Physics – Arthur Bieser, Tata McGraw Hill
9. A course on Experiments with He-Ne Laser – R S Sirohi, New Age International Publishers
10. Introduction to Solid State Physics - C. Kittel, Wiley Publications
11. Principles of Solid State – H V Keer, New Age International
12. Semiconductor Device Fundamentals – R F Pierret, Pearson
13. Physics of Semiconductor Devices – S M Sze and K K Ng, Wiley
14. Electronic Principles – Albert Malvino and David Bates, McGraw Hill
15. Integrated Electronics J Millman, C Halkias, McGraw Hill
16. Solar Physics – G N Tiwari, Narosa Publications
17. Solar Energy –S P Sukhatme, McGraw Hill
18. Solar Photovoltaic - C S Solanki, PHI Learning
19. Nuclear Physics - J Lilley, Wiley India

## Department of Engineering & Applied Sciences

# Engineering Chemistry (ES10175B)

**Teaching Scheme**
Credits : 4
Lectures : 3Hrs/week
Laboratory Work : 2Hrs/week

**Examination Scheme**
F. A. : 50 Marks
S. A. : 50 Marks

**Course objectives:**

1. To understand water technology for water softening/ purification
2. To study instrumental methods of analysis and supplement the learning with hands on experience in the chemistry laboratory.
3. To understand fundamental concepts of fuel and to study liquid fuels, hydrogen as a fuel and combustion calculations
4. To understand structure and properties of polymers used for engineering applications
5. To study corrosion of metals and methods for its prevention
6. To understand types and electrochemical processes of batteries and fuel cells

**Course Outcomes:**

Students will be able to

1. Analyze water for its impurities like hardness, alkalinity and explain water softening methods.
2. Explain and perform analysis of chemical solutions by using instrumental methods of analysis.
3. Explain fundamental concepts of fuel, liquid fuels, hydrogen as a fuel and compute air required for combustion of fuel.
4. Explain chemical structure and properties of polymers and relate them to their applications.
5. Explain chemical and electrochemical corrosion and describe methods used for prevention of corrosion.
6. Explain types of batteries and fuel cells and the electrochemical process involved in them.

**Unit I –Water Technology**

Impurities in water, Hardness of water, estimation of hardness by EDTA method, Alkalinity of water, Ill effects of hard water on boiler, Softening of water - zeolite process, demineralization by ion exchangers, reverse osmosis &electrodialysis ,Municipal water treatment, Specifications for drinking water (BIS & WHO standards)

**Unit II - Instrumental methods of analysis**

Fundamentals of spectroscopy, UV Visible spectroscopy, pHmetry, Potentiometry, Conductometry

**Unit III - Fuels and Combustion**

Introduction: Characteristics of good fuel, Calorific values, Measurement of calorific value by Bomb calorimeter and Boy's gas calorimeter, Liquid fuels – Petroleum- composition and refining, Octane number of petrol, Cetane number of Diesel, Power alcohol, Biodiesel
Hydrogen gas as a future fuel-manufacturing, storage and transportation
Combustion: chemical reactions, calculations for air required.

**Unit IV - Polymers**

Introduction, Functionality of monomer, Degree of polymerization, Concept and significance of —

average molecular weight, Crystallinity, $T_g$ and $T_m$, Techniques of polymerization, Thermoplastic and Thermosetting polymers
Synthesis, properties and applications of Polyethylene, Polyvinyl chloride, Urea formaldehyde resin and Epoxy resin.
Specialty polymers: Biodegradable polymers, Conducting polymers, Liquid crystal polymers, Polymer composites— fiber reinforced plastic (FRP)

**Unit V - Corrosion Science**

Introduction: Types of corrosion- dry corrosion- mechanism, wet corrosion-mechanism, Factors influencing corrosion- nature of metal, nature of environment, Methods of corrosion control: cathodic and anodic protection, Protective coatings: surface preparation, types of protective coatings: a) metallic coatings: types of coatings, methods of applications, (hot dipping, cladding ,electroplating & cementation), electro less coatings, b) non-metallic coatings: chemical conversion coatings, powder coatings

**Unit VI –Batteries and Fuel cells**

Batteries: Introduction and important terms, classification-primary and secondary batteries, Dry cell, Lead-acid cell, Nickel-Cadmium cell, Modern batteries-Lithium batteries, Nickel- metal hydride batteries.
Fuel cells— definition, advantages and limitations, Solid oxide fuel cell, Polymer electrolyte membrane fuel cell

**List of experiments (6 out of the following experiments)**

1. Estimation of temporary & permanent hardness of water sample by EDTA method.
2. Determination of alkalinity of water sample
3. Determination of dissociation constant of weak acid (acetic acid) using pH meter.
4. Spectrophotometric or colorimetric estimation of $Fe^{+3}$ from a given sample
5. Titration of acid with base using conductometer
6. Titration of mixture of weak acid and strong acid with strong base using conductometer
7. Determination of molecular weight of polyvinylalcohol by viscosity measurements.
8. Preparation of Urea formaldehyde resin
9. Study of batteries
10. Determine rate of corrosion of metal in the solution of different pH

**Text Books**

1. Engineering Chemistry- Jain and Jain
2. Engineering Chemistry – Wiley India
3. Engineering Chemistry - 0. G. Palanna, Tata McGraw Hill Education Pvt. Ltd.
4. A Textbook of Engineering Chemistry – Dr .S .S. Dara and Dr. S. S. Umare, S. Chand publication

**Reference Books**

1. Instrumental methods of analysis- Willard Meritte Dean Settle, CBS Publishers
2. Instrumental methods of chemical analysis-Gurdeep Chatwal and Sham Anand, Himalaya publishing home
3. Basic Concepts of Analytical Chemistry - S. M. Khopkar, New Age International Publishers.

4. Polymer science - V. R. Gowarikar, New Age International Publishers
5. A textbook of Engineering Chemistry – Shashi Chawla, DhanpatRai Publications

**Laboratory manual:**

1. Vogel's Text book of Quantitative Chemical Analysis - J. Mendham, R. C. Denney, J. D. Barnes, M. J. K. Thomas, Pearson Education Ltd.
2. Applied Chemistry Theory and Practice - 0. P. Virmani and A. K. Narula, New Age International (P) Ltd.

## Department of Engineering & Applied Sciences

# Engineering Graphics (ME11176)

**Teaching Scheme**
Credits : 4
Lectures : 3Hrs/week
Laboratory Work : 2Hrs/week

**Examination Scheme**
F. A. : 50 Marks
S. A. : 50 Marks

**Course objectives:**

1. To develop imagination of manual drawing and interpretation skill for better engineering communication

**Course Outcomes:**

By the end of the course, students will

1. Understand the basics of dimensioning, lettering and representation of lines.
2. Comprehend lines used for representation of different Engineering Sections.
3. Illustrates Lines, Plane, and Solids.
4. Sketch geometric and engineering curves & understand the logic behind development of surfaces.
5. Construct Orthographic projections and sections views, isometric views.
6. Design two dimensional drawings using Auto CAD software.

**Unit I - Lines, Lettering, Dimensioning, Scales & Engineering Curves**

Different types of lines used in drawing practice, method of dimensioning – aligned and unidirectional systems (According to SP-46: 1988 Engineering Drawing Practice for Schools and Colleges), scales.
Engineering Curves-
Involute, Cycloid, Ellipse, Parabola, Hyperbola, Archimedean spiral, Helix (No tangent & normal)
Self Learning: Practical applications of engineering curves

**Unit II - Orthographic Projections**

Principal planes of Projection – Horizontal plane or horizontal reference plane, vertical plane or frontal reference plane, profile planes of projection, first and third angle methods of projection. Orthographic projections on principal planes. Sectional views: - full, half, partial (broken or local), offset, revolved, removed sections
Self Learning: Reading industrial drawing

**Unit III - Isometric Projections**

Definition, isometric scale, drawing isometric view from the given orthographic views with reference to given origin
Self Learning : Perspective Projections

**Unit IV - Projection lines and planes**

Introduction to Projections of Lines (lines fully lying in the first quadrant only)
Projections of planes such as triangle, quadrilateral, regular polygon, circle.etc, Oblique Planes
Self Learning: Projection of line in a third quadrant, HT and VT of Planes

**Unit V - Projections of solids**

Projection of solids such as tetrahedron, cube, right regular prism and pyramid, cylinder, cone, axis of

the solid inclined to HP and VP (Solid resting on HP only)
Self Learning: Solid resting on VP

**Unit VI –Development of lateral Surfaces**

Development of lateral surfaces – Prisms (maximum six sides), Cone, Pyramid, Cylinder with AIP Cutting plane only.
Self Learning: Development of and sheet metal component.

**Term-Work**

The Term-Work shall consist of Five Sheets (Any two using AutoCAD)
Three A2 (420×594 mm) size-drawing sheets as given below

1. Sheet No 1 : Minimum four problems on engineering curves
2. Sheet No. 2: Minimum two problems on orthographic projections.
3. Sheet No. 3: Minimum two problems on Isometric projections.
4. Sheet No. 4: Minimum one problem on Projections of planes
5. Sheet No. 5: Projection of Solid
6. Sheet No. 6: Development of Lateral Surfaces two Problems)

**Text Books**

1. "Elementary drawing", N. D Bhatt, Charotar Publishing house, Anand India, ISBN 978-93-80358-96-3
2. "Text Book on Engineering Drawing", K. L. Narayana & P. Kannaiah, Scitech Publications, Chennai.

**Reference Books**

1. Fundamentals of Engineering Drawing, Warren Luzzader, Prentice Hall of India, New Delhi. ISBN 13: 978-1-259-06288-9
2. "Engineering Graphics", P. S. Gill, S.K. Kataria & Sons, New Delhi, ISBN: 81-85749-61-2
3. Principals of Engineering Graphics, Frederick E. Giesecke, Alva Mitchell & others, Maxwell McMillan Publication.ISBN-13: 978-0023428203, ISBN-10: 0023428201.
4. AutoCAD Instant Reference George Omura, BPB Publications.
5. "Engineering Drawing", Dhananjay Jolhe, Tata Mcgraw-Hill Publication.

## Department of Engineering & Applied Sciences

# English for Engineers- I (ES11177)

**Examination Scheme**

**Teaching Scheme**
Credits : 1
Lectures : NA
Laboratory Work : 2Hrs/week

F. A. : 50 Marks
S. A. : -

**Course Objectives :**

1. To maintain good linguistic competence- through accuracy in grammar, pronunciation and vocabulary.
2. To acquire strategic competence to use both spoken & written language to use in a wide range of communication strategies.
3. To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm.

**Course Outcome :**

Students will be able to

1. Express and participate in the classroom discussions and other such academic or academic support activities.
2. Cultivate the habit of reading passages and improve their reading skills and, comprehension, inferring meanings and summarizing.
3. Understand the technical writing and will be able to communicate effectively in all circumstances.

**Unit I : Basics of English Grammar**

1. Parts of Speech and its functions and its uses
2. Use of Articles
3. Tenses
4. Exercises on all above

**Unit II : Vocabulary Enrichment**

1. Vocabulary Development- Formal and Informal
2. Punctuation
3. Word Formation-Suffix-Prefix
4. Syntax
5. Conditional Sentences
6. Précis Writing-Summary Writing, Comprehension
7. One-word substitution,
8. Phonology, Word Stress-Rhythm and intonation
9. Idioms and Phrases
10. Practice Exercises on all above

**Unit III : Words and the Grammar**

1. Active and Passive forms
2. Direct and Indirect speech
3. Synonyms and Antonyms

4. Confusing Words-Homophones
5. Practice Exercises on all above

**List of Assignments : (Any 6 out of the following experiments)**

1. Write and narrate an article regarding the inventions or discoveries made by any scientist.
2. Note Making
3. Grammar Exercises
4. Comprehension
5. Power point Presentation
6. Watch a documentary movie and write about it in your own words
7. Advertisement making using videography.
8. Spell bee exercises

**Text/Reference Books :**

1. Developing Communication Skills, Krishna Mohan, Meera Banerji, Second Edition, ISBN 10 : 0230-63843-0, ISBN 13: 978-0230-63843-3
2. Technical Communication for Engineers, ShaliniVerma ISBN : 978-93259-9018-0
3. Effective Technical Communication, M Ashraf Rizvi, ISBN-13: 978-0-07-059952-9, ISBN-10: 0-07-059952-1
4. English Grammar, Wren and Martin

## Department of Engineering & Applied Sciences

# Workshop Practice (ME10178A)

**Teaching Scheme**
Credits : 2
Lectures : NA
Laboratory Work : 2Hrs/week

**Examination Scheme**
F. A: 50 Marks
S. A. : -

**Course objectives:**
To tackle various tools, devices and machines to integrate and combine ideas into a product from raw material.

**Course Outcomes:**
Students will be able to

1. Recognize various tools, machines, devices used in engineering practice for creating objects from materials.
2. Understand and perform various operations in basic fabrication shops
3. Prepare process sheet by interpreting the job drawings.

**Unit I : Utility Jobs (Any Two)**

**i) Carpentry**
Introduction to wood working, types of woods,hand tools and machines.Types of joints,wood turning.Pattern making,types of pattern,contraction, draft and machining allowances.
(Term work includes one job involving various joints and wood turning)

**ii) Fitting**
Introduction to Types of fits, concept of inter-changeability, datum selection, location layout, marking, cutting, shearing, chipping, sizing of metals, drilling and tapping.
(Term work includes one job involving fitting to size and male- female fitting with drilling and tapping)

**iii) Sheet Metal Practice**
Introduction to primary technology processes involving bending, punching, and drawing various Sheet metal joints, development of joints.
(Term work to include a utility job including Rivetting & Soldering operations)

**Unit II: Demonstrations (Any Four)**

a) **Assembly and Inspection**
Assembly and disassembly of some products and tools used. Videos of advancement in manufacturing technology. Inspection of various components using different measuring instrument. Introduction to measuring instruments used in Quality controls

b) **Safety in Workshop**
fire hazard, electric short circuits-causes and remedies, machine protection, human protection, accident prevention methods, developing abilities to observe safe working habits

c) **Smithy and Forging**
Introduction**,** tools &equipments used in forging. Hot working and cold working process, forging materials, hand tools & appliances, power forging and hand forging,forging operation

such as upsetting, cutting, drawing out, punching &drifting, welding, pressforging, machine forging, roll forging and High Velocity Forging(HVF)

**d) Molding & Casting**
Principle of molding, methods, core and core boxes, preparation of foundry sand, casting and plastic molding.

**e) Plumbing& Joining**
Types of pipe joints, threading dies and pipe fittings, Joining includes temporary & permanent joints

**f) PCB making**
Layout drawing, positive and negative film making, PCB etching and drilling

**g) Machine Tools**
Turning ,milling, drilling, grinding, shaping, planning-machines, tools and accessories

**h) Press Work**
Introduction, die & punch, basic operations such as punching, bending, shearing etc. safety precautions

**i) General Tools**
Introduction about general tools used in common practice like pliers, spanners, screw drivers, nut-bolts, vehicle tool kits, bearing puller, wire ropes, etc.

**Submission:**

**1. Two jobs as mentioned above**
**2. Brief write-up of 04 demonstrations conducted with illustration/sketches on the demonstration(not more than three pages for each demonstration)**

**Text Books**

1. "Elements of Workshop Technology Volume-I", S. K. Chaudhary, Edition-14, Indian Book Distributing Company Calcutta, 1986, ISBN 8185099146, 9788185099149
2. "A Textbook of Workshop Technology: Manufacturing Processes,R. S. Khurmi and J.K. Gupta, S. Chand Limited, 2008, ISBN 812190868X, 9788121908689

**Reference Books**

1. "Workshop Technology (Manufacturing Process)", S.K. Garg, Laxmi Publications Private Limited, 2009, ISBN 8131806979, 978813180697
2. Course in Workshop Technology, Vol- I, manufacturing process, B. S. Raghuvanshi, Dhanpat Rai and Co (P) Ltd, ISBN-13:1234567144613

## Department of Engineering & Applied Sciences

# Basics of Computer Programming (CS1017B)

**Teaching Scheme**
Credits : 2
Lectures/Theory : 1 Hr/Week
Practical: 2 Hrs/Week
Laboratory Work : NA

**Examination Scheme**
F. A.: 50 Marks
S. A. : -

**Course Objectives**
Students should be able to:
1. Design and develop the art of computer programming using program planning tools.
2. Compare the features of various programming languages and select a programming language for solving a problem using a computer.
3. Develop a program using C language to solve the given problem statement.
4. Use the open source software such as Linux for developing the program using C language.

**Course Outcomes**
On completion of this course, students will able to:
1. Design and develop algorithm/flowchart for given problem statement using planning tools.
2. Compare the features of various programming languages and select a programming language for solving the problem.
3. Design and develop the programming C language using standard programming practices, based on algorithm/flowchart.
4. Use an open source operating system such as Linux to develop the program in C Language.

**Unit I - Introduction to Programming**

Introduction to programming: Problem solving using computer and logic design, Algorithms and their representation: flow chart and pseudo code, Types of programming languages: Machine-level, Assembly-level and High-level Language, Scripting Language, Introduction to Linux Operating System: file system, basic commands. Editor such as 'gedit', program development environment - gcc
Self Study Component:-Define Computer, Block diagram of computer ,Define hardware and software, Introduction to Operating System - Types O/S, Functions of O/S

**Unit II - Programming in C**

Character set, Constants, Variables, Keywords and Comments , Data Types, Operators and Operator Precedence, Statements, I/O Operations, Preprocessor Directives, Control Structures: Conditional and Unconditional Branching using "if", "switch", "break", "continue", and "return" statements, Loop Structures: Creating Pretest Loops using "for" and "while" Statements, Creating Posttest Loops using "do…while";
Self Study Component:- History of C Programming Language

**Unit III –Functions**

Introduction to top-down programming, Introduction to Function: Function Parameters, Local Variables, Return Types, Parameter Passing, Function Declaration, Function Call, Built-in and User-defined Functions, Introduction to Pointers: Basic Concept, Declaration, Initialization, Pointer Assignment,

Address Operator, Pointer Arithmetic, Call by Value, Call by Reference
Self Study Component:- Pointer to Function, Pointer to Array

**Unit IV - Arrays and Structures**

Concept of Array: Declaration and Initialization of Array, Multidimensional Array, Strings, Structures: Notion, Declaration, Initialization, Structure Variables, Accessing and Assigning Values of the fields, Functions and Structures, Arrays of Structures, Introduction to Object Oriented Programming
Self Study Component:- Study of Data Structures-Linked List, Stack and Queue

**List of Experiments**

Student should maintain a journal consisting of at least 6 exercises/ assignments (any 4 assignments from Group A & any 2 assignments from Group B) that includes flowchart, algorithm and printout of the program and necessary theory for the following exercises/assignments:

**Group A**

1. Write a program in C which implements concept of conditional construct (if-else)
2. Write a program in C which implements concept of conditional construct (switch-case)
3. Write a program in C which implements concept of for loop
4. Write a program in C which implements concept of nested for loop
5. Write a program in C which implements concept of while/do...while loop
6. Write a program in C which implements concept of pointer

**Group B**

1. Write a program in C which implements concept of array
2. Write a program in C which implements concept of structure
3. Write a program in C which implements concept of function.
4. Write a program in C to carry out following operations on strings using library functions
   a. To concatenate a string S2 to string S1.
   b. To find the length of a given string
   c. To compare two strings S1 and S2.
   d. To copy a string S2 to another string S1.
5. Create a student database (roll number, name, marks etc.). Perform operations: a.Add Record b. Display Record c. Search Record
6. Write a program in C to perform following operations on a linked list for a library database (Book Title, Author Name, Publication, Genre, Number of Pages, Price)
   a) Create a linked list and add book record at the end of the list
   b) Modify a record
   c) Delete a record
   d) Display all records

**Text Books**

1. "The C Programming Language", Kernighan, Ritchie ,Prentice Hall of India
2. "Computer Science: A Structured Programming Approach Using C", Behrouz A. Forouzan, Richard F. Gilberg, Cengage Learning © 2007
3. "Let Us C", Yashavant Kanetkar, BPB Publications
4. "Object Oriented Programming with C++",E Balaguruswami, Tata McGraw-Hill Publishing Company Limited

**Reference Books**

1. "Computer Fundamentals", Pradeep K. Sinha and Priti Sinha, BPB Publications
2. "Programming approach using C", Indian Edition, Thomson, 3rd edition
3. "Programming Language Concepts", Carlo Ghezi, Mehdi Jazayeri, John Wiley and Sons
4. "Programming in ANSIC C", E. Balagurusamy, Tata McGraw Hill, 2002
5. "The Complete Reference Linux", Richard Petersen, McGraw-Hill Publications

# Semester - II

***Disclaimer:***
***The Academic board of VIIT shall reserve the right to modify the academic calendar, structure and curriculum, as and when required. Students are requested to be in constant touch with the department for any updation in academic calendar, structure and curriculum***

## Department of Engineering & Applied Sciences

# Engineering Mathematics – II (ES12171)

**Teaching Scheme**
Credits : 4
Lectures : 4 Hrs/week

**Examination Scheme**
F. A. : 50 Marks
S. A. : 50 Marks

**Course objectives**

To develop the ability, to understand the concept of Engineering Mathematics and to apply it properly to solve engineering problems in various fields. Tutorial and Assignment will help the students to practice more questions on the particular topics.

**Course outcomes**

1. After successful completion of the course, student will be able to
2. Apply the knowledge of ordinary differential equations related to simple electrical circuits, orthogonal trajectory, Newton's Law of cooling, rectilinear motion.
3. Design and analysis of continuous and discrete system, where knowledge of Fourier series and Harmonic analysis is required.
4. Apply advanced techniques to evaluate integrals of higher level.
5. Demonstrate and understand the nature of curves like Cardioids, Astroid, Lemniscates, and Rose Curve by tracing the same using certain properties and measure arc lengths of various curves.
6. Apply knowledge of solid geometry in various field of Engineering. Evaluate Double& triple integral & apply knowledge of multiple integrals to find Area, Volume.

**Unit I - Ordinary Differential Equations & Applications**

**Self-Study components:** "Trigonometric formulae, standard derivatives and integrals."
Definition, order, degree , solution of differential equations, formation of differential equation , solutions, separable variables, homogenous D.E, exact D.E, linear D.E and reducible to these types.

**Application of DE:** Orthogonal Trajectories, Newton's Law of Cooling, Kirchhoff's Law of Electrical Circuits, Rectilinear Motion.

**Unit II - Fourier Series**

**Self-Study components:** "Trigonometric formulae, standard integrals".
Definition, Dirichlet's conditions, Full Range Fourier Series , Half Range Fourier Series, Harmonic Analysis and Applications to Problems in Engineering

**Unit III – Integral Calculus**

**Self-Study components:** "Trigonometric formulae, standard derivatives and integrals."
Reduction formulae, Beta and Gamma functions, Differentiation Under the Integral Sign, Error functions.

**Unit IV - Curve Tracing**

**Self-Study components:** "Basic geometry".
Tracing of Curves, Cartesian, Polar and Parametric Curves. Rectification of Curve

| |
|---|
| **Unit V - Solid Geometry** |
| **Self-Study components:** "Basic concepts of 2 Dimensions & 3 Dimensions".<br>Introduction to solid geometry-Spherical polar and Cylindrical coordinate systems, Sphere, Right circular cone, Right circular Cylinder. |
| **Unit VI - Multiple Integrals & Applications** |
| **Self-Study components:** "Trigonometric formulae, standard derivatives and integrals".<br>Evaluation of Double integral, Change of order of Double integral, Change into polar coordinates, Evaluation of Triple integral, Area, Volume |
| **Text Books** |
| 1. Higher Engineering Mathematics Dr. B. S. Grewal, Khanna Publications<br>2. Applied Engineering Mathematics by P. N. Wartikar and J. N. Wartikar, Pune Vidyarthi Griha Prakashan. |
| **Reference Books** |
| 1. Advanced Engineering Mathematics By Erwin Kreyszig, Wiley Publications.<br>2. Advanced Engineering Mathematics By O'Neil, Cengage India. |

## Department of Engineering & Applied Sciences

# Mathematics Practice– II (ES12172)

**Teaching Scheme**
Credits : 1
Lectures: N.A.
Tutorial Work : 1Hr/week

**Examination Scheme**
F. A. : 50 Marks
S. A. : -

| |
|---|
| **Course Objectives:** To develop the ability to solve engineering problems in various fields. |
| **Course Outcomes:**<br>After successful completion of the course, student will be able to<br>1. Form Ordinary Differential Equation, Identify the Integrating Factors, and solve linear differential equations. Understand the need to convert to polar coordinates<br>2. Modeling of various physical systems such as Newton's Law of cooling, L-C-R circuits, rectilinear motion, mass-spring systems heat transfer etc.<br>3. Design and analysis of continuous and discrete system, where knowledge of Fourier series and Harmonic analysis is required.<br>4. Advanced techniques to evaluate integrals.<br>5. Tracing and measurement of arc lengths of various curves.<br>6. Sphere, cone and cylinder that arise in vector calculus, electro-magnetic field theory, cad-cam, computer graphics etc.<br>7. Multiple integrals which are used in calculating areas, volumes, mean and RMS values, mass, moment of inertia and centre of gravity. |
| **Tutorial 1** |
| Differential Equations and Applications of Differential Equations |
| **Tutorial 2** |
| Fourier Series |
| **Tutorial 3** |
| Reduction Formulae , Gamma & Beta Functions |
| **Tutorial 4** |
| Curve Tracing, rectification of curves |
| **Tutorial 5** |
| Sphere cone and Cylinder |
| **Tutorial 6** |
| Multiple Integration & Applications of Multiple Integration |
| **Assignment on differential equations and applications and Fourier series** |
| **Assignment on reduction formulae, Gamma & Beta Functions, Curve Tracing, rectification of curves** |
| **Text Books** |
| 1. Higher Engineering Mathematics Dr. B. S. Grewal, Khanna Publications |

2. Applied Engineering Mathematics by P. N. Wartikar and J. N. Wartikar, Pune Vidyarthi Griha Prakashan.

**Reference Books**

1. Advanced Engineering Mathematics By Erwin Kreyszig, Wiley Publications.
2. Advanced Engineering Mathematics By O'Neil, Cengage India.

## Department of Engineering & Applied Sciences

# Basic Mechanical Engineering (ME12173)

**Teaching Scheme**
Credits : 4
Lectures : 3Hrs/week
Laboratory Work : 2Hr/week

**Examination Scheme**
F. A. : 50 Marks
S. A. : 50 Marks

**Course objectives :**
To develop understanding of basics of mechanical engineering in terms of thermodynamics, power transmission devices and manufacturing processes.

**Course Outcomes :**
Students will be able to
1. Understand basic concepts and use of thermal and mechanical system, machine tools, machine elements
2. Identify various manufacturing processes and classify various materials and their properties
3. Understand basic principles and working of various power producing and absorbing devices.

**Unit I : Introduction to Mechanical Engineering**

a) Introduction and significance of mechanical engineering, Application of mechanical engineering to other disciplines (robotics, material properties, mechanism, electronic cooling, computer graphics, engine, energy conversing devices, day to day Mechanical devices etc).
b) Thermodynamic system, thermodynamic properties, thermodynamic processes, reversible and irreversible cycles. Zeroth law of thermodynamic applications with simple numerical.
c) Introduction to measurement and measuring instruments: distance, speed, pressure, mass, temperature, flow.

**Unit II : Thermal Engineering (6 Hrs)**

a) First law of thermodynamic applications (Closed and Open System) with simple numerical for non flow and steady flow.
b) Second law of thermodynamic applications (Kelvin Plank, Claussius, heat engine, heat pump, and refrigeration engine) with simple numerical applications.

**Unit III : Engineering Materials, Properties and Design Perspectives**

a) Introduction and Applications of Ferrous and Non-ferrous Materials (Steel, Cast Iron, Aluminium, Brass, Copper), Polymers.
b) Mechanical properties such as strength, toughness, hardness, ductility, malleability, brittleness, elasticity, plasticity, resilience, fatigue, creep,
c) Engineering design perspective, aesthetic and ergonomic considerations.

**Unit IV : Power Transmission Devices (6 Hrs)**

a) Introduction to various elements of power transmission devices: shaft, keys, couplings.
b) Types of power transmission devices: belt drive, chain drive and gear drives. Simple numerical on belt and gear drives.
c) Applications of Power Transmission Devices

**Unit V : Manufacturing Processes**

a) Introduction to various manufacturing processes such as casting, metal joining processes

(Welding, Brazing, Soldering), sheet metal working, metal forming and machining.
b) Introduction to various machine tools such as lathe, drilling, milling and grinding machines.

**Unit VI: Power Producing and Absorbing Devices.**

a) Introduction to power producing devices: boilers, Four Stroke internal combustion engines (spark ignition and compression ignition).
b) Introduction to power absorbing devices: blowers, compressors, pumps, household refrigerators and air conditioners..

**List of Experiments: (Any 6 out of the following experiments)**

The Laboratory work shall consist of following:

1. Study of various measuring instruments distance, speed, pressure, mass, temperature, flow
2. Study of power transmission elements on actual vehicle
3. Study of fire tube boiler and water tube boiler
4. Study of Mechanisms: Four Bar Mechanism, Slider Crank Mechanism
5. Study, demonstration and working of Centre Lathe Mechanism
6. Study of any one power plant: Steam Power Plant
7. Study, demonstration on two stroke and four stroke engine
8. Study, domestic refrigerator and window air conditioner

**Text Books:**

1. Fundamentals of Thermal-Fluid Sciences, Yunus Cengel and Robert Turner and John, McGraw-Hill Education.
2. "Basic Mechanical Engineering", T. S. Rajan, Wiley Eastern Ltd.
3. "Basic Mechanical Engineering", Prabhu T. J., Jai Ganesh, V. and Jebaraj, S., SciTech Publications, Chennai.

**Reference Books:**

1. "Internal Combustion Engines", V. Ganesan, McGraw Hill Education (India) Pvt Ltd
2. "Thermal Engineering", R. K. Rajput, Laxmi Publications
3. "Automobile Engineering", Kirpal Singh, Vol. I - , Standard publications, New Delhi
4. "Heat and Mass Transfer", R. K. Rajput, S Chand
5. "Design of Machine Elements", V. B. Bhandari, Tata McGraw-Hill Education
6. "Introduction to Robotics", S. K. Saha, McGraw Hill Education (India) Pvt. Ltd
7. "Elements of Workshop Technology", S. K. Hajra Choudhary, Volume I and II, Media Promoters and Publishers, Mumbai
8. "A course in Thermal Engineering", S. Domkundwar, C P Kothandaraman and A V Domkundwar, Dhanpat Rai and Co., Educational & Technical Publishers, New Delhi

## Department of Engineering & Applied Sciences

# Engineering Mechanics (CV12176)

**Teaching Scheme**
Credits : 4
Lectures : 3Hrs/week
Laboratory Work : 2Hr/week

**Examination Scheme**
F. A. : 50 Marks
S. A. : 50 Marks

**Course Objectives**

1. To demonstrate formulation of equilibrium equations and applying them to perform analysis of beams, trusses and frames, including friction and its few applications.
2. To illustrate concepts of kinematics and kinetics of rectilinear and curvilinear motion of particles.

**Course Outcomes**

Upon completion of this Course, the students will be able to –

1. **Classify** various force systems, **employ** composition and resolution of forces
2. **Interpret** and **solve** equilibrium equations to coplanar and concurrent space force system.
3. **Analyze** plane trusses and frames.
4. **Examine** dry friction and its applications
5. **Apply** equations of kinematics for rectilinear and curvilinear motion
6. **Compare** Newton's laws of motion, Work Energy and Impulse Momentum Principle and **solve** problems on kinetics of rectilinear and curvilinear motion

**Unit I Resultant of Coplanar Forces**

a. Fundamental concepts and axioms, Laws of mechanics, Force & force systems, resolution and composition of forces, resultant and equilibrant of concurrent forces.
b. Moment of a force, couple, application of Varignon's theorem of moments, equivalent force couple system, resultant of parallel and general force system. Distributed forces and its centroid.

**Unit II - Equilibrium of Forces**

a. Free body diagram, equilibrium of concurrent, parallel and general forces in a plane, equilibrium of three forces in a plane, types of beams, simple and compound beams, types of loads, supports and reactions.
b. Resultant and equilibrium of concurrent forces and parallel in space.

**Unit III - Rectilinear Motion of Particles**

a. Kinematics- Basic concepts, equations of motion for constant acceleration, variable acceleration, relative motion.
b. Kinetics- Newton's laws of motion and their applications.

**Unit IV - Curvilinear Motion of Particle**

a. Kinematics- Equation of motion in Cartesian, path and polar coordinate systems, motion of a projectile on horizontal surface.
b. Kinetics-Newton's laws of motion for curvilinear motion in Cartesian and path coordinate systems.

**Unit V - Analysis of Structures and Friction**

a. Two force member, analysis of plane trusses by method of joint and method of section, plane frames.
b. Friction - Introduction, friction on inclined plane, wedges and flat belt.

**Unit VI - Work-Energy Principle & Impulse Momentum Principle**

a. Work, power, energy, conservative forces & potential Energy, conservation of energy principle, work energy principle and its application.
b. Impulse, momentum, directs central impact and coefficient of restitution, conservation of momentum and impulse momentum principle and its application.

**List of experiments**

Laboratory work shall consist of the following:

1. Verification of law of parallelogram of forces/ polygon of forces
2. Support reaction of simple / compound beams.
3. Determination of coefficient friction of belt/ inclined plane.
4. Equilibrium of concurrent forces in a Space.
5. Curvilinear motion.
6. Determination of coefficient of restitution.

**Text Books**

1. Mechanics for Engineers - Fourth Edition, by F. P. Beer and E. R. Johnson, McGraw-Hill Publication.
2. Engineering mechanics - S. S. Bhavikatti, K. G. Rajashekharappa, New Age International (P) limited publisher
3. Applied Mechanics- R. K. Rajput, Laxmi Publications

**Reference Books**

1. Engineering Mechanics - statics and dynamics by J. L. Meriam and Craige, John Willey and Son's publication.
2. Engineering Mechanics by A. P. Boresi and R. J. Schmidt, Brooks/Cole Publication.
3. Engineering Mechanics - Statics and dynamics by R. C. Hibbeler, McMillan Publication.

## Department of Engineering & Applied Sciences

# English for Engineers- II (ES12177A)

**Teaching Scheme**
Credits : 1
Lectures:N.A.
Laboratory Work : 2Hr/week

**Examination Scheme**
F. A.: 50 Marks
S. A. : -

**Course Objectives :**
The objective of this course is
1. To enable students to understand the concept and application of various models of verbal and non-verbal communication through English medium.
2. To develop the students ability to improve technical communication through real life assignments.
3. To develop the students ability to improve their interpersonal skills through understanding their own behavioral skills and that of others

**Course Outcome :**
Students will be able to
1. Apply techniques of writing and speaking skills in technical communication
2. Identify the strategies for making individual contributions in debates and discussions.
3. Develop their interpersonal skills and to communicate effectively.

**Unit I : Communication and its Aspects**

1. Communication and its process
2. Importance of Communication
3. Barriers to Communication
4. Corporate Communication.

**Unit II : Verbal and Non-Verbal Communication**

a) Communication through Body language
b) Communication through Technology
c) Dyadic Communication

**Unit III : Technical Communication**

a) Introduction and its effectiveness
b) Report writing, e--mail writing, Minutes of Meeting, Formal and informal letter writing
c) Composition writing

**Unit IV : Public Speaking**

a) Introduction
b) Just-a-Minute Sessions
c) Extempore, Speech
d) Debate, Articles
Dialogue Delivery

| **Unit V : Self Development** |
|---|
| a) Self-Management and Discipline,<br>b) Values and beliefs,<br>c) Success Strategy, Handling Failure and Depression<br>d) Etiquettes |
| **List of Assignments : (Any 6 out of the following experiments)** |
| 1. Communication – Meetings, Agenda, Minutes of meeting<br>2. Report Writing – for any event, workshop conference attended<br>3. Letter Writing – Formal and Informal<br>4. Composition writing<br>5. Debate – Topics related to current affairs<br>6. Article – From newspaper, magazine or internet<br>7. Dialogue Writing and Delivery – role play |
| **Text/Reference Books :** |
| 1. Developing Communication Skills, Krishna Mohan, Meera Banerji, Second Edition, ISBN 10 : 0230-63843-0, ISBN 13: 978-0230-63843-3<br>2. Technical Communication for Engineers, ShaliniVerma ISBN : 978-93259-9018-0<br>3. Effective Technical Communication, M Ashraf Rizvi, ISBN-13: 978-0-07-059952-9, ISBN-10: 0-07-059952-1 |

## Department of Engineering & Applied Sciences

# Elective –German (ES12177B)

**Teaching Scheme**
Credits : 1
Lectures: N.A.
Laboratory Work : 2Hr/week

**Examination Scheme**
F. A.: 50 Marks
S. A. : -

**Course Objectives:**

1. To enable the students to understand the basic language structures in German which are used in everyday context
2. To read and understand easy text in German
3. To be able to communicate in German using simple grammar structures and a core vocabulary
4. To be able to write in simple and correct German

**Course Outcome:**

On completion of the course students will be able to

1. Communicate (read, write and speak) in German
2. Be aware of the close connection between German and English as well as with Indian languages.
3. Obtain awareness about various opportunities and career options, as well as provide a 'world view'

**Unit I - Fundamentals**

Introduction to script, Cardinal & ordinal numbers (1 to 1000), How to tell date, day & time, Greetings & Introduction, Self Introduction, Asking about directions, Useful expressions

**Unit II - Countries, Language**

*T*he present tense of related verbs only affirmative related vocabulary the nominative case related nouns and its pronouns simple sentence structure: position of subject & object only as nouns, linking of verbs, and predicate adjectives & introduction to compound nouns

**Unit III - Food and Shopping**

The present tense of related verbs only affirmative related vocabulary the dative case related nouns and its pronouns simple sentence structure : position of subject & object only as nouns, linking of verbs, and predicate adjectives & introduction to compound nouns

**Unit IV - Holidays, Vacations & city life**

The present tense of related verbs only affirmative related vocabulary the accusative case related nouns and its pronouns simple sentence structure: position of subject & object as pronouns, linking of verbs, and predicate adjectives & introduction to compound nouns

**Unit V - Banking and Hotel Accommodations**

The present tense of related verbs negative & interrogative form related vocabulary the genitive case related nouns and its pronouns simple sentence structure: position of subject & object as pronouns, linking of verbs, and predicate adjectives & introduction to compound nouns

**Unit VI - Introduction of Basic Grammar**

Articles, Nouns&Pronouns, Adjectives, Verbs, Prepositions, Conjunctions, Adjectives, Listening

| **List of assignments:** |
|---|
| 1. Introduce yourself and your family in German language<br>2. Fill in the blanks.<br>3. Match the following<br>4. Vocabulary building by using dictionary, exercises, framing sentences<br>5. Translate small passages from English to German<br>6. Paragraphs for comprehensions.<br>7. Make posters based on textbook.<br>8. Make power point presentations on festivals of Germany |
| **Text Books / Reference Books** |
| Netzwerk A1, Goyal Publishers & DistributorsPvt Ltd, Author – Stefanie Dengler, Paul Rusch, Helen Schmitz, Tanja Sieber |

## Department of Engineering & Applied Sciences

# Elective- French (ES12177C)

**Teaching Scheme**
Credits : 1
Lectures: N.A.
Laboratory Work : 2Hr/week

**Examination Scheme**
F. A.: 50 Marks
S. A. : -

**Course Objectives:**

1. To enable the students to understand the basic language structures in French which are used in everyday context
2. To read and understand easy text in French
3. To be able to communicate in French using simple grammar structures and a core vocabulary
4. To be able to write in simple and correct French

**Course Outcome:**

Students will be able to

1. Communicate (read, write and speak) in French
2. Aware of the close connection between French and English as well as with Indian languages.
3. Obtain awareness about various opportunities and career options, as well as provide a 'world view'

**Unit I - Fundamentals**

Introduction to script Cardinal & ordinal numbers (1 to 1000), How to tell date, day & time Greetings & Introduction Self Introduction Asking about directions
Useful expressions

**Unit II - Countries, Language**

The present tense of related verbs only affirmative, related vocabulary, subject related nouns and its pronouns, simple sentence structure: position of subject & object, linking of verbs, and predicate adjectives & introduction to compound nouns

**Unit III - Food and Shopping**

The present tense of related verbs only affirmative related vocabulary the direct object related nouns and its pronouns simple sentence structure: position of subject & object only as nouns, linking of verbs, and predicate adjectives & introduction to compound nouns

**Unit IV - Holidays, Vacations & city life**

The present tense of related verbs only affirmative related vocabulary the indirect object related nouns and its pronouns simple sentence structure: position of subject & object only as nouns, linking of verbs, and predicate adjectives & introduction to compound nouns

**Unit V - Banking and Hotel Accommodations**

The present tense of related verbs negative & interrogative form related vocabulary simple sentence structure: position of subject & object as pronouns, linking of verbs, and predicate adjectives & introduction to compound nouns related nouns and its pronouns

| **Unit VI - Introduction of Basic Grammar** |
|---|
| Articles, Nouns & Pronouns, Adjectives, Verbs, Prepositions, Conjunctions, Adjectives, Listening |
| **List of assignments:** |
| 1. Introduce yourself and your family in French language<br>2. Fill in the blanks.<br>3. Match the following<br>4. Vocabulary building by using dictionary, exercises, framing sentences<br>5. Translate small passages from English to French<br>6. Paragraphs for comprehensions.<br>7. Make posters based on textbook.<br>8. Make power point presentations on festivals of France. |
| **Text Book / Reference Book :** |
| Jumelage, Methode de Francais, Niveau 1, Author – Manjiri Khandekar and Roopa Luktuke, Saraswati House Pvt Ltd, New Delhi |