



## SCHEME AND SYLLABUS - B.E. COMPUTER ENGINEERING



### SYLLABI OF COMPULSORY FOUNDATION COURSES

B.E. COMPUTER ENGINEERING - SEMESTER I												
Course Code	Type	Subject	L	T	P	Credits	Evaluation Scheme (Percentage weights)					Pre-requisites
							Theory			Practical		
							CA	MS	ES	CA	ES	
FC001	FC	Mathematics-I	3	1	0	4	25	25	50	-	-	None

#### COURSE OUTCOMES

1. By the end of this course, the student will be able to :
2. Analyze and test infinite series for its convergence.
3. Find Taylor's series expansion, maxima & minima of functions of one and more variables.
4. Calculate length, area, radius of curvature, surface of revolution and volume of revolution.
5. Calculate area of a given region and volume enclosed by a surface.

#### COURSE CONTENT

**Infinite Series:** Tests for convergence of series (Comparison, Integral, Ratio's, Raabe's, Logarithmic and nth root,), Alternating series, Absolute convergence, Conditional convergence.

**Function of Single Variable:** Hyperbolic functions, Taylor's and Maclaurin's theorems with remainder terms, Polar Curves, Angle between tangent and radius vector, Curvature and Radius of Curvature, Asymptotes, Curve tracing, Applications of definite integral to area, arc length, surface area and volume of revolution (in Cartesian, parametric and polar co-ordinates).

**Function of Several Variables:** Partial Derivatives, Differentiability, Total differential, Euler's theorem, Jacobian, Taylor's theorem, Maxima and Minima for functions of two



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or more variables, Extreme values, Lagrange’s method of undetermined multipliers, Differentiation under the integral sign.

**Multiple Integrals:** Evaluation of double integral (in Cartesian and polar co-ordinates) change of order of integration, integration by change of variables and its applications in area, mass, and volume. Triple integral (in Cartesian, cylindrical and spherical co-ordinates) and its application in volume.

### SUGGESTED READINGS

1. G. B. Thomas and R. L. Finney, “Calculus and Analytic Geometry,” Pearson Education.
2. R. K. Jain and S. R. K. Iyenger, “Advanced Engineering Mathematics,” Narosa.
3. Erwin Kreyszig, “Advanced Engineering Mathematics”, Wiley.
4. Michael Greenberg, “Advanced Engineering Mathematics”, Pearson Education.

Course Code	Type	Subject	L	T	P	Credits	CA	MS	ES	CA	ES	Pre-Requisites
FC002	FC	Computer Programming	3	0	2	4	15	15	40	15	15	None

### COURSE OUTCOMES

1. To understand the basic terminology and program structures used in computer programming to solve real world problems.
2. To learn the process of representing problems and writing, compiling and debugging programs.
3. To develop programming skills in using different types of data, decision structures, loops functions, pointers, data files and dynamic memory allocation/de-allocation.
4. To understand the need for continuing to learn new languages to solve complex problems in different domains.



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### COURSE CONTENT

#### **C Programming Language**

**Thinking like a programmer:** problem solving. Components of a problem, algorithm, checking for errors and inconsistencies, writing a pseudocode.

**Boolean Logic:** Binary Number systems and codes and operations.

**Introduction to programming & Basics of C:** Concepts of Algorithm and Flowcharts, Process of compilation, Basic features of C Language like Identifier, Keywords, Variable, data types, Operators and Expression, basic screen and keyboard I/O, Control Statements, iteration, nested loops, Enumerated data types, bitwise operators, C Preprocessor statements.

**Arrays and Pointers:** One and multidimensional dimensional arrays, strings arrays, operations on strings, Array and Pointers, Pointers and strings, Pointer to Pointer, other aspect of pointers, User Defined Data Types: Structures, Unions, bit fields.

**Functions:** Concept of modular programming, Using functions, Scope of data, Recursive functions, Pointers and functions, Command line arguments.

**Linked List:** Dynamic memory allocation, singly link list, traversing, searching, insertion, deletion.

**Files:** Types of files, working with files, usage of file management functions.

#### **C++ Programming Language**

**Moving from C to C++:** Concepts of Object Orientation, Objects, classes, encapsulation, data abstraction, inheritance, delegation, software reuse. Inheritance visibility rules using public, private, protected, member functions: Constructors / destructors, operator (::), accessing member functions within a class, new, delete.

**Friend functions and classes,** static data and functions, function templates, pointers within a class, passing / returning objects as arguments.

**Functions Polymorphism** – virtual functions, function overloading, variable definition at the point of use, reference variables, strict type checking, default arguments, type conversion.

**Exception handling,** streams based I/O.

**Emerging Trends:** Kinds of programming languages.

#### **Guidelines for practical work:**

Programs for temperature conversion, area of triangle, counting frequencies of letters,



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words to understand the basic data types, input-output, control flags.  
Programs for decision making using selection, looping, processing of arrays for sorting, searching , string manipulations, matrix operations.  
Programs for parameter passing to functions, returning values, interactions among functions, pointer with arrays, strings, call by reference.  
Programs using structure , pointers and files for linked lists , inventory management etc.  
Program using bit wise operators to simulate the combinational circuits.  
Program showing the concept of objects, access specifiers and inheritance.

### SUGGESTED READINGS

1. B. W. Kernighan and D.M. Ritchie, "The C programming language", Prentice Hall.
2. Herbert Schildt and Tata McGraw Hill , "The Complete Reference",.
3. Yashwant Kanitkar, "Let us C", BPB Publication
4. Byron Gottfried, Schaum Series, Tata McGraw Hill, "Schaum's Outline of Programming with C",
5. Addison Wesley, "Object Oriented Programming", Budd.
6. D Samantha, "Object oriented Programming in C++ and Java ", PHI. Stroustrup, "Programming in C++", Special Edition, Addison Wesley.



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Course Code	Type	Subject	L	T	P	Credits	CA	MS	ES	CA	ES	Pre-Requisites
FC003	FC	Electrical and Electronics Engineering	3	0	2	4	15	15	40	15	15	None

### COURSE OUTCOMES

1. To understand the basic concepts of magnetic, AC & DC circuits
2. To learn the basics of semiconductor diodes, BJTs
3. Will be able to analyze basic electrical and electronic circuits

### COURSE CONTENT

**D.C. Circuits and Theorems:** Ohm's Law, KCL, KVL Mesh and Nodal Analysis, Circuit parameters, energy storage aspects, Superposition, Thevenin's, Norton's, Reciprocity, Maximum Power Transfer Theorem, Millman's Theorem, Star-Delta Transformation. Application of theorem to the Analysis of dc circuits.

**A.C.Circuits:** R-L, R-C, R-L-C circuits (series and parallel), Time Constant, Phasor representation, Response of R-L, R-C and R-L-C circuit to sinusoidal input Resonance-series and parallel R-L-C Circuits, Q-factor, Bandwidth.

**Magnetic Circuits:** Magnetomotive Force, Magnetic Field Strength; Permeability, Reluctance, Permeance, Analogy between Electric and Magnetic Circuits.

**Semiconductor Diodes and Rectifiers:** Introduction, general characteristics, energy levels, extrinsic materials n & p type, ideal diode, basic construction and characteristics, DC & AC resistance, equivalent circuits, drift & diffusion currents, transition & diffusion capacitance reverse recovery times, temperature effects, diode specifications, different types of diodes (Zener, Varactor, Schouky, Power, Tunnel, Photodiode & LED), Half wave & full wave rectifiers. Switched Mode Power Supply.

**Bipolar junction transistor:** Introduction, Transistor, construction, transistor operations, BIP characteristics, load line, operating point, leakage currents, saturation and cut off mode of operations, Eber-Moll's model



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

### SUGGESTED READINGS

- (1) Vincent Del Toro , “Electrical Engineering Fundamentals,”
- (2) Basic Electrical Engineering: Mittal and Mittal, TMH
- (3) Electronic Devices and Circuit Theory: Boylestad and Nashelsky, 10<sup>th</sup> Edition, Pearson.
- (4) Microelectronics: Millman & Grabel. TMH.

Course Code	Type	Subject	L	T	P	Credits	CA	MS	ES	CA	ES	Pre-Requisites
FC004	FC	Physics	3	0	2	4	15	15	40	15	15	None

### COURSE OUTCOMES

1. Knowing important concepts and phenomena linked to relativity, waves and oscillations and be able to do analytical and numerical calculations for faithful measurements, observations and gravitational wave communications.
2. The course is helpful to the students in understanding various optical wave phenomena which are required for optical & electromagnetic wave communications and in optical devices.
3. Concepts of Laser and Optical Fiber for modern developments in physics which are helpful in designing and developing new devices used in optical communications, medicine, environment, industries and related physics.

### COURSE CONTENT

**Relativity:** Special Relativity, Lorentz Transformations, Velocity addition, Time dilation, Length Contraction, Variation of mass with velocity, Mass and energy,



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Relativistic momentum and relativistic energy, General theory of relativity, Einstein's theory of Gravitation, Gravitational waves, Gravity and Light.

**Oscillations and Waves:** Damped and forced oscillations, Sharpness of resonance, Q-factor, Application in resonance, Acoustic waves, Pressure wave equations, Intensity pressure relation, Acoustic impedance, Reflection and transmission of acoustic waves, Impedance matching; Ultrasonics and its applications.

**Optics:** Interference: Interference due to thin films, Newton's rings, and determination of the wavelength of sodium light, Interference due to wedge shaped film. Diffraction: Fraunhofer diffraction due to single slit and N Slits, Plane transmission grating, Rayleigh criterion of resolution, Resolving power of a grating, Polarization: Polarization in light, Birefringence, Nicol prism, Quarter and half wave plates, Production and analysis of plane, Circularly and elliptically polarized light, Optical rotation, specific rotation, Polarimeter.

**Quantum Theory of Light :** Hertz's Experiments- Light as an Electromagnetic Wave, Blackbody radiation, Light Quantization, Compton Effect , X-rays.

**LASERS :** Absorption and emission of radiation, Main features of a laser, Spatial and temporal coherence, Einstein Coefficients, condition for light amplification, Basic requirement for Laser, Population Inversion - Threshold Condition, Line shape function , Optical Resonators , Three level and four level systems. Classification of Lasers: Solid State Laser-Ruby laser and Gas Laser- He-Ne laser (Principle, Construction and working), Optical properties of semiconductor, Semiconductor laser (Principle, Construction and working), Applications of lasers in the field of medicine, Industry, Environment and Communication.

**Fibre Optics :** Need for fiber Optic Communication, Physical nature of Optical fiber, Theory of Light propagation in optical fiber, Acceptance angle and numerical aperture, Step index and graded index fibers, Single mode and multimode fibers, Losses in optical fiber, Optical Fiber cables and bundles, Dispersion in optical fibers: Intermodal and Intramodal dispersion.

**Term work Experiments:** Any ten experiments based on the theory course or related subject as above. For examples : Wavelength by diffraction grating, Newton's rings experiments and bi-prism assembly, resolving power of a Telescope, Nodal-Slide assembly , specific rotation of cane sugar by Polarimeter, dispersive power of Prism, Wavelength of He-Ne laser by diffraction, refractive index for O-ray and E-ray, Brewster's law, Ultrasonic interferometer, numerical aperture of an optical fibre, other experiments based on LASER and optical fiber.



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### SUGGESTED READINGS

1. Arthur Beiser, Shobhit Mahajan, "Concepts of Modern Physics," McGraw Hill
2. Serwey , Moses, Moyer, "Modern Physics," Cengage Learning
3. S Chand & co., "Mechanics", D S Mathur
4. Jenkins and White, "Fundamentals of Optics", McGraw Hill
5. N. Subramaniam and Brij Lal (S Chand), "A Text Book of Optics"
6. Indu Prakash, "A Text Book of Practical Physics, Volume-1", Kitab Mahal Publication.

Course Code	Type	Subject	L	T	P	Credits	CA	MS	ES	CA	ES	Pre-requisites
FC005	FC	English-I	2	0	0	2	25	25	50	-	-	None

### COURSE OUTCOMES

1. The course will focus on the four integral skills of language, improving the proficiency levels in all of them and to learn to use language as a tool for effective communication.
2. This course will widen the understanding of the learners in all genres of literature (short stories, poetry, autobiographies..) with the help of expository pieces .
3. The course will strive to equip the learner with the ability to express oneself and be understood by others with clarity and precision, in both written and spoken forms.
4. This course will encourage creative use of language through translation, paraphrasing and paragraph writing.
5. Along with the above, the course will also build confidence and encourage the students to use a standard spoken form of English in order to prepare them to face job interviews, workplace and in higher studies.

### COURSE CONTENT

1. Practice in dictation, punctuation and spellings, listening and reading comprehension.
2. Practice with well formed sentences with stress on remedial grammar.





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3. Exercises in unseen comprehension, paraphrasing, paragraph writing & summarizing.
4. Reinforcement in letter writing, preparing CVs, writing book reviews.
5. Exposure to the nuances and usages of the language through newspapers and magazines as an exercise to be in line with current form of language used.
6. Proficiency in spoken English with focus on confidence building and standard pronunciation through language lab sessions.

### **Literature**

1. Sadat Hasan Manto: Toba Tek Singh,
2. Abdul Kalam: Wings of Fire (excerpts)
3. Jhumpa Lahiri: The Namesake (excerpts)
4. Khaled Hosseini: The Kite Runner (excerpts)
5. Mohan Rakesh: Halfway House

### **Language Skills**

1. Dictation, punctuation and spellings, listening and reading comprehension.
2. Correspondence (formal & informal)
3. Reading editorials, columns, speeches & essays

### SUGGESTED READINGS

1. Margaret M Maison, "*Examine Your English*"