Program: B Tech Integrated (All Branches)				Semester: III	
Course: Mathematics-III				Code: 704BS0C001	
Teaching Scheme				Evaluation Scheme	
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks - 50)	Term End Examinations (TEE) (Marks - 100)
3	0	1	4	Marks Scaled to 50	Marks Scaled to 50

Pre-requisite: Mathematics II

Course Objective

The course aims to impart knowledge of Complex numbers and Permutations and Combinations and its applications to solve Engineering problems. It also develops an understanding of Calculus to solve applied problems

Course Outcomes

After completion of the course, the student will be able to –
1. Identify suitable techniques of conics, integration, vectors, counting principles and complex numbers to solve related problems
2. Solve problems based on conic equations, integration, vector calculus, counting methods and complex numbers
3. Apply knowledge of integration, vector calculus and complex numbers to solve related engineering problems

Detailed Syllabus

Unit	Description	Duration
1.	**Conic sections** Circle, Parabola, Ellipse and Hyperbola	05
2.	**Integration** Integration by substitution, partial fraction, special integrals Definite Integrals - Fundamental theorem of integral calculus, Properties of definite integrals, Application of integration to find the area under the curve	12
3.	**Vector Algebra** Definition, notation and rectangular resolution of a vector, Addition and subtraction of vectors, Scalar and vector products of 2 vectors, Simple problems related to work, moment and angular velocity, Scalar and vector triple products, Product of four vectors, curves in space, Differentiation of a vector function of a single scalar variable, Theorems on derivatives, concept of tangent vector, scalar and vector point functions	10
4.	**Permutations and Combinations** Fundamental principle of counting, Factorial n, Permutations and combinations formulae, simple applications	06

5.	**Complex Numbers** Introduction to complex numbers, modulus and amplitude of a complex number, Argand's diagram, cartesian, polar and exponential forms of a complex number. Algebra of complex numbers: equality, addition, subtraction, multiplication and division. De-Moivre's theorem, Roots of complex numbers, Euler's form of circular functions, Hyperbolic functions, relation between circular and hyperbolic functions	**12**
	Total	**45**

Text Books
1. Anthony Croft, Robert Davison, Martin, James, *Engineering Mathematics*, 5th Edition, Pearson Publication, 2017

Reference Books
1. John Bird, *Higher Engineering Mathematics*, 6th Edition, Newnes Publication, 2010
2. *Mathematics Textbook for Class XI*, NCERT Publication, 2013
3. *Mathematics Part I and Part II - Textbook for Class XII*, NCERT Publication
4. H. R. Hass, C. E. Heil, M. D. Weir, *Thomas' Calculus*, 14th Edition, Pearson, 2017

Tutorial work

8 to 10 tutorial exercises based on the syllabus.

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Signature
(Head of the Department)

Program: B Tech Integrated (All Branches)		Semester: III	
Course: Physics-III		Code: 704BS0C002	
Teaching Scheme		**Evaluation Scheme**	
Lecture (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credit**	**Internal Continuous Assessment (ICA) (Marks - 50)**	**Term End Examinations (TEE) (Marks - 100)**
3	2	0	4	Marks Scaled to 50	Marks Scaled to 50

Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks - 50)	Term End Examinations (TEE) (Marks - 100)
3	2	0	4	Marks Scaled to 50	Marks Scaled to 50

Pre-requisite: Nil

Course Objective

The knowledge of Physics relevant to engineering is critical for converting ideas into technology. This course aims to make students understand the basic concepts of Physics thoroughly with a view to lay foundations for the various engineering courses.

Course Outcomes

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

1. Interpret the structural properties of elemental solids and its application to explain the working of semiconductors at molecular level
2. Explain the fundamentals of laser and intensity variation of light due to interference & diffraction.
3. Formulate and solve the engineering problems on electromagnetism

Detailed Syllabus

Unit	Description	Duration
1.	**Crystal structure** Lattice, basis, crystal structure, unit cell, Structure of cubic crystals (SC, BCC, FCC). Miller Planes and direction in crystal structure, derivation of inter-planar spacing. Imperfections in crystals: point, line, surface & volume	**09**
2.	**Semiconductors Physics** Formation of energy bands and classification of solids into conductors, semiconductors and insulators, direct and indirect band gap semiconductors, fermi levels in semiconductor, energy gap and its temperature dependence, physics of semiconductor junction, hall effect and application	**09**
3.	**Optics** Interference: Thin film interference, wedge shaped film and Newton's rings and their applications. Diffraction: Fraunhofer and Fresnel diffraction, Fraunhofer diffraction at single slit, double slit, and multiple slits, Characteristics of diffraction grating and its applications	**09**
4.	**LASER and Fiber optics** Introduction to interaction of radiation with matter, Population inversion, pumping, various modes, threshold, population inversion, Solid state	**09**

	LASER, Semiconductor LASER, Gas LASER, applications of lasers Introduction, optical fiber as a dielectric wave guide, total internal reflection, numerical aperture and various fiber parameters, losses associated with optical fibers, step and graded index fibers, application of optical fibers	
5.	**Electricity and Magnetism** The Lorentz force law, Biot-Savart law, magnetic Vector potential, boundary conditions, multipole expansion of vector potential, magnetization, magnetic materials, torque and forces on magnetic dipoles, field of a magnetized object, the auxiliary field H, boundary conditions, linear and non-linear media Electrodynamics: Electromotive force, electro-magnetic induction, Application of Maxwell's equations, boundary conditions	**09**
	Total	**45**

Text Books

1. H.K Malik and A.K. Singh, *Engineering Physics*, 2nd edition, Tata McGraw Hill, 2017

Reference Books

1. Jearl Walker, David Halliday and Robert Resnick, *Fundamentals of Physics*, 10th edition, Wiley India, 2013
2. Avadhanulu M.N. and Kshirsagar P.G and TVS Arun Murthy, *A textbook of Engineering Physics*, 11th edition, S. Chand, 2018
3. James F. Shackelford and Madanapalli K. Muralidhara, *Materials Science for Engineers*, 7th edition, Pearson Education, 2006
4. Francis F. Chen, *Introduction to Plasma Physics*, 4th edition, Springer, 2012

Laboratory Work

8 to 10 experiments based on the syllabus

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Signature
(Head of the Department)

Program: B Tech Integrated (Computer and Data Science)		Semester: III
Course: C Programming		Code: 704CO0C001

Teaching Scheme				Evaluation Scheme	
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks - 50)	Term End Examinations (TEE) (Marks - 100)
2	2	0	3	Marks scaled to 50	Marks scaled to 50*

*Practical exam will be conducted at school level (Non-University Examination)

Prerequisite: NIL

Course Objective

 To impart the knowledge of programming concepts and methodologies which are essential to build programs using C language

Course Outcomes

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

1. Design flowchart and algorithm for a given problem
2. Implement 'C' programs using control structure, arrays and strings
3. Implement 'C' programs using functions, pointers and structures

Detailed Syllabus

Unit	Description	Duration
1	**Introduction to Problem Solving** Steps to solve logical and numerical problems using algorithms, representation of algorithm, flowchart/pseudocode with examples.	04
2	**Introduction to C-programming Constructs** History of C, structure of a 'C' Program, compiling and executing C Program, program's components, variables, numeric data types, constants, statements, expressions, arithmetic, relational, logical and bitwise operators; input, output, formatting and file I/O.	06
3	**Decision making and Looping** **Decision making:** IF statement, The IF-ELSE statement, nesting of IF-ELSE statement. **Branching:** While, Do-While, For, Nested Loops.	06
4	**Arrays and Strings** **Arrays:** One Dimensional Array, declaration and initialization, multidimensional array. **Strings:** Introduction to strings, header functions.	06
5	**Functions and Pointers** Defining functions in C, functions & parameters, introduction to recursive functions pointers and simple variables declaration, dynamic memory allocation: concept of dynamic allocation, allocating and freeing memory, implementing malloc and calloc functions.	06
6	**Structures**	02

	Simple structures and unions, difference between structures and unions.	
	Total	**30**

Text Books
1. E. Balaguruswamy, *Programming in ANSI C*, 8th Edition, Tata McGraw Hill, 2019.
2. Yashavant Kanetkar, *Let Us C*, 18th Edition, BPB Publications, 2021.

Reference Books
1. Ashok N Kamthane, *Programming in C,* 2nd Edition Pearson Educations, 2011
2. K. R. Venugopal, S. R. Prasad, *Mastering C,* 2nd Edition, Tata McGraw Hill, 2015

Laboratory Work
8 to 10 experiments (and a practicum where applicable) based on the syllabus

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Signature
(Head of the Department)

Program: B Tech Integrated (Computer and Data Science)		Semester : III	
Course : Basic Electronics		Code : 701EX0C001	
Teaching Scheme				**Evaluation Scheme**	
Lecture (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credit**	**Internal Continuous Assessment (ICA) (Marks - 50)**	**Term End Examinations (TEE) (Marks - 100)**
3	2	0	4	Scaled to 50 marks	Scaled to 50 marks

Pre-requisite

1. Theory of semiconductor materials, their atomic structures and properties.
2. DC circuit analysis, AC fundamentals.

Course Objective

To provide knowledge of the basic principles of electronic circuits operation, calculation and measurement of parameters and performance analysis of electronic circuits.

Course Outcomes

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

1. Use special purpose diodes and assemble circuits for relevant applications
2. Explain the functionality of BJT and FET with the help of applications
3. Analyze BJT and FET amplifiers
4. Illustrate the working of oscillator circuits.

Detailed Syllabus

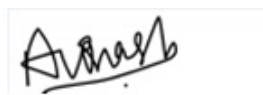| Unit	Description	Duration
1.	**Special Purpose Diodes** LED, LED voltage and current, advantages of LED, multicolour LEDs, applications of LEDs, photodiode, photodiode operation, photodiode characteristics, applications of photodiode, optoisolator, varactor diode, applications of varactor diode, schottky barrier diode.	8
2.	**Bipolar Junction Transistor** Transistor load line analysis, operating point, cut-off and saturation points, power rating of transistor. **Transistor Biasing -** Base resistor bias (Fixed bias), emitter bias, and voltage divider bias. **Solid State Switching Circuits -** Electronic switches, advantages of electronic switches, important terms, switching transistors, switching action of transistor. **Multivibrators** – Transistor astable multivibrator, transistor monostable multivibrator, transistor bistable multivibrator.	12
3.	**Field Effect Transistors**	15

	Types of FETs, JFET, principle and working of JFET, schematic symbol of JFET, difference between JFET and BJT, JFET as an amplifier, input and output characteristics of JFET, important terms, expression for drain current, parameters of JFET, relationship between parameters, JFET fixed bias and voltage divider bias methods.		
4.	**Sinusoidal Oscillators** Positive feedback amplifier, oscillator, essentials of transistor oscillator, explanation of Barkhausen criterion, different types of transistor oscillators – Colpitts Oscillator, Hartely Oscillator, Phase-Shift Oscillator, Wien-bridge Oscillator, Crystal Oscillator.	**10**	
	Total	**45**	

Text Books
1. V. K. Mehta, Rohit Mehta, *Principles of Electronics*, 11th edition, S. Chand & Co., 2014.

Reference Books
1. Robert Boylestad& Louis Nashelsky, *Electronic Devices & Circuit Theory*, 9th Edition, Pearson Education2015.
2. David A. Bell, *Electronic Devices & Circuits*, 5th edition, Prentice Hall, 2008.

Laboratory Work
8 to 10 experiments (and a practicum where applicable) based on the syllabus.

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Signature
(Head of the Department)

Program: B Tech Integrated (Computer and Data Science)				**Semester:** III	
Course: Computer Hardware and Maintenance				**Code:** 704CO0C002	
Teaching Scheme				**Evaluation Scheme**	
Lecture (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credit**	**Internal Continuous Assessment (ICA) (Marks - 50)**	**Term End Examinations (TEE) (Marks- ---)**
0	2	0	1	Marks scaled to 50	--
Prerequisite: Electrical and Computer workshop					
Course Objective					
To impart the knowledge of computer hardware and its testing & troubleshooting.					
Course Outcomes					
After completion of the course, the student will be able to -					
1. Identify the hardware components of computer system					
2. Illustrate troubleshooting process for common computer problems					
3. Identify power supply units and networking peripherals					
Detailed Syllabus					

Unit	Description	Duration
1	**PC Hardware and Components** Introduction to computer hardware, components of motherboards, CPU, various ports, slots, connectors, addon cards Primary and secondary memory and their installation, Cabinet types	**06**
2	**Diagnose & repair problems of Desktop and Laptop** General Troubleshooting rules, Preventive Maintenance. BIOS Features, BIOS & Boot Sequences, BIOS Shortcoming & Compatible Issues, BIOS Troubleshooting. POST, Error Code: Beep Code, Post Code, preventive maintenance of latest gazettes	**06**
3	**Input-Output devices and their troubleshooting** Troubleshoot Input-Output devices: keyboard, switches, mouse, scanners, webcam, monitors, printers, speaker and mike, LCD projector. I/O Cables: specification of I/O Cables, types of I/O cables, types of I/O ports, internal and external modem	**06**
4	**Power Supply** Switched Mode Power supply block diagram, working principles, testing and troubleshooting, power rating, requirement of SMPS wattage depending parameters like type of processors and HDDs	**06**
5	**Transmission Media and Networking Connectivity Hardware** Network interface cards–Ethernet, Cabling Concepts (designing, installing, and maintaining modern communications infrastructures and electronic physical security systems. Fiber optics, wireless networks), various networking devices like routers, repeaters, switches, bridges	**06**
	Total	**30**

Text Books

1.   Craig Zacker,*PC Hardware: The Complete Reference*, 1st edition , McGraw-Hills, 2019.

Reference Books

1.   James, K.L. *The computer hardware installation, interfacing troubleshooting and maintenance,* PHI Learning, New Delhi, 2014

Laboratory Work

8 to 10 experiments (and a practicum where applicable) based on the syllabus.

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Signature

(Head of the Department)

Program: B Tech Integrated (All Branches)					Semester: III /IV	
Course : Constitution of India					Code : 702BS0C006	
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks - 50)		Term End Examinations (TEE) (Marks - 100)
1	0	0	0	Marks Scaled to 50		----

Prerequisite: NIL

Course Objective

The course would enable students to get a brief introduction of the Indian Constitution and its principles. The students would have knowledge of concept of 'State' and interdependencies of its institutions vis a vis their relation with fundamental rights.

Course Outcomes

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

1. understand the historic evolution of the Indian Constitution, its drafting, nature and to understand the principles mentioned in its Preamble,
2. inculcate fundamental rights in its true sense and also the permissible restrictions upon it so as to enjoy these rights within permissible limits while simultaneously performing their duties and to apply these principles into their professional lives,
3. ingrain the structure of our polity and role of Judiciary in maintaining the basic structure of the Constitution,
4. attain knowledge of the Emergency provisions, when and how it is imposed, to know the additional powers the bestowed upon the Government at times of Emergency and to understand the Amendment procedure.

Detailed Syllabus

Unit	Description	Duration
1.	Nature, Characteristics and Sources of Indian Constitution	2
2.	Fundamental rights and Fundamental duties – Concept of State, Right to Equality under Articles 14 and 15, Right to certain freedoms under Article 19, Right to Life and liberty under Article 21, Right to religion under Article 25 and 26, Right to remedy under Article 32 and Fundamental duties	6
3.	Indian Judiciary – Concept of Supreme Court and High Courts, Appointment of Judges, Independence of Judiciary, Jurisdictions of Supreme Court and High Courts	3

4.	Emergency Provisions – Concept of National Emergency under Article 352, Financial Emergency under Article 360 and President rule under Article 356 of the Constitution	4
	Total	**15**

Text Books

1. Dr. Durga Das Basu, *Introduction to the Constitution of India* , 24th Edition, Lexis Nexis, 2019.

Reference Books

1. P. M. Bakshi, *The Constitution of India*, 17th Edition, Universal Law Publishing, 2020.
2. J. N. Pandey, *Constitutional Law of India*, 57th Edition, Central Law Agency, 2020.
3. N. A. Palkhivala, *We the people,* UBS Publishers Distributors, 1999.

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Signature
(Head of the Department)