

Curriculum Structure & Syllabi

of

B.Tech.

In

Information Technology

(w.e.f. 2021-2022)

Vision

Mission

Program Educational Objectives

Program Outcomes

Program Specific Outcomes

Overall Credit Structure

Curriculum

Syllabus



Offered By

DEPARTMENT OF INFORMATION TECHNOLOGY & COMPUTER APPLICATION

M. M. M. UNIVERSITY OF TECHNOLOGY,

GORAKHPUR-273010, UP

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VISION

To become pioneer in the field of Information Technology and Computer Applications at global level by imparting quality education with excellent teaching-learning processes and research methodologies.

MISSION

Mission-1 To offer state-of-art education in Information Technology to keep pace with industry requirements.

Mission-2 To promote quality research in the field of IT and its applications.

Mission-3 To ensure the holistic development of the students by inculcating value based socially committed professionalism.

B. Tech. (Information Technology)

PROGRAMME EDUCATIONAL OBJECTIVES (PEOS)

PEO-1 To inculcate the fundamental knowledge of Mathematics, Science & Engineering disciplines for developing the ability to formulate, solve and analyse the problems of Information Technology field and to provide them the skills for the pursuit of under-graduate studies, research & development and higher education.

PEO-2 To provide the understanding of the prerequisite of the software, technical aspects, and design for coming up with the novel engineering solutions and efficient product developments.

PEO-3 To assist the students in the pursuit of the successful career by adopting the ethical practices and social responsibility.

PEO-4 To provide students the technical as well as soft skills required by the national as well as international organizations.

PEO-5 To elevate cognizance in the students towards the lifelong learning and to inculcate the ethical and moral values.

PEO-6 To give students the knowledge of the contemporary technologies, practical experiences, and possibilities in the field of Information Technology to provide the multidisciplinary knowledge to develop the team spirit and leadership qualities by working on multidisciplinary projects.

PROGRAMME OUTCOMES (POs)

- PO-1** The students will develop the ability towards the application of fundamental knowledge of hardware, computing, algorithms, and programming for developing the solutions of the critical problems of computer applications. **(Rudimentary analytical skills)**
- PO-2** The students will be able to model and carry out the experiments by using the fundamental knowledge of computing techniques and derive the conclusions by analysing and interpreting the data. **(Computing skills)**
- PO-3** The students will be able to analyze, design, implement and assess a computer-based information system, procedure, module, or program to fulfill the requirements along with the consideration of economical, privacy and reliability constraints. **(Innovative skills)**
- PO-4** The students will be able to perform efficiently in teams. **(Team spirit)**
- PO-5** The students will develop the analytical skills to critically analyze, recognize, formulate, and devise solutions to the computing problems by using the adequate computing skills and knowledge. **(Problem solving skills)**
- PO-6** The students will have the awareness towards the professional, legal, and ethical practices. **(Professional integrity)**
- PO-7** The students will have the efficient speaking and written/interpersonal communication skills. **(Oral and written communication skill)**
- PO-8** To impart the exhaustive education in the students required to understand and analyze the local and global consequences of computing solutions ranging from individuals and organizations to society. **(Computing consequences assessment skills)**
- PO-9** The students will develop the realization of the requirements and the ability to indulge in maintaining professional growth and lifelong learning. **(Continuing education cognizance)**
- PO-10** The students will have the cognition towards the current issues and problems of the society. **(Societal awareness)**
- PO-11** The students will possess the ability to utilize the knowledge of innovative programming and computing equipment required for the problem-solving tasks. **(Pragmatic skills)**
- PO-12** The students will be able to apply the design and evolution precepts in the development of software and hardware systems. **(Software hardware interface)**

PROGRAMME SPECIFIC OBJECTIVES (PSOs)

- PSO-1** To produce strong Engineers with the latest knowledge and thinking.
- PSO-2** To produce the strong engineers having decision-making, design, and development abilities.
- PSO-3** To produce Engineers to serve the IT industries with strong analytical bent of mind, research, and innovative thinking.
- PSO-4** To promote the students for higher studies and lifelong learning.
- PSO-5** To develop the skill of implementing the interdisciplinary application software projects to meet the demands of industry requirements using latest tools and technologies.
- PSO-6** To develop analytical skills in the Engineers for analysing the societal needs and providing the novel solutions through technological based research.
- PSO-7** To get the knowledge for appearing in the National and International level Exams GRE/GATE, Public-Private sectors, and further higher studies in India and abroad.
- PSO-7** To develop professional skills and latest technical knowledge time to time by conducting Board of Studies (BOS), updating syllabus to keep pace with the demands of industries for maximising the employability.

Curriculum for B.Tech. (Information Technology)

(NEP for newly admitted students for Session 2021-2022)

First Year, Semester I

S. N.	Category	Paper Code	Subject	L	T	P	Credit
1.	BSM	BSM-104	Linear Algebra and Differential Equations	3	1	0	4
2.	EF	BIT-101	Fundamentals of Information Technology	3	1	0	4
3.	HSS*	BHM-102	Communication Skill-1	2	1	2	4
4.	PS	BIT-102	Software Tools-I	0	1	2	2
5.	EF	BEC-105	Introduction to Electronics Engineering	2	0	0	2
6.	EF	BEE-105	Basic Concepts of Electrical Engineering	2	0	2	3
7.	HSSE**	HMS	Humanities & Social Sc. Elective	2	0	0	2
			Total	14	4	6	21
	ECA-I	ECA-100	Induction Program	-	-	-	0

*This can be taught either in first semester or in second semester as per the departmental decision

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First Year, Semester II

S. N.	Category	Paper Code	Subject	L	T	P	Credit
1.	BSM	BSM-156	Applied Probability and Statistics	3	1	0	4
2.	EF	BIT-151	Programming Fundamentals	3	1	2	5
3.	BSM	BSM-157	Graph Theory and Discrete Mathematics	3	1	2	5
4.	PS	BIT-152	Software Tools-II	0	1	2	2
5.	EF	BIT-153	Linux Lab	0	1	2	2
6.	PLBSE	BHM-153	Communication Skill-2	2	1	2	4
			Total	13	4	8	22
	ECA-II	ECA-220	Unity & Discipline (NCC/NSS)	-	-	-	0

Syllabus**BIT-101****FUNDAMENTALS OF INFORMATION TECHNOLOGY**

Course category : Engineering Fundamentals(EF)

Pre-requisite Subject :NIL

Contact hours/week : Lecture: 3, Tutorial: 1, Practical:0

Number of Credits : 4

Course Assessment methods :Continuous assessment through tutorials, attendance, home assignments, quizzes, Two Minor test and Major Theory Examination

Course Objective: Students will gain an understanding of the fundamentals of hardware, software, number systems, operating systems and computer networks.**Course Outcomes:** The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. understand the basics of computers Hardware/Software
2. understand the execution methodology of the programming languages
3. understand the techniques of different number systems
4. know the importance and algorithms of lossy and lossless data compression
5. learn the basic concepts of operating system
6. learn the fundamentals of computer networks

TOPICS TO BE COVERED

UNIT-I

09

Introduction to Computer Hardware/Software: Processor, Motherboard, I/O Devices, peripherals, Memory Types & Hierarchy: Cache, Primary & Secondary memories with examples, Concept of Computer Languages: Low-Level, Assembly and High-Level, System Software: Assembler, Compiler, Interpreter, Loader/Linker

UNIT-II

09

Data & Information, Digital representation of Information, Number Systems & Comparisons: Binary, Octal, Decimal, Hexadecimal, Text Representation: ASCII, EBCDIC, Unicode, Multimedia Data, Data Compression Types and Techniques: Lossy / Lossless, Huffman, Shannon-Fano, Dictionary Based Compression techniques

UNIT-III

09

Operating System: Concept, Functions, Types, Single-user/Multi-user operating system, Architectural differences, Shell fundamentals, Exemplary commands: Internal & External, Basics of Primary and Secondary Memory Management

UNIT-IV

09

Network Basics: Concept, Types, Transmission modes, Topologies, OSI & TCP/IP Models: Functions of different Layers, concept of MAC, IP (Private/Public) and TCP addresses, Basic Introduction to CSMA/CD, IP & TCP/UDP and HTTP Protocols, Current Internet Applications

Textbooks

1. Mark Nelson and Jean-Loup Gailly “The Data Compression Book”, M&T Books, A Division of MIS: Press, Inc.
2. K Sayood, “Introduction to Data Compression” 3/e, Elsevier 2006
3. Forouzan, Data Communication and Networking, TMH
4. Silberschatz, A., Galvin, P. and Gagne, G., Applied Operating Systems Concepts, John Wiley & Sons Inc.

BIT-102

SOFTWARE TOOLS-I

Course category	: Professional Skill (PS)
Pre-requisite Subject	: NIL
Contact hours/week	: Lecture: 0, Tutorial: 1, Practical: 2
Number of Credits	: 2

Course Assessment methods :Continuous assessment through tutorials, attendance, home assignments, quizzes, practical work, record, viva voce, and Major Practical Examination

Course Objective: Students will gain an understanding of the fundamentals of web designing languages viz., HTML, CSS and JavaScript.

Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Discuss the process of editing a web page using text editors
2. Discuss the process of editing a web page using web page editors.
3. Cover commonly used HTML tags
4. Discuss the importance of HTML to a web designer
5. Demonstrate an understanding of basics of CSS
6. Understand the basics of Java Script

Experiments are based on the following topics

HTML

Learning the basic structure of HTML Document, HTML basic elements like title, head, body, metadata, script, no script, working with elements and attributes used to format web page like Horizontal Rules and line breaks and paragraph, working with citation, quotation, definitions and comments, types of Tags in HTML, Aligning text, exploring the hyperlinks and linking to a mail system, exploring the link relations, Working with Images and embedding media like video, audio etc., formatting text with HTML physical style elements, formatting text with HTML logical style elements, Displaying Plain, Bold, Italic, Small, Subscripted, Superscripted text, Displaying Program Code, Program Output, Keyboard text, Emphasizing text, Defining New Terms, Short and long Quotations, Tables, frames and lists, Form Elements like Action, Id, On submit, on reset, Target Attribute, Form Controls Like Text Inputs, Button, Check Boxes, Radio Buttons, Select, File Select, understanding GET and POST

CSS

Introduction to CSS and syntax, Learning about Selectors, CSS properties like text controlling, text formatting and positioning, CSS pseudo class and pseudo elements, working with gradients, media query, shadows, rounded corners etc., Introduction to CSS framework – Bootstrap

JavaScript

Overview, JavaScript Versions, Incorporating JavaScript in the <head> and <body> element, JavaScript using External JavaScript file, learning JavaScript syntax, comments, variables and

operators, Type Conversion, control statements such as if...else, switch, break and continue, looping statements such as while, do...while, for ,Popup boxes such as Alert, Confirm, and Prompt, JavaScript Events - on click, on load, on reset, on submit, on dbl click, on mouse over, on mouse out, on mouse move, on mouse up, on mouse down etc.

EXPERIMENTS

HTML

1. Introduction to basic HTML elements.

2. Use table tag to format web page. Also create the Time Table of your class using table tag.
3. Write an HTML document with an example of Ordered List and Unordered List..
4. Write an HTML document with an example of Table format to print your Bio-Data..
5. Write an HTML document with an example of Table format to print your Telephone Bill.

CSS

1. Design a CSS to create menu.
2. Design a webpage i.e. Bio data using CSS.
3. WAP to create table and list using CSS.
4. To create a web page that displays college information using various Style sheets.
5. Write a program to Use different font, styles: In the style definition you define how each selector should work (font, color etc.). Then, in the body of your pages, you refer to these selectors to activate the styles.

JavaScript

1. Embedding JavaScript in HTML pages.
2. Design a registration form and validate its field by using JavaScript.
3. To design the scientific calculator and make event for each button using JavaScript.
4. WAP to create popup boxes in JavaScript.
5. 5. Program to create a class calculator that contains an overloaded method called "add" to calculate the sum of two integers, two float numbers and, one integer and one float.

BIT-151

PROGRAMMING FUNDAMENTALS

Course category	: Engineering Fundamentals(EF)
Pre-requisite Subject	:NIL
Contact hours/week	: Lecture: 3, Tutorial: 1, Practical:2
Number of Credits	: 5
Course Assessment methods	:Continuous assessment through tutorials, attendance, home assignments, quizzes, practical work, record, viva voce, two minor test, major theory examination & major practical examination

Course Objective: Students will gain an understanding of the fundamentals of computers and programming. The objective is to prepare them for various dimensions of C Programming language.

Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Describing the basics of terminologies used in computer programming.
2. Practicing C language programming by writing, compiling and debugging the code.
3. Designing programs involving simple statements, conditional statements, iterative statements, array, strings, functions, recursion and structure.
4. Discussing the dynamic memory allocations and use of the pointers.
5. Applying basic operations on files through programs.
6. Studying and implementing the codes using macros, pre-processor directives and command line arguments

TOPICS TO BE COVERED

UNIT-I

09

Basics of Computers and Programming: Functional diagram of computer; Language Processors;

Approaches to problem solving, Concept of algorithm and flow charts. **Simple Statements:** Data types; Tokens and its types; Variable declaration and initialization; User defined type declaration: type def, enum; Comments; Format specifiers; Standard I/O: taking input and displaying output; **Operators:** types, precedence and associativity; Expressions; Type conversion, Cshort-hands.

UNIT-II

09

Conditional Statements: Simple if, if-else, nested if-else, else-if ladder, switch statements, nested switch, advantages of switch over nested if, restrictions on switch values. **Iterative Statements:** Concepts of entry and exit controlled loops; Uses of for, while and do while loops; Nested Loops; Printing various patterns using nested loops; Using break, continue and goto statements.

UNIT-III

09

Arrays: Single-dimensional, multi-dimensional array and their applications; declaration and manipulation of arrays; strings and string handling functions. **Pointers:** Pointer and address arithmetic; dereferencing; pointers and arrays; dynamic memory allocation and de-allocation. **Functions:** Function prototype; Arguments and its types: actual, formal and default arguments; Scope of a variable; Argument passing methods; Passing pointer as the function argument; Recursion: types, advantages and disadvantages; Storage class specifies; Character test functions.

UNIT-IV

09

Structure: Declaring and defining structures; Array within structure; Array of structure; Defining and using some data structures: Stack, Queue, and Linked lists. **File Handling:** Types of files; Text files and different operations on text files, opening a file, closing a file; Data structure of a file; EOF; I/O operations on files; Random access to the files. **Standard C Pre-processors & C Library:** Pre-processor, Directives, Macro, Macro substitution; Conditional Compilation; Command Line Arguments; Standard C Library.

Textbooks

1. Brian W. Kernighan and Dennis M. Ritchie, "The C programming language", Pearson
2. E. Balagurusamy, "Programming in ANSI C", McGraw Hill Education
3. Yashavant Kanetkar, "Let Us C", bpb publication
4. Jeri R. Hanly, Elliot B. Koffman, "Problem Solving and Program Design in C", Pearson
5. Herbert Schildt, "C: The Complete Reference", McGraw Hill Education

EXPERIMENTS

Implementing programs in following categories using programming language 'C':

1. Programs of simple statements, conditional statements, and iterative statements with the applications.
2. Programs of single and multi-dimensional arrays and their applications.
3. Programs of strings and the applications
4. Programs of pointer and the applications
5. Programs of function and the applications
6. Programs of structure and the applications
7. Codes of file handling and management
8. Codes with Pre-processor, Macro, Conditional Compilation and Command Line Arguments

BIT- 152

SOFTWARE TOOLS-II

Course category	: Professional Skill (PS)
Pre-requisite Subject	:NIL
Contact hours/week	: Lecture: 0, Tutorial: 1, Practical:2
Number of Credits	: 2
Course Assessment methods	:Continuous assessment through tutorials, attendance, home assignments, quizzes, practical work, record, viva voce, and Major Practical Examination

Course Objective: Students will gain an understanding of the advanced concepts of web designing scripting language like JavaScript.

Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Use JavaScript as an interactive tool for web development
2. Hand code a number of interactive processes
3. Implement interactive responses in your web pages
4. Modify CSS styles and presentation properties with JavaScript
5. Control images as interactive objects
6. Understand the Document Object Model (DOM)
7. Use JavaScript for specific tasks effectively and have the confidence to explore it further.

Experiments are based on the following topics

JavaScript

Working with functions with parameters, Using function Arguments, Return statement, JS Scopes, Error Handling, Hoisting, Strict Mode, Arrow function, working with Strings - Methods, Search, Templates, working with Numbers – Methods, Arrays - Methods, Sort, Iteration, Const, working with Dates - Format, Get Methods, Set Methods, JS Classes and Objects, JSON, asynchronous JavaScript, JavaScript library – jQuery

EXPERIMENTS

1. Write a JavaScript program to converts a specified number to an array of digits
2. Write a JavaScript program to convert the length of a given string in bytes.
3. Write a JavaScript program to return the minimum-maximum value of an array, after applying the provided function to set comparing rule
4. Write a JavaScript program to remove specified elements from the left of a given array of elements.
5. Write a JavaScript program to remove specified elements from the right of a given array of elements
6. Write a JavaScript program to get every nth element in a given array
7. Write a JavaScript program to get a random number in the specified range
8. Write a JavaScript program to get a sorted array of objects ordered by properties and orders.
9. Write a JavaScript program to chain asynchronous functions.
10. Write a JavaScript program to get the maximum value of an array, after mapping each element to a value using the provided function

BIT- 153

LINUX LAB

Course category	: Engineering Fundamentals(EF)
Pre-requisite Subject	:NIL
Contact hours/week	: Lecture: 0, Tutorial: 1, Practical:2
Number of Credits	: 2
Course Assessment methods	:Continuous assessment through tutorials, attendance, home assignments, quizzes, practical work, record, viva voce, and Major Practical Examination

Course Objective: Students will gain an understanding for the fundamentals of Linux operating system, its booting process, system commands and shell programming.

Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Understanding of Booting Process
2. Understand the installation of Operating System
3. Understand the usage of Operating System commands
4. Understanding basics of the Shell
5. Demonstrate the usage of Shell as a programming language
6. Understanding of Computer Networking concepts

EXPERIMENTS

1. Installation of Linux operating system using virtualization technique
2. Understanding and practice of various Linux commands
3. Creation/usage of various types of files supported by Linux
4. Practice of Computer networking commands
5. Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported
6. Illustrate by writing script that will print, message “Hello World, in Bold and Blink effect, and in different colors like red, brown etc using echo commands?
7. Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.
8. Illustrate by writing script using for loop to print the pyramid patterns?
9. Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.
10. Write a shell script to find factorial of a given number
11. Write other simple programs using shell programming

BSM-104 Linear Algebra and Differential Equations

Course category	: Basic Sciences & Maths (BSM)
Pre-requisite Subject	: NIL
Contact hours/week	: Lecture : 3, Tutorial : 1 , Practical: 0
Number of Credits	: 4
Course Assessment methods	: Continuous assessment through tutorials, attendance, home assignments, quizzes and Two Minor tests and One Major Theory Examination
Course Objectives	: The course is aimed to develop the basic mathematical skills of engineering students that are imperative for effective understanding of engineering subjects.
Course Outcomes	: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Use of basic differential operators in various engineering problems.
2. To understand the concept of convergence and divergence of sequences.
3. Solve linear system of equations using matrix algebra.
4. Know about qualitative applications of Gauss , Stoke's and Green's theorem.
5. To know the applications of double and triple integration in finding the area and volume.
6. To inculcate the habit of mathematical thinking and lifelong learning.

Topics Covered

UNIT-I 9

Sequences and Series of Real Numbers Sequence of real numbers, convergence of sequences, bounded and monotone sequences, convergence criteria for sequences of real numbers, Cauchy sequences, subsequences, Bolzano-Weierstrass theorem. Series of real numbers, absolute convergence, tests of convergence for series of positive terms, comparison test, ratio test, and root test; Leibniz test for convergence of alternating series.

UNIT-II 9

Linear Algebra: Symmetric, Skew-symmetric matrices, Hermitian, Skew Hermitian Matrices, orthogonal and unitary matrices and basic properties, linear independence and dependence of vectors, Rank of Matrix, Inverse of a Matrix, Elementary transformation, Consistency of linear system of equations and their solution, Characteristic equation, Eigenvalues, Eigenvectors, Cayley-Hamilton theorem, Diagonalization of matrices.

UNIT-III 9

Functions of Two or Three Real Variables: Limit, continuity, partial derivatives, differentiability, Taylors Theorem, maxima, and minima. **Integral Calculus:** Double and triple integrals, change of order of integration, change of variables, calculating surface areas and volumes using double integrals, Dirichlet's Integral, calculating volumes using triple integrals.

UNIT-IV 9

Differential Equations: Linear differential equations with constant coefficients (n^{th} order), complementary function and particular integral. Simultaneous linear differential equations, solution of second order differential equations by changing dependent and independent variables, Method of variation of parameters.

Books & References

1. B.S. Grewal: Higher Engineering Mathematics; Khanna Publishers
2. Erwin kreyszig: Advanced Engineering Mathematics, John Wiley & Sons.
3. R. K. Jain and Iyenger: Advanced Engineering Mathematics, Narosa Publications.
4. B.V. Ramana: Higher Engineering Mathematics, Tata Mc. Graw Hill Education Pvt. Ltd.,

BHM-102/152

COMMUNICATION SKILLS - I

(L-T-P: 2-1-2)

Course Category:	Humanities & Social Science (HSS)
Pre-requisite Subject:	None
Contact hours/week:	4 Credit
No of Credits:	Lecture: 2, Tutorial: 1, Practical: 2 (Total Credit: 04)
Course Assessment Methods:	Continuous assessment through tutorials, Attendance, home assignments, quizzes, Two Test and one Major Theory Exam.

Course Objective: The course aims:

- 1) To sensitize the students to understand the role & importance of communication for personal & professional success.
- 2) To enable learners to exhibit knowledge, skills, and judgment in and around human communication that facilitates their ability to work collaboratively with others in an interpersonal environment.
- 3) To develop awareness and understanding of applying appropriate communication strategies resulting into the enhancement of learners' employability skills.

Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

- 1) Use of various facets of communication skills, such as, Reading, Writing, Listening and speaking skills.
- 2) To identify, formulate and solve the real life problems with positive attitude.
- 3) To inculcate the habit of learning and developing the communication and soft skills by practice.
- 4) To enhance effortless speaking and writing skills with the help of rich word power.
- 5) To develop personality by introducing and inculcating effective presentation strategies.
- 6) To focus on audio, visual aids for effective oral communication skills.

Syllabus

Unit I: - Art of Good Communication:

9 Hours

Introduction, Verbal & Non-Verbal Communication, Difference between Oral and Written Communication, 7'Cs of Effective Communication, Importance of Effective Communication

Unit II: - Acquisition of Effective Communicative Skills by the application of English Grammar and Composition:

9 Hours

Introduction-Clarity, Consistency and Economy of using words in sentences, Different Patterns of Verbs, Nouns and Adjectives in writing variety of sentences, Different Orders/Methods to be followed in composition of sentences and paragraphs

Unit III: - Body Language and Communication:

9 Hours

Introduction, Non-Verbal Communication, Types of Body Language, Functions of Body Language, Role of Body Language, Proxemics.

Unit IV: - Team and Group Discussion:

9 Hours

Introduction, Team Behaviour, Types of Teams, Team Roles and Behaviour, Group Discussion, Do's and Don't

List of Practical:

- 1.Vowel and Consonant Sounds
- 2.Syllables and their identification
- 3.listen and Repeat words
- 4.Speak on the basis of pictures of the places you have visited
- 5.Enrich your word power by practices
6. Communication by Conversation
- 7.Speak English using Software in Language Lab
- 8.Make your English Effortless.

Text & Books:

- 1) Bansal, R.K. & Harrison J.B., (1972) *Spoken English*, Orient Longman, India.
- 2) Chauhan, Narender Kr. & Singh, Sudhir N., (2013) *Formal Letters*, Pankaj Publication International, New Delhi.
- 3) Chhabra T.N., (2019) *Business Communication*, Sun India Publication, New Delhi.
- 4) Dixon Robert J., (1986) *Complete Course in English*, Prentice Hall of India, New Delhi.
- 5) Jones, Daniel. (2012) *Cambridge English Pronouncing Dictionary*, 18th Edition, Paperback, CUP, India.
- 6) Lewis, Norman, (2015) *Word Power Made Easy*, Penguin India.
- 7) Sethi J. & Jindal, (1993) *Handbook of Pronunciation of English Words - D.V.A*, Prentice Hall of India, New Delhi.
- 8) Sharma R.C. & Mohan Krishna, (2017) *Business Correspondence and Report Writing*, Tata McGraw Hill.
- 9) Thomson, A. J. & and Martinet A. V., (1997) *A Practical English Grammar*, Paperback, Ed. IVth, Oxford.

BEC-105 Introduction to Electronics Engineering

Course category : Engineering Fundamentals (EF)

Pre-requisite : Nil

Subject

Contact : Lecture: 2, Tutorial:0, Practical: 0

hours/week

Number of Credits : 2

Course Assessment methods : Continuous assessment through tutorials, attendance, assignments, quizzes, viva voce and Two Test and One Major theory Examination

Course Objective The objective of this course is to develop an understanding of the

different types of different electronic circuits such as BJT, MOSFET etc. and study the working principles of different instruments.

Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills, and attitudes after completing this course:

1. Able to identify schematic symbols and understand the working principles of electronic devices, e.g., Diode, Zener Diode, semiconductor sensors, BJT, JFET and MOSFET etc.
2. Able to understand the working principles of electronic circuits e.g., Rectifiers, Clipper, Clamper, Amplifiers and Operational Amplifiers etc. also understand methods to analyse and characterize these circuits.
3. Able to understand the functioning and purposes of Measuring equipment such as multimeter, CROs and function generator sets.
4. Understand use, general specifications and deploy abilities of the electronic devices, and assemblies
5. Confidence in handling and usage of electronic devices, tools and instruments in engineering applications
6. Able to rig up and test small electronics circuits.

Topics Covered

UNIT-I

6

Semiconductor materials and properties: electron-hole concepts, Basic concepts of energy bands in materials, Intrinsic and extrinsic semiconductors, p-n junction diode, V-I characteristics of p-n junction diode, Shockley equation of diode. Diode Applications in rectifier, clipper, and clamper circuits. Breakdown mechanism and characteristics (Zener and avalanche), Zener diode application.

UNIT-II

6

Basic construction, transistor action, CB, CE and CC configurations, input/output characteristics, Biasing of transistors, comparison of biasing circuits, Concept of early effect, Ebers-Moll model. Applications of BJT as an amplifier and switch, Graphical analysis of CE amplifier, concept of voltage gain, current gain, h- parameter model (low frequency).

UNIT-III

6

JFET: Basic construction, transistor action, concept of pinch off, input and transfer characteristics, characteristic equation CG, CS and CD configurations, fixed & self-biasing. MOSFET: depletion and enhancement type MOSFET-construction, operation, and characteristics. Concept and applications of CMOS circuits.

UNIT-IV

6

Basics of semiconductor sensors and integrated circuits (IC). Operational Amplifiers: Concept of ideal operational amplifiers, ideal op-amp parameters, inverting, non-inverting and unity gain amplifiers, adders, difference amplifiers, integrators. Electronics Instruments: Working principle of digital voltmeter, digital multimeter, cathode ray oscilloscope (CRO).

List of Books:

1. Robert L. Boylestand / Louis Nashelsky “Electronic Devices and Circuit Theory”, Latest Edition, Pearson Education.
2. H S Kalsi, “Electronic Instrumentation”, Latest Edition, TMH Publication.

3. George Kennedy, “Electronic Communication Systems”, Latest Edition, TMH.
4. David A. Bell, “Electronic Devices and Circuits”, Latest Edition, Oxford University Press.
5. Jacob Millman, C.C. Halkias, StayabrataJit, “Electronic Devices and Circuits”, Latest Edition, TMH.
6. David A. Bell, Electronic Instrumentation and Measurements, Latest Edition, Oxford University Press India.

BEE-105/ 155 Basic Concepts of Electrical Engineering

Course category : Engineering Fundamentals (EF)
Pre-requisite Subject : NIL
Contact hours/week : Lecture: 2, Tutorial: 0, Practical: 2
Number of Credits : 3
Course Assessment methods : Continuous assessment through tutorials, attendance, home assignments, quizzes, practical work, record, viva voce and One Minor tests and One Major Theory & Practical Examination.

Course Objectives : **1.** To demonstrate and understand the basic knowledge of electrical quantities such as current, voltage, power, energy, and frequency to understand the impact of technology in a global and societal context.
2. To demonstrate and understand the basic concepts of analysis of simple DC and AC circuits used in electrical engineering and apply the basic concepts in Electrical engineering for multi-disciplinary tasks.

Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills, and attitudes after completing this course”

1. Understand the basic properties of electrical elements, and solve problem based on basic electrical circuits.
2. Verify the concept of DC network theorems and interpret the results.
3. Understand the fundamental behaviour of AC circuits and solve AC circuit problems.
4. Understand 3 phase balanced and unbalanced, star and delta connected supply and load and to measure power in 3 phase circuits
5. Understand the basic concepts of magnetic circuits.
6. Explain construction and working principle of transformer.

Topic Covered

UNIT I 6

D C Circuit Analysis:

Circuit Concepts: Concepts of network, Active and passive elements, Voltage and current sources, Concept of linearity and linear network, Unilateral and bilateral elements, R, L and C as linear elements, Source transformation, Kirchhoff’s laws, Loop and nodal methods of analysis, Star-delta transformation.

UNIT II 6

Network Theorems:

Superposition theorem, Thevenin’s theorem, Norton’s theorem, Maximum Power

Transfer theorem.

UNIT III

6

Single-Phase AC Circuits

AC fundamentals: Sinusoidal, square and triangular waveforms – Average and effective values, Form and peak factors, Concept of phasor, phasor representation of sinusoidally varying voltage and current, Analysis of series, parallel and series-parallel RLC Circuits, Resonance in series and Parallel circuit

UNIT IV

6

Magnetic Circuit & Single-Phase Transformers:

Magnetic circuit, concepts, analogy between electric & magnetic circuits, B-H curve, Hysteresis, and eddy current losses.
Single Phase Transformer: Principle of operation, Construction, EMF equation, Power losses, Efficiency.

EXPERIMENTS

1. Verification of Kirchhoff's Law.
2. Verification of Norton's Theorem.
3. Verification of Thevenin's Theorem.
4. Verification of Maximum Power Transfer Theorem.
5. Verification of Series & Parallel R-L-C circuit.
6. To perform O.C. and S.C. test of a single-phase transformer.

Textbooks:

1. Fundamentals of Electric Circuits, C.K. Alexander and M.N.O. Sadiku; TATA McGraw-Hill.
2. Principles of Electrical Engineering, V. Del Toro; Prentice Hall International.
3. Electrical and Electronics Technology, Edward Hughes; Pearson.
4. Basic Electrical Engineering, D P Kothari, I.J. Nagarath; Tata McGraw Hill
5. Electrical Technology, B. L. Thareja and A. K. Thareja; S. Chand.

BSM-156 Applied Probability and Statistics

Course category	: Basic Sciences & Maths (BSM)
Pre-requisite Subject	: NIL
Contact hours/week	: Lecture : 3, Tutorial : 1 , Practical: 0
Number of Credits	: 4
Course Assessment methods	: Continuous assessment through tutorials, attendance, home assignments, quizzes and Two Minor tests and One Major Theory Examination
Course Objectives	: The course is aimed to develop the basic mathematical skills of engineering students that are imperative for effective understanding of engineering subjects.
Course Outcomes	: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course
	<ol style="list-style-type: none"> 1. To understand the basic concepts of probability and probability Distributions. 2. To understand the central tendency, correlation, and correlation coefficient and also

regression.

3. To understand the fitting of various curves by method of least square
4. To apply the statistics for testing the significance of the given large and small sample data by using t- test, F- test and Chi-square test.
5. Application of probability and statistics in real life.
6. To inculcate the habit of statistical thinking and lifelong learning.

Topics Covered

UNIT-I 9

Basic Statistics: Frequency distribution, Mean, Median, Mode, Moments, Moment Generating function, Skewness, Types of Skewness, Measurement of Skewness, Kurtosis, and its types. Curve fitting: Method of Least Squares, Fitting of Straight lines, Fitting of Parabola of second degree.

UNIT-II 9

Applied Statistics: Correlation, Correlation coefficient, Spearman's rank correlation coefficient, Regression, Equation of regression lines, linear, and non-linear regression analysis. Relation between Regression Analysis and Correlation Analysis

UNIT-III 9

Probability: Random experiment, outcome, trial and event, Exhaustive events, favourable events, independent events, sample space, classical and empirical definition of probability, addition theorem of probability, multiplication theorem of probability, conditional probability, Baye's theorem.

UNIT-IV 9

Probability Distribution: Discrete and continuous random variable and their properties, distribution functions, Binomial, Poisson and Normal Distribution and evaluation of statistical parameter of these three distributions. **Test of significance:** sampling, large sample test for single proportion, difference of proportions, single mean, difference of means and difference of standard deviation, Chi-square test for goodness of fit.

Books & References

1. D. C. Montgomery and G. C. Runger, Applied Statistics and Probability for Engineers, Wiley.
2. J. L. Devore, Probability and Statistics for Engineering and the Sciences, Cengage Learning.
3. S.M. Ross, Introduction to Probability and Statistics for Engineers and Scientists, Academic Press; 5th edition
4. Robert V Hogg, Joseph McKean, Allen T Craig, Introduction to Mathematical Statistics, Pearson Edu.
5. Mood, Graybill and Boes, Introduction to the Theory of Statistics, Tata McGraw-Hill.

BSM-157 Discrete Mathematics and Graph Theory

Course category : Basic Sciences & Maths (BSM)

Pre-requisite : NIL

Subject

Contact hours/week : Lecture: 3, Tutorial: 1, Practical: 2

Number of Credits : 5

Course Assessment methods : Continuous assessment through tutorials, attendance, home assignments, quizzes and Two Minor tests and One Major Theory & Practical Examination

Course Objectives : The course is aimed to develop the basic mathematical skills of engineering students that are imperative for effective understanding of engineering subjects.

Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Use logical notation to define different function such as set, function and relation.
2. Use of basic properties of group theory in computer science.
3. Use of graph theory models to solve problems of connectivity and constraint satisfaction.
4. Use of induction hypotheses to prove formulae.
5. Application of Euler and Hamiltonian graph in real life.
6. To inculcate the habit of mathematical thinking and lifelong learning.

Topics Covered

UNIT-I 9

Set Theory, Relation and Function: Operations on sets, relations and functions, binary relations, partial ordering relations, equivalence relations, principles of mathematical induction. Finite and infinite sets, countable and uncountable sets, Cantor's diagonal argument and the power set theorem, Schröder-Bernstein theorem.

UNIT-II 9

Algebraic Structures: Algebraic structures with one binary operation - semigroups, monoids and groups, congruence relation and quotient structures. Free and cyclic monoids and groups, permutation groups, substructures, normal subgroups. Algebraic structures with two binary operations - rings, integral domains and fields. Boolean algebra and Boolean ring.

UNIT-III 9

Combinatorics: Basic counting techniques: inclusion and exclusion, pigeon-hole principle, permutation, combination, summations. Introduction to recurrence relations and generating functions.

UNIT-IV 9

Graphs: Graphs and their basic properties - degree, path, cycle, subgraphs, isomorphism, digraphs, Undirected graph, duality principle, Eulerian and Hamiltonian walks, graph coloring, planar graphs, trees. Applications.

Books & References

1. Kenneth H Rosen, Discrete Mathematics and its Applications, TMH.
2. C L Liu, Elements of Discrete Mathematics, Second Edition, Tata McGraw-Hill.
3. Bernard Kolman, Robert C Busby, and Sharon Cutler Ross, Discrete Mathematical Structures, fifth edition, Prentice-Hall of India.
4. Ralph P Grimaldi, Discrete and Combinatorial Mathematics, Pearson Education Asia.
5. J P Tremblay and R Manohar, Discrete mathematical structures with applications to Computer Science, Tata McGraw-Hill.

List of Practical's

1. Write a program in C to create two sets and perform the union and intersection operations on sets.
2. Write a program in C to find the complement of a set.
3. Write a program in C to create two sets and perform symmetric differences operations on these two sets.
4. Write a program to find the Cartesian product of two sets.
5. Write a C program to verify Truth table of AND, OR and NOT Gate

6. Write a program in C to find power set of a given set.
7. Write a Program in C for Graph Coloring.
8. Write a program in C to verify:
 - a. Given relation is equivalence or not.
 - b. Given algebraic system is Abelian group or not.
9. Write a program in C to perform following operation:
 - a. Is the given relation is reflexive?
 - b. Is the given relation is symmetric?
 - c. Is the given relation is Transitive?
10. Write a program in C for finding the shortest path in a graph.
11. Write a program in C to implement a recursive counting technique
12. Write a program in C to find permutation of the set.
13. Write program in C for minimum cost spanning tree.

BHM-103/153 COMMUNICATION SKILLS - II (L-T-P: 2-1-2)

Course Category:	Humanities & Social Science (HSS)
Pre-requisite Subject:	None
Contact hours/week:	4 Credit
No of Credits:	Lecture: 2, Tutorial: 1, Practical: 2 (Total Credit: 04)
Course Assessment Methods:	Continuous assessment through tutorials, Attendance, home assignments, quizzes, one minor Test and one Major Theory Exam.

Course Objective: The course aims:

- 1) To sensitize the students to understand the role & importance of communication for personal & professional success.
- 2) To enable learners to exhibit knowledge, skills, and judgment in and around human communication that facilitates their ability to work collaboratively with others in an interpersonal environment.
- 3) To develop awareness and understanding of applying appropriate communication strategies resulting into the enhancement of learners' employability skills.

Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

- 1) Use of various facets of communication skills, such as, Reading, Writing, Listening and speaking skills.
- 2) To identify, formulate and solve the real life problems with positive attitude.
- 3) To inculcate the habit of learning and developing the communication and soft skills by practice.
- 4) To learn and develop advance levels of communication skills.
- 5) To identify the weaknesses in the area of communication and combat with them by G.Ds and speech delivery.
- 6) To face the challenges during interview and overcome the emerging problems by continuous interactive sessions and practices.

Syllabus

Unit I: - Spoken English: 9 Hours

Introduction, Course Structure, Stress, rhythm, pitch and Intonation in English Pronunciation, Phonetic Transcription and its role in pronouncing English words, Sounds of English Vowels and Consonants

Unit II: - Personality and Communication: 9 Hours

Introduction, Personality, Definition, Elements, and Determinants, Personal Grooming, Personal Hygiene, Social Effectiveness, Business Etiquettes (Power Dressing)

Unit III: - Presentation and its Strategies: 9 Hours

Introduction, Warm up before Facing the Audience, Tips of Effortless Presentation, Role of Audio-Visual Aids in Presentation, Sign posting in Presentation

Unit IV: - Interview Preparation: 9 Hours

Introduction, Resume Writing, Dress Code, Mock-Interview, How to be Successful in an Interview

List of Practical:

1. warm-up for Giving Your Presentation
2. Tips for Presentation
3. Audio-visual aids for facing the Audience
4. Checking grammar in Presentation
5. GD in Language Lab
6. Brain-storming sessions and their importance
7. Interview Skills with practice of mock interview
8. Case -study : presentation and Speech Delivery

Text & Books:

- 1) Bansal, R.K. & Harrison J.B., (1972) *Spoken English*, Orient Longman, India.
- 2) Chauhan, Narender Kr. & Singh, Sudhir N., (2013) *Formal Letters*, Pankaj Publication International, New Delhi.
- 3) Chhabra T.N., (2019) *Business Communication*, Sun India Publication, New Delhi.
- 4) Dixon Robert J., (1986) *Complete Course in English*, Prentice Hall of India, New Delhi.
- 5) Jones, Daniel., (2012) *Cambridge English Pronouncing Dictionary*, 18th Edition, Paperback, CUP, India.
- 6) Lewis, Norman, (2015) *Word Power Made Easy*, Penguin India.
- 7) Sethi J. & Jindal, (1993) *Handbook of Pronunciation of English Words - D.V.A*, Prentice Hall of India, New Delhi.
- 8) Sharma R.C. & Mohan Krishna, (2017) *Business Correspondence and Report Writing*, Tata McGraw Hill.
- 9) Thomson, A. J. & Martinet A. V., (1997) *A Practical English Grammar*, Paperback, Ed. IVth, Oxford.