



# ACE

## Engineering College

### An Autonomous Institution

All the courses are Accredited by NBA and NAAC with A  
Grade, Affiliated to JNTUH

Ankushapur, Ghatkesar, Medchal, Hyderabad-501301

**B.TECH. FOUR YEAR DEGREE COURSE**

**DEPARTMENT OF INFORMATION TECHNOLOGY**

**R-22 COURSE STRUCTURE (2<sup>nd</sup> Years)**

#### II Year I Semester

S.No.	Course Title	Periods Per Week			Credits
		L	T	P	
1.	Electronic Devices and Circuits	2	0	0	2
2.	Data Structures	3	0	0	3
3.	Computer Oriented Statistical Methods	3	1	0	4
4.	Computer Organization and Microprocessor	3	0	0	3
5.	Introduction to IoT	2	0	0	2
6.	Elements of Computer Science & Engineering	0	0	2	1
7.	Digital Electronics Lab	0	0	2	1
8.	Data Structures Lab	0	0	3	1.5
9.	Internet of Things Lab	0	0	3	1.5
10.	Gender Sensitization Lab	0	0	2	0
11	Skill Development Course (Data visualization- R Programming/ Power BI/ Google data studio/IBM NODE-RED)	0	0	2	1
	<b>Total</b>	<b>13</b>	<b>1</b>	<b>14</b>	<b>20</b>

## ELECTRONIC DEVICES AND CIRCUITS

**B.Tech. II Year I Sem.**

**L T P C**  
**2 0 0 2**

### **Course Objectives:**

1. To introduce components such as diodes, BJTs and FETs.
2. To know the applications of devices.
3. To know the switching characteristics of devices.

**Course Outcomes:** Upon completion of the Course, the students will be able to:

1. Acquire the knowledge of various electronic devices and their use on real life.
2. Know the applications of various devices.
3. Acquire the knowledge about the role of special purpose devices and their applications.

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	3	1	2	-	-	1	1	-	-	-	-	1
C02	3	2	3	-	-	2	1	-	-	-	-	1
C03	3	3	3	-	-	2	1	-	-	-	-	1

### **UNIT - I**

**Diodes:** Diode - Static and Dynamic resistances, Equivalent circuit, Diffusion and Transition Capacitances, V-I Characteristics, Diode as a switch- switching times.

### **UNIT - II**

**Diode Applications:** Rectifier - Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, Rectifiers with Capacitive and Inductive Filters, Clippers-Clipping at two independent levels, Clamper-Clamping Circuit Theorem, Clamping Operation, Types of Clampers.

### **UNIT - III**

**Bipolar Junction Transistor (BJT):** Principle of Operation, Common Emitter, Common Base and Common Collector Configurations, Transistor as a switch, switching times,

### **UNIT - IV**

**Junction Field Effect Transistor (FET):** Construction, Principle of Operation, Pinch-Off Voltage, Volt- Ampere Characteristic, Comparison of BJT and FET, FET as Voltage Variable Resistor, MOSFET, MOSTET as a capacitor.

### **UNIT - V**

**Special Purpose Devices:** Zener Diode - Characteristics, Zener diode as Voltage Regulator, Principle of Operation - SCR, Tunnel diode, UJT, Varactor Diode, Photo diode, Solar cell, LED, Schottky diode.

### **TEXT BOOKS:**

1. Jacob Millman - Electronic Devices and Circuits, McGraw Hill Education
2. Robert L. Boylestead, Louis Nashelsky- Electronic Devices and Circuits theory, 11<sup>th</sup> Edition, 2009, Pearson.

### **REFERENCE BOOKS:**

1. Horowitz -Electronic Devices and Circuits, David A. Bell – 5<sup>th</sup> Edition, Oxford.
2. Chinmoy Saha, Arindam Halder, Debaati Ganguly - Basic Electronics-Principles and Applications, Cambridge, 2018.

## DATA STRUCTURES

**B.Tech. II Year I Sem.**

**L T P C**

**3 0 0 3**

**Prerequisites:** Programming for Problem Solving

### Course Objectives

- Exploring basic data structures such as stacks and queues.
- Introduces a variety of data structures such as hash tables, search trees, tries, heaps, graphs.
- Introduces sorting and pattern matching algorithms

### Course Outcomes

- Ability to select the data structures that efficiently model the information in a problem.
- Ability to assess efficiency trade-offs among different data structure implementations or combinations.
- Implement and know the application of algorithms for sorting and pattern matching.
- Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees.

### UNIT - I

Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack applications, Queues-operations, array and linked representations.

### UNIT - II

Dictionaries: linear list representation, skip list representation, operations - insertion, deletion and searching.

Hash Table Representation: hash functions, collision resolution-separate chaining, open addressing- linear probing, quadratic probing, double hashing, rehashing, extendible hashing.

### UNIT - III

Search Trees: Binary Search Trees, Definition, Implementation, Operations- Searching, Insertion and Deletion, B- Trees, B+ Trees, AVL Trees, Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching, Red –Black, Splay Trees.

### UNIT - IV

Graphs: Graph Implementation Methods. Graph Traversal Methods.

Sorting: Quick Sort, Heap Sort, External Sorting- Model for external sorting, Merge Sort.

### UNIT - V

Pattern Matching and Tries: Pattern matching algorithms-Brute force, the Boyer –Moore algorithm, the Knuth-Morris-Pratt algorithm, Standard Tries, Compressed Tries, Suffix tries.

**TEXT BOOKS:**

1. Fundamentals of Data Structures in C, 2 nd Edition, E. Horowitz, S. Sahni and Susan AndersonFreed, Universities Press.
2. Data Structures using C – A. S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/PearsonEducation.

**REFERENCE BOOK:**

1. Data Structures: A Pseudocode Approach with C, 2 nd Edition, R. F. Gilberg and B.A.Forouzan,Cengage Learning.

## COMPUTER ORIENTED STATISTICAL METHODS

**B.Tech. II Year I Sem.**

**L T P C**  
**3 1 0 4**

**Pre-requisites:** Mathematics courses of first year of study.

**Course Objectives:** To learn

- ☐ The theory of Probability, Probability distributions of single and multiple random variables
- ☐ The sampling theory, testing of hypothesis and making statistical inferences
- ☐ Stochastic process and Markov chains.

**Course outcomes:** After learning the contents of this paper the student must be able to

- ☐ Apply the concepts of probability and distributions to case studies.
- ☐ Formulate and solve problems involving random variables and apply statistical methods for analyzing experimental data.
- ☐ Apply concept of estimation and testing of hypothesis to case studies.
- ☐ Correlate the concepts of one unit to the concepts in other units.

### **UNIT - I: Probability**

**10 L**

Sample Space, Events, Counting Sample Points, Probability of an Event, Additive Rules, Conditional Probability, Independence, and the Product Rule, Baye's Rule,

**Random Variables and Probability Distributions:** Concept of a Random Variable, Discrete Probability Distributions, Continuous Probability Distributions.

### **UNIT - II: Expectation and discrete distributions**

**10 L**

Mean of a Random Variable, Variance and Covariance of Random Variables, Means and Variances of Linear Combinations of Random Variables, Chebyshev's Theorem.

**Discrete Probability Distributions:** Binomial Distribution, Poisson distribution.

### **UNIT - III: Continuous and Sampling Distributions**

**10 L**

Uniform Distribution, Normal Distribution, Areas under the Normal Curve, Applications of the Normal Distribution, Normal Approximation to the Binomial Distributions.

**Fundamental Sampling Distributions:** Random Sampling, Some Important Statistics, Sampling Distributions, Sampling Distribution of Means and the Central Limit Theorem, t - Distribution, F- Distribution.

### **UNIT - IV: Sample Estimation & Tests of Hypotheses**

**10 L**

Introduction, Statistical Inference, Classical Methods of Estimation, Single Sample: Estimating the mean, standard error of a point estimate, prediction interval. Two sample: Estimating the difference between two means, Single sample: Estimating a proportion, Two samples: Estimating the difference between two proportions, Two samples: Estimating the ratio of two variances.

Statistical Hypotheses: General Concepts, Testing a Statistical Hypothesis, Single sample: Tests concerning a single mean, Two samples: tests on two means, One sample: test on a single proportion. Two samples: tests on two proportions, Two- sample tests concerning variances.

**UNIT-V: Stochastic Processes and Markov Chains****8L**

Introduction to Stochastic processes- Markov process. Transition Probability, Transition Probability Matrix, First order and Higher order Markov process, n-step transition probabilities, Markov chain, Steady state condition, Markov analysis.

**TEXT BOOKS:**

1. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability & Statistics For Engineers & Scientists, 9<sup>th</sup> Ed. Pearson Publishers.
2. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khanna publications.
3. S.D.Sharma, Operations Research, Kedarnath and Ramnath Publishers, Meerut, Delhi.

**REFERENCE BOOKS:**

1. T.T. Soong, Fundamentals of Probability and Statistics For Engineers, John Wiley & Sons, Ltd, 2004.
2. Sheldon M Ross, Probability and statistics for Engineers and scientists, academic press.
3. Miller and Freund's, Probability and Statistics for Engineers, 8<sup>th</sup> Edition, Pearson Educations.

## COMPUTER ORGANIZATION AND MICROPROCESSOR

**B.Tech. II Year I Sem.**

**L T P C**  
**3 0 0 3**

### **Course Objectives:**

1. To understand basic components of computers.
2. To understand the architecture of the 8086 processor.
3. To understand the instruction sets, instruction formats and various addressing modes of 8086.
4. To understand the representation of data at the machine level and how computations are performed at machine level.
5. To understand the memory organization and I/O organization.
6. To understand the parallelism both in terms of single and multiple processors.

### **Course Outcomes:**

1. Able to understand the basic components and the design of CPU, ALU and Control Unit.
2. Ability to understand memory hierarchy and its impact on computer cost/performance.
3. Ability to understand the advantage of instruction level parallelism and pipelining for highperformance Processor design.
4. Ability to understand the instruction set, instruction formats and addressing modes of 8086.
5. Ability to write assembly language programs to solve problems.

### **UNIT - I**

**Digital Computers:** Introduction, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture.

**Basic Computer Organization and Design:** Instruction codes, Computer Registers, Computer instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt, Complete Computer Description.

### **UNIT - II**

**Central Processing Unit:** The 8086 Processor Architecture, Register organization, Physical memory organization, General Bus Operation, I/O Addressing Capability, Special Processor Activities, Minimum and Maximum mode system and timings.

### **UNIT - III**

Assembly Language Programming with 8086- Machine level programs, Machine coding the programs, Programming with an assembler, Assembly Language example programs. Stack structure of 8086, Interrupts and Interrupt service routines, Interrupt cycle of 8086, Interrupt programming, Passing parameters to procedures, Macros, Timings and Delays.

### **UNIT - IV**

**Computer Arithmetic:** Introduction, Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating - point Arithmetic operations. Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct memory Access, Input –Output Processor (IOP), Intel 8089 IOP.

## **UNIT - V**

**Memory Organization:** Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory.

**Pipeline and Vector Processing:** Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

### **TEXT BOOKS:**

1. Computer System Architecture, M. Morris Mano, Third Edition, Pearson. (UNITS – I, IV, V)
2. Advanced Microprocessors and Peripherals, K M Bhurchandi, A. K Ray ,3<sup>rd</sup> edition, McGrawHill India Education Private Ltd. (UNITS - II, III).

### **REFERENCES BOOKS:**

1. Microprocessors and Interfacing, D V Hall, SSSP Rao, 3<sup>rd</sup> edition, McGraw Hill India Education Private Ltd.
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky: Computer Organization, 5<sup>th</sup> Edition, Tata McGraw Hill, 2002
3. Computer Organization and Architecture, William Stallings, 9<sup>th</sup> Edition, Pearson.
4. David A. Patterson, John L. Hennessy: Computer Organization and Design – The Hardware /Software Interface ARM Edition, 4<sup>th</sup> Edition, Elsevier, 2009.



## INTRODUCTION TO IOT

**B.Tech. II Year I Sem.**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>2</b>	<b>0</b>	<b>0</b>	<b>2</b>

**Course Objectives:** The objectives of the course are to:

- Understand the concepts of Internet of Things and able to build IoT applications
- Learn the programming and use of Arduino and Raspberry Pi boards.
- Known about data handling and analytics in SDN.

**Course Outcomes:** Upon completing this course, the student will be able to:

- Known basic protocols in sensor networks.
- Program and configure Arduino boards for various designs.
- Python programming and interfacing for Raspberry Pi.
- Explore IoT applications in different domains.

### UNIT - I

Introduction to Internet of Things, Characteristics of IoT, Physical design of IoT, Functional blocks of IoT, Sensing, Actuation, Basics of Networking, Communication Protocols, Sensor Networks.

### UNIT - II

Machine-to-Machine Communications, Difference between IoT and M2M, Interoperability in IoT, Introduction to Arduino Programming, Integration of Sensors and Actuators with Arduino.

### UNIT - III

Introduction to Python programming, Introduction to Raspberry Pi, Interfacing Raspberry Pi with basic peripherals, Implementation of IoT with Raspberry Pi, Case studies.

### UNIT - IV

Implementation of IoT with Raspberry Pi, Introduction to Software defined Network (SDN), SDN for IoT, Data Handling and Analytics.

### UNIT - V

Cloud Computing, Sensor-Cloud, Smart Cities and Smart Homes, Connected Vehicles, Smart Grid, Industrial IoT.  
Case Study: Agriculture, Healthcare, Activity Monitoring

### TEXT BOOKS:

1. Pethuru Raj and Anupama C. Raman "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", (CRC Press)
2. Terokarvinen, kemo, karvinen and villey valtokari, "Make sensors": 1<sup>st</sup> edition, maker media, 2014.

### REFERENCE BOOKS:

1. Vijay Madiseti, Arshdeep Bahga, "Internet of Things: A Hands-On Approach"
2. Waltenegus Dargie, Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice"
3. Beginning Sensor networks with Arduino and Raspberry Pi – Charles Bell, Apress, 2013

## ELEMENTS OF COMPUTER SCIENCE AND ENGINEERING

**B.Tech. II Year I Sem.**

**L T P C**  
**0 0 2 1**

**Course Objective:** To provide an overview of the subjects of computer science and engineering.

### **Course Outcomes:**

1. Know the working principles of functional units of a basic Computer
2. Understand program development, the use of data structures and algorithms in problemsolving.
3. Know the need and types of operating system, database systems.
4. Understand the significance of networks, internet, WWW and cyber security.
5. Understand Autonomous systems, the application of artificial intelligence.

### **UNIT – I**

**Basics of a Computer** – Hardware, Software, Generations of computers. Hardware - functional units, Components of CPU, Memory – hierarchy, types of memory, Input and output devices. Software – systems software, application software, packages, frameworks, IDEs.

### **UNIT – II**

**Software development** – waterfall model, Agile, Types of computer languages – Programming, markup, scripting Program Development – steps in program development, flowcharts, algorithms, data structures – definition, types of data structures

### **UNIT – III**

**Operating systems:** Functions of operating systems, types of operating systems, Device & Resourcemanagement

**Database Management Systems:** Data models, RDBMS, SQL, Database Transactions, data centers, cloud services

### **UNIT – IV**

**Computer Networks:** Advantages of computer networks, LAN, WAN, MAN, internet, WiFi, sensornetworks, vehicular networks, 5G communication.

World Wide Web – Basics, role of HTML, CSS, XML, Tools for web designing, Social media, Onlinesocial networks.

Security – information security, cyber security, cyber laws

### **UNIT – V**

**Autonomous Systems:** IoT, Robotics, Drones, Artificial Intelligence – Learning, Game Development, natural language processing, image and video processing.  
Cloud Basics

### **TEXT BOOK:**

1. Invitation to Computer Science, G. Michael Schneider, Macalester College, Judith L. Gersting University of Hawaii, Hilo, Contributing author: Keith Miller University of Illinois, Springfield.

**REFERENCE BOOKS:**

1. Fundamentals of Computers, Reema Thareja, Oxford Higher Education, Oxford University Press.
2. Introduction to computers, Peter Norton, 8th Edition, Tata McGraw Hill.
3. Computer Fundamentals, Anita Goel, Pearson Education India, 2010.
4. Elements of computer science, Cengage.

## DIGITAL ELECTRONICS LAB

### B.Tech. II Year I Sem.

**Course Outcomes:** Upon Completing This Course, the students will be able to:

- Acquire the knowledge on numerical information in different forms and Boolean Algebra Theorems.
- Define Postulates of Boolean algebra and to minimize combinational functions, and design the combinational circuits.
- Design and Analyze Sequential Circuits for various cyclic functions.
- Characterize logic families analyze them for the purpose of AC and DC parameters.

### LIST OF EXPERIMENTS:

1. Realization of Logic circuit to generate r's Complement using Logic Gates.
2. Realization of given Boolean function using universal gates and minimizing the same.
3. Compare the gate count before and after minimization.
4. Design and realize Full Adder circuit using gates/universal gates. Implement Full Subtractor
5. using full adder.
6. Designing a 2 – bit Comparator using AND, OR and NOT gates. Realize 4 – bit Comparator
7. using 2 – bit Comparators.
8. Realize 2:1 MUX using the given gates and Design 8:1 using 2:1 MUX.
9. Implement the given Boolean function using the given MUX(ex: code converters).
10. Realize a 2x4 Decoder using logic gates and implement 3x8 Decoder using 2x4 Decoder.
11. Implement the given Boolean function using given Decoders.
12. Convert Demultiplexer to Decoder and vice versa.
13. Verification of truth tables of flip flops using different clocks (level triggering, positive and
14. negative edge triggering) also converts the given flip flop from one type to another.
15. Designing of Universal n-bit shift register using flip flops and Multiplexers. Draw the timing
16. diagram of the Shift Register.
17. Design a Synchronous binary counter using D-flipflop /given flip flop.
18. Design Asynchronous counter for the given sequence using given flip flops.
19. Designing of MOD 8 Counter using JK flip flops.

### Major Equipment required for Laboratories:

1. 5 V Fixed Regulated Power Supply/ 0-5V or more Regulated Power Supply.
2. 20 MHz Oscilloscope with Dual Channel.
3. Bread board and components/ Trainer Kit.
4. Multimeter.

## DATA STRUCTURES LAB

**B.Tech. II Year I Sem.**

**L T P C**  
**0 0 3 1.5**

**Prerequisites:** A Course on “Programming for problem solving”.

### Course Objectives:

- It covers various concepts of C programming language
- It introduces searching and sorting algorithms
- It provides an understanding of data structures such as stacks and queues.

### Course Outcomes:

- Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.
- Ability to Implement searching and sorting algorithms

### List of Experiments:

1. Write a program that uses functions to perform the following operations on singly linkedlist.:  
i) Creation ii) Insertion iii) Deletion iv) Traversal
2. Write a program that uses functions to perform the following operations on doubly linkedlist.:  
i) Creation ii) Insertion iii) Deletion iv) Traversal
3. Write a program that uses functions to perform the following operations on circular linkedlist.:  
i) Creation ii) Insertion iii) Deletion iv) Traversal
4. Write a program that implement stack (its operations) using  
i) Arrays ii) Pointers
5. Write a program that implement Queue (its operations) using  
i) Arrays ii) Pointers
6. Write a program that implements the following sorting methods to sort a given list of integers in ascending order  
i) Quick sort ii) Heap sort iii) Merge sort
7. Write a program to implement the tree traversal methods (Recursive and Non Recursive).
8. Write a program to implement  
i) Binary Search tree ii) B Trees iii) B+ Trees iv) AVL trees v) Red - Black trees
9. Write a program to implement the graph traversal methods.
10. Implement a Pattern matching algorithm using Boyer- Moore, Knuth-Morris-Pratt

### TEXT BOOKS:

1. Fundamentals of Data Structures in C, 2<sup>nd</sup> Edition, E. Horowitz, S. Sahni and Susan Anderson-Freed, Universities Press.
2. Data Structures using C – A. S. Tanenbaum, Y. Langsam, and M. J. Augenstein, PHI/Pearson Education.

**REFERENCE BOOK:**

1. Data Structures: A Pseudocode Approach with C, 2<sup>nd</sup> Edition, R. F. Gilberg and B. A. Forouzan, Cengage Learning.

## INTERNET OF THINGS LAB

B.Tech. II Year I Sem.

L T P C  
0 0 3 1.5

### Course Objectives:

- To introduce the raspberry PI platform, that is widely used in IoT applications
- To introduce the implementation of distance sensor on IoT devices

### Course Outcomes:

- Ability to introduce the concept of M2M (machine to machine) with necessary protocols and get awareness in implementation of distance sensor
- Get the skill to program using python scripting language which is used in many IoT devices

### List of Experiments

1. Using raspberry pi
  - a. Calculate the distance using a distance sensor.
  - b. Basic LED functionality.
2. Using Arduino
  - a. Calculate the distance using a distance sensor.
  - b. Basic LED functionality.
  - c. Calculate temperature using a temperature sensor.
3. Using Node MCU
  - a. Calculate the distance using a distance sensor.
  - b. Basic LED functionality.
  - c. Calculate temperature using a temperature sensor.
4. Installing OS on Raspberry Pi
  - a) Installation using PiImager
  - b) Installation using image file
    - Downloading an Image
    - Writing the image to an SD card
      - using Linux
      - using Windows
    - Booting up Follow the instructions given in the URL  
<https://www.raspberrypi.com/documentation/computers/getting-started.html>
5. Accessing GPIO pins using Python
  - a) Installing GPIO Zero library.  
First, update your repositories list:  
sudo apt update  
Then install the package for Python 3:  
sudo apt install python3-gpiozero

- b) Blinking an LED connected to one of the GPIO pin
- c) Adjusting the brightness of an LED Adjust the brightness of an LED (0 to 100, where 100 means maximum brightness) using the in-built PWM wavelength.

#### 6. Collecting Sensor Data

##### a) DHT Sensor interface

- Connect the terminals of DHT GPIO pins of Raspberry Pi.
- Import the DHT library using `import Adafruit_DHT`
- Read sensor data and display it on screen.

#### **TEXT BOOKS:**

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

#### **REFERENCE BOOKS:**

1. Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer, 2016
2. N. Ida, Sensors, Actuators and Their Interfaces, Scitech Publishers, 2014.



## **GENDER SENSITIZATION LAB**

**B.Tech. II Year I Sem.**

**L T P C**  
**0 0 2 0**

### **COURSE DESCRIPTION**

This course offers an introduction to Gender Studies, an interdisciplinary field that asks critical questions about the meanings of sex and gender in society. The primary goal of this course is to familiarize students with key issues, questions and debates in Gender Studies, both historical and contemporary. It draws on multiple disciplines – such as literature, history, economics, psychology, sociology, philosophy, political science, anthropology and media studies – to examine cultural assumptions about sex, gender, and sexuality.

This course integrates analysis of current events through student presentations, aiming to increase awareness of contemporary and historical experiences of women, and of the multiple ways that sex and gender interact with race, class, caste, nationality and other social identities. This course also seeks to build an understanding and initiate and strengthen programmes combating gender-based violence and discrimination. The course also features several exercises and reflective activities designed to examine the concepts of gender, gender-based violence, sexuality, and rights. It will further explore the impact of gender-based violence on education, health and development.

### **Objectives of the Course**

- To develop students' sensibility with regard to issues of gender in contemporary India.
- To provide a critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.
- To expose students to more egalitarian interactions between men and women.

### **Learning Outcomes**

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight into the gendered division of labor and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.
- Students will develop a sense of appreciation of women in all walks of life.
- Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

## **Unit-I: UNDERSTANDING GENDER**

Introduction: Definition of Gender-Basic Gender Concepts and Terminology-  
Exploring Attitudetowards Gender-Construction of Gender-Socialization: Making  
Women, Making Men  
- Preparing for Womanhood. Growing up Male. First lessons in Caste.

## **Unit – II: GENDER ROLES AND RELATIONS**

Two or Many? -Struggles with Discrimination-Gender Roles and Relations-Types of  
Gender Roles- Gender Roles and Relationships Matrix-Missing Women-Sex Selection  
and Its Consequences- Declining Sex Ratio. Demographic Consequences-Gender  
Spectrum: Beyond the Binary

## **Unit – III: GENDER AND LABOUR**

Division and Valuation of Labour-Housework: The Invisible Labor- “My Mother doesn’t  
Work.” “Sharethe Load.”-Work: Its Politics and Economics -Fact and Fiction.  
Unrecognized and Unaccounted work.  
-Gender Development Issues-Gender, Governance and Sustainable Development-  
Gender andHuman Rights-Gender and Mainstreaming

## **Unit – IV: GENDER - BASED VIOLENCE**

The Concept of Violence- Types of Gender-based Violence-Gender-based Violence  
from a Human Rights Perspective-Sexual Harassment: Say No!-Sexual Harassment,  
not Eve-teasing- Coping withEveryday Harassment- Further Reading: “Chupulu”.  
Domestic Violence: Speaking OutIs Home a Safe Place? -When Women Unite [Film].  
Rebuilding Lives.Thinking about Sexual Violence Blaming the Victim-“I Fought for my Life....”

## **Unit – V: GENDER AND CULTURE**

Gender and Film-Gender and Electronic Media-Gender and Advertisement-Gender  
and Popular Literature- Gender Development Issues-Gender Issues-Gender  
Sensitive Language-Gender andPopular Literature - Just Relationships: Being  
Together as Equals  
Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers.  
Rosa Parks-The Brave Heart.

**Note:** Since it is Interdisciplinary Course, Resource Persons can be drawn from the  
fields of English Literature or Sociology or Political Science or any other qualified  
faculty who has expertise in this field from engineering departments.

- *Classes will consist of a combination of activities: dialogue-based lectures, discussions, collaborative learning activities, group work and in-class assignments. Apart from the above prescribed book, Teachers can make use of any authentic materials related to the topics given in the syllabus on “Gender”.*

▮ **ESSENTIAL READING:** The Textbook, *“Towards a World of Equals: A Bilingual Textbook on Gender”* written by A.Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu **published by Telugu Akademi, Telangana Government in 2015.**

**ASSESSMENT AND GRADING:**

- Discussion & Classroom Participation: 20%
- Project/Assignment: 30%
- End Term Exam: 50%

## SKILL DEVELOPMENT COURSE (DATA VISUALIZATION - R PROGRAMMING/ POWER BI)

**B.Tech. II Year I Sem.**

**L T P C**  
**0 0 2 1**

### **Course Objectives:**

- Effective use of Business Intelligence (BI) technology (Tableau) to apply data visualization
- To discern patterns and relationships in the data.
- To build Dashboard applications.
- To communicate the results clearly and concisely.
- To be able to work with different formats of data sets.

**Course Outcomes:** At the end of the course a student should be able to

- Understand How to import data into Tableau.
- Understand Tableau concepts of Dimensions and Measures.
- Develop Programs and understand how to map Visual Layouts and Graphical Properties.
- Create a Dashboard that links multiple visualizations.
- Use graphical user interfaces to create Frames for providing solutions to real world problems.

### **Lab Problems:**

1. Understanding Data, What is data, where to find data, Foundations for building Data Visualizations, Creating Your First visualization?
2. Getting started with Tableau Software using Data file formats, connecting your Data to Tableau, creating basic charts (line, bar charts, Tree maps), Using the Show me panel.
3. Tableau Calculations, Overview of SUM, AVG, and Aggregate features, Creating custom calculations and fields.
4. Applying new data calculations to your visualizations, Formatting Visualizations, Formatting Tools and Menus, Formatting specific parts of the view.
5. Editing and Formatting Axes, Manipulating Data in Tableau data, Pivoting Tableau data.
6. Structuring your data, Sorting and filtering Tableau data, Pivoting Tableau data.
7. Advanced Visualization Tools: Using Filters, Using the Detail panel, using the Size panels, customizing filters, Using and Customizing tooltips, Formatting your data with colors.
8. Creating Dashboards & Storytelling, creating your first dashboard and Story, Design for different displays, adding interactivity to your Dashboard, Distributing & Publishing your Visualization.
9. Tableau file types, publishing to Tableau Online, Sharing your visualizations, printing, and Exporting.

10. Creating custom charts, cyclical data and circular area charts, Dual Axis charts.

**REFERENCE BOOKS:**

1. Microsoft Power BI cookbook, Brett Powell, 2nd edition.
2. R Programming for Data Science by Roger D. Peng (References)
3. The Art of R Programming by Norman Matloff Cengage Learning India.



