University of Engineering & Management

Institute of Engineering & Management

IT, CSE & Allied Branches

Semester III (Second year) Curriculum									
Sl. No.	**Type of course**	**Code**	**New Code**	**Course Title**	**Hours per week**				**Credits**
					Lecture	**Tutorial**	**Practical**	**Sessional**	
Theory Papers									
1	Engineering Science Course	ESC301	ESC301	Analog Electronic Circuits	3	0	0	0	3
2	Professional Core Courses	PCCCS301	PCC301	Data structure & Algorithms	3	0	0	0	3
3	Engineering Science Course	ESC302	ESC302	Digital Electronics	3	0	0	0	3
4	Professional Core Courses	PCCCS302	PCCCS302	IT Workshop (MATLAB)	1	0	0	0	1
5	Basic Science course	BSC301	BSM301	Mathematics - III	3	0	0	0	3
6	Humanities & Social Sciences including Manage	HSMC 301	HSMCS 301	Humanities - I (Principles of Management)	3	0	0	0	3

	ment courses								
7	Humanities & Social Sciences including Management courses	HSMC302	ESP301	Essential Studies for Professionals - III	2	0	0	0	0.5
Total					**18**	**0**	**0**	**0**	**16.5**
			Practical Papers						
1	Engineering Science Course	ESC391	ESC391	Analog Electronic Circuits Lab	0	0	4	0	2
2	Professional Core Courses	PCCCS391	PCC391	Data structure & Algorithms Lab	0	0	4	0	2
3	Engineering Science Course	ESC392	ESC392	Digital Electronics Lab	0	0	4	0	2
4	Professional Core Courses	PCCCS392	PCCCS392	IT Workshop (MATLAB) Lab	0	0	4	0	2
	Total				**0**	**0**	**16**	**0**	**8**
Sessional Papers									
1	Humanities & Social Sciences including Management courses	HSMC382	SDP381	Skill Development for Professionals - III	0	0	0	2	0.5
2	Innovative Project	PROJ CS301	PRJCS381	Innovative Project – I	0	0	0	0	1
3	Mandatory Additional	MAR381	MAR	Mandatory Additional	0	0	0	0	0

	Require ments (MAR)			Require ments					
4	MOOCs (Mandat ory for Honours)	MOOCs	MOOCS	Massive Open Online Courses	-	-	-	-	-
5	IFC	IFC	IFC	Industry and Foreign Certificat ion	0	0	0	0	0
	Total				**0**	**0**	**0**	**2**	**1.5**
Total					**18**	**0**	**16**	**2**	**26**

University of Engineering and Management

Institute of Engineering & Management, Salt Lake Campus
Institute of Engineering & Management, New Town Campus
University of Engineering & Management, Jaipur

Syllabus for B.Tech Admission Batch 2023

Course Code: ESC301
Course Title: ANALOG ELECTRONIC CIRCUITS
Prerequisites: Basic Electronics
Credit: 3

Course Objective:

1. To understand the methods of biasing of transistors.
2. To design and analyse single stage and multistage amplifier circuits.
3. To analyse the frequency response of small signal amplifiers and design of voltage and power amplifiers using ac models of transistor.
4. To analyse and design active filters.
5. To analyse and design regulated DC power supplies.
6. To impart knowledge on oscillators, feedback amplifiers and tuned amplifiers.

Course Outcomes:

At the end of the course, a student will be able to:

CO1	Design and analyze various rectifiers, amplifier circuits and oscillators.
CO2	Understand the characteristics and applications of transistors.

CO3	Understand the functioning of OP-AMP and design OP-AMP based circuits.
CO4	Understand the concept of Multivibrator and timer.

Relevant Links:

1. Link for Study Material:

https://iemcollege-my.sharepoint.com/:w:/g/personal/amit_mandal_iem_edu_in/Edy9OXcE6MNPsUpt_XhXzBgBOWmg6A9p8x7U78sN7WvV7A?e=YwFm2e

2. Link for NPTEL Course:

https://archive.nptel.ac.in/courses/108/105/108105158/

2. Link for Coursera Course:

i) **https://www.coursera.org/learn/linear-circuits-dcanalysis**

ii) **https://www.coursera.org/learn/semiconductor-1**

iii) **https://www.coursera.org/learn/linear-circuits-ac-analysis?isNewUser=true**

4. Link for LinkedIn Learning Courses:

https://www.linkedin.com/learning/electronics-foundations-basic-circuits/principles-of-basic-electronic-circuits?autoplay=true&trk=course_preview&upsellOrderOrigin=sem-ga_campid.11663861480_asid.114329355340_crid.481097052948_kw.linkedin%2Blearning%2Bcourses_d.c_tid.kwd-336730500916_n.g_mt.e_geo.9061848

5. Link for Infosys Springboard Course:

i) **https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013986385481318400909/overview**

ii) **https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_0138478721765785605552_shared/overview**

iii) **https://infyspringboard.onwingspan.com/web/en/ap/toc/lex_auth_013841728221593600237 0_shared/overview**

Detailed Syllabus:

Module number	Topic	Sub-topics	Mapping with Industry and International Academia	Lecture Hours	Corresponding Lab Assignment
1	1. **Rectifiers, Filters and Regulators:** i) Boylestad & Nashelsky (11th edition) Chapter 15	Introduction to full-wave and half-wave rectifiers. Capacitor filter. Inductor filter, LC and π −section filter. Series and Shunt voltage regulator, percentage regulation. Regulator ICs 78xx and 79xx series. Introduction to SMPS.	As per International Standards : (https://explorecourses.stanford.edu/search?q=EE101A) (https://explorecourses.stanford.edu/search?q=EE101B) https://ocw.mit.edu/courses/6-101-introductory-analog-electronics-laboratory-spring-2007/pages/syllabus/ and AICTE-prescribed syllabus: (https://www.aicte-india.org/sites/default/files /Model_Curriculum/Final_ ECE.pdf) ***Industry Mapping:*** LT-SPICE software, LabView, Proteus. Hardware Chipset: IN4001/4007, 7815, 7915.	4	1. Simulation of full-wave and half-wave rectifiers with and without filter using LT-SPICE software to study of Ripple and Regulation characteristics.
	2. **Transistor Biasing and Stability of Q-point:** i) Boylestad & Nashelsky (11th edition)	Introduction to transistor biasing, Q-point selection, Diode Compensation. Bias stabilization and stability factors. h-parameter model of transistors.	As per International Standards : (https://explorecourses.stanford.edu/search?q=EE101A) (https://explorecourses.stanford.edu/search?q=EE101B) https://ocw.mit.edu/courses/6-101-introductory-analog-electronics-	6	2. Simulation of transistor circuit with self bias using LT-SPICE software to study parameters of Q-point. 3. Simulation of transistor amplifier with potential

	Chapter 4 ii) Boylestad & Nashelsky (11th edition) Chapter 5	Analysis of transistor amplifiers, expression for voltage gain, current gain, input and output impedance. Design of transistor amplifier. High frequency model of transistor, short circuit current gain and β cut off frequency.	laboratory-spring-2007/pages/syllabus/ and AICTE-prescribed syllabus : :(https://www.aicte-india.org/sites/default/files /Model_Curriculum/Final_ ECE.pdf) ***Industry Mapping:*** LT-SPICE software, LabView, Proteus. Hardware Chipset: BC547, SL100		divider bias using LT-SPICE software to study output voltage and gain for an input signal.

2	**1. RC coupled amplifier.** i) Boylestad & Nashelsky (11th edition) Chapter 9 **Tuned amplifier:** i) Chattopadhyay and Rakshit Chapter 9	Introduction to RC coupled amplifier, equivalent circuit, analysis of R C coupled amplifier for voltage and current gains, input and output impedances at three frequency ranges, frequency response characteristics, lower and upper cut off frequencies, bandwidth, and concept of wide band amplifier.	As per International Standards : (https://explorecourses.stanford.edu/search?q=EE101A) (https://explorecourses.stanford.edu/search?q=EE101B) https://ocw.mit.edu/courses/6-101-introductory-analog-electronics-laboratory-spring-2007/pages/syllabus/ and AICTE-prescribed syllabus : (https://www.aicte-india.org/sites/default/files /Model_Curriculum/Final_ ECE.pdf) ***Industry Mapping:*** LT-SPICE, LabView, Proteus software. Hardware Chipset: SL 100, BC547.	6	4. Simulation of two stages R-C coupled amplifier using LT-SPICE software to study of its gain and bandwidth.
	2. Feedback Amplifiers & Oscillators: i) Chattopadhyay and Rakshit Chapter 10 and	Introduction to Feedback concept, negative & positive feedback, voltage/current, series/shunt feedback topologies. Introduction to Oscillators, Berkhausen criterion, pole-zero concept, Colpitts , Hartley, Phase	As per International Standards : (https://explorecourses.stanford.edu/search?q=EE101A), (https://explorecourses.stanford.edu/search?q=EE101B), https://ocw.mit.edu/courses/6-101-introductory-analog-electronics-laboratory-spring-2007/pages/syllabus/	4	ii) Simulation of Phase shift oscillator using OPAMP and LT-SPICE software to study frequency of oscillation by varying component values.

	11	shift, Wein bridge and crystal oscillators.	and AICTE-prescribed syllabus : (https://www.aicte-india.org/sites/default/files /Model_Curriculum/Final_ ECE.pdf) ***Industry Mapping:*** LT-SPICE software, LabView, Proteus. Hardware Chipset: SL100, IC 741.		

3	**1. Operational Amplifier:** i) R.A. Gayakwad. Chapter 3	ii) Introduction to operational amplifier, Ideal OP AMP, Differential Amplifier, Constant current source (current mirror etc.), level shifter, CMRR, Open & Closed loop circuits, importance of feedback loop (positive& negative), inverting & non inverting amplifiers, voltage follower/buffer circuit.	As per International Standards : (https://explorecourses.stanford.edu/search?q=EE101A), (https://explorecourses.stanford.edu/search?q=EE101B), https://ocw.mit.edu/courses/6-101-introductory-analog-electronics-laboratory-spring-2007/pages/syllabus/ and AICTE-prescribed syllabus : (https://www.aicte-india.org/sites/default/files /Model_Curriculum/Final_ ECE.pdf), Industry Mapping: LT-SPICE software, LabView, Proteus. Hardware Chipset: IC741, IC328.	6	iii) Simulation of ADC using IC AD570, and using LT-SPICE software. iv) Simulation of DAC using DAC 0808 and using LT-SPICE software. v) Simulation of Inverting and Non Inverting Amplifier using Op-Amp and using LT-SPICE software.
	2. Applications of Operational Amplifiers: i) R.A. Gayakwad. Chapter 6	Applications of Operational Amplifiers: adder, integrator & differentiator, comparator. Instrumentation Amplifier, Log & Anti-log amplifiers, Trans-conductance multiplier, Precision Rectifier, voltage to current and current to voltage converter, free running oscillator.	As per International Standards: (https://explorecourses.stanford.edu/search?q=EE101A) ,(https://explorecourses.stanford.edu/search?q=EE101B), https://ocw.mit.edu/courses/6-101-introductory-analog-electronics-laboratory-spring-2007/pages/syllabus/ and AICTE-prescribed syllabus: (https://www.aicte-india.org/sites/default/files /Model_Curriculum/Final_ ECE.pdf), ***Industry Mapping:*** LT-SPICE	6	vi) Simulation of differentiator and integrator circuit using Op-Amp and using LT-SPICE software. vii) Simulation of Logarithmic and Anti Logarithmic Amplifier circuit using IC TL441, ICL8049 and with

			software, LabView, Proteus. Hardware Chipset: IC741, IC328, Multiplier IC AD633, Logarithmic Multiplier IC TL441, Anti Logarithmic Amplifier ICL 8049.		LT-SPICE software.
4	**Multivibrator:** i) Chattopadhyay and Rakshit Chapter 11	Introduction to multivibrators, Monostable, Bistable, Astable multivibrators using transistor and op-amp; Monostableand astable operation using555 timer.	As per International Standards: (https://explorecourses.stanford.edu/search?q=EE101A), (https://explorecourses.stanford.edu/search?q=EE101B), https://ocw.mit.edu/courses/6-101-introductory-analog-electronics-laboratory-spring-2007/pages/syllabus/ and AICTE-prescribed syllabus : (https://www.aicte-india.org/sites/default/files/Model_Curriculum/Final_ECE.pdf), ***Industry Mapping:*** LT-SPICE software, LabView, Proteus. Hardware Chipset: IC555.	4	viii) Simulation of Monostable Multivibrator using IC555 and using LT-SPICE software. ix) Simulation of Astable Multivibrator using IC555 and using LT-SPICE software. x) Simulation of Schmitt trigger circuit using IC555 and using LT-SPICE software.

Text book and Reference books:

Text Book:

1. Boylestad, Robert L., and Louis Nashelsky. Electronic devices and circuit theory. PrenticeHall, 2012.
2. Electronics Fundamentals and Applications, D. Chattopadhyay and P. C. Rakshit.
3. Op-amps and Linear IC's, R.A. Gayakwad, PHI.

Reference Books:

1. Microelectronic Circuit- Analysis & Design, Rashid, Cenage Learning.
2. Electronic Circuits: Discrete & Integrated, 3rd Edition, Schilling & Belove, Mc Graw HillCompany.
3. Electronic principles, 6th Edition, Malvino, Mc Graw Hill Company.
4. Operational Amplifier & Linear IC's, Bell, Oxford University Press.
5. 2000 Solved Problems in Electronics, Jimmie J. Cathey, Mc Graw Hill Inc.
6. Electronic Devices -System & Application, Robert Diffenderfer, Cengage Learning.
7. Op- Amps & Linear Integrated Circuits, Ravi Raj Dudeja & Mohan Dudeja, Umesh Publication

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1:	S	S	W	W	W	-	-	-	-	W	-	S
CO2:	S	S	M	M	M	W	-	-	-	W	-	S
CO3:	S	S	S	S	S	M	W	-	W	W	S	S
CO4:	S	S	M	W	-	-	-	-	-	-	-	S

S: Strong **M: Medium** **W:Weak**

University of Engineering and Management
Institute of Engineering & Management, Salt Lake Campus
Institute of Engineering & Management, New Town Campus
University of Engineering & Management, Jaipur

Syllabus for B.Tech Admission Batch 2023

Subject Name: Digital Electronics **Credit: 3** **Lecture Hours: 40**

Subject Code: ESC302

Pre-requisite: Fundamental concepts of Basic Electronics

Relevant Links:

Study Material Coursera NPTEL Linkedin Learning Infosys Springboard

COURSE OBJECTIVES:

1. To introduce the fundamental concepts of various Number systems, Boolean algebra as well as techniques for simplification of Boolean expressions
2. To present the conceptual design and implementation of various combinational logic circuits.
3. To develop an understanding of sequential logic design and implementation.
4. To illustrate the various digital systems for analog to digital conversion.

COURSE OUTCOMES:

CO1: Students would be able to convert from one number system to another, work out and design problems related to Boolean algebra, minimization etc.
CO2: Have the ability to identify basic requirements for a design application and propose a cost-effective solution.
CO3: Have the ability to understand, analyse and design various combinational and sequential circuits.
CO4: Have the ability to understand, analyse and design various A/D and D/A conversion techniques.

Module number	Topic	Sub-topics	Mapping with Industry and International Academia	Lecture Hours	Text Books with Chapters mapping	Corresponding Lab Assignment
1	**Introduction to Numer System and Boolean Logic**	Number System:[2L] Decimal, binary, octal, hexadecimal number system and conversion. Binary weighted codes: BCD, Excess-3, Gray codes and their conversions, ASCII, EBCDIC [2L]; Signed binary number representation with 1's and 2's complement methods, Binary arithmetic [1L]; Boolean algebra, Various properties (associative ,distributive properties), DeMorgan's theorem , the realization of functions using logic gates [2L]; Representation in SOP and POS forms, [2L]; Minimization of logic expressions by KMAP (function with two, three, and four variables)[2L]; Quine-McCuskey Minimization Technique (Tabular Method) [1L].	***International Academia:*** 1. https://ocw.mit.edu/courses/6-111-introductory-digital-systems-laboratory-spring-2006/ 2. https://online.stanford.edu/courses/ee273-digital-systems-engineering ***AICTE-prescribed syllabus:*** https://www.aicte-india.org/sites/default/files/Model_Curriculum/AICTE%20-%20UG%20CSE.pdf ***Industry Mapping:***	12L	**Text Book1:** **Chapters:** **1,2,3**	**Hardware Experiments (Experiments can be performed in 7400 series IC or 4000 series IC)** • Familiarity with basic gates ICs and Realization of NOT, AND, OR and XOR operations by using universal gates (both NAND and NOR) • Design a logic circuit of function F=A'B+C'D • Design a circuit to indicate 4 bits odd and even numbers. • Realization of a circuit to display prime and non-prime numbers (4 bit) **Software Experiments** Above mentioned experiments can be performed in any of the following simulation platform

			Proteus software for simulation https://www.labcenter.com/			1. **Circuitverse (https://circuitverse.org/simulator)** 2. Design of basic digital circuits using Tinkercad. **https://www.tinkercad.com/things/b91zk1E9SHy-bodacious-maimu-tumelo/editel?tenant=circuits** 3. Proteus software for simulation 4. Logisim simulator platform
2	**Analysis & design of Combinational Logic**	Combinational circuits - Adder and Subtractor circuits (half and full adder, half and full subtractor) [2L]; Design of Code converters, Encoder, Decoder, Magnitude Comparator, Multiplexer, De-Multiplexer, Parity Generator, Parity Checker [10L].	***International Academia:*** 1. https://ocw.mit.edu/courses/6-111-introductory-digital-systems-laboratory-spring-2006/ 2. https://online.stanford.edu/courses/ee273-digital-systems-engineering ***AICTE-prescribed syllabus:*** https://www.aicte-india.org/sites/default/files/Model_Curriculum/AI	12L	**Text Book1:** **Chapters:** **4,5** **Text Book2:** **Chapters:** **5,6**	**Hardware Experiments** • Familiarity with basic gates ICs and Realization of NOT, AND, OR and XOR operations by using universal gates (both NAND and NOR) • Design a logic circuit of function F=A'B+C'D • Design a circuit to indicate 4 bits odd and even numbers. • Realization of a circuit to display prime and non-prime numbers (4 bit) **Software Experiments**

			CTE%20-%20UG%20CSE.pdf ***Industry Mapping:*** Proteus software for simulation https://www.labcenter.com/			Above mentioned experiments can be performed in an online simulation platform 1. Circuitverse **(https://circuitverse.org/simulator)** 2. Design of basic digital circuits using Tinkercad. **https://www.tinkercad.com/things/b91zk1E9SHy-bodacious-maimu-tumelo/editel?tenant=circuits** 3. Proteus software for simulation 4. Logisim simulator platform
3	**Sequential Logic Circuit**	Sequential Circuits - Latch & Basic Flip-flops [1L]; Types of Flip-flops -SR, JK, D, T and JK Master slave Flip-flops[3L]; Finite State Machine: State equations ,State table , State diagram[2L] Basic concept of Synchronous and Asynchronous counters, Upcounter and downcounter[2L]; Design of Mod N Counter [3L]; Ring counter, Johnson counter [1L]; Shift Registers (SISO, SIPO, PIPO, PISO) [2L].	***International Academia:*** 1. https://ocw.mit.edu/courses/6-111-introductory-digital-systems-laboratory-spring-2006/ 2. https://online.stanford.edu/courses/ee273-digital-systems-engineering	14L	**Text Book1:** **Chapters:** **6,7** **Text Book3:** **Chapters:** **7,8**	• Design of R-S, J-K, D and T Flip flops using universal gates and also study master-slave J-K flip flop • Design of synchronous and asynchronous counter • Design of 4-bit shift register (SISO, SIPO, PIPO, PISO) **Software Experiments** Above mentioned experiments can be performed in an online

			AICTE-prescribed syllabus: https://www.aicte-india.org/sites/default/files/Model_Curriculum/AICTE%20-%20UG%20CSE.pdf ***Industry Mapping:*** Proteus software for simulation https://www.labcenter.com/			simulation platform 1. Circuitverse **(https://circuitverse.org/simulator)** 2. Design of basic digital circuits using Tinkercad. **https://www.tinkercad.com/things/b91zk1E9SHy-bodacious-maimu-tumelo/editel?tenant=circuits** 3. Proteus software for simulation 4. Logisim simulator platform
4	Digital integrated circuits	Logic families- TTL, ECL, MOS, and CMOS - basic concepts; Logic levels, propagation delay time, power dissipation fan-out and fan-in, noise margin, logic families and their characteristics Basics of A/D and D/A converters.	***International Academia:*** 1. https://ocw.mit.edu/courses/6-111-introductory-digital-systems-laboratory-spring-2006/ 2. https://online.stanford.edu/courses/ee273-digital-systems-engineering ***AICTE-prescribed syllabus:*** https://www.aicte-	2L	**Text Book3:** **Chapters:** **4,13**	• Design of ADC and DAC using IC ADC AD570, DAC 0808 • Design of ADC and DAC using TinkerCad

			india.org/sites/default/files/Model_Curriculum/AICTE%20-%20UG%20CSE.pdf ***Industry Mapping:*** Proteus software for simulation https://www.labcenter.com/			

TEXTBOOKS

1. Digital Logic and Computer Design, M. Morris Mano PHI, 1st Edition, ISBN 978-01-32-4510-7
2. Modern Digital Electronics, R.P.Jain 2/e , McGraw Hill
3. Digital Circuits and Design- S. Salivahanan, S. Arivazhagan, 5th Edition Oxford University Press.

REFERENCE BOOKS

4. Digital Systems Principles and Applications, Ronald J. Tocci, Neal S. Widmer, Gregory L. Moss, Pearson Prentice Hall.
5. Digital Design, M. Morris Mano and Michael D. Ciletti, 4th Edition , PHI
6. Fundamental of Digital Circuits- A. ANAND KUMAR, PHI
7. D.Ray Chaudhuri- Digital Circuits-Vol-I & II, 2/e- Platinum Publishers
8. Leach & Malvino—Digital Principles & Application, 5/e, McGraw Hill
9. Floyed & Jain- Digital Fundamentals-Pearson
10. Digital Electronics, As per AICTE: Principles and Integrated Circuits

University of Engineering and Management

Institute of Engineering & Management, Salt Lake Campus Institute of Engineering & Management, New Town CampusUniversity of Engineering & Management, Jaipur

Syllabus for B.Tech Admission Batch 2023

Subject Name: Data Structure and Algorithms **Credit: 3** **Lecture Hours: 36**

Subject Code: PCC301

Pre-requisite: Introduction to Programming

Relevant Links:

Study Material	Coursera	NPTEL	LinkedIn Learning	Infosys Springboard

COURSE OBJECTIVES:

1. To acquire knowledge of fundamental data structures.
2. To be able to implement any problem by writing their own algorithms.
3. To analyze an algorithm for a given problem using different data structures.
4. To learn various data structure approaches and techniques to develop and design projects.

COURSE OUTCOMES:

CO1	Students will be able to acquire and remember the knowledge of fundamental data structures.
CO2	Students will be able to implement any problem by writing their own algorithms.
CO3	Students will be able to analyze the algorithm for a given problem using different data structures.
CO4	Students will be able to learn various data structure approaches and techniques to develop and design projects.

Module number	Topic	Sub-topics	Mapping with Industry and International Academia	Lecture Hours		Book-Chapter Mapping
1	**Introduction**	Why do we need data structure? Concepts of data structures: a) Data and data structure b) Abstract Data Type and Data Type Applications Algorithms and programs. The basic idea of pseudo-code. Algorithm efficiency and analysis. Time and space complexity analysis of algorithms – order notations.	***International Academia:*** Advanced Data Structures | Electrical Engineering and Computer Science | MIT OpenCourseWare ***AICTE-prescribed syllabus:*** CTE Model Curriculum for (aicte-india.org) ***Industry Mapping:*** Various web-based and standalone compilers, Programming practice in	10	1) Write a Program to generate the Armstrong numbers from N to M. 2) Write a Program to print the following sequence of numbers: 0,1,1,2,3,5,8,13,21,34… 3) Twenty five numbers are entered from the keyboard. Write a program to find out how many of them are positive, how many are negative, how many are even and	1. Reema Thareja- Chapter 2 2.Debasis Samanta – Chapter 1 3.Aaron M. Tannenbaum– Chapter 1

			Hackerrank, Leetcode, GeeksforGeeks platform.		how many odd. 4) WAP a program to check if a given string is palindrome or not (the user may choose an example string).	
2	**Linear Data Structures**	**Array:** Different representations – row-major, column-major [1L]; Sparse matrix - its implementation and usage [1L]; Array representation of polynomials [1L]; **Linked List:** Singly linked list, circular linked list, doubly linked list, linked list representation of polynomials and applications [2L]; **Stack and Queue:** Stack and its implementations (using array, using linked list), applications (Infix to Postfix conversion, Evaluation of Postfix expression etc.) [2L]; Queue, circular queue, dequeue [1L]; Implementation of queue- both linear and circular (using array, using linked	**International Standards** : Advanced Data Structures | Electrical Engineering and Computer Science | MIT OpenCourseWare	10	1) Write a program using array where we can find maximum and second maximum number. 2) Write a program to search the location of a given element in array and after searching delete that element from array. 3) Write a program to perform the push and pop operations in a stack. 4) Write a program for infix to postfix conversion using stack. 5) Write a program for performing the insert and delete operations in a queue.	1. Reema Thareja – Chapter 3, 6, 7, 8 2.Debasis Samanta – Chapters 2, 3, 4, 5 3.Aaron M. Tannenbaum – Chapters 1, 2, 3, 4

		list), Applications [1L]; **Recursion:** Principles of recursion – use of the stack, differences between recursion and iteration, tail recursion. Applications - Tower of Hanoi [1L].			6) Write a menu driven program for the following operation of a Singly Linked List. A)Insert a node at beginning B)Insert a node as per given position. C)Insert a node at the end of the linked list. D)Delete a node at beginning E)Delete a node as per given position. F)Delete a node at the last of the linked list. 7) Write a C program to concatenate two doubly linked lists. 8)Write a Program to implement the procedure of Tower of Hanoi using recursion. 9) You are given an array of size N. You can perform an operation in which you will remove the largest and the smallest elements from the array and you will add their difference at the end of the array. So, finally the array size will be decreased by 1 after each such operation.	

					You are given Q tasks and in each task, you are given an integer K. For each task, you have to print the sum of all the elements in the array after such k operations. 10) Suppose there is a circle. There are N petrol pumps on that circle. You will be given two sets of data. 1. The amount of petrol that every petrol pump has. 2. Distance from that petrol pump to the next petrol pump. Find a starting point where the truck can start to get through the complete circle without exhausting its petrol in between. Note : Assume for 1 litre petrol, the truck can go 1 unit of distance.	

			AICTE prescribed syllabus: CTE Model Curriculum for (aicte-india.org) ***Industry Mapping:*** Various web-based and standalone compilers, Programming practice in Hackerrank, Leetcode, GeeksforGeeks platform.			
3	**Nonlinear Data structures**	**Trees:** Basic terminologies, tree representation (using array, using linked list); Binary trees - binary tree traversal (pre-, in-, post- order), recursive and non-recursive traversal algorithms of binary tree, threaded binary tree (left, right, full), and expression tree; Binary search tree- operations (creation, insertion, deletion, searching); Height balanced binary tree – AVL tree (insertion, deletion with examples only); B- Trees – operations (insertion, deletion with examples only); B+ Trees – operations (insertion, deletion with examples only) [1L];	***International Standards***: Advanced Data Structures | Electrical Engineering and Computer Science | MIT OpenCourseWare ***AICTE prescribed syllabus:*** CTE Model Curriculum for (aicte-india.org) ***Industry Mapping:*** Various web-based and standalone compilers, Programming practice in Hackerrank, Leetcode, GeeksforGeeks platform.	12	1) Write a Program to insert and delete a node from the BST. 2) Write a Program for Tree Traversal in Pre-order. 3) Write a Program for Tree Traversal in In-order. 4) Write a Program to implement the Tree Traversal in Post-order. 5) Write a Program to implement the BFS procedure. 6) Write a Program to implement the DFS	1. Reema Thareja – Chapters 9, 13 2. Debasis Samanta – Chapters 7, 8 3. Aaron M. Tannenbaum – Chapters 5, 8

		Graphs: Graph definitions and concepts (directed/undirected graph, weighted/un-weighted edges, subgraph, degree, cut vertex/ articulation point, pendant node, clique, complete graph, connected components – strongly connected component, weakly connected component, path, shortest path, and isomorphism); Graph representations / storage implementations – adjacency matrix, adjacency list, adjacency multi-list; Graph traversal and connectivity – Depth-first search (DFS), Breadth-first search (BFS) – concepts of edges used in DFS and BFS (tree-edge, backedge, cross-edge, forward-edge); applications. Minimal spanning tree – Prim's algorithm, Kruskal's algorithm (basic idea of greedy methods).			procedure. 7) Robert lives in a town. He has made some crafts and want to make some money out of it. So he decides to visit every city on the state and sell his crafts. Now there are multiple routes to visit every city in that state and each route has different travel fares. Robert knows all the routes and the travel fares. Help Robert to identify a route where he can spend less money while going to each city and returning home. Take the User Input Format as following: N = no of cities in the state fare[][] = 2D matrix showing the fares for each route.	

4	**Searching and Sorting:**	**Sorting Algorithms:** Bubble sort, insertion sort, shell sort, selection sort, merge sort, quick sort, heap sort (concept of max heap, application – priority queue), radix sort; Time and space complexity derivations; **Searching:** Sequential search, binary search, interpolation search. Time and space complexity derivations. **Hashing:** Hashing functions, collision resolution techniques.	***International Standards:*** Advanced Data Structures | Electrical Engineering and Computer Science | MIT OpenCourseWare ***AICTE prescribed syllabus:*** CTE Model Curriculum for (aicte-india.org) ***Industry Mapping:*** Various web-based and standalone compilers, Programming Practice in Hackerrank, Leetcode, GeeksforGeeks platform.	4	1) You are given a list of n-1 integers in the range from 1 to n. There are no duplicates in the list. One of the integers from 1 to n is missing in the list. Write a program in C to find the missing integers. Note the user input format as: p = size of array a = enter the array elements. 2) A class has "n" number of students. They are standing in a queue and not roll number wise. Write a program in C to let them enter the classroom in a Sorted Manner based on their roll number (in ascending order). Note the User input format as: n = number of students in the queue. a = enter their roll numbers in the array as	1. Reema Thareja – Chapters 14, 15 2. Debasis Samanta – Chapter 6, 10 3. Aaron M. Tannenbaum – Chapters 6, 7

					they are standing (random order).	

TEXT BOOK:

1. "Classic Data Structures" by Debasis Samanta.
2. "Data Structures using C" by Aaron M. Tanenbaum.
3. "Data Structures using C" by Reema Thareja.

REFERENCE BOOKS:

1. "Data Structures", by Mark Allan Weiss.
2. "Introduction to Algorithms" by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein.
3. "Data Structures - Schaum – ASE" by Seymour Lipschutz.

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Syllabus for B.Tech Admission Batch 2023

Subject Name: IT Workshop (MATLAB) **Credit: 1** **Lecture Hours: 18**

Subject Code: PCCCS302

Pre-requisite: Basic Mathematics

Relevant Links:

Study Material | Coursera | NPTEL | Linkedin Learning | Infosys Springboard

COURSE OBJECTIVES:

1. To be familiar with basic commands, syntax and mathematical operation in MATLAB.
2. To solve different mathematical problems using matrix operations in MATLAB.
3. To develop script and function by using complex programming concepts i.e. decision making, looping etc.
4. To learn data visualization and GUI development in MATLAB.

COURSE OUTCOMES:

CO1: Students would be able to understand basic commands, syntax and mathematical operation in MATLAB.
CO2: Students would be able to solve different mathematical problems using matrix operations in MATLAB.
CO3: Students would be able to develop script and function by using complex programming concepts i.e. decision making, looping etc.
CO4: Students would be able to learn data visualization and GUI development in MATLAB.

Module number	Topic	Sub-topics	Mapping with Industry and International Academia	Lecture Hours	Corresponding Lab Assignment
1	**Introduction to MATLAB** **(MATLAB Programming for Engineers, 6E Author(s): Stephen J. Chapman- Chapter 1)**	Introduction, Why MATLAB? History, it's strengths, Competitors, Starting MATLAB, Using MATLAB as a calculator, Quitting MATLAB Basics commands in MATLAB, Basic Operations, MATLAB-Data types, Rules about variable names, Predefined variables etc.	***International Academia:*** 1. https://ocw.mit.edu/courses/6-057-introduction-to-matlab-january-iap-2019/pages/syllabus 2. https://stanford.edu/class/cme192/index.html ***AICTE-prescribed syllabus:*** https://www.aicte-india.org/sites/default/files/Model_Curriculum/AICTE%20-%20UG%20CSE.pdf ***Industry Mapping:*** https://matlabacademy.mathworks.com/details/matlab-fundamentals/mlbe	2L	• **Create One Account in MATLAB Online and Sign In** (Use Institutional email e.g. abc@iem.edu.in) **Link:** https://in.mathworks.com/products/matlab-online.html • Explore MATLAB Layout • Using MATLAB as a Basic Calculator • **Variables**: create, view, edit, and display • Predefined Variables • Keywords • Operators • **Execute Basic Commands**: clc, clear all, clear <variable>, close all, quit, help version, who, whos, date, delete, cd, dir, save, load

2	**Vector, Matrix, Array, Cell and String Operations** **(MATLAB Programming for Engineers, 6E Author(s): Stephen J. Chapman- Chapter 2, Chapter 9, Chapter 10)**	Vector, Matrix, Array Addressing, Built-in functions, Mathematical Operations, Dealing with strings (Array of characters), Array of array (cell) concept.	***International Academia:*** 1. https://ocw.mit.edu/courses/6-057-introduction-to-matlab-january-iap-2019/pages/syllabus 2. https://stanford.edu/class/cme192/index.html ***AICTE-prescribed syllabus:*** https://www.aicte-india.org/sites/default/files/Model_Curriculum/AICTE%20-%20UG%20CSE.pdf ***Industry Mapping:*** https://matlabacademy.mathworks.com/details/matlab-fundamentals/mlbe	4L	• **User Input:** Numeric & String • **Vector**: create and display • **Matrix:** create, concatenate, indexing in a matrix (insert, update, and delete), arithmetic operations (addition, subtraction, multiplication, and division) on matrix • **String**: create, display, concatenation, finding length, and string operations (uppercase, lowercase, split, join, unique) • **Cell Array**: create, indexing in cell array (insert, update, and delete), conversion from cell to matrix

3	**Script, Function, and Debugging** **(MATLAB Programming for Engineers, 6E Author(s): Stephen J. Chapman- Chapter 1, Chapter 6)**	Script file, Input commands, Output commands, Structure of function file, Inline functions, feval command, Comparison between script file and function file, Debugging scripts.	***International Academia:*** 1. https://ocw.mit.edu/courses/6-057-introduction-to-matlab-january-iap-2019/pages/syllabus 2. https://stanford.edu/class/cme192/index.html ***AICTE-prescribed syllabus:*** https://www.aicte-india.org/sites/default/files/Model_Curriculum/AICTE%20-%20UG%20CSE.pdf ***Industry Mapping:*** https://matlabacademy.mathworks.com/details/matlab-fundamentals/mlbe	3L	• **Script**: explore script editor, create and execute a script, include multiple sections in a script, and execute separately • **Function**: create and call a function, inline function, feval command • **Debugging**: Debug a MATLAB script and mention all the necessary steps

4	**Complex programming and working with dataset** **(MATLAB Programming for Engineers, 6E Author(s): Stephen J. Chapman- Chapter 4, Chapter 5)**	Conditional statements and Loop, Relational and Logical Operators, if-else statements, switch-case statements, for loop, while loop, Special commands (break and continue), Table, import data from a large database, Export data to own file or database.	***International Academia:*** 1. https://ocw.mit.edu/courses/6-057-introduction-to-matlab-january-iap-2019/pages/syllabus 2. https://stanford.edu/class/cme192/index.html ***AICTE-prescribed syllabus:*** https://www.aicte-india.org/sites/default/files/Model_Curriculum/AICTE%20-%20UG%20CSE.pdf ***Industry Mapping:*** https://matlabacademy.mathworks.com/details/matlab-fundamentals/mlbe	3L	• Problems to explore conditional statements • Problems to explore iteration • Problems to explore recursion • **Table:** create, insert, and delete a column, display and join two tables • **Import & Export Files**: – Import from a spreadsheet – Export to a spreadsheet – Import from a text file – Export to a text file

5	**Data Visualization using MATLAB** **(MATLAB Programming for Engineers, 6E Author(s): Stephen J. Chapman- Chapter 3, Chapter 8)**	2D Plotting: In-built functions for plotting, Multiple plotting with special graphics, Curve fitting, Interpolation, Basic fitting interface. 3D Plotting: Use of meshgrid function, Mesh plot, Surface plot, Plots with special graphics.	***International Academia:*** 1. https://ocw.mit.edu/courses/6-057-introduction-to-matlab-january-iap-2019/pages/syllabus 2. https://stanford.edu/class/cme192/index.html ***AICTE-prescribed syllabus:*** https://www.aicte-india.org/sites/default/files/Model_Curriculum/AICTE%20-%20UG%20CSE.pdf ***Industry Mapping:*** https://matlabacademy.mathworks.com/details/matlab-fundamentals/mlbe	3L	• **2D Plots:** – Line plot- multiple lines, line style, color, marker, axis, title, marker – Subplot- changing row and column – Bar plot- categorical, ordering categorical, stacked, color, horizontal – Pie chart- explode, label, legend, color – Histogram plot – Rader plot • **Polynomial & Curve Fitting:** polyval, polyint, polyfit • **3D Plots**: mesh plot, surface plot, quiver plot

6	**Graphical User Interface Design** **(MATLAB Programming for Engineers, 6E Author(s): Stephen J. Chapman- Chapter 14)**	GUI in MATLAB, App designer, Component library (Edit Field, Text Area, Label, Button, Check Box, Drop Down, List Box, Button Group, Slider, Spinner etc.), Containers (Panel, Tab Group), Instrumentation, Component browser, Design view and code view, Call back function, Exporting App.	***International Academia:*** 1. https://ocw.mit.edu/courses/6-057-introduction-to-matlab-january-iap-2019/pages/syllabus 2. https://stanford.edu/class/cme192/index.html ***AICTE-prescribed syllabus:*** https://www.aicte-india.org/sites/default/files/Model_Curriculum/AICTE%20-%20UG%20CSE.pdf ***Industry Mapping:*** https://in.mathworks.com/academia/courseware/graphic-user-interfaces.html	3L	• **Components and callbacks** – Create a simple calculator app – Create an app for student registration data entry using different form components • **Containers and instrumentation** – Create an app to display the output in a gauge where input is given by a knob. – Create an app to control light with a switch **MATLAB Project Ideas**: https://in.mathworks.com/academia/matlab-engineering-project-ideas.html

TEXT BOOK:

1. "MATLAB Programming for Engineers (6e)" by Stephen J. Chapman

REFERENCE BOOKS:

1. "MATLAB: Easy Way of Learning" by S. Swapna Kumar and S. V. B. Lenina
2. "MATLAB for Beginners: A Gentle Approach" by Peter Issa Kattan
3. "Get Started with MATLAB (7e)" by Rudra Pratap
4. "A Guide to MATLAB for Beginners and Experienced Users (3e)" by Brian R. Hunt, Ronald L.Lipsman, Jonathan M. Rosenberg

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Syllabus for B. Tech Admission Batch 2023

Subject Name: Mathematics - III **Credit: 3**

Subject Code: BSM301 **Lecture Hours: 42**

Pre-Requisites: Permutation & Combination, Concept of Basic Probability, Evaluation of definite, improper and infinite integrals, Concept of β & Γ functions.

Relevant Links:

Coursera: Probability & Statistics https://www.coursera.org/learn/machine-learning-probability-and-statistics
NPTEL Advanced Engineering Mathematics https://onlinecourses.nptel.ac.in/noc24_ma03/preview

Study Material Link (BL 4, 5,6)

https://drive.google.com/drive/folders/19umqy3stib1-wuHy0h-p0arM0NkIzdxC?usp=sharing

COURSE OBJECTIVES:

1. The syllabus will prepare the learners for Engineering Exit Examinations, ESE and campus placements.

2. Students will apply concepts of various probability distributions to find probabilities.

3. Students will make estimations for a mean, variance, standard deviation and proportions for big data.

4. Students will be eligible to work in the Data domain which is the emerging technology of the future

and create more opportunities for creative work.

5. Students will be able to describe and quantify the uncertainty inherent in predictions made by machine learning models.

COURSE OUTCOMES:

CO	Course Outcomes
CO 1	Illustrate the ideas of probability and random variables, various discrete and continuous probability distributions with their properties and their applications in physical and engineering environment that will make a bridge between elementary statistical tools and probability theory.
CO 2	Find the inter-relation between two or more phenomena with the help of curve fitting.
CO 3	Understand the basic components of sampling and have the knowledge on exact sampling distributions which are essential for estimating and testing hypothetical statements. Know the various sampling methodologies and their efficiencies in theoretical and practical aspects.
CO 4	Estimate and test the parameters associated with the relevant areas for forecasting and verification of economic theory
CO 5	Apply the statistical tools in business, economical and commercial areas for analyzing problems and to make better decisions for future in their fields.

Detailed Syllabus:

Module No.	Topic	Sub-topics	Mapping with Chapters of the Text Book	Mapping with Industry & International Academia	Lecture hour	Corresponding Lab Assignment
1	**Random Variables and Probability Distributions**	*Discrete Random Variable:* Discrete Probability Distribution, Expectation and Variance of random variables; Binomial and Poisson Distributions; Mean, Variance and Moment Generating Functions of Binomial and Poisson Variates; Convergence of Binomial to Poisson Variate. *Continuous Random Variable;* Continuous Probability Distributions, Expectation and Variance of random variables, Exponential, Normal Distributions; Mean, Variance and Moment Generating Functions of the corresponding variates.	Chapters 2 and 3/Text Book 1 Chapter 12 /Text Book 2	https://ocw.mit.edu/courses/18-05-introduction-to-probability-and-statistics-spring-2022/	**12**	"R" software for statistical computing
2	**Method of Least Squares and Curve Fitting**	Principle of Least Squares, Curve fitting by the method of Least Squares - fitting of straight lines, second degree parabolas and exponential curves.	Chapter 9/Text Book 1 Chapter 8 /Text Book 2	https://ocw.mit.edu/courses/18-05-introduction-to-probability-and-statistics-spring-2022/	**4**	"stata": statistical software for data science
3	**Sampling and**	Population and Sample, Sampling	Chapter 11	https://www.c	**8**	"stata": statistical

	Sampling Distributions	With and Without Replacement (SRSWR and SRSWOR); Random Samples, Population Parameters, Sample Statistics, Sampling Distributions, Standard Error and Probable Error; Sample Mean, Sampling Distribution of Means; Sample Proportion, Sampling Distribution of Proportions, Sample Variances, Sampling Distribution of Variances; Case where Population Variance is unknown; Central Limit Theorem (Statement only); Degrees of freedom, Chi-square distribution, Mean & Variance of Chi-square variate.	/Text Book 1 Chapter 13/Text Book 2	l.cam.ac.uk/teaching/2021/IntroProb/materials.html		software for data science
4	**Estimation of Parameters**	Point and Interval estimations, Biased and Unbiased estimators, Minimum Variance Unbiased Estimator (MVUE), Consistent Estimator, Maximum Likelihood Estimation of Parameters, Applications in populations following theoretical distributions (Binomial, Poisson and Normal), Calculation of confidence limits for population mean and population proportions.	Chapter 12 /Text Book 1 Chapters 14/ Text Book 2	https://ocw.mit.edu/courses/1-010-uncertainty-in-engineering-fall-2008/	**6**	"R" software for statistical computing
5	**Testing of Hypothesis**	*Large Sample Test***:** Statistical Hypotheses, Test Statistic, Best Critical Region, Test for single mean, difference of means, single proportion, difference of proportions, and difference of standard deviations. *Small Sample Test:* Test for single	Chapter 13/ Text Book 1 Chapter 14?Text Book 2	https://ocw.mit.edu/courses/6-041-probabilistic-systems-analysis-and-applied-	**12**	"R" software for statistical computing

		mean, difference of means and correlation coefficients, Test for ratio of variances, Chi-square test for goodness of fit and independence of attributes.		probability-fall-2010/		

TEXT BOOK:

1. Saktipada Nanda and Sibashis Nanda , "A Course on Probability & Statistics", 2nd Edition (2024), Mindprobooks Academic Series [Available in flipkart.com/amazon.in]

2. N.G.Das, "Statistical Methods", Combined Edition Vol. 1 &2 (2017) McGraw Hill Education

REFERENCE BOOKS:

1. Sheldon M. Ross, "Introduction to Probability and Statistics for Engineers and Scientists", 6th Edition (2020), Academic

2. Douglas C, Montgomery and George C. Runger, Applied Statistics and Probability for Engineers, 7th edition (2018), John Wiley & Sons.

3. Murray R. Spiegel, John J. Schiller and R. Alu Srinivasan, "Schaum's Outline of Probability & Statistics" , 4th Edition (2012), McGraw Hill Education.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	2	1	1	1	1	1	2	1
CO2	3	3	3	3	2	1	1	1	1	1	2	1
CO3	3	3	3	3	2	1	1	1	1	1	2	1
CO4	3	3	3	3	2	1	1	1	1	1	2	1
CO5	3	3	3	2	2	2	1	2	2	2	3	2

3: Strong correlation
2: Medium correlation
1: Weak correlation

PSO	PSO Description
PSO1	**Technical knowledge and analysis:** Apprehend and analyze specific engineering problems of communication, networking, electrical & electronics circuits, signal processing, computer programming, embedded systems, VLSI design and semiconductor technology by applying the knowledge of basic sciences, engineering mathematics and engineering fundamentals.
SO2	**Design and Implementation:** Ability to design and implement the acquired technical knowledge with proficiency in logical programming for applications in electronics & communication engineering.
SO3	**Development of professional skill and professional ethics:** Ability to communicate effectively with excellent professional proficiency, interpersonal skills and demonstrate the practice of professional ethics for societal benefit.

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Syllabus for B.Tech Admission Batch 2023

Subject Name: Humanities – I (Principles of Management)

Credit: 3 **Lecture Hours: 36** **Subject Code: HSMCS301**

Pre-requisite: Basic understanding of Communication

Relevant Links:

Study Material Coursera NPTEL Linkedin Learning Infosys Springboard

COURSE OBJECTIVES:

1. Understand basics of Management.
2. Understanding Management in the context of Society & Leadership
3. Use of Decision-making tools and understanding operations and production management to illustrate the concept of synchronous and asynchronous sequential circuits.
4. Understanding Customer management

COURSE OUTCOMES:

CO 1: Students would gain a thorough grounding in the fundamentals of business management
CO 2: Enabled students to predict corrective business approach and educate detailed process to start up a venture
CO 3: Developed the ability of students to apply current trends in business for better performance
CO 4: The deeper understanding and evaluate the business environment and predict corrective business model for cost effective business performance.

Module number	Topic	Sub-topics		Mapping with Industry and International Academia	Lecture Hours	Corresponding Lab Assignment
1	**Basic concepts of management**	Definition–Essence, Functions, Roles, Level. Functions of Management: Planning – Concept, Nature, Types, Analysis, Management by objectives; Organisation Structure – Concept, Structure, Principles, Centralization, Decentralization, Span of Management; Organisational Effectiveness.	Management : Principles, Processes & Practices – Bhat, A & Kumar, A (OUP). Chapter: 1 and 2	***International Academia:*** (https://learn.saylor.org/course/BUS208) ***AICTE-prescribed syllabus:*** (https://www.aicte-india.org/sites/default/files/Vol.%20I_UG.pdf) ***Industry Mapping:*** https://www.forbes.com/advisor/business/software/best-erp-systems/	7	1. Mostly ERP Software: https://www.forbes.com/advisor/business/software/best-erp-systems/
2	**Management and Society**	Concept, External Environment, CSR, Corporate Governance, Ethical Standards. People Management – Overview, Job design, Recruitment & Selection, Training & Development, Stress Management. Managerial Competencies – Communication, Motivation, Team Effectiveness, Conflict Management, Creativity, Entrepreneurship. Leadership: Concept,Nature, Styles	Management : Principles, Processes & Practices – Bhat, A & Kumar, A (OUP). Chapter : 3 and 4	**International Standards** :(https://learn.saylor.org/course/BUS208) ***AICTE-prescribed syllabus:*** (https://www.aicte-india.org/sites/default/files/Vol.%20I_UG.pdf) ***Industry Mapping:*** https://www.forbes.com/advisor/business/software/best-erp-systems/	8	1. Mostly ERP Software: https://www.forbes.com/advisor/business/software/best- erp-systems/.

3	**Decision making**	Concept, Nature, Process, Tools & techniques. Economic, Financial & Quantitative Analysis – Production, Markets, National Income Accounting, Financial Function & Goals, Financial Statement & Ratio Analysis, Quantitative Methods – Statistical Inference, Forecasting, Regression Analysis, Statistical Quality Control.	Essentials for Management – Koontz, Revised edition, Tata McGraw Hill (TMH) Chapter: 7, 8 and 9	https://learn.saylor.org/course/BUS208 ***AICTE-prescribed syllabus:*** (https://www.aicte-india.org/sites/default/files/Vol.%20I_UG.pdf) ***Industry Mapping:*** https://www.forbes.com/advisor/business/software/best-erp-systems/	15		Mostly ERP Software: https://www.forbes.com/advisor/business/software/best-erp-systems/
4	**Customer Management**	Market Planning & Research, Marketing Mix, Advertising & Brand Management. Operations & Technology Management – Production & Operations Management, Logistics & Supply Chain Management, TQM, Kaizen & Six Sigma, MIS.	Management: Principles, Processes & Practices – Bhat, A & Kumar, A (OUP). Chapter: 11, 12 and 13	https://learn.saylor.org/course/BUS208 ***AICTE-prescribed syllabus:*** (https://www.aicte-india.org/sites/default/files/Vol.%20I_UG.pdf) ***Industry Mapping:*** https://www.forbes.com/advisor/business/software/best-erp-systems/	10		Mostly ERP Software: https://www.forbes.com/advisor/business/software/best-erp-systems/

Text Book:
Management: Principles, Processes & Practices – Bhat, A & Kumar, A (OUP).

Reference Books:
1. Essentials for Management – Koontz, Revised edition, Tata McGraw Hill (TMH)
3. Management – Stoner, James A. F. (Pearson)
4.Management - Ghuman, Tata McGraw Hill(TMH)