

University of Mumbai



**Title of the program**

- A-** U.G. Certificate in Information Technology
- B-** U.G. Diploma in Information Technology
- C-** B.Sc. (Information Technology)
- D-** B.Sc. (Honours) in Information Technology
- E-** B.Sc. (Honours with Research) in Information Technology

**Syllabus for Semester –**

**Sem I & II**

**Ref: GR dated 20<sup>th</sup> April, 2023 for Credit Structure of UG**

**(With effect from the academic year 2024-25 Progressively)**

# University of Mumbai



## Syllabus for Approval

(As per NEP 2020)

Sr. No.	Heading	Particulars	
1	<b>Title of program</b> O. _____A	A	Title of the program U.G. Certificate in Information Technology
	O. _____B	B	U.G. Diploma in Information Technology
	O. _____C	C	B.Sc. (Information Technology)
	O. _____D	D	B.Sc. (Honours) in Information Technology
	O. _____E	E	B.Sc. (Honours with Research) in Information Technology
2	<b>Eligibility</b> O. _____A	A	10+2 (A learner must have completed HSC or equivalent with 45% of aggregate for open category and 40% of aggregate in case of reserved candidates in one attempt with Mathematics and/or Statistics as one of the subjects (OR) Passed Equivalent Academic Level 4.0 with CGPA equivalent to 45% for open category and 40% in case of reserved candidates with Mathematics and/or Statistics as one of the subjects
	O. _____B	B	Under Graduate Certificate in Information Technology Academic Level 4.5
	O. _____C	C	Under Graduate Diploma in Information Technology Academic Level 5.0
	O. _____D	D	Bachelors of Science in Information Technology with minimum CGPA of 7.5 Academic Level 5.5
	O. _____E	E	Bachelors of Science in Information Technology with minimum CGPA of 7.5 Academic Level 5.5
3	<b>Duration of program</b> R. _____	A	One Year
		B	Two Years
		C	Three years
		D	Four years

		E	Four years
4	<b>Intake Capacity</b> R. _____		
5	<b>Scheme of Examination</b> R. _____	NEP 40% Internal 60% External, Semester End Examination Individual Passing in Internal and External Examination	
6	<b>Standards of Passing</b> R. _____	40% in each component	
7	<b>Sem. I &amp; II Credit Structure</b> R: _____ A R: _____ B  <b>Sem. III &amp; IV Credit Structure</b> R: _____ C R: _____ D  <b>Sem. V &amp; VI Credit Structure</b> R: _____ E R: _____ F	Attached herewith	
8	<b>Semesters</b>	A	Sem I & II
		B	Sem I, II, III & IV
		C	Sem I, II, III, IV, V & VI
		D	Sem I, II, III, IV, V, VI, VII & VIII
		E	Sem I, II, III, IV, V, VI, VII & VIII
9	<b>Program Academic Level</b>	A	4.5
		B	5.0
		C	5.5
		D	6.0
		E	6.0
10	<b>Pattern</b>	Semester	
11	<b>Status</b>	New	
12	<b>To be implemented from Academic Year Progressively</b>	From Academic Year: 2023-24	

Sign of Chairperson  
Dr. Mrs. R.  
Srivaramangai  
Ad-hoc BoS (IT)

Sign of the  
Offg. Associate Dean  
Dr. Madhav R. Rajwade  
Faculty of Science &  
Technology

Sign of Offg. Dean,  
Prof. Shivram S. Garje  
Faculty of Science &  
Technology

## **Preamble**

### **1) Introduction**

Information technology (IT) continues to be a dynamic and rapidly evolving field with high demand for skilled professionals. The demand for IT workers is driven by various factors, and the landscape may have evolved over a period of time. NEP envisages the multidisciplinary approach thus making IT much more applicable in all fields of life. This facilitates multi-institutional mobility of the students within India as well as abroad thus making the students attain different proficiency levels right from certificate to B.Sc Honours with Research. This new syllabus under NEP will thus enable the students for higher education, research and career in the field of IT

### **2) Aims and Objectives**

The aims and objectives of a Bachelor of Science (B.Sc) program in Information Technology (IT) generally revolve around providing students with a comprehensive understanding of the principles, technologies, and applications within the field of information technology. The entire program collectively aims to produce graduates who are well-rounded IT professionals, capable of contributing to the design, development, and management of information technology systems in various industries. The specific details of the curriculum may vary among institutions offering B.Sc in Information Technology programs.

### **3) Learning Outcomes**

The B. Sc. (Information Technology) Programme shall prepare and enable the graduates to:

- ✓ Demonstrate proficiency in programming languages, Data structures, Design and implement software solutions with their technical competence
- ✓ Analyze user requirements and design effective IT systems or applications.
- ✓ Apply system analysis and design methodologies to address complex business challenges.
- ✓ Acquire the skills of Database Management, Networking and Security, Web Technologies
- ✓ Plan, execute, monitor, and control IT projects.
- ✓ Analyze and solve complex IT problems using critical thinking skills.
- ✓ Apply concepts of artificial intelligence, machine learning, cloud computing, and IoT
- ✓ Effectively communicate technical information both orally and in writing.

### **4) Any other point (if any)**

## **PROGRAMME SPECIFIC OUTCOMES (PSO)**

On completing the B. Sc.(Information Technology) at the University of Mumbai, the graduates shall be able to

- Technical Proficiency:
  - Demonstrate a comprehensive understanding of fundamental concepts, principles, and technologies in information technology.
  - Apply programming and software development skills to design and implement IT solutions.
- System Thinking and Analysis:
  - Apply system analysis and design methodologies to analyze and address



- complex problems.
- Design and develop IT systems that meet user requirements and organizational needs.
- Database Management:
  - Design, implement, and manage relational databases to store and retrieve information effectively.
  - Demonstrate proficiency in using database management systems and querying languages.
- Networking and Security:
  - Understand and implement computer networks, protocols, and security measures.
  - Evaluate and implement security solutions to protect information systems.
- Web Technologies:
  - Develop web applications using a variety of technologies and programming languages.
  - Design and create user interfaces that adhere to web design principles.
- Project Management:
  - Apply project management principles to plan, execute, and deliver IT projects.
  - Demonstrate the ability to work effectively within project teams.
- Emerging Technologies:
  - Stay informed about and adapt to emerging technologies in the IT field.
  - Apply concepts of artificial intelligence, machine learning, cloud computing, and IoT to solve real-world problems.
- Critical Thinking and Problem-Solving:
  - Analyze and solve complex IT problems using critical thinking skills.
  - Apply problem-solving strategies to troubleshoot and resolve technical issues.
- Communication Skills:
  - Effectively communicate technical information to diverse audiences, both orally and in writing.
  - Collaborate with team members and stakeholders to achieve common goals.
- Ethics and Professionalism:
  - Demonstrate ethical behavior and professionalism in all aspects of the IT profession.
  - Adhere to ethical standards and legal considerations related to information technology.

**(Credit Struture Sem I & II)**

	R: _____A									
Level	Sem ester	Major		Minor	OE	VSC, SEC (VSEC)	AEC, VEC, IKS	OJT, FP, CEP, CC, RP	Cum. Cr. / Sem.	Degr ee/ Cum. Cr.
		Mandatory	Electiv es							
	I	6		-	2+2	VSC:2, SEC:2	AEC:2, VEC:2, IKS:2	CC:2	22	UG Certificate 44
		<ul style="list-style-type: none"><li>• Program ming with C - 02</li><li>• Database Managem ent Systems - 02</li><li>• Practical I - 02</li></ul>				VSC : Combinational and Sequential Design- 02  SEC – 02 Office Tools for Data Management OR Fundamentals of Telecommunication Systems				
R: _____B										
	II	6		2	2+2	VSC:2, SEC:2	AEC:2,VEC:2	CC:2	22	
		<ul style="list-style-type: none"><li>• OOPs with C++ - 02</li><li>• Web Designi ng - 02</li><li>• Practica l II - 02</li></ul>				<ul style="list-style-type: none"><li>• VSC : Assembly Language Programm ing – 02</li><li>• SEC: 02<ul style="list-style-type: none"><li>• Web Program ming</li></ul></li><li>• PL/SQL</li></ul>				
	Cum Cr.	12	-	2	8	8	10	4	44	
Exit option: Award of UG Certificate in Major with 40-44 credits and an additional 4 credits core NSQF course/ Internship OR Continue with Majorand Minor										

### Under Graduate Diploma in Information Technology

#### Credit Structure (Sem. III & IV)

	R: _____ C									
Level	Semester	Major		Minor	OE	VSC, SEC (VSEC)	AEC, VEC, IKS	OJT, FP, CEP, CC, RP	Cum. Cr. / Sem.	Degree/ Cum. Cr.
		Mandatory	Electives							
	III	8		4	2	VSC:2	AEC:2,	FP :2 CC:2	22	UG Diploma 88
		<ul style="list-style-type: none"> <li>• Python Programming -02</li> <li>• Python Programming Practical-02</li> <li>• Data Structures-02</li> <li>• Data Structures Practical-02</li> </ul>				VSC : Operating Systems-02				
	R: _____ D									
	IV	6		4	2	SEC:2	AEC:2	CEP : 2 CC: 2	22	
		<ul style="list-style-type: none"> <li>• Core Java - 02</li> <li>• Core Java Practical-02</li> <li>• Software Engineering-02</li> <li>• Software Engineering Practical-02</li> </ul>				<ul style="list-style-type: none"> <li>• Computer Graphics and Animation -02</li> </ul> <b>OR</b> <ul style="list-style-type: none"> <li>• Mojo-02</li> </ul> <b>OR</b> <ul style="list-style-type: none"> <li>• Mobile Programming-02</li> </ul>				
	Cum Cr.	28		10	12	12	14	12	88	
Exit option; Award of UG Diploma in Major and Minor with 80-88 credits and an additional 4 credits core NSQF course/ Internship OR Continuewith Major and Minor										

**B.Sc. (Information Technology)****Credit Structure (Sem. V & VI)**

	R: _____E									
Level	Semester	Major		Minor	OE	VSC, SEC (VSEC)	AEC, VEC, IKS	OJT, FP, CEP, CC, RP	Cum. Cr. / Sem.	Degree/ Cum. Cr.
		Mandatory	Electives							
	V	10	4	4		VSC: 2		FP/C EP:2	22	UG Degree 132
		<ul style="list-style-type: none"><li>Advanced Web Programming-02</li><li>Advanced Web Programming Practical-02</li><li>Business Intelligence-02</li><li>Business Intelligence Practical-02</li><li>Software Project Management-02</li></ul>	<ul style="list-style-type: none"><li>Linux Administration -02</li><li>Linux Administration Practical-02</li><li>OR</li><li>EARN-02</li><li>EARN Practical-02</li><li>OR</li><li>Enterprise Java-02</li><li>Enterprise Java Practical-02</li></ul>			<ul style="list-style-type: none"><li>Advanced Mobile Programming-02</li></ul>		FP: Project Dissertation-02	22	
	R: _____E									
	VI	10	4	4				OJT :4	22	
		<ul style="list-style-type: none"><li>Security in Computing -02</li><li>Security in Computing Practical-02</li><li>AI and ML-02</li><li>AI and ML Practical-02</li><li>Software Quality Assurance-02</li></ul>	<ul style="list-style-type: none"><li>Enterprise Networking-02</li><li>Enterprise Networking Practical-02</li><li>OR</li><li>Principles of GIS-02</li><li>Principles of GIS Practical-02</li></ul>					<ul style="list-style-type: none"><li>OJT: Project Implementation-04</li></ul>		
	Cum Cr.	48	8	18	12	14	14	18	132	
Exit option: Award of UG Degree in Major with 132 credits OR Continue with Major and Minor										

[Abbreviation - OE – Open Electives, VSC – Vocation Skill Course, SEC – Skill Enhancement Course, (VSEC), AEC – Ability Enhancement Course, VEC – Value Education Course, IKS – Indian Knowledge System, OJT – on Job Training, FP – Field Project, CEP – Continuing Education Program, CC – Co-Curricular, RP – Research Project]

# **SEMESTER I**

**Syllabus**  
**B.Sc. (Information Technology)**  
**(Sem.- I)**

## Major Courses

### Name of the Course: Programming with C

Sr.No	Heading	Particulars
1	<b>Description the course : Including but Not limited to:</b>	This course allows the students to understand the fundamental concepts of programming which will allow them to program applications in C.
2	<b>Vertical :</b>	Major
3	<b>Type :</b>	Theory
4	<b>Credits :</b>	2 credits (1 credit = 15 Hours for Theory in a semester)
5	<b>Hours Allotted :</b>	30 Hours
6	<b>Marks Allotted:</b>	50 Marks
7	<b>Course Objectives(CO):</b> CO 1. To understand the concepts of computer programming. CO 2. To understand syntax and semantics of the C language CO 3. To understand loops and decision making in programming. CO 4. To understand the use of arrays, structures, union and pointers. CO 5. To understand functions for modular code and handle errors.	
8	<b>Course Outcomes (OC):</b> OC 1. Students can build flowcharts, pseudocode for C programs. OC 2. Students can use C language syntax and semantics in their programs. OC 3. Students can implement loops and decision making. OC 4. Students can use different types of data structures in their programs. OC 5. Students can write well-structured, readable, and maintainable C code and debug programs if there are any errors.	
9	<b>Modules:-</b> <b>Module 1:</b>	<b>15 Hrs</b>
	<b>1. Introduction:</b> Algorithms, History of C, Structure of C Program. Program Characteristics, Compiler, Linker and preprocessor, pseudo code statements and flowchart symbols, Desirable program characteristics. Program structure. Compilation and Execution of a Program, C Character Set, identifiers and keywords, data types and sizes, constants and its types, variables, Character and character strings, typedef, typecasting <b>2. Type of operators:</b> Arithmetic operators, relational and logical operators, Increment and Decrement operators, assignment operators, the conditional operator, Assignment operators and expression, Precedence and order of Evaluation Block Structure, Initialization, C Preprocessor	
	<b>Module 2:</b>	

	<ol style="list-style-type: none"> <li>1. Control Flow: Statements and Blocks, If-Else, Else-If, Switch, Loops- While and For Loops Do-while, Break and Continue, Goto and Labels</li> <li>2. Basics of functions. User defined and Library functions</li> <li>3. Pointer and Addresses, Pointer and Function Arguments, Pointer and Arrays.</li> <li>4. User-defined data types- structure and union</li> </ol>	<b>15 Hrs</b>
<b>10</b>	<b>Books and References:</b> <ol style="list-style-type: none"> <li>1. C Programming Language, Brian W. Kernighan, Dennis M. Ritchie , 2017</li> <li>2. Let Us C, Yashvant Kanetkar, BPB Publications,2008.</li> <li>3. Mastering in C, K. R. Venugopal and Sudeep R. Prasad, Tata McGraw-Hill Publications.</li> <li>4. A Computer Science –Structure Programming Approaches using C, Behrouz Forouzan, Cengage Learning.</li> <li>5.. Schaum's outlines Programming with C, Byron S. Gottfried, Tata McGraw- Hill Publications.</li> <li>6. Basics of Computer Science, by Behrouz Forouzan, Cengage Learning.</li> <li>7. Programming Techniques through C, by M. G. Venkateshmurthy, Pearson Publication.</li> </ol>	
<b>12</b>	<b>Internal Continuous Assessment: 40%</b>	<b>Semester End Examination: 60%</b>
<b>13</b>	<b>Continuous Evaluation through:</b> Class test of 1 of 15 marks Class test of 2 of 15 marks Average of the two: 15 marks  Quizzes/ Presentations/ Assignments: 5 marks Total: 20 marks	<b>Format of Question Paper: External Examination (30 Marks)– 1 hr duration</b>
<b>14</b>	<b>Format of Question Paper: (Semester End Examination : 30 Marks. Duration:1 hour)</b> Q1: Attempt any two (out of four) from Module 1 (15 marks) Q2: Attempt any two (out of four) from Module 2 (15 marks)	



## Name of the Course: Database Management System

Sr.No	Heading	Particulars
1	<b>Description the course : Including but Not limited to:</b>	The objective of the course is to present an introduction to fundamentals of database management systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively -information from a DBMS.
2	<b>Vertical :</b>	Major
3	<b>Type :</b>	Theory
4	<b>Credits:</b>	2 credits ( 1 credit = 15 Hours for Theory)
5	<b>Hours Allotted :</b>	30 Hours
6	<b>Marks Allotted:</b>	50 Marks
7	<b>Course Objectives(CO):</b> CO 1. To make students aware fundamentals of database system. CO 2. To give idea how ERD components helpful in database design and implementation. CO 3. To experience the students working with database using MySQL. CO 4. To familiarize the student with normalization, database protection and different DDL, DML, DQL, DCL Statements CO 5. To make students aware about importance of protecting data from unauthorized users.	
8	<b>Course Outcomes (OC):</b> OC 1. Define and describe the fundamental elements of relational database management system. OC 2. To relate the basic concepts of relational data model, entity-relationship model, relational database OC 3. Design ER-models to represent simple database application scenarios. OC 4. Understand the normalization and its role in the database design process OC 5. Transform the ER-model to relational tables, populate relational database and formulate SQL OC 6. Understand basic database storage structures and access techniques: file and page organizations, indexing methods and hashing.	
9	<b>Modules:-</b> <b>Module 1:</b>	
	<b>1. Introduction to Databases and transactions</b> What is database system, purpose of database system, view of data, relational databases, database architecture, transaction management <b>2. Data Models</b> The importance of data models, Basic building blocks, Business rules, The evolution of data models, Degrees of data abstraction <b>3. Database Design, ER-Diagram</b> Database design and ER Model: overview, ER-Model, Constraints, ER-Diagrams, ERD Issues, Codd's rules, Relational Schemas <b>4. Relational database model</b> Logical view of data, keys, integrity rules	<b>15 Hrs</b>

	<b>Module 2:</b>	
	<b>1. Database Design theory and normalization:</b> Basics of functional dependencies and normalization for relational databases. Relational database design and further dependencies. <b>2. SQL, Indexing:</b> Introduction to SQL, Complex queries, triggers, views, joining database tables and schema modification. Query Processing and optimization. File structure, hashing and indexing <b>3. Transaction management and concurrency control and recovery:</b> Introduction to transaction processing concepts and theory. Concurrency control technique. Database recovery technique	<b>. 15 Hrs</b>
<b>10</b>	<b>Text Books</b> 1. "Fundamentals of Database System", Elmasri Ramez, Navathe Shamkant, Pearson Education, Seventh edition, 2017 2. Database Management Systems", Raghu Ramakrishnan and Johannes Gehrke, 3rd Edition, 2014 3. Database Systems: Design implementation and management by Carlos Coronel, Steven Morris, Peter Rob	
<b>11</b>	<b>Reference Books</b> 1. "Database System Concepts", Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw Hill, 2017 2. "MySQL: The Complete Reference", Vikram Vaswani , McGraw Hill, 2017 3. "Learn SQL with MySQL: Retrieve and Manipulate Data Using SQL Commands with Ease", Ashwin Pajankar, BPB Publications, 2020	
<b>12</b>	<b>Internal Continuous Assessment: 40%</b>	<b>Semester End Examination: 60%</b>
<b>13</b>	<b>Continuous Evaluation through:</b> Class test of 1 of 15 marks Class test of 2 of 15 marks Average of the two: 15 marks  Quizzes/ Presentations/ Assignments: 5 marks Total: 20 marks	<b>Format of Question Paper: External Examination (30 Marks)– 1 hr duration</b>
<b>14</b>	<b>Format of Question Paper: (Semester End Examination : 30 Marks. Duration:1 hour)</b> Q1: Attempt any two (out of four) from Module 1 (15 marks) Q2: Attempt any two (out of four) from Module 2 (15 marks)	

**Name of the Course: Major Practical 1**

Sr.No	Heading	Particulars
1	<b>Description the course : Including but Not limited to:</b>	<u>Programming with C -practical</u> This course is stepping stone to learn other languages. This course provides students hands on experiences of coding exercises and projects.  <u>Database Management System's</u> practical approach is useful to gain the knowledge for software backend development. It benefits to user by providing data definition, data access, reduced data redundancy, data integrity, data sharing, data organizing, data consistency, data accuracy, and security
2	<b>Vertical :</b>	Major
3	<b>Type :</b>	Practical
4	<b>Credits :</b>	2 credits (60 Hours of Practical work in a semester )
5	<b>Hours Allotted :</b>	30 Hours (C Programming Practical) + 30 Hours(DBMS - Practical)
6	<b>Marks Allotted:</b>	50 Marks
7	<b>Course Objectives(CO):</b>  CO 1. To provide exposure in developing algorithm, flowchart and to write efficient code. CO 2. To understand loops and decision making in programming. CO 3. To understand the arrays, structures, union. CO 4. To understand the use of function and pointers. CO 5. To Identify entities and its relationship with relational model structure. CO 6. To understand relational database using SQL and constraints implementation using create table queries. CO 7. To Understand DML operations and backing of database CO 8. To understand how to retrieve data from database and learn how to retrieve single value after performing calculations on group of values CO 9. To understand built-in functions to perform operations on data CO 10. To understand how to fetch data from two or more tables, which is joined to appear as single set of data CO 11. To understand nested and larger query as advanced fetching of data to understand concept of virtual table. CO 12. To understand how to control user access in a database.	

8

**Course Outcomes (OC):**

- OC 1. Students can demonstrate the concepts of datatypes, variables and operators in C.
- OC 2. Students can implement the concept of control statements and looping in C program.
- OC 3. Students can demonstrate the use of arrays, strings and structures in C
- OC 4. Students can implement modular C program using functions and pointers.
- OC 5. Students can demonstrate the use of arrays, strings and structures in C.
- OC 6. Students able to perform various operations such as insert, update delete and retrieve data from database using SQL queries.
- OC 7. Students able to perform alteration in tables and can restore and take backup of the database.
- OC 8. Students able to perform operations using simple SQL Queries to fetch data and learns various aggregate functions to get single value.
- OC 9. Students able to perform SQL Queries using JOIN keyword for joining two or more tables.
- OC 10. Students able to perform nested queries using in, exists operators.
- OC 11. Students able to create new table by joining one or more tables and learn how to hide attribute from end user.
- OC 12. Students able to restrict the user from accessing data in database.
- OC 13. Students should be able to create, manipulate the database management system to evaluate the business information problem.

9	<p><b>Module 1:- Programming with C</b></p> <p><b>1. Practical 1:-</b></p> <ol style="list-style-type: none"> <li>To calculate simple interest taking principal, rate of interest and number of years as input from user. Write algorithm &amp; draw flowchart for the same.</li> <li>Write a program to find greatest of three numbers using conditional operator. Write algorithm &amp; draw flowchart for the same.</li> <li>Write a program to check if the year entered is leap year or not. Write algorithm &amp; draw flowchart for the same.</li> </ol> <p><b>2. Practical 2:-</b></p> <ol style="list-style-type: none"> <li>Write a program to calculate roots of a quadratic equation.</li> <li>Write a menu driven program using switch case to perform add / subtract / multiply / divide based on the users choice.</li> <li>Write a program to print the pattern of asterisks.</li> </ol> <p><b>3. Practical 3</b></p> <ol style="list-style-type: none"> <li>Write a program using while loop to reverse the digits of a number.</li> <li>Write a program to calculate the factorial of a given number.</li> <li>Write a program to print the Fibonacci series.</li> </ol> <p><b>4. Practical 4</b></p> <ol style="list-style-type: none"> <li>Write a program to print area of square using function.</li> <li>Write a program using recursive function.</li> <li>Write a program to square root, abs() value using function.</li> <li>Write a program using goto statement .</li> </ol> <p><b>5. Practical 5</b></p> <ol style="list-style-type: none"> <li>Write a program to print rollno and names of 10 students using array.</li> <li>Write a program to sort the elements of array in ascending or descending order</li> </ol> <p><b>6. Practical 6</b></p> <ol style="list-style-type: none"> <li>Write a program to extract the portion of a character string and print the extracted part.</li> <li>Write a program to find the given string is palindrome or not.</li> <li>Write a program to using strlen(), strcmp() function .</li> </ol> <p><b>7. Practical 7</b></p> <p>Write a program to swap two numbers using a function. Pass the values to be swapped to this function using call-by-value method and call-by-reference method.</p> <p><b>8. Practical 8</b></p> <ol style="list-style-type: none"> <li>Write a program to read a matrix of size m*n.</li> <li>Write a program to multiply two matrices using a function.</li> </ol> <p><b>9. Practical 9</b></p> <p>Write a program to print the structure using</p> <p style="padding-left: 40px;">Title Author Subject Book ID</p> <p>Print the details of two students.</p> <p><b>10. Practical 10</b></p> <p>Create a mini project on “Bank management system”. The program should be menu driven.</p>	30 Hrs
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	<p><b>Module 2</b></p> <ol style="list-style-type: none"> <li>1. Conceptual Designing using ER Diagrams (Identifying entities, attributes, keys and relationships between entities, cardinalities, generalization, specialization etc.)</li> <li>2. Perform the following: <ul style="list-style-type: none"> <li>• Viewing all databases</li> <li>• Creating a Database</li> <li>• Viewing all Tables in a Database</li> <li>• Creating Tables (With and Without Constraints)</li> <li>• Inserting/Updating/Deleting Records in a Table</li> </ul> </li> <li>3. Perform the following: <ul style="list-style-type: none"> <li>• Altering a Table</li> <li>• Dropping/Truncating/Renaming Tables</li> <li>• Backing up / Restoring a Database</li> </ul> </li> <li>4. Perform the following: <ul style="list-style-type: none"> <li>• Simple Queries</li> <li>• Simple Queries with Aggregate functions</li> </ul> </li> <li>5. Queries involving <ul style="list-style-type: none"> <li>• Date Functions</li> <li>• String Functions</li> <li>• Math Functions</li> </ul> </li> <li>6. Join Queries <ul style="list-style-type: none"> <li>• Inner Join</li> <li>• Outer Join</li> </ul> </li> <li>7. Subqueries <ul style="list-style-type: none"> <li>• With IN clause</li> <li>• With EXISTS clause</li> </ul> </li> <li>8. Converting ER Model to Relational Model and apply Normalization on database. (Represent entities and relationships in Tabular form, Represent attributes as columns, identifying keys and normalization up to 3rd Normal Form).</li> <li>9. Views <ul style="list-style-type: none"> <li>• Creating Views (with and without check option)</li> <li>• Dropping views</li> <li>• Selecting from a view</li> </ul> </li> <li>10. DCL statements <ul style="list-style-type: none"> <li>• Granting and revoking permissions</li> <li>• Saving (Commit) and Undoing (rollback)</li> </ul> </li> </ol>	30 Hrs
10	<p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. "Fundamentals of Database System", Elmasri Ramez, Navathe Shamkant, Pearson Education, Seventh edition, 2017 .</li> <li>2. Database Management Systems", Raghu Ramakrishnan and Johannes Gehrke, 3rd Edition, 2014</li> </ol>	
11	<p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. MASTERING C, K. R. Venugopal and Sudeep R. Prasad, Tata McGraw-Hill Publications.</li> <li>2. "A Computer Science –Structure Programming Approaches using C", Behrouz</li> </ol>	

	<p>Forouzan, Cengage Learning.</p> <p>3. Schaum's outlines "Programming with C", Byron S. Gottfried, Tata McGraw-Hill Publications.</p> <p>4. "Basics of Computer Science", Behrouz Forouzan , Cengage Learning.</p> <p>5. "Programming Techniques through C", M. G. Venkateshmurthy, Pearson Publication.</p> <p>6. "Programming in ANSI C", E. Balaguruswamy, Tata McGraw-Hill Education.</p> <p>7. "MySQL: The Complete Reference", Vikram Vaswani , McGraw Hill, 2017.</p> <p>8. "Learn SQL with MySQL: Retrieve and Manipulate Data Using SQL Commands with Ease", Ashwin Pajankar, BPB Publications, 2020.</p>	
12	<b>Internal Continuous Assessment: 40%</b>	<b>Semester End Examination: 60%</b>
13	<b>Continuous Evaluation through:</b> Students are expected to attend each practical and submit the written practical of the previous session. Performing Practical and writeup submission will be continuous internal evaluation. 2.5 marks can be awarded for each practical performance and writeup submission totalling to 50 marks and can be converted to 20 marks.	30 marks practical exam of 2 hours duration
14	<b>Format of Question Paper: Duration 2 hours. Certified copy of Journal is compulsory to appear for the practical examination</b> Practical Slip: Q1. From Module 1      13 marks Q2. From Module 2      12marks Q3. Journal and Viva    05 marks	

## Vocational Skill Course (VSC)

**Name of the course: Combinational and Sequential Design**

Sr.No	Heading	Particulars
1	<b>Description the course : Including but Not limited to:</b>	<p>Combinational and Sequential Design is a course that focuses on digital electronics and the design of circuits that combine multiple digital components. The course covers the theoretical and practical aspects of both combinational and sequential circuit design, as well as their applications.</p> <p>Digital circuits are used in many electronic devices, including computers, smartphones, and communication systems. The design of these circuits is critical to the performance and functionality of these devices. Understanding the basics of combinational and sequential design is essential for anyone interested in pursuing a career in the field of digital electronics.</p> <p>The course will cover the various techniques and tools used in digital circuit design, including Boolean algebra and K-map simplification.</p> <p>The course is highly relevant in today's technological landscape, as all modern electronics devices are based on digital circuits. The skills learned in the course are highly useful in various fields, such as computer and electronics engineering, telecommunications, and robotics.</p> <p>The application of combinational and sequential design is quite broad, and the skills acquired from the course can be applied in various areas. Students will be able to design digital circuits, troubleshoot and repair digital circuits, and optimize circuit performance.</p> <p>The course is highly interesting and engaging, providing students with the opportunity to explore and analyze complex digital circuitry. It is also connected to other courses such as Digital Logic Design, Computer Organization, and Microcontrollers.</p> <p>The demand for professionals with digital circuit design skills is high in various industries such as electronics, semiconductors, telecommunications, and computing. There is an increasing demand for professionals with these skills,</p>



		<p>and job prospects are promising for those with a solid background in digital circuit design.</p> <p>In summary, Combinational and Sequential Design is a course that offers students a comprehensive understanding of digital circuits' design principles and techniques. The knowledge and skills gained from this course are highly useful and applicable in various industries, with promising career prospects.</p>
2	<b>Vertical :</b>	Vocational Skill Course(VSC)
3	<b>Type :</b>	Practical
4	<b>Credits :</b>	2 credits (60 hours in a semester)
5	<b>Hours Allotted :</b>	60 Hours
6	<b>Marks Allotted:</b>	50 Marks
7	<b>Course Objectives(CO):</b> CO 1.To provide students with a comprehensive understanding of combinational and sequential circuit design principles and techniques. CO 2.To enable students to apply Boolean algebra, K-map simplification, and other design techniques to create optimized digital circuits. CO 3.To equip students with the necessary tools and skills to implement arithmetic circuits, data path circuits, and memory circuits. CO 4.To enable students to analyze and troubleshoot digital circuits to ensure optimal performance. CO 5.To provide students with hands-on practical experience in designing and implementing digital circuits using simulation software and real-world hardware.	
8	<b>Course Outcomes (OC):</b> OC 1. Students can explain the differences between combinational and sequential circuits, and identify their different applications. OC 2. Students can define the concept of Boolean algebra and its importance in digital circuit design. OC 3. Students can explain and apply the principles of K-map simplification and other design techniques. OC 4. Students can design and construct combinational circuits using Boolean algebra and K-maps. OC 5. Students can design and implement arithmetic circuits such as adders, subtractors, and multipliers. OC 6. Students can design and implement data path circuits such as registers, multiplexers, and decoders. OC 7. Students can implement digital circuits using breadboards, logic probes, and oscilloscopes. OC 8. Students can troubleshoot and verify the correctness of digital circuits using real-world hardware and measure their performance using various metrics.	
9	<b>Modules:-</b> <b>Module 1:</b>	

	<ol style="list-style-type: none"> <li><b>1. Study of Logic gates and their ICs and universal gates:</b> <ol style="list-style-type: none"> <li>a. Study of AND, OR, NOT, XOR, XNOR, NAND and NOR gates</li> <li>b. Study of IC 7400, 7402, 7404, 7408, 7432, 7486, 74266</li> <li>c. Implement AND, OR, NOT, XOR, XNOR using NAND gates.</li> <li>d. Implement AND, OR, NOT, XOR, XNOR using NOR gates.</li> </ol> </li> <li><b>2. Implement the given Boolean expressions using minimum number of gates.</b> <ol style="list-style-type: none"> <li>a. Verifying De Morgan's laws.</li> <li>b. Implement other given expressions using minimum number of gates.</li> <li>c. Implement other given expressions using minimum number of ICs.</li> </ol> </li> <li><b>3. Implement combinational circuits.</b> <ol style="list-style-type: none"> <li>a. Design and implement combinational circuit based on the problem given and minimizing using K-maps. (Various Equations, SOP, POS forms can be given)</li> </ol> </li> <li><b>4. Implement code converters.</b> <ol style="list-style-type: none"> <li>a. Design and implement Binary – to – Gray code converter.</li> <li>b. Design and implement Gray – to – Binary code converter.</li> <li>c. Design and implement Binary – to – BCD code converter.</li> <li>d. Design and implement Binary – to – XS-3 code converter.</li> </ol> </li> <li><b>5. Implement Adder and Subtractor Arithmetic circuits.</b> <ol style="list-style-type: none"> <li>a. Design and implement Half adder and Full adder.</li> <li>b. Design and implement BCD adder.</li> <li>c. Design and implement XS – 3 adder.</li> <li>d. Design and implement binary subtractor.</li> <li>e. Design and implement BCD subtractor.</li> <li>b. Design and implement XS – 3 subtractor.</li> </ol> </li> </ol>	<b>30 Hrs</b>
	<p><b>Module 2:</b></p> <ol style="list-style-type: none"> <li><b>6. Implement Arithmetic circuits.</b> <ol style="list-style-type: none"> <li>a. Design and implement a 2-bit by 2-bit multiplier.</li> <li>b. Design and implement a 2-bit comparator.</li> </ol> </li> <li><b>7. Implement Encode and Decoder and Multiplexer and Demultiplexers.</b> <ol style="list-style-type: none"> <li>a. Design and implement 8:3 encoder.</li> <li>b. Design and implement 3:8 decoder.</li> <li>c. Design and implement 4:1 multiplexer. Study of IC 74153, 74157</li> <li>d. Design and implement 1:4 demultiplexer. Study of IC 74139</li> <li>e. Implement the given expression using IC 74151 8:1 multiplexer.</li> <li>f. Implement the given expression using IC 74138 3:8 decoder.</li> </ol> </li> <li><b>8. Study of flip-flops and counters.</b> <ol style="list-style-type: none"> <li>a. Study of flip-flops and counters.</li> <li>b. Study of IC 7473.</li> <li>c. Study of IC 7474.</li> <li>d. Study of IC 7476.</li> <li>e. Conversion of Flip-flops.</li> </ol> </li> </ol>	<b>30 Hrs</b>

	f. Design of 3-bit synchronous counter using 7473 and required gates. g. Design of 3-bit ripple counter using IC 7473. <b>9. Study of counter ICs and designing Mod-N counters.</b> a. Study of IC 7490, 7492, 7493 and designing mod-n counters using these. b. Designing mod-n counters using IC 7473 and 7400 (NAND gates) <b>10. Design of shift registers and shift register counters.</b> a. Design serial – in serial – out, serial – in parallel – out, parallel – in serial – out, parallel – in parallel – out and bidirectional shift registers using IC 7474. b. Study of ID 7495. c. Implementation of digits using seven segment displays.	
<b>10</b>	<b>Text Books</b> 1. Digital Electronics and Logic Design, N. G. Palan, Technova	
<b>11</b>	<b>Reference Books</b> 1. Digital Principles and Applications, Malvino and Leach, Tata McGrawHill 2. Modern Digital Electronics, R. P. Jain, Tata McGrawHill 3. Digital Design, M. Morris R. Mano, Michael D. Ciletti, Pearson Education, 2012	
<b>12</b>	<b>Internal Continuous Assessment: 40%</b>	<b>Semester End Examination: 60%</b>
<b>13</b>	<b>Continuous Evaluation through:</b> Students are expected to attend each practical and submit the written practical of the previous session. Performing Practical and writeup submission will be continuous internal evaluation. 2.5 marks can be awarded for each practical performance and writeup submission totalling to 50 marks and can be converted to 20 marks.	30 marks practical exam of 2 hours duration
<b>14</b>	<b>Format of Question Paper: Duration 2 hours. Certified copy of Journal is compulsory to appear for the practical examination</b> Practical Slip: Q1. From Module 1      13 marks Q2. From Module 2      12marks Q3. Journal and Viva    05 marks	

## Skill Enhancement Course (SEC)

### Name of the Course: Office Tools for Data Management

Sr.No.	Heading	Particulars
1	Description the course:	<ul style="list-style-type: none"><li>• <b>Introduction:</b> The MS Access course offers a comprehensive understanding of Microsoft's relational database management system, making it a valuable skill in today's data-driven environment. This course is designed to empower individuals with the tools needed to efficiently organize, manage, and analyse data.</li><li>• <b>Relevance and Usefulness:</b> It provides practical insights into leveraging a relational database system for enhanced efficiency and organization. The MS Access course is useful for individuals seeking to enhance their data management skills.</li><li>• <b>Applications:</b> With applications in various sectors, from business to research and project management, MS Access is versatile. It facilitates the creation of databases for tasks ranging from contact management to complex systems for inventory and financial analysis.</li><li>• <b>Interest and Connection with Other Courses:</b> Its practical applications and user-friendly interface make it attractive to individuals looking to boost their data management skills. The MS Access course establishes a practical link with other data-related courses, offering foundational knowledge in database management. It complements courses in data analysis, business intelligence, and information systems.</li><li>• <b>Demand in the Industry:</b> As businesses increasingly rely on data for decision-making, there is a growing demand for professionals skilled in database management. Proficiency in MS Access is particularly sought after in roles involving data organization, analysis, and reporting.</li><li>• <b>Job Prospects:</b> Professionals completing the MS Access course are well-positioned for roles requiring efficient data management and analysis. Job prospects include positions in database administration, data analysis, and business intelligence, where MS Access proficiency is a valuable asset.</li></ul>
2	Vertical :	Skill Enhancement Course(SEC)
3	Type :	Practical
4	Credits :	2 credits
5	Hours Allotted :	60 Hours
6	Marks Allotted:	50 Marks
7	Course Objectives (CO):	

	<p>CO 1. Participants will grasp essential database concepts, including tables, relationships, and normalization principles.</p> <p>CO 2. Participants will design and construct well-organized databases in MS Access, showcasing proficiency in table design and data validation.</p> <p>CO 3. Participants will master the creation of complex queries in MS Access, enabling them to extract specific information efficiently.</p> <p>CO 4. Participants will develop expertise in crafting user-friendly forms and interfaces in MS Access, optimizing data entry processes.</p> <p>CO 5. Participants will generate comprehensive reports in MS Access, demonstrating skills in grouping, sorting, and presenting data for meaningful analysis.</p>	
8	<p><b>Course Outcomes (OC):</b></p> <p>OC 1. Participants can explain normalization importance, identify table relationships, and justify database design choices.</p> <p>OC 2. Participants create well-structured MS Access databases with proper relationships, data types, and normalization.</p> <p>OC 3. Participants execute advanced queries in MS Access, retrieving specific information based on diverse criteria.</p> <p>OC 4. Participants design intuitive MS Access forms, incorporating controls for an efficient and user-friendly data entry experience.</p> <p>OC 5. Participants produce insightful MS Access reports, organizing and presenting data effectively for analysis.</p>	
9	<p><b>Modules:- All Practicals are based on MS Access</b></p> <p><b>Module 1:</b></p>	
	<p><b>Practical 1:</b></p> <p>A. Getting familiar with MS Access Ribbon options.</p> <p>B. With the help of access wizard Create Database. Add 2 Tables. In each table add 5 columns of different data types. Add 10-10 entries in each table. Add necessary integrity constraints.</p> <p>C. Use the Table Wizard to create a table. Add and delete fields in an existing table. Establish an input mask and validation rule for fields within a table. Switch between the Design and Datasheet views of a table.</p> <p><b>Practical 2:</b></p> <p>A. Create and use an Input Mask to enter the data in sample table.</p> <p>B. Adding records in table by using Datasheet View, using a Form and using SQL.</p> <p>C. Create the Employee Database with necessary table and data and then implement the following transitions:</p> <ul style="list-style-type: none"> <li>• Delete the record for Kelly Marder.</li> <li>• Change Pamela Milgrom's salary to \$59,500.</li> <li>• Use the Replace command to change all occurrences of "Manager" to "Supervisor".</li> </ul> <p><b>Practical 3:</b></p> <p>A. Create the Bookstore database with necessary table and data and modify the database to accommodate the following:</p>	30 Hrs

	<ul style="list-style-type: none"> <li>i. Add the book Exploring Microsoft Office 2000 Vol II (ISBN: 013-011100-7) by Grauer/Barber, published in 1999 by Prentice Hall, selling for \$45.00.</li> <li>ii. Change the price of Memory Management for All of Us to \$29.95.</li> <li>iii. Delete The Presentation Design Book.</li> </ul> <p>B. Create a table employ with (idno, name, job, age, salary). Insert 10 records. Create a query to display the information of all managers. Create a query to display the names of employs who's salary is &gt;15000.</p> <p>C. Use the Form Wizard to create a form, Move and size controls within a form. Use the completed form to enter data into the associated table.</p> <p><b>Practical 4:</b></p> <ul style="list-style-type: none"> <li>A. Add fields to an existing table. Use the Lookup Wizard to create a combo box. Add controls to an existing form to demonstrate inheritance. Add command buttons to a form.</li> <li>B. Generate and use various the queries using Query Wizards.</li> <li>C. Generate and use various the Query with User Input.</li> <li>D. Demonstrate use of Expression Builder.</li> </ul> <p><b>Practical 5:</b></p> <ul style="list-style-type: none"> <li>A. Use the report wizard to create a new report. Modify an existing report by adding, deleting, and/or modifying its controls.</li> <li>B. Create a query containing a calculated control. Then, create report based on that query. Use the Sorting and Grouping command to add a group header and group footer to a report.</li> <li>C. Use action queries to modify a database. Create a crosstab query to display summarized values from a table.</li> </ul>	
	<p><b>Module 2:</b></p> <p><b>Practical 6:</b></p> <ul style="list-style-type: none"> <li>A. Create and Open a database with multiple tables; Identify the one-to-many relationships within the database and to produce reports based on those relationships.</li> <li>B. Create and Open a database with multiple tables; Identify the one-to-one relationships within the database and to produce reports based on those relationships.</li> <li>C. Create and Open a database with multiple tables; Identify the Many-to-Many relationships within the database and to produce reports based on those relationships.</li> </ul> <p><b>Practical 7:</b></p> <ul style="list-style-type: none"> <li>A. Demonstrate use of look up tables.</li> <li>B. Use the Report Wizard to create a report having the following requirements: <ul style="list-style-type: none"> <li>i. Select the LastName field from the Author table.</li> <li>ii. Select the Title and Price fields from the Book table.</li> <li>iii. Select the PubName field from the Publisher table.</li> </ul> </li> </ul>	30 Hrs

- iv. View the data by Publisher.
  - v. Add a grouping level using LastName.
  - vi. Sort the report by the Title field in ascending order.
  - vii. Choose Stepped layout and Portrait orientation.
  - viii. Type Book List as the report's title.
- C. Define the relationship between two tables and add a subform to a form.

**Practical 8:**

- A. Import an Access table from an Excel workbook. Create a one-to-many relationship between tables in a database. Create a multiple-table query.
- B. Import external data from the Excel spreadsheet file Bookstore.
- i. Make sure Import the source data into a new table in the current database is selected.
  - ii. Select the Author worksheet.
  - iii. Make sure that First Row Contains Column Headings is selected.
  - iv. For the AuthorID field, set the Data Type option to Long Integer and set the Indexed option to Yes (No Duplicates).
  - v. Select Choose my own primary key and make sure the AuthorID field is selected.
  - vi. Save the table with the name Author.
- C. Export data from access to various formats.

**Practical 9:**

- A. Relationships: Create and Use Author and Book Table.
- i. Create a relationship between the AuthorID field in the Author table and the AuthorCode field in the Book table. Put a checkmark in the box labeled Enforce Referential Integrity.
  - ii. Create a relationship between the PubID field in the Publisher table and the PubID field in the Book table. Put a checkmark in the box labeled Enforce Referential Integrity.
- B. Create a switchboard; Use the Link Tables command to associate tables in one database with the objects in a different database.
- C. Create an AutoExec and a Close Database macro and demonstrate the use.

**Practical 10:**

- A. Create the College Library database find out the following: -
- i. Total no. of copies of books subject wise.
  - ii. A report displays all books group by Publisher.
  - iii. A report displays all books group by Book Title.
  - iv. A report displays all books group by Book Edition
- B. Demonstrate the use of Database Splitter Wizard by splitting database.
- C. Make Access database as an executable-only

**10**

**Online reference/Text Books**

1. [https://www.quackit.com/microsoft\\_access/tutorial/](https://www.quackit.com/microsoft_access/tutorial/)

	2. <a href="https://www.tutorialspoint.com/ms_access/index.htm">https://www.tutorialspoint.com/ms_access/index.htm</a> 3. Access 2016 in easy steps, by Mike McGrath, In Easy Steps, 1st Edition, 2017 4. Relational Databases and Microsoft Access, by Ron McFadyen, 1st Edition
<b>11</b>	<b>Reference Books</b> 1. MICROSOFT ACCESS 2019 by David Murray, Kendall Hunt Publishing, 1 <sup>st</sup> Edition, 2020. 2. Step by Step Microsoft Access 2013, by Joyce Cox and Joan Lambert, 1 <sup>st</sup> Edition, Microsoft Press, 2013 3. Access 2019 Bible, by Michael Alexander, Richard Kusleika, Wiley, 1 <sup>st</sup> Edition, 2018 4. Access 2019 For Dummies, by Laurie A. Ulrich, Ken Cook, Wiley, 1 <sup>st</sup> Edition, 2018
<b>12</b>	<b>Internal Continuous Assessment: 40%</b>
<b>13</b>	<b>Continuous Evaluation through:</b> Students are expected to attend each practical and submit the written practical of the previous session. Performing Practical and writeup submission will be continuous internal evaluation. 2.5 marks can be awarded for each practical performance and writeup submission totalling to 50 marks and can be converted to 20 marks.
<b>14</b>	<b>Semester End Examination: 60%</b>  30 marks practical exam of 2 hours duration  <b>Format of Question Paper: Duration 2 hours. Certified copy of Journal is compulsory to appear for the practical examination</b> Practical Slip: Q1. From Module 1      13 marks Q2. From Module 2      12marks Q3. Journal and Viva    05 marks

**Name of the Course: Fundamentals of Telecommunication Systems**

Sr.No	Heading	Particulars
<b>1</b>	<b>Description the course : Including but Not limited to:</b>	<p>The course on Fundamentals of Telecommunication Systems aims to provide an in-depth understanding of the basic concepts and theories of signals and systems, as well as their applications in the field of telecommunication engineering. The course also focuses on the latest trends in 5G technology, providing students with insights into the driver, pillars, and challenges of 5G networks.</p> <p>Relevance and Usefulness: The course is highly relevant to students pursuing degrees in electronics and communication engineering, as well as those interested in telecommunications engineering. By focusing on key concepts and terminologies, such as sets, mappings, functions, and systems operators, the course provides a foundation for understanding both the theoretical and</p>



		<p>practical aspects of signals and systems. Additionally, the course helps students understand the role of 5G technology in enabling advanced wireless communication and the internet of things (IoT), which can be useful for developing innovative applications and services.</p> <p>Application and Interest: By completing the course, students will be equipped to apply their knowledge and skills in a range of industries and sectors, including telecommunication, internet of things, and wireless communication. The course is also highly engaging, as it covers several fascinating topics, including wireless communication, 5G technology, and IoT, among others.</p> <p>Connections with Other Courses: The course has links with other courses in electronics and communication engineering, including digital signal processing, telecommunication theory and practice, mobile communication, Information Technology and internet of things.</p> <p>Demand in the Industry and Job Prospects: Graduates with a background in signals and systems and 5G technology are in high demand in the telecommunication industry, as there is an increasing need for professionals who can design, implement, and oversee advanced communication networks. Specializations in 5G technology and signals and systems can open up a range of job prospects, including roles such as telecommunications engineer, network architect, systems engineer, and wireless communication developer, among others.</p> <p>In conclusion, the course in signals and systems and 5G technology is highly relevant and useful for students pursuing degrees in electronics and communication engineering and Information Technology. The course is engaging and provides a solid foundation in key concepts and technologies, enabling students to pursue a range of job prospects within the telecommunication industry.</p>	
2	<b>Vertical :</b>	Skill Enhancement Course(SEC)	
3	<b>Type :</b>	Theory	
4	<b>Credits :</b>	2 credits (30 hours in a semester)	
5	<b>Hours Allotted :</b>	30 Hours	
6	<b>Marks Allotted:</b>	50 Marks	
7	<b>Course Objectives(CO):</b> CO 1. Identify the fundamental concepts and terminologies of signals and systems theory through an introduction to sets, mappings, functions, and systems operators.		

		<p>CO 2. Demonstrate knowledge of the properties of continuous-time signals and systems, transformations of the independent variable, properties of functions, and representation of arbitrary functions.</p> <p>CO 3. Demonstrate knowledge of the properties of discrete-time signals and systems, transformations of the independent variable, properties of sequences, and representation of arbitrary sequences.</p> <p>CO 4. Analyze the drivers for 5G technology, identify the 10 pillars of 5G, and describe the evolution of wireless communication from LTE technology to beyond 4G.</p> <p>CO 5. Discuss the 5G internet of things (IoT), explain networking reconfiguration and virtualization support, and identify the mobility and quality of service control in 5G networks.</p> <p>CO 6. Evaluate the challenges of small cells in 5G mobile networks and identify the capacity limits and achievable gains with densification.</p>	
8	<p><b>Course Outcomes (OC):</b></p> <p>OC 1. Identify the fundamental concepts and terminologies of signals and systems theory through an introduction to sets, mappings, functions, and systems operators.</p> <p>OC 2. Demonstrate knowledge of the properties of continuous-time signals and systems, transformations of the independent variable, properties of functions, and representation of arbitrary functions.</p> <p>OC 3. Demonstrate knowledge of the properties of discrete-time signals and systems, transformations of the independent variable, properties of sequences, and representation of arbitrary sequences.</p> <p>OC 4. Analyze the drivers for 5G technology, identify the 10 pillars of 5G, and describe the evolution of wireless communication from LTE technology to beyond 4G.</p> <p>OC 5. Discuss the 5G internet of things (IoT), explain networking reconfiguration and virtualization support, and identify the mobility and quality of service control in 5G networks.</p> <p>OC 6. Evaluate the challenges of small cells in 5G mobile networks and identify the capacity limits and achievable gains with densification.</p>		
9	<p><b>Modules:-</b></p> <p><b>Module 1: Signals and Systems:</b></p> <p>1. <b>Signals and Systems:</b> Introduction, Signals, Systems, Why Signals and Systems? Preliminaries, Overviews, Sets, Mappings, Functions, Sequences, Abuse of notations, System operators, Basic Signal Properties.</p> <p>2. <b>Continuous-Time Signals and Systems:</b> Overview, Transformations of the Independent Variable, Transformations and the Dependent Variable, Properties of functions, Elementary functions, Representation of Arbitrary Functions using elementary functions, Continuous -time systems, Properties of systems,</p> <p>3. <b>Discrete-Time Signals and Systems:</b> Overview, Transformations of the independent variable, Properties of Sequences, Elementary Sequences, Representing Arbitrary Sequences Using Elementary Sequences, Discrete-Time Systems, Properties of Systems</p>	15 Hrs	
	<p><b>Module 2: Fundamentals of 5G Networks</b></p> <p>4. <b>Drivers for 5G:</b> Introduction, Historical trend of Wireless Communication, Evolution of LTE technology to beyond 4G, 5G</p>	15 Hrs	

	<p>Roadmap, 10 pillars of 5G, 5G in Europe, 5G in Asia, 5G in Asia, 5G Architecture</p> <p><b>5. The 5G Internet:</b> Introduction, Internet of Things and Context-Awareness, Networking Reconfiguration and Virtualisation Support, Mobility, Quality of Service Control, Emerging Approach for Resource Over-Provisioning</p> <p><b>6. Small Cells for 5G Mobile Networks:</b> Introduction, What are small cells? Capacity Limits and Achievable Gains with Densification, Mobile Data Demand, Demand vs Capacity, Small-Cell Challenges, Conclusions and future directions</p>	
<b>10</b>	<p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. Signals and Systems, Michael Adams, University of Victoria, 3<sup>rd</sup> Edition, 2012</li> <li>2. Fundamentals of 5G Mobile Networks, Edited by Jonathan Rodriguez, Wiley Publications, 2015</li> </ol>	
<b>11</b>	<p><b>Reference Books</b></p> <ol style="list-style-type: none"> <li>1. Signals and Systems, Michael Adams, University of Victoria, 3<sup>rd</sup> Edition, 2012</li> <li>2. Fundamentals of 5G Mobile Networks, Edited by Jonathan Rodriguez, Wiley Publications, 2015</li> </ol>	
<b>12</b>	<b>Internal Continuous Assessment: 40%</b>	<b>Semester End Examination: 60%</b>
<b>13</b>	<p><b>Continuous Evaluation through:</b></p> <p>Class test of 1 of 15 marks</p> <p>Class test of 2 of 15 marks</p> <p>Average of the two: 15 marks</p> <p>Quizzes/ Presentations/ Assignments: 5 marks</p> <p>Total: 20 marks</p>	<p><b>Format of Question Paper:</b></p> <p><b>External Examination (30 Marks)–</b></p> <p><b>1 hr duration</b></p>
<b>14</b>	<p><b>Format of Question Paper: (Semester End Examination : 30 Marks. Duration:1 hour)</b></p> <p>Q1: Attempt any two (out of four) from Module 1 (15 marks)</p> <p>Q2: Attempt any two (out of four) from Module 2 (15 marks)</p>	

# **SEMESTER II**

**Syllabus**  
**B.Sc. (Information Technology)**  
**(Sem.- II)**

## Major Courses

### Name of the Course: Object Oriented Programming using C++

Sr.No.	Heading	Particulars
1	<b>Description the course : Including but Not limited to:</b>	This course provides students knowledge and skills to understand and implement the object oriented skills. It will help them to implement OOP solutions to real-world problems.
2	<b>Vertical :</b>	Major
3	<b>Type :</b>	Theory
4	<b>Credits :</b>	2 credits (1 credit = 15 Hours for Theory in a semester)
5	<b>Hours Allotted :</b>	30 Hours
6	<b>Marks Allotted:</b>	50 Marks
7	<b>Course Objectives(CO):</b>  CO 1. To explain the difference between object oriented programming and procedural programming. CO 2. To understand OOP principles to create modular, reusable, and maintainable code. CO 3. To understand the concept of polymorphism ,virtual functions,inheritance and exception handling. CO 4. To understand file handling concepts using C++.	
8	<b>Course Outcomes (OC):</b>  OC 1. Students can explain the key concept of OOP and their application in software development. OC 2. Students can Design and implement classes and objects to model real-world entities. OC 3. Students can apply the concepts of polymorphism, virtual functions, inheritance and exception handling in program. OC 4. Students can apply operator overloading, runtime polymorphism, generic Programming OC 5. Students can implement file handling concepts in program	
9	<b>Modules:-</b> <b>Module 1:</b>	
	1. Object Oriented Methodology: Introduction, Advantages and Disadvantages of Procedure Oriented Languages, Application of OOPS, Principles of OOPS: Objects, Classes, Data Abstraction and Data Encapsulation, Inheritance, Polymorphism, Dynamic Binding, Message Passing. 2. Classes and Objects: Simple classes (Class specification, class members accessing), Defining member functions, passing object as an argument, Returning object from functions, friend classes, friend function.	<b>15 Hrs</b>

	<p>3. Constructors and Destructors: Introduction, Default Constructor, Parameterized Constructor and examples, Destructors.</p> <p>4. Program development using Inheritance: Introduction, Advantages provided by inheritance, choosing the access specifier, Derived class declaration, derived class constructors, class hierarchies, multiple inheritance, multilevel inheritance, hybrid inheritance.</p>	
	<b>Module 2:</b>	
	<p>5. Polymorphism: Concept of function overloading, overloaded operators, overloading unary and binary operators.</p> <p>6. Virtual Functions: Introduction and need, Pure Virtual Functions, this Pointer, abstract classes, virtual destructors.</p> <p>7. Exception Handling: Introduction, Exception Handling Mechanism, Concept of throw &amp; catch with example.</p> <p>8. Working with Files: Introduction, File Operations, Various File Modes, File Pointer and their Manipulation.</p>	<b>15 Hrs</b>
<b>10</b>	<b>Text Books</b> <p>1. Object-oriented Programming C++, Hari Mohan Pandey , Laxmi Publications</p> <p>2. C++ Programming: An Object-Oriented Approach, Behrouz A. Forouzan, Richard F. Gilberg , McGraw-Hill Education</p> <p>3. C++ How to Program , Paul Deitel, Harvey Deitel</p>	
<b>11</b>	<b>Reference Books</b> <p>1. Object Oriented Programming in C++ , E Balagurusamy</p> <p>2. Object-Oriented Programming in C++ , Robert Lafore, Pearson Education.</p> <p>3. Programming with ANSI C++ , Bhushan Trivedi</p> <p>4. Demystified Object- Oriented Programming with C++, Dorothy R. Kirk</p>	
<b>12</b>	<b>Internal Continuous Assessment: 40%</b>	<b>Semester End Examination: 60%</b>
<b>13</b>	<b>Continuous Evaluation through:</b> Class test of 1 of 15 marks Class test of 2 of 15 marks Average of the two: 15 marks  Quizzes/ Presentations/ Assignments: 5 marks Total: 20 marks	<b>Format of Question Paper:</b> <b>External Examination (30 Marks)–</b> <b>1 hr duration</b>
<b>14</b>	<b>Format of Question Paper: (Semester End Examination : 30 Marks. Duration:1 hour)</b> Q1: Attempt any two (out of four) from Module 1 (15 marks) Q2: Attempt any two (out of four) from Module 2 (15 marks)	

## Name of the Course: Web Designing

Sr.No	Heading	Particulars
1	<b>Description the course : Including but Not limited to:</b>	The objective of Web Designing course is to provide instructions on creating and maintaining a web page for publishing on the Internet. Students will be able to use HTML editor to author pages that include text and graphics..
2	<b>Vertical :</b>	Major
3	<b>Type :</b>	Theory
4	<b>Credits :</b>	2 credits ( 1 credit = 15 Hours for in a semester )
5	<b>Hours Allotted :</b>	30 Hours
6	<b>Marks Allotted:</b>	50 Marks
7	<b>Course Objectives(CO):</b> CO 1. To understand the fundamentals of Internet, and the principles of web design CO 2. To develop basic websites using HTML and Style Sheets. CO 3. To understand different style sheets used in web designing. CO 4. To implement JavaScript as a tool to add dynamism to static HTML pages.	
8	<b>Course Outcomes (OC):</b> OC 1. Learners will be able to use the HTML programming language OC 2. Learners will be able to execute web pages designed using HTML OC 3. Describe the concepts of World Wide Web, and the requirements of effective web design OC 4. List various tags in html and <b>use</b> these to <b>create</b> web page OC 5 : Gain necessary skills for designing and developing web applications	
9	<b>Modules:-</b> <b>Module 1:</b> 1. Introduction to HTML 5: What Is HTML? Understanding HTML Tags, Setting Up the Document Structure: Specifying the Document Type, Creating the HTML, Specifying a Page Title. Formatting Text by Using Tags: Creating Headings, Applying Bold and Italic Formatting, Applying Superscript and Subscript Formatting, Using Monospace and Preformatted Text. Using Lists and Backgrounds: Creating Bulleted and Numbered Lists, Creating Definition Lists, Inserting Special Characters, Inserting Horizontal Lines, Choosing Background and Foreground Colors. Creating Hyperlinks and Anchors- Hyperlinking to a Web Page, Creating Hyperlinking to an E-Mail Address, Hyperlinking to Other Content. <b>Style Sheets and Graphics:</b> Introduction to Style Sheets: Understanding Styles, Constructing Style Rules, Creating Styles for Nested Tags, Applying Styles to Hyperlinks, Creating and Linking to External Style Sheets.	<b>15 Hrs</b>



	<p><b>Formatting Text by Using Style Sheets:</b> Specifying a Font Family, Specifying a Font Size and Color, Applying Bold and Italics, Applying Strikethrough and Underlining, Creating Inline Spans, Adjusting Spacing Between Letters. Formatting Paragraphs by Using Style Sheets: Indenting Paragraphs, Applying a Border to a Paragraph, Specifying the Horizontal Alignment of a Paragraph,</p> <p><b>Displaying Graphics</b>  Selecting a Graphics Format, Preparing Graphics for Web Use, Inserting Graphics, Arranging Elements on the Page, Controlling Image Size and Padding, Hyperlinking from Graphics, Using Thumbnail Graphics, Including Alternate Text for Graphics, Adding Figure Captions</p> <p>2. Page Layout and Navigation- Creating Navigational Aids , Creating a Text-Based and Graphical Navigation Bar, Creating an Image Map, Creating Tables, Specifying the Size of a Table, Specifying the Width of a Column, Merging Table Cells. Formatting Tables-Applying Table Borders, Applying Borders by Using Attributes, Applying Borders by Using Styles, Changing Cell Padding, Spacing, and Alignment. Setting Horizontal and Vertical Alignment</p> <p><b>Creating User Forms-</b> Creating a Basic Form- Creating a Text Box,Special Field types for E-Mail and Web Addresses, Creating a Text Area, Creating a Submit or Clear Button, Creating Check Boxes and Option Buttons, Additional Input Types in HTML5</p> <p>Incorporating Sound and Video- What's New with Audio and Video in HTML5?,Embedding Video Clips- Introducing the &lt;video&gt; Tag, The &lt;embed&gt; Tag: Your Fallback Plan, Placing a Video Clip on a Web Page. Incorporating Audio on a Web Page- Playing Audio with the &lt;audio&gt; Tag, Placing an Audio Clip on a Web Page</p>	
	<p><b>Module 2:</b></p> <p>1. JavaScript:  Introduction to JavaScript: Variable, statements, Operators, Comments, constructs, Functions, expressions, JavaScript console, Scope, Events, Strings, String Methods, Numbers, Number Methods, Dates, Date Formats, Date,Methods,Arrays, Array Methods, Booleans, Comparisons, Control Structures: Conditions, Switch, Loop For, Loop While, Break.</p> <p><b>Operators:</b> Arithmetic Operators, Assignment Operators, Comparison Operators, Logical Operators, Bitwise Operators</p> <p>Statements: Conditional Statements – if else, switch, Loops – while, do while, for, for in, for of, Loop Control – break, continue, labels</p> <p>JavaScript Objects: User-defined Objects, with Keyword, Native Objects – Array, String, Date, Math, Number, RegExp, Cookies</p> <p>Events and Event Handlers: HTML Events, DOM Events, DOM Event Listener,onAbort, onBlur, onChange, onClick, onDbClick, onError, onFocus, onKeyDown,onKeyPress, onKeyUp, onLoad, onMouseDown, onMouseMove, onMouseOut,onMouseOver, onMouseUp, onReset, onResize, onSelect, onSubmit, onUnload</p> <p>2. Basics of JQuery, JQuery selection and events, JQuery Effects, JQuery traversal and manipulation, Data attributes and templates, jQuery Plugins.</p>	15 Hrs

	3. JSON – JSON: Introduction, JSON Grammar, JSON Values, JSON Tokens, Syntax, JSON vs. XML, Data Types, Objects, Arrays, Creating JSON, JSON Object, Parsing JSON, Persisting JSON, Data Interchange, JSON HTML, JSONP	
<b>10</b>	<b>Text Books</b> <ol style="list-style-type: none"> <li>1. Step by Step HTML5 by Faithe Wempen, Microsoft Press, 2011</li> <li>2. The Complete Reference HTML &amp; CSS, Thomas A. Powell. McGrawHill, 5th Edition, 2010</li> <li>3. The Complete Reference JavaScript Thomas A. Powell &amp; Fritz Schneider McGrawHill 3rd 2012</li> <li>4. Web Technologies: HTML, JAVASCRIPT, PHP, JAVA, JSP, XML and AJAX, Black Book Kindle Edition, by Kogent Learning Solutions Inc</li> <li>5. HTML 5 Black Book, Covers CSS 3, JavaScript, XML, XHTML, AJAX, PHP and jQuery, 2nd Kindle Edition, by DT Editorial Services</li> <li>6. JSON at work, Tom MArrs, O'REILLY, First edition, 2017</li> </ol>	
<b>11</b>	<b>Reference Books</b> <ol style="list-style-type: none"> <li>1. Learning Web Design A Beginner's Guide to Html, CSS, JavaScript, And Web Graphics, Jennifer Niederst Robbins, O'Reilly, 5th Edition, 2018.</li> <li>2. Ivan Bayross, "Web Enabled Commercial Applications Development using HTML, DHTML, Javascript, Perl CGI", BPB, 2004</li> <li>3. HTML 5 for Web Designers (By: Jeremy Keith) – <a href="http://freepdf-books.com">http:// freepdf-books.com</a></li> <li>4. Introduction to JavaScript Object Notation: A To-the-Point Guide to JSON kindle Edition by Lindsay Bassett, O'REILLY</li> </ol>	
<b>12</b>	<b>Internal Continuous Assessment: 40%</b>	<b>Semester End Examination: 60%</b>
<b>13</b>	<b>Continuous Evaluation through:</b> Class test of 1 of 15 marks Class test of 2 of 15 marks Average of the two: 15 marks Quizzes/ Presentations/ Assignments: 5 marks Total: 20 marks	<b>Format of Question Paper: External Examination (30 Marks)– 1 hr duration</b>
<b>14</b>	<b>Format of Question Paper: (Semester End Examination : 30 Marks. Duration: 1 hour)</b> Q1: Attempt any two (out of four) from Module 1 (15 marks) Q2: Attempt any two (out of four) from Module 2 (15 marks)	

**Name of the Course: Major Practical II**

Sr.No.	Heading	Particulars
<b>1</b>	<b>Description the course : Including but Not limited to:</b>	<b>Object Oriented Programming using C++ Practical</b> OOP encourages modular objects for reusable code, ensures well-organized and maintainable code via encapsulation, inheritance, and polymorphism, allowing flexibility and easy updates. Additionally, OOP models real-world scenarios, enhancing system understanding. <b>Web Designing Practical</b> Applying basic programming principles to the construction of websites

<b>2</b>	<b>Vertical :</b>	Major Practical
<b>3</b>	<b>Type :</b>	Practical
<b>4</b>	<b>Credits :</b>	2 credits (Total 60 hrs; 1 credit = 15 Hours for Theory or 30 Hours of Practical work in a semester )
<b>5</b>	<b>Hours Allotted :</b>	60 Hours
<b>6</b>	<b>Marks Allotted:</b>	50 Marks
<b>7</b>	<b>Course Objectives(CO):</b> CO 1. To explain the important characteristics of the C++ programming language. CO 2. To combine components of the C++ programming language to develop structured program. CO 3. To demonstrate the skills essential to compile, debug, and test C++ programs correctly. CO 4. To understand how to effectively implement HTML. CO 5. To develop the concept of basic and advanced text formatting. CO 6. To understand Hyper linking, Designing of webpage.	
<b>8</b>	<b>Course Outcomes (OC):</b> OC 1. Utilize C++ characteristics in software design and development. OC 2. Explain object-oriented techniques and explain how C++ supports them. OC 3. Employ C++ to demonstrate practical skill developing object-oriented solutions. OC 4. Examine a problem statements and design and develop object-oriented software using good coding practices and procedures. OC 5. Design static web pages using Hyper Text Markup Language (HTML). OC 6. Use their learned skills, knowledge and abilities to develop web sites OC 7. Collect information from the user with HTML Forms. OC 8. Enhance the look of web pages by implementing audio and video	
<b>9</b>	<b>Module I</b>	
	1. a. Write a C++ program to create a simple calculator. b. Write a C++ program to convert seconds into hours, minutes and seconds. c. Write a C++ program to find the volume of a square, cone, and rectangle.  2. a. Write a C++ program to find the greatest of three numbers. b. Write a C++ program to find the sum of even and odd n natural numbers c. Write a C++ program to generate all the prime numbers between 1 and n, where n is a value supplied by the user 3. a. Write a C++ program using classes and object Student to print name of the student, roll_no. Display the same. b. Write a C++ program for Structure bank employee to print name of the employee, account_no. & balance. Display the same also display the balance after withdraw and deposit	<b>30 Hrs</b>

c. Design the class Demo which will contain the following methods: readNo(), factorial() for calculating the factorial of a number, reverseNo() will reverse the given number, isPalindrome() will check the given number is palindrome, isArmstrong() which will calculate the given number is armStrong or not. Where readNo() will be private method.

d. Write a program to demonstrate function definition outside class and accessing class members in function definition.

4.

a. Write a friend function for adding the two complex numbers, using a single class

b. Write a friend function for adding the two different distances and display its sum, using two classes.

c. Write a friend function for adding the two matrix from two different classes and display its sum

d. Write a Program to find Maximum out of Two Numbers using friend function.

Note: Here one number is a member of one class and the other number is member of some other class.

5.

a. Design a class Complex for adding the two complex numbers and also show the use of constructor.

b. Design a class Geometry containing the methods area() and volume() and also overload the area() function

c. Design a class StaticDemo to show the implementation of static variable and static function

d. Write a C++ program to overload new/delete operators in a class.

e. Write a C++ Program to generate Fibonacci Series by using Constructor to initialize the Data Members.

6.

a. Overload the operator unary(-) for demonstrating operator overloading

b. Overload the operator + for adding the timings of two clocks, And also pass objects as an argument.

c. Overload the + for concatenating the two strings. For e.g "Py" + "thon" =Python

7.

a. Implement the concept of method overriding.

b. Show the use of virtual function

c. Show the implementation of abstract class.

8.

a. Write a C++ Program that illustrate single inheritance.

b. Write a C++ Program that illustrate multiple inheritance.

c. Write a C++ Program that illustrate multi-level inheritance.

d. Write a C++ Program that illustrate Hierarchical inheritance.

9.

a. Show the implementation of exception handling

	<div>b. Show the implementation for exception handling for strings</div> <div>c. Show the implementation of exception handling for using the pointers.</div> <div>10.</div> <div><div>a. Design a class FileDemo open a file in read mode and display the total number of words and lines in the file.</div><div>b. Design a class to handle multiple files and file operations</div><div>c. Design a editor for appending and editing the files</div></div>				
	<div>Module II</div> <div><div>1 Use of Basic and Advanced Tags, Lists and Backgrounds</div><div><div>a. Understanding elements, Tags and basic structure of HTML files</div><div>b. Design a web page using basic and advanced text formatting tags.</div><div>c. Design a web page using ordered, unordered list and description list.</div><div>d. Design a web page by choosing Background and Foreground Colors</div><div>e. Design a web page using Nested list and special characters.</div><div>f. Write an HTML code to display your CV on a web page.</div></div><div>2 Creating Hyperlinks, Anchors and style sheets</div><div><div>a. Design a web page with links to different pages and allow navigation between web pages.</div><div>b. Design a web page that automatically redirects the user to Other Content</div><div>c. Creating Hyperlinking to an E-Mail Address</div><div>d. Design a web page for creating Styles for Nested Tags</div><div>e. Design a web page by applying Styles to Hyperlinks</div><div>f. Design a web page by Creating and Linking to External Style Sheets.</div></div><div>3 Formatting Text and Paragraph by Using Style Sheets and displaying graphics</div><div><div>a. Design a web page by using text formatting tags</div><div>b. Design a web page using Indenting Paragraphs, Applying Border to a Paragraph and Specifying Horizontal Alignment of a Paragraph</div><div>c Implement a web page by creating inline spans and adjusting space between lines</div><div>d. Implement a web page by inserting a image and controlling the image size and padding</div><div>e. Design a web page by making image as a hyperlink</div><div>f. Develop a web page by using thumbnail graphics and also implement text for graphics</div></div><div>4 Tables , Page Layout and Navigation</div><div><div>a. Display a time table and display it in tabular format,</div><div>b. Write an html program to get the following output</div></div></div>	<div>30 Hrs</div> <table><tr><td>NAME</td><td>SUBJECT</td><td>MARKS</td></tr></table>	NAME	SUBJECT	MARKS
NAME	SUBJECT	MARKS			

	Advanced Web	75
Hillary	Operating System	60
	Advanced Web	80
Lary	Operating System	75
	Total Average: 72.5	

- c. Design a table by merging the table cells.
- d. Design a web page by Creating a Text-Based Navigation Bar
- e . Design a web page by Creating a Graphical Navigation Bar
- f. Design a web page with Image Map

#### 5. Forms and Introducing video and audio tags

- a. Design a web page with a form that uses all types of controls.
- b. Design an admission form for any course in your college with text, pass word fields, check boxes, radio button and reset button.
- c. Write a program to get the following output

Sign In	
E-mail addresss	<input type="text"/>
Password	<input type="password"/>
<input type="button" value="Sign In"/>	

- d. Design a web page by placing a Video Clip on a Web Page
- e. Design a web page by placing an Audio Clip on a Web Page
- f. Design a web page embedding image, audio and video.

#### 6 .Basics of java script

- a. Using JavaScript, design a web page to accept a number from the user and print its Factorial.
- b. Using JavaScript, a web page that prints Fibonacci series/any given series.
- c. Write a JavaScript program to display all the prime numbers between 1 and 100.
- d. Write a JavaScript program to accept a number from the user and display the sum of its digits.

#### 7. Java Script: Validating User fields

- a. Demonstrate the use of Document object methods.
- b. Using java script, demonstrate validating Text Input Fields, Drop-down Lists and Checkboxes
- c. Using java script, demonstrate validating Radio buttons and Validating Multi-Select Boxes
- d. Write a Java script to prompt for users name and display it on the screen.

	<p>8. Java Script : Handling the events</p> <p>a. Using java script, demonstrate the use of onAbort, onBlur, onChange, onClick, onDbClick events</p> <p>b. Using java script, demonstrate the use of onDragDrop, onError, onFocus events</p> <p>c. Using java script, demonstrate the use of onKeyDown, onKeyPress, onKeyUp, onLoad, onReset, onResize, onSelect, onSubmit, onUnload events</p> <p>d. Using java script, demonstrate the use of onMouseDown, onMouseMove, onMouseOut, onMouseOver, onMouseUp, onMouse events.</p> <p>e. Using java script, demonstrate the use of onKeyDown, onKeyPress, onKeyUp, onLoad, onReset, onResize, onSelect, onSubmit, onUnload events</p> <p>9. JQuery</p> <p>a. use JQuery effect in page</p> <p>b. Write a jQuery Code to find the data passed with the on() method for each element.</p> <p>c. Use JQuery Events</p> <p>d. JQuery traversal and manipulation</p> <p>10. JSON Basics and Working with JSON</p> <p>a. Creating JSON</p> <p>b. Parsing JSON</p> <p>c. Persisting JSON</p> <p>d. Demonstrate use of JSON objects in array, print array on web page using document object</p> <p>e. Read data from json file and convert it into a JavaScript object and display the data in web page using document object</p>	
10	<p><b>Text Books</b></p> <ol style="list-style-type: none"> <li>Object-oriented Programming C++, Hari Mohan Pandey</li> <li>C++ Programming: An Object-Oriented Approach, Behrouz A. Forouzan, Richard F. Gilberg</li> <li>C++ How to Program, Paul Deitel, Harvey Deitel</li> <li>Step by Step HTML5, Faithe Wempen, Microsoft Press, 2011</li> <li>The Complete Reference HTML &amp; CSS, Thomas A. Powell. McGraw Hill, 5<sup>th</sup> Edition, 2010</li> </ol>	
11	<p><b>Reference Books</b></p> <ol style="list-style-type: none"> <li>Object Oriented Programming in C++, E Balagurusamy</li> <li>Object-Oriented Programming in C++ by Robert Lafore</li> <li>Programming with ANSI C++, Bhushan Trivedi</li> <li>Demystified Object- Oriented Programming with C++, Dorothy R. Kirk</li> <li>Learning Web Design A Beginner's Guide to Html, CSS, JavaScript, And Web Graphics, Jennifer Niederst Robbins, O'Reilly, 5<sup>th</sup> Edition, 2018.</li> <li>"Web Enabled Commercial Applications Development using HTML, DHTML, Javascript, Perl CGI", Ivan Bayross, BPB, 2004</li> <li>HTML 5 for Web Designers (By: Jeremy Keith) – <a href="http://freepdf-books.com">http:// freepdf-books.com</a></li> </ol>	
12	<p><b>Internal Continuous Assessment: 40%</b></p>	<p><b>Semester End Examination: 60%</b></p>

13	<b>Continuous Evaluation through:</b> Students are expected to attend each practical and submit the written practical of the previous session. Performing Practical and writeup submission will be continuous internal evaluation. 2.5 marks can be awarded for each practical performance and writeup submission totalling to 50 marks and can be converted to 20 marks.	30 marks practical exam of 2 hours duration
14	<b>Format of Question Paper: Duration 2 hours. Certified copy of Journal is compulsory to appear for the practical examination</b> Practical Slip: Q1. From Module 1     13 marks Q2. From Module 2     12marks Q3. Journal and Viva   05 marks	



## Vocational Skill Courses (VSC)

### Name of the Course: Assembly Language Programming

Sr.No	Heading	Particulars
1	<b>Description the course : Including but Not limited to:</b>	<p><b>Introduction:</b> The 8085 Assembly Language Programming course covers the principles and practices of writing low-level software that controls the 8085 microprocessor. This course provides an in-depth understanding of the 8085 microprocessor architecture and its instruction set, as well as how to write, debug, and optimize assembly language programs for this microprocessor.</p> <p><b>Relevance and Usefulness:</b> The course is relevant to computer science/engineering students interested in learning about microprocessors and embedded systems programming. The course provides the fundamental knowledge and skills required to design and implement computer systems with low-level software control. Assembly language programming is the foundation of modern computer technology, which makes the course relevant to anyone interested in computer systems and programming.</p> <p><b>Application and Interest:</b> The course is essential for students aspiring to work in the field of embedded systems, microcontroller/microprocessor programming, or any programming role that involves low-level software development. By the end of the course, students will be able to write efficient and optimized assembly language programs that control the functionality of a microprocessor.</p> <p><b>Connection with Other Courses:</b> 8085 Assembly Language Programming is a fundamental course that provides an understanding of how computer systems work at the lowest level. It connects with several other computer science courses, such as Computer Organization and Architecture, Operating Systems, Compiler Design, and Embedded Systems Design.</p> <p><b>Demand in the Industry and Job Prospects:</b> There is a high demand in the industry for programmers who possess knowledge of low-level software development, such as programming microprocessors with assembly language. Many industries, including aerospace, automotive, healthcare, and consumer electronics, require low-level software development skills in their employees. Job prospects for graduates with expertise in 8085 Assembly language</p>

		programming are abundant in these sectors. Job roles may include embedded software engineer, hardware engineer, firmware developer, software developer, and testing/validation engineer.
2	<b>Vertical :</b>	Vocational Skill Course(VSC)
3	<b>Type :</b>	Practical
4	<b>Credits :</b>	2 credits (60 hours in a semester)
5	<b>Hours Allotted :</b>	60 Hours
6	<b>Marks Allotted:</b>	50 Marks
7	<b>Course Objectives(CO):</b> CO 1. To gain a thorough understanding of the 8085 microprocessor architecture and its associated instruction set. CO 2. To develop the ability to write and debug assembly language programs for the 8085 microprocessor. CO 3. To learn the principles of computer organization and how they relate to the 8085 microprocessor. CO 4. To become proficient in the use of 8085 assembly language programming tools, simulators, and debuggers. CO 5. To learn how to interface different input/output devices with the 8085 microprocessor. CO 6. To understand the concept of interrupts and how they are used in 8085 assembly language programming.	
8	<b>Course Outcomes(CO):</b> OC 1. Explain the architecture of the 8085 microprocessor and its associated instruction set. OC 2. Identify the different types of registers and their functions in the microprocessor. OC 3. Describe the memory organization and addressing modes of the 8085 microprocessor. OC 4. Write assembly language programs for the 8085 microprocessor using various instructions and addressing modes. OC 5. Debug and troubleshoot assembly language programs for the 8085 microprocessor using simulators and debuggers. OC 6. Implement conditional branching and looping constructs in assembly language programs. OC 7. Use 8085 assembly language programming tools, such as editors, assemblers, and emulators for developing and testing programs. OC 8. Simulate microprocessor operations using emulators and debuggers. OC 9. Connect input/output devices, such as LEDs, switches, and displays, to the 8085 microprocessor. OC 10.	
9	<b>Modules:-</b> <b>Module 1:</b>	
	<b>1. Perform the following Operations related to memory locations.</b> a. Store the data byte 32H into memory location 4000H. b. Exchange the contents of memory locations 2000H and 4000H  <b>2. Simple assembly language programs.</b>	<b>30 Hrs</b>

- a. Subtract the contents of memory location 4001H from the memory location 2000H and place the result in memory location 4002H.
- b. Subtract two 8-bit numbers.
- c. Add the 16-bit number in memory locations 4000H and 4001H to the 16-bit number in memory locations 4002H and 4003H. The most significant eight bits of the two numbers to be added are in memory locations 4001H and 4003H. Store the result in memory locations 4004H and 4005H with the most significant byte in memory location 4005H.
- d. Add the contents of memory locations 40001H and 4001H and place the result in the memory locations 4002H and 4003H.
- e. Subtract the 16-bit number in memory locations 4002H and 4003H from the 16-bit number in memory locations 4000H and 4001H. The most significant eight bits of the two numbers are in memory locations 4001H and 4003H. Store the result in memory locations 4004H and 4005H with the most significant byte in memory location 4005H.
- f. Find the 1's complement of the number stored at memory location 4400H and store the complemented number at memory location 4300H.
- g. Find the 2's complement of the number stored at memory location 4200H and store the complemented number at memory location 4300H.

### **3. Packing and unpacking operations.**

- a. Pack the two unpacked BCD numbers stored in memory locations 4200H and 4201H and store result in memory location 4300H. Assume the least significant digit is stored at 4200H.
- b. Two digit BCD number is stored in memory location 4200H. Unpack the BCD number and store the two digits in memory locations 4300H and 4301H such that memory location 4300H will have lower BCD digit.

### **4. Register Operations**

- a. Write a program to shift an eight bit data four bits right. Assume that data is in register C.
- b. Program to shift a 16-bit data 1 bit left. Assume data is in the HL register pair
- c. Write a set of instructions to alter the contents of flag register in 8085.
- d. Write a program to count number of 1's in the contents of D register and store the count in the B register.

### **5. Multiple memory locations.**

- a. Calculate the sum of series of numbers. The length of the series is in memory location 4200H and the series begins from memory location 4201H. a. Consider the sum to be 8 bit number. So, ignore carries. Store the sum at memory location 4300H. b. Consider the sum to be 16 bit number. Store the sum at memory locations 4300H and 4301H
- b. Multiply two 8-bit numbers stored in memory locations 2200H and 2201H by repetitive addition and store the result in memory locations 2300H and 2301H.
- c. Divide 16 bit number stored in memory locations 2200H and 2201H by the 8 bit number stored at memory location 2202H. Store the quotient in memory locations 2300H and 2301H and remainder in memory locations 2302H and 2303H.

	<p>d. Find the number of negative elements (most significant bit 1) in a block of data. The length of the block is in memory location 2200H and the block itself begins in memory location 2201H. Store the number of negative elements in memory location 2300H</p> <p>e. Find the largest number in a block of data. The length of the block is in memory location 2200H and the block itself starts from memory location 2201H. Store the maximum number in memory location 2300H. Assume that the numbers in the block are all 8 bit unsigned binary numbers.</p>	
<b>Module 2:</b>		
	<p><b>1. Calculations with respect to memory locations.</b></p> <p>a. Write a program to sort given 10 numbers from memory location 2200H in the ascending order.</p> <p>b. Calculate the sum of series of even numbers from the list of numbers. The length of the list is in memory location 2200H and the series itself begins from memory location 2201H. Assume the sum to be 8 bit number so you can ignore carries and store the sum at memory location 2Sample problem:</p> <p>c. Calculate the sum of series of odd numbers from the list of numbers. The length of the list is in memory location 2200H and the series itself begins from memory location 2201H. Assume the sum to be 16-bit. Store the sum at memory locations 2300H and 2301H.</p> <p>d. Find the square of the given numbers from memory location 6100H and store the result from memory location 7000H</p> <p>e. Search the given byte in the list of 50 numbers stored in the consecutive memory locations and store the address of memory location in the memory locations 2200H and 2201H. Assume byte is in the C register and starting address of the list is 2000H. If byte is not found store 00 at 2200H and 2201H</p> <p>f. Two decimal numbers six digits each, are stored in BCD package form. Each number occupies a sequence of byte in the memory. The starting address of first number is 6000H Write an assembly language program that adds these two numbers and stores the sum in the same format starting from memory location 6200H</p> <p>g. Add 2 arrays having ten 8-bit numbers each and generate a third array of result. It is necessary to add the first element of array 1 with the first element of array-2 and so on. The starting addresses of array 1, array2 and array3 are 2200H, 2300H and 2400H, respectively</p> <p><b>2. Assembly programs on memory locations.</b></p> <p>a. Write an assembly language program to separate even numbers from the given list of 50 numbers and store them in the another list starting from 2300H. Assume starting address of 50 number list is 2200H</p> <p>b. Write assembly language program with proper comments for the following:</p> <p>c. A block of data consisting of 256 bytes is stored in memory starting at 3000H. This block is to be shifted (relocated) in memory from 3050H onwards. Do not shift the block or part of the block anywhere else in the memory.</p>	30 Hrs

- d. Add even parity to a string of 7-bit ASCII characters. The length of the string is in memory location 2040H and the string itself begins in memory location 2041H. Place even parity in the most significant bit of each character.
- e. A list of 50 numbers is stored in memory, starting at 6000H. Find number of negative, zero and positive numbers from this list and store these results in memory locations 7000H, 7001H, and 7002H respectively
- f. Write an assembly language program to generate Fibonacci number.
- g. Program to calculate the factorial of a number between 0 to 8.

### **3. String operations in assembly programs.**

- a. Write an 8085 assembly language program to insert a string of four characters from the tenth location in the given array of 50 characters
- b. Write an 8085 assembly language program to delete a string of 4 characters from the tenth location in the given array of 50 characters.
- c. Multiply the 8-bit unsigned number in memory location 2200H by the 8-bit unsigned number in memory location 2201H. Store the 8 least significant bits of the result in memory location 2300H and the 8 most significant bits in memory location 2301H.
- d. Divide the 16-bit unsigned number in memory locations 2200H and 2201H (most significant bits in 2201H) by the 8-bit unsigned number in memory location 2300H store the quotient in memory location 2400H and remainder in 2401H
- e. DAA instruction is not present. Write a sub routine which will perform the same task as DAA.

### **4. Calculations on memory locations.**

- a. To test RAM by writing '1' and reading it back and later writing '0' (zero) and reading it back. RAM addresses to be checked are 40FFH to 40FFH. In case of any error, it is indicated by writing 01H at port 10
- b. Arrange an array of 8 bit unsigned no in descending order
- c. Transfer ten bytes of data from one memory to another memory block. Source memory block starts from memory location 2200H where as destination memory block starts from memory location 2300H
- d. Write a program to find the Square Root of an 8 bit binary number. The binary number is stored in memory location 4200H and store the square root in 4201H.
- e. Write a simple program to Split a HEX data into two nibbles and store it in memory

### **5. Operations on BCD numbers.**

- a. Add two 4 digit BCD numbers in HL and DE register pairs and store result in memory locations, 2300H and 2301H. Ignore carry after 16 bit.
- b. Subtract the BCD number stored in E register from the number stored in the D register
- c. Write an assembly language program to multiply 2 BCD numbers

**10**

### **Text Books**

- 1. 8080A/8085 Assembly Language Programming, Lance A. Leventhel, Osborne, 1978

<b>11</b>	<b>Reference Books</b> 1. Microprocessors Architecture, Programming and Applications with the 8085, Fifth Edition, Penram Publications, 2012	
<b>12</b>	<b>Internal Continuous Assessment: 40%</b>	<b>Semester End Examination: 60%</b>
<b>13</b>	<b>Continuous Evaluation through:</b> Students are expected to attend each practical and submit the written practical of the previous session. Performing Practical and writeup submission will be continuous internal evaluation. 2.5 marks can be awarded for each practical performance and writeup submission totalling to 50 marks and can be converted to 20 marks.	30 marks practical exam of 2 hours duration
<b>14</b>	<b>Format of Question Paper: Duration 2 hours. Certified copy of Journal is compulsory to appear for the practical examination</b> Practical Slip: Q1. From Module 1      13 marks Q2. From Module 2      12marks Q3. Journal and Viva    05 marks	

## Skill Enhancement Courses (SEC)

Name of the course : Web Programming

Sr.No.	Heading	Particulars
1	<b>Description the course : Including but Not limited to:</b>	<p>This course covers a range of topics aimed at equipping students with the skills and knowledge needed to create visually appealing, functional, and user-friendly websites.</p> <p>The course provides an insight into emerging technologies to design and develop state of the art web applications using client-side scripting, server-side scripting, and database connectivity.</p> <p>website development includes all related development tasks, such as client-side scripting, server-side scripting, server and network security configuration, eCommerce development, and content management system (CMS) development.</p> <p>Website design is a combination of different elements that work together to create an effective and user-friendly experience. These include the use of typography, layout, color theory, grid systems, motion graphics, and responsive designs.</p>
2	<b>Vertical :</b>	Skill Enhancement Course(SEC)
3	<b>Type :</b>	Practical
4	<b>Credits:</b>	2 credits ( 1 credit = 30 Hours of Practical work in a semester )
5	<b>Hours Allotted :</b>	60 Hours
6	<b>Marks Allotted:</b>	50 Marks
7	<b>Course Objectives (CO)</b> <b>CO1:</b> To understand how to use Java script objects and XML. <b>CO2:</b> To create well organized, styled web pages <b>CO3:</b> To add versatility to a web page using jQuery <b>CO4:</b> To deploy a local web server and run a simple web application. <b>CO5:</b> To read and process data in MySQL using PHP. <b>CO6:</b> To understand usage of Bootstrap	
8	<b>Course Outcomes (OC)</b> OC1: Knowledge in different java script objects. OC2: How to use XML with CSS and XSL OC3: validate a form using jQuery OC4: handle asynchronous requests OC4: Write and deploy PHP with database and to simplify web development. OC5: Create a responsive layout using the Bootstrap	

9	<b>Modules:</b> <b>Module 1:</b> 1. <b>Write JavaScript code for</b> a. Demonstrating different JavaScript Objects such as String, RegExp, Math, Date b. Demonstrating different JavaScript Objects such as Window, Navigator, History, Location, Document c. Storing and Retrieving Cookies 2. <b>Create a XML file with Internal / External DTD and display it using</b> a. CSS b. XSL 3. <b>Write PHP scripts for- Performing certain mathematical operations such as calculating factorial / finding Fibonacci Series / Displaying Prime Numbers in a given range / Evaluating Expressions</b> 4. <b>Write PHP scripts for</b> a. Retrieving data from HTML forms b. Working with Arrays c. Working with Files (Reading / Writing) 5. <b>Advanced PHP</b> a. Write a PHP program to demonstrate use of sessions and cookies. b. Write a PHP program to demonstrate use of filters.	30 Hrs
	<b>Module 2</b> 6. <b>PHP and MySQL</b> a. Write a PHP program to create: Create a database College b. Create a table Department (Dname, Dno, Number_of_faculty) c. Write a PHP program to create a database named "College". Create a table named "Student" with following fields (sno, sname, percentage). Insert 3 records of your choice. Display the names of the students whose percentage is between 35 to 75 in a tabular format. 7. <b>Write a PHP program</b> a. Update rows in a table b. Delete rows from a table 8. <b>Design a PHP page for authenticating a user</b> 9. <b>Write PHP scripts for</b> a. Storing and Retrieving Cookies b. Storing and Retrieving Sessions 10. <b>Perform the following using Bootstrap:</b> a. Create a responsive layout using the Bootstrap grid system b. Create a simple Bootstrap navbar with dropdown menus c. Create a basic Bootstrap form with validation	30 Hrs
10	<b>Text Books</b> <ul style="list-style-type: none"> <li>HTML 5 Black Book, Covers CSS 3, JavaScript, XML, XHTML, AJAX, PHP and jQuery, 2ed, Dreamtech Press, 2016</li> <li>Web Programming and Interactive Technologies, scriptDemics, StarEdu Solutions India, 2018</li> </ul>	



	<ul style="list-style-type: none"> <li>• PHP: A Beginners Guide, Vikram Vaswani, TMH</li> </ul>	
<b>11</b>	<b>Reference Books</b> <ul style="list-style-type: none"> <li>• HTML, XHTML, and CSS Bible Fifth Edition, Steven M. Schafer, WILEY, 2011</li> <li>• Learning PHP, MySQL, JavaScript, CSS &amp; HTML5, Robin Nixon, O'Reilly, 2018</li> <li>• PHP, MySQL, JavaScript &amp; HTML5 All-in-one for Dummies, Steve Suehring, Janet Valade Wiley, 2018</li> </ul>	
<b>12</b>	<b>Internal Continuous Assessment: 40%</b>	<b>Semester End Examination: 60%</b>
<b>13</b>	<b>Continuous Evaluation through:</b> Students are expected to attend each practical and submit the written practical of the previous session. Performing Practical and writeup submission will be continuous internal evaluation. 2.5 marks can be awarded for each practical performance and writeup submission totalling to 50 marks and can be converted to 20 marks.	30 marks practical exam of 2 hours duration
<b>14</b>	<b>Format of Question Paper: Duration 2 hours. Certified copy of Journal is compulsory to appear for the practical examination</b> Practical Slip: Q1. From Module 1     13 marks Q2. From Module 2     12marks Q3. Journal and Viva   05 marks	

## Name of the Course: PLSQL Practical

Sr.No.	Heading	Particulars
1	<b>Description the course : Including but Not limited to:</b>	PL/SQL ,Oracle's procedural extension language for SQL, allows developers to include procedural language components such as loops, conditional statements and functions. The course enables students with practical experience in using PL/SQL for effective database programming and development.
2	<b>Vertical :</b>	Skill Enhancement Course(SEC)
3	<b>Type :</b>	Practical
4	<b>Credits :</b>	2 credits
5	<b>Hours Allotted :</b>	60 Hours
6	<b>Marks Allotted:</b>	50 Marks
7	<b>Course Objectives(CO):</b> CO 1. Comprehend the basics of PL/SQL and gain knowledge about control and conditional statement in PL/SQL. CO 2. Understand working with cursors,collections and composite data types in PL/SQL. CO 3. Develop expertise in creating stored procedures and functions. CO 4. Explore the use of triggers to automate responses to events within the database. CO 5. Understand the concept of Exception handling. CO 6. Design modular applications using packages.	
8	<b>Course Outcomes (OC):</b> OC 1. Use PL/SQL variables ,data types, control and conditional statement. OC 2. Apply sequences and cursor in PL/SQL. OC 3. Work with Collection and Composite Data Types. OC 4. Develop PL/SQL structures like functions, procedures and triggers for database applications. OC 5. Handle errors and exceptions in PL/SQL programs. OC 6. Develop PL/SQL packages.	
9	<b>Modules:-</b> <b>Module 1:</b> <ol style="list-style-type: none"> <li><b>PL/SQL Basics-</b> Use of variables, Write executable statement, Interacting with Oracle Server, Create anonymous PL/SQL block,Sequences</li> <li><b>Control Structure in PL/SQL-</b> Using while loop, Do loop, For loop, Use of GOTO statement</li> <li><b>Create conditional statement using PL/SQL-</b> Using if statement, Using if else statement, Using elsif ladder, Using case expression.</li> <li><b>Create cursor in PL/SQL-</b> Implicit cursor, Explicit cursor, Parameterized cursor</li> <li><b>Collection and Composite Data Types</b> - Working with Collections,Working with Composite Data Types</li> </ol>	
		<b>30 Hrs</b>

	<b>Module 2:</b>	
	<b>1. Creation of Procedures in PL/SQL</b> <b>2. Functions in PL/SQL</b> <b>3. Creation of Trigger</b> – Create Row level trigger, Create Statement level trigger, Create instead of trigger <b>4. Handling exceptions-</b> Creation of user defined exception, Creation of system defined exception <b>5. Creation of Package in PL/SQL</b>	<b>30 Hrs</b>
<b>10</b>	<b>Text Books</b> 1. Programming with PL/SQL for Beginners , H. Dand, R. Patil and T. Sambare, X –Team 2. Oracle pl/sql Programming ,Feuerstein, S., & Pribyl, B. ," O'Reilly Media, Inc.".	
<b>11</b>	<b>Reference Books</b> 1. Oracle Database PL/SQL Language Reference, 12c Release 1 (12.1) E50727-04 , Alpern, D., Belden, E., Agrawal, S., Baer, H., Castledine, S., Chang, T., & Yang, M. 2. Oracle PL/SQL for dummies , Rosenblum, M., & Dorsey, P. (2006), John Wiley & Sons. 3. PL/SQL Programming ,Ivan Bayross, BPB	
<b>12</b>	<b>Internal Continuous Assessment: 40%</b>	<b>Semester End Examination: 60%</b>
<b>13</b>	<b>Continuous Evaluation through:</b> Students are expected to attend each practical and submit the written practical of the previous session. Performing Practical and writeup submission will be continuous internal evaluation. 2.5 marks can be awarded for each practical performance and writeup submission totalling to 50 marks and can be converted to 20 marks.	30 marks practical exam of 2 hours duration
<b>14</b>	<b>Format of Question Paper: Duration 2 hours. Certified copy of Journal is compulsory to appear for the practical examination</b> <b>Practical Slip:</b> Q1. From Module 1      13 marks Q2. From Module 2      12marks Q3. Journal and Viva    05 marks	

## QUESTION PAPER PATTERN

(External and Internal)

I	<b>A Theory of 2 credits is evaluated for a total of 50 Marks</b>	
	<b>Internal Continuous Assessment:</b>	<b>40%[20 Marks]</b>
	<b>Continuous Evaluation through:</b> Class test of 1 of 15 marks Class test of 2 of 15 marks Average of the two: 15 marks  Quizzes/ Presentations/ Assignments: 5 marks Total: 20 marks	
	<b>External Semester End Examination: 60%[30 Marks]</b>	
	<b>Format of Question Paper: (Semester End Examination : 30 Marks. Duration:1 hour)</b> Q1: Attempt any two (out of four) from Module 1 (15 marks) Q2: Attempt any two (out of four) from Module 2 (15 marks)	
II	<b>A Practical of 2 credits is evaluated for a total of 50 Marks</b>	
	<b>Internal Continuous Assessment:</b>	<b>40%[20 Marks]</b>
	<b>Continuous Evaluation through:</b> Students are expected to attend each practical and submit the written practical of the previous session. Performing Practical and writeup submission will be continuous internal evaluation. 2.5 marks can be awarded for each practical performance and writeup submission totalling to 50 marks and can be converted to 20 marks.	
	<b>Semester End Examination: 60%[30 Marks]</b>	
	<b>Format of Question Paper: Duration 2 hours. Certified copy of Journal is compulsory to appear for the practical examination(30 Marks)</b> Practical Slip: Q1. From Module 1      13 marks Q2. From Module 2      12marks Q3. Journal and Viva    05 marks	

### Examination and Standard of Passing:

Regulations regarding the scheme of exams, number of credits and standard of passing will be asprescribed by the University of Mumbai.

A student is said to have passed if he/she secures 40% of marks allotted in each head of passing. External evaluation of 30 marks and Internal evaluation of 20 marks are treated as separate heads of passing.

The Ten Point Grading System prescribed by the University of Mumbai will be as follows:

**Letter Grades and Grade Points**

<b>Semester GPA/ Program CGPA Semester/ Program</b>	<b>% of Marks</b>	<b>Alpha-Sign / Letter GradeResult</b>	<b>Grade Points</b>
9.00-10.00	90.0-100	O (Outstanding)	10
8.00-<9.00	80.0-<90.0	A+ (Excellent)	9
7.00-<8.00	70.0-<80.0	A (Very Good)	8
6.00-<7.00	60.0-<70.0	B+ (Good)	7
5.50-<6.00	55.0-<60.0	B (Above Average)	6
5.00-<5.50	50.0-<55.0	C (Average)	5
4.00-<5.00	40.0-<50.0	P (Pass)	4
Below 4.00	Below 40	F (Fail)	0
Ab (Absent)	-	Absent	0

**This syllabus is applicable to IDOL students as well, w.e.f. 2025-26**

### Justification for B.Sc. (Information Technology)

1.	Necessity for starting the course:	A large amount of The demand for IT professionals is consistently high, and individuals with a B.Sc in IT can find opportunities in various sectors, including technology companies, healthcare, finance, government, and more.
2.	Whether the UGC has recommended the course:	Yes
3.	Whether all the courses have commenced from the academic year 2024-2025	To be implemented from 2024-2025 onwards
4.	The courses started by the University are self-financed, whether adequate number of eligible permanent faculties are available?:	Self-financed Yes. Some experts are called as visiting faculties
5.	To give details regarding the duration of the Course and is it possible to compress the course?:	4 years. Not possible to compress the program
6.	The intake capacity of each course and no. of admissions given in the current academic year:	60 seats for one division. Admissions will be held from 2024-2025 onwards
7.	Opportunities of Employability / Employment available after undertaking these courses:	B.Sc in Information Technology can open up a wide range of opportunities and employment prospects across various industries. Additionally, as technology continues to advance, new roles and specialties within the IT field are continually emerging, providing diverse career paths for IT graduates.

Sign of Chairperson  
Dr. Mrs. R.  
Srivaramangai  
Ad-hoc BoS (IT)

Sign of the  
Offg. Associate Dean  
Dr. Madhav R. Rajwade  
Faculty of Science &  
Technology

Sign of Offg. Dean,  
Prof. Shivram S. Garje  
Faculty of Science &  
Technology

# As Per NEP 2020

## University of Mumbai



Syllabus for Basket of AEC	
Board of Studies in English	
UG First Year Programme B.Sc	
Semester	I
Title of Paper	Credits
Introduction to Communication Skills in English I	2
From the Academic Year	2024-2025

Sr. No.	Heading	Particulars
1	<b>Description of the course:</b> <b>Including but Not limited to:</b>	<p><b>Introduction to Communication Skills in English I</b></p> <p>Effective academic communication skills are essential for success in scholarly pursuits. In the academic realm, proficiency extends beyond verbal articulation to encompass precise and coherent written expression. Students are not only required to engage in thoughtful discussions and articulate complex ideas verbally but must also demonstrate their understanding through well-crafted written assignments, and presentations. Academic communication involves the mastery of scholarly conventions, such as adherence to academic writing styles, and the ability to engage in dialogue with peers and scholars. It encompasses the skillful navigation of academic discourse, fostering an environment where ideas are shared, challenged, and refined. Developing strong academic communication skills empower individuals to contribute meaningfully to intellectual conversations, enriching both their academic journey and the broader scholarly community.</p> <p>This course with its 30:20 pattern will also help in accomplishing this goal. The course is aimed at honing their cognitive, analytical, linguistic and creative skills. It is hoped that by the end of the academic year, the learners will have developed confidence in using the English language both for oral and written communication as well as develop interest in enhancing these skills later on.</p>
2	<b>Vertical:</b>	AEC (Ability Enhancement Course)
3	<b>Type:</b>	Theory
4	<b>Credit:</b>	2 credits (1credit=15 Hours for Theory in a semester)
5	<b>Hours Allotted:</b>	30Hours
6	<b>Marks Allotted:</b>	50Marks
7	<b>Course Objectives:</b> <ol style="list-style-type: none"> <li>1. To cultivate a comprehensive understanding of communication skills</li> <li>2. To enhance reading proficiency with a diverse range of written texts with different genres and styles of written communication.</li> <li>3. To develop proficiency in grammatical accuracy with specific focus on common grammatical errors and provide targeted exercises for improvement.</li> <li>4. To equip learners with proficient presentation and conversation skills by integrating practical exercises for public speaking and interpersonal communication.</li> <li>5. To provide practical experience in formal writing, including Statement of Purpose (SoP) preparation.</li> </ol>	



8	<p><b>Course Outcomes:</b> At the end of the course, learners will:</p> <ul style="list-style-type: none"> <li>• Demonstrate an understanding of essential aspects of communication skills</li> <li>• Exhibit the ability to Read a variety of written text using subskills such as skimming and scanning.</li> <li>• Identify and rectify common grammatical errors in English.</li> <li>• Show competence in delivering compelling presentations and engage in articulate and effective conversations in English across different contexts.</li> <li>• Display advanced formal writing skills in crafting job application letters, CVs, and Statements of Purpose.</li> </ul>
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9	<p><b>Modules: -</b></p> <hr/> <p><b>Module1: (15 Lectures)</b></p> <hr/> <p><b>A) Introduction to Communication Skills</b></p> <ul style="list-style-type: none"> <li>• The Seven Cs of Effective Communication</li> <li>• Verbal and Non-Verbal Communication</li> <li>• Cross-cultural communication</li> <li>• Technology-enabled Business Communication</li> <li>• Features of Effective Written Communication</li> <li>• Characteristics of an Effective Speech</li> <li>• Effective Listening Skills</li> </ul> <p><b>B) Reading Skills:</b></p> <ul style="list-style-type: none"> <li>• Scanning a text for information</li> <li>• Skimming a passage to look for main ideas, understanding text type</li> <li>• Guessing meaning of an expression (word/phrase/clause)</li> <li>• Building inference skills</li> </ul> <p>Passages from academic, professional, and literary domains around 200- 250 words, could be chosen in this section.</p> <p><b>C) Grammar</b></p> <ul style="list-style-type: none"> <li>• Subject Verb Agreement</li> <li>• Tenses</li> <li>• Question Tag</li> <li>• Change the Voice</li> <li>• Framing Interrogative sentence</li> <li>• Synonyms and Antonyms</li> <li>• Misplaced modifiers</li> </ul> <p>Grammar should be taught with a remedial approach so as to enable learners to avoid common errors in their written and spoken communication.</p>
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**Module 2: (15 Lectures)**

**A) Speaking Skills in English**

**Conversation skills**

- Opening a conversation
- Introducing oneself in various contexts
- Introducing others formally and informally

**Presentation Skills**

- Introduction: Essentials of Presentation skills
- Analysis of model Presentations
- Planning and Delivering the Presentation
- Developing & Displaying Visual Aids
- Handling Questions from the Audience

**B) Formal Writing Skills:**

- Interpreting and describing different types of visual information
- Job applications with bio data (solicited and unsolicited)
- Statement of Purpose

**10 Text Books: N.A.**

**11 References:**

- Bellare, Nirmala. *Reading & Study Strategies*. Books. 1 and 2. Oxford University Press, 1997, 1998
- Bellare, Nirmala. *Easy Steps to Summary Writing and Note-Making*. Amazon Kindle Edition, 2020
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- Doff, Adrian and Christopher Jones. *Language in Use* (Intermediate and Upper Intermediate). CUP, 2004.
- Glendinning, Eric H. and Beverley Holmstrom. Second edition. *Study Reading: A Course in Reading Skills for Academic Purposes*. CUP, 2004
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- Turton, Nigel D. *A B C of Common Grammatical Errors*. 1995. Macmillan India Ltd., 1996
- Vas, Gratian. *English Grammar for Everyone*. Mumbai, Shree Book Centre, 2015
- Watson, T. *Reading Comprehension Skills and Strategies: Level 6*. Saddleback Educational Publishing, 2002

#### Web link Resources:

- A conversation about household appliances: <https://youtu.be/rAP10fSborU> 13.
- Video on psychology: Why do we dream? <https://youtu.be/2W85Dwxx218>
- Video on social media: What is a social media influencer? <https://youtu.be/39A3og7enz8>
- Tips on communication (TED Talk): The Secrets of Learning a New Language [https://youtu.be/o\\_XVt5rdpFY](https://youtu.be/o_XVt5rdpFY)
- Expressing opinions: If Cinderella Were a Guy: <https://youtu.be/p40yCNctKXg>
- Video on the English language: Where did English come from? <https://youtu.be/YEaSxhcns7Y>

12	Internal Continuous Assessment: 40%	Semester End Examination: 60%								
13	<b>Continuous Evaluation through:</b> <ul style="list-style-type: none"><li>• Participation in an activity based on Presentation Skills and Conversation skills each (Module 2 A) (10 marks) The class may be divided into batches by creating formal schedule for the same before the semester End Examination.</li><li>• Participation in two classroom activities involving skills other than presentation and conversation skills (05 marks)</li><li>• Overall attendance (05 marks) (Percentage of learners' attendance in class to be considered)</li></ul> <b>Suggested Activities:</b> <ul style="list-style-type: none"><li>▪ Listening to audio clips/ books to enhance listening skills</li><li>▪ Reading aloud from newspapers, magazines, stories, non-fiction followed by classroom discussion on these to enhance reading and speaking skills</li></ul>									
14	<b>Format of Question Paper:</b> for the final examination <table><tr><td>Q.1. Short notes (2 out of 4) – On Module 1 (A)</td><td>10 marks</td></tr><tr><td>Q.2. A. Unseen Passage (200-250 words) (Module 1 B)</td><td>06 marks</td></tr><tr><td>B. Questions on grammar (Module 1 C)</td><td>04 marks</td></tr><tr><td>Q. 3. Writing Skills (1 out of 2) on Module 2 (B)</td><td>10 marks</td></tr></table>		Q.1. Short notes (2 out of 4) – On Module 1 (A)	10 marks	Q.2. A. Unseen Passage (200-250 words) (Module 1 B)	06 marks	B. Questions on grammar (Module 1 C)	04 marks	Q. 3. Writing Skills (1 out of 2) on Module 2 (B)	10 marks
Q.1. Short notes (2 out of 4) – On Module 1 (A)	10 marks									
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B. Questions on grammar (Module 1 C)	04 marks									
Q. 3. Writing Skills (1 out of 2) on Module 2 (B)	10 marks									

Sign of BOS Chairman  
Prof. Dr. Shivaji Sargar  
Board of Studies in  
English

Sign of the Offg.  
Associate Dean  
Dr. Suchitra Naik  
Faculty of  
Humanities

Sign of the Offg.  
Associate Dean  
Dr. Manisha Karne  
Faculty of  
Humanities

Sign of the Dean  
Prof. Dr. Anil Singh  
Faculty of  
Humanities

## As Per NEP 2020

# University of Mumbai



Syllabus for Basket of Minor	
Board of Studies in Data Science	
UG First Year Programme	
Semester	II
Title of Paper	Credits 2/ 4
I. DS_R Programming (Minor)	2
From the Academic Year	2024-2025

**Name of the Course: DS\_R Programming**

Sr.No.	Heading	Particulars
1	<b>Description the course : Including but Not limited to:</b>	R-Programming is a course that provides a comprehensive introduction to the R programming language, widely used in data analysis, statistics, and machine learning. The course covers the basics of R programming, including its user interface, objects, functions, writing own functions, and scripts. Students will learn how to use packages and help pages in R programming and work with R objects such as atomic vectors, matrices, arrays, lists, and data frames. They will also learn about different data subsetting and manipulation techniques and get familiar with working with different environments and scoping rules. The course includes working with programs, strategies, if statements, else statements, lookup tables, code comments, and S3 systems. Students will gain an understanding of loops, expected values, expand.grid, repeat loops, and how to write fast, vectorized code. The course will also cover the basic applications of R programming for data science, and machine learning
2	<b>Vertical :</b>	<b>Minor</b>
3	<b>Type :</b>	Theory
4	<b>Credits :</b>	2 credits (1 credit = 15 Hours for Theory)
5	<b>Hours Allotted :</b>	30 Hours
6	<b>Marks Allotted:</b>	50 Marks
7	<b>Course Objectives:</b>  CO 1. To provide students with a strong foundation in R programming basics, including its user interface, objects, functions, and scripts.  CO 2. To help students master the use of R packages and help pages to carry out data analysis tasks more efficiently.  CO 3. To enable students to work with R objects such as atomic vectors, matrices, arrays, lists, data frames, and understand loading and saving data for effective analysis.  CO 4. To teach students how to use R notation techniques such as selecting values, shuffling a deck, and modulating values and different data subsetting techniques.  CO 5. To enable students to work with R programming environments, including their introduction, different kinds of scoping rules, assignment,	

	evaluation, closures, and how to debug them more effectively.
8	<p><b>Course Outcomes:</b></p> <p>OC 1. Students will have the ability to write their own functions, manage arguments and understand scripts in the R programming language.</p> <p>OC 2. Students will proficiently use packages and help pages in R programming for the better resolution of the challenges of data analysis.</p> <p>OC 3. Students will gain a strong foundation in R objects, different data frames, working with loading data, saving data, and data coercions.</p> <p>OC 4. Students will have a comprehensive understanding of R notation techniques such as selecting values, shuffling a deck, and modulating values and different data subsetting techniques.</p> <p>OC 5. Students will be able to work effectively in R programming environments, including their introduction, different kinds of scoping rules, assignment, evaluation, closures, and debugging.</p> <p>OC 6. Students will understand programs in R programming that includes strategies for different tasks while working with if statements, else statements lookup tables, and code comments.</p> <p>OC 7. Students will have the ability to understand S3 systems, attributes, generic functions, methods, classes, and S3 and R5 debugging implications.</p> <p>OC 8. Students will have the ability to use different loops and functions like expand.grid and able to write fast loops, understand how vectorized code works, and will apply it in practice while working with large datasets.</p>
9	<p><b>Modules:-</b></p> <p><b>Module 1: (15 hours)</b></p> <ol style="list-style-type: none"> <li>1. <b>R Basics:</b> The R User interface, objects, functions, sample with replacement, writing own functions, arguments, scripts</li> <li>2. <b>Packages and Help pages:</b> Packages, Help packages</li> <li>3. <b>R Objects:</b> Atomic Vectors, Attributes, Matrices, Arrays, Class, Coercion, Lists, data frames, loading data, saving data</li> <li>4. <b>R Notation:</b> Selecting values, deal a card, shuffling a deck, dollar signs and double brackets</li> <li>5. <b>Modifying Values:</b> Changing values in place, logical subsetting, missing information</li> <li>6. <b>Environments:</b> Introduction, working with environments, scoping rules, assignment, evaluation, closures</li> </ol> <p><b>Module 2: (15 hours)</b></p> <ol style="list-style-type: none"> <li>7. <b>Programs:</b> Strategy, if statements, else statements, lookup tables, code comments</li> <li>8. <b>S3:</b> The S3 system, attributes, generic functions, methods, classes, S3 and debugging, S4 and R5</li> <li>9. <b>Loops:</b> Expected values, expand.grid, for loops, while loops, repeat loops,</li> <li>10. <b>Speed:</b> Vectorized code, how to vectorize? writing fast loops, vectorized code in practice</li> <li>11. <b>R for data science</b></li> <li>12. <b>R for machine learning</b></li> </ol>

<b>10</b>	<b>Text and References:</b> 1. Hands-On Programming with R, Garrett Grolemond, O' Reilly, 2014 2. R Programming: A Step-by-Step Guide for Absolute Beginners. Daniel Bell, Guzzler Media, 2020	
<b>11</b>	<b>In 10 above</b>	
<b>12</b>	<b>Internal Continuous Assessment: 40%</b>	<b>Semester End Examination: 60%</b>
<b>13</b>	<b>Continuous Evaluation through:</b> Class test of 1 of 15 marks Class test of 2 of 15 marks Average of the two: 15 marks  Quizzes/ Presentations/ Assignments: 5 marks Total: 20 marks	<b>Format of Question Paper: External Examination (30 Marks)– 1 hr duration</b>
<b>14</b>	<b>Format of Question Paper: (Semester End Examination : 30 Marks. Duration:1 hour)</b> Q1: Attempt any two (out of four) from Module 1 (15 marks) Q2: Attempt any two (out of four) from Module 2 (15 marks)	

**Sign of Chairperson**  
**Dr. Mrs. R. Srivaramangai**  
**Ad-hoc BoS (Data Science)**

**Sign of the**  
**Offg. Associate Dean**  
**Dr. Madhav R. Rajwade**  
**Faculty of Science & Technology**

**Sign of Offg. Dean,**  
**Prof. Shivram S. Garje**  
**Faculty of Science & Technology**



## As Per NEP 2020

# University of Mumbai



### Syllabus for Basket of Minor Courses

Board of Studies in Computer Science

UG First Year Programme

Semester

II

Title of Paper

Credits 2/ 4

I) Programming with Python

2

From the Academic Year

2024 – 2025

## Minor Courses

### Name of the Course: Programming with Python

Sr. No.	Heading	Particulars
1	Description the course:	<p><b>Introduction:</b></p> <p>This course provides a comprehensive understanding of Python programming, focusing on designing and developing Python applications. Students will delve into the intricacies of Python programming, exploring its components and structure to gain a solid foundation in this versatile language.</p> <p><b>Relevance:</b></p> <p>Python is one of the most popular programming languages globally, widely used in various domains including web development, data science, artificial intelligence, and automation. Learning Python programming is highly relevant in today's technology-driven world, offering abundant opportunities for career growth and innovation.</p> <p><b>Usefulness:</b></p> <p>Learning Python programming equips students with a valuable skill set applicable across a wide range of industries and professions. Whether aspiring to become a software developer, data analyst, machine learning engineer, or web developer, proficiency in Python opens doors to diverse career paths and opportunities.</p> <p><b>Application:</b></p> <p>Throughout the course, students will apply their knowledge of Python programming to design, develop, and implement real-world applications. From simple scripts to complex algorithms, students will gain hands-on experience in solving practical problems using Python.</p> <p><b>Interest:</b></p> <p>Python's simplicity, readability, and versatility make it an engaging and accessible programming language for learners of all levels. Students are likely to find the process of learning Python enjoyable and rewarding, fostering a keen interest in exploring its capabilities</p>

		<p>further.</p> <p><b>Connection with Other Courses:</b></p> <p>Python programming forms a foundational skill set that complements and enhances learning in various other courses. Whether in data science, web development, machine learning, or automation, proficiency in Python programming serves as a common thread connecting different domains of technology.</p> <p><b>Demand in the Industry:</b></p> <p>The demand for Python programmers is steadily increasing across industries, driven by its versatility, ease of use, and robust community support. Companies are actively seeking professionals proficient in Python to drive innovation, streamline processes, and tackle complex challenges.</p> <p><b>Job Prospects:</b></p> <p>Completion of this course opens up a wide array of job prospects in industries ranging from software development to data analysis, artificial intelligence, cybersecurity, and beyond. Graduates can pursue roles such as software developer, data analyst, Python developer, machine learning engineer, and more, with promising career advancement opportunities.</p>
2	<b>Vertical:</b>	Minor
3	<b>Type:</b>	Practical
4	<b>Credits:</b>	2 credits (1 credit = 30 Hours of Practical work in a semester)
5	<b>Hours Allotted:</b>	60 hours
6	<b>Marks Allotted:</b>	50 Marks
7	<p><b>Course Objectives (CO):</b></p> <p><b>CO 1.</b> To learn to design and program Python applications.</p> <p><b>CO 2.</b> To explore the components of Python programming and understand its structure.</p> <p><b>CO 3.</b> To define the structure and components of a Python program.</p> <p><b>CO 4.</b> To learn writing loops and decision statements in Python.</p> <p><b>CO 5.</b> To understand inbuilt input/output operations and compound data types in Python.</p>	
8	<p><b>Course Outcomes (OC):</b></p> <p>After successful completion of this course, students would be able to -</p> <p><b>OC 1.</b> Store, manipulate, and access data effectively in Python.</p>	

	<p><b>OC 2.</b> Implement basic input/output operations and file handling in Python.</p> <p><b>OC 3.</b> Define the structure and components of Python programs confidently.</p> <p><b>OC 4.</b> Write loops, decision statements, and functions proficiently in Python.</p> <p><b>OC 5.</b> Utilize and manipulate compound data types in Python with ease.</p> <p><b>OC 6.</b> Handle exceptions gracefully and effectively in Python programs.</p>
9	<p><b>Modules:</b></p> <p><b>Module 1: Introduction to Python (30 hours):</b></p> <p><b>Overview of Python:</b> Introduction to Python, its significance, its evolution, and applications. Install Anaconda, configure Jupyter Notebook, and navigate its interface.</p> <p><b>Python Basics:</b> Writing and executing simple Python programs.</p> <p><b>Data Types and Variables:</b> Exploring basic data types like numbers, strings, lists, and dictionaries. Understanding variables and their usage.</p> <p><b>Input and Output:</b> Learning how to take user input and display output in Python programs.</p> <p><b>Control Statements:</b> Introduction to decision-making with if statements and looping with for and while loops.</p> <p><b>Operators:</b> Basic arithmetic, logical, and comparison operators. Exploring their usage in Python.</p> <p><b>Module 2: Advanced Python Concepts (30 hours):</b></p> <p><b>Introduction to Modules:</b> Understanding the concept of modules in Python. How to import and use modules in Python programs.</p> <p><b>Functions:</b> Defining and calling functions, returning values, and using built-in functions. Introduction to lambda functions.</p> <p><b>Strings and Lists:</b> Manipulating strings and lists in Python. Understanding common operations and methods.</p> <p><b>Tuples and Dictionaries:</b> Introduction to tuples and dictionaries. Exploring their usage and operations.</p> <p><b>Advanced Data Structures:</b></p> <p>Arrays: Introduction to arrays and basic array operations. Understanding indexing, slicing, and basic array processing.</p> <p>NumPy: Introduction to the NumPy library for numerical computing. Exploring advanced array operations and attributes.</p> <p><b>Working with Files:</b> Reading from and writing to files in Python.</p> <p><b>Handling Exceptions:</b> Understanding error handling in Python using try-except blocks.</p>

<b>10</b>	<b>Text Books</b> 1. Practical Programming: An Introduction to Computer Science Using Python 3, Paul Gries , Jennifer Campbell, Jason Montoyo, Pragmatic Bookshelf, 2nd Edition, 2014 2. Programming through Python, M. T Savaliya, R. K. Maurya& G M Magar, Sybgen Learning India, 2020													
<b>11</b>	<b>Reference Books</b> 1. Python: The Complete Reference, Martin C. Brown, McGraw Hill, 2018 2. Beginning Python: From Novice to Professional, Magnus Lie Hetland, Apress, 2017 3. Programming in Python 3, Mark Summerfield, Pearson Education, 2nd Ed, 2018 4. Python Programming: Using Problem Solving Approach, ReemaThareja, Oxford University Press, 2017													
<b>12</b>	<b>Internal Continuous Assessment: 40%</b>	<b>Semester End Examination: 60%</b>												
<b>13</b>	<p>The internal evaluation will be determined by the completion of practical tasks and the submission of corresponding write-ups for each session. Each practical exercise holds a maximum value of 10 marks. The total evaluation, out of 100 marks, should be scaled down to a final score of 20 marks.</p> <hr/> <b>Total: 20 marks</b>	<p><b>A Semester End Practical Examination of 2 hours duration for 30 marks</b> as per the paper pattern given below.</p> <p><b>Certified Journal is compulsory</b> for appearing at the time of Practical Exam</p> <hr/> <b>Total: 30 Marks</b>												
<b>14</b>	<b>Format of Question Paper:</b>  <div style="display: flex; justify-content: space-between;"> <b>Total Marks: 30</b> <b>Duration: 2 Hours</b> </div> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Question</th><th style="width: 50%;">Practical Question Based On</th><th style="width: 25%;">Marks</th></tr> </thead> <tbody> <tr> <td><b>Q. 1</b></td><td>Module 1</td><td>12</td></tr> <tr> <td><b>Q. 2</b></td><td>Module 2</td><td>12</td></tr> <tr> <td><b>Q. 3</b></td><td>Viva</td><td>06</td></tr> </tbody> </table>		Question	Practical Question Based On	Marks	<b>Q. 1</b>	Module 1	12	<b>Q. 2</b>	Module 2	12	<b>Q. 3</b>	Viva	06
Question	Practical Question Based On	Marks												
<b>Q. 1</b>	Module 1	12												
<b>Q. 2</b>	Module 2	12												
<b>Q. 3</b>	Viva	06												

# University of Mumbai

Subject: Computer Science

## MINOR COURSES

Year	Sem.	Theory / Practical	Course Title	No of Credits	No of Lectures Hours	Total Credits
1	II	Pr	Programming with Python	2	30	2
II	III	Pr	Algorithms and Data Structures	2	30	4
		Pr	Web Design & Development	2	30	
	IV	Pr	Open Source Database: MySQL	2	30	4
		Pr	Introduction to IoT	2	30	
III	V	Pr	Computer Networks & Applications	2	30	4
		Pr	Cyber Security	2	30	
	VI	Pr	AI and Data Science	2	30	4
		Pr	Data Analysis & Visualization	2	30	

**Sign of the BOS Chairman**  
**Dr. Jyotshna Dongardive**  
Ad-hoc BOS (Computer Science)

**Sign of the Offg. Associate Dean**  
**Dr. Madhav R. Rajwade**  
Faculty of Science & Technology

**Sign of Offg. Dean**  
**Prof. Shivram S. Garje**  
Faculty of Science & Technology

# As Per NEP 2020

## University of Mumbai



**Title of the Course Indian Constitution**

**Semester – Sem I**

**Syllabus for Two Credit**

**(With effect from the academic year 2024-25)**

<b>PROGRAM</b>	BA /BSc/ BCOM
<b>SEMESTER</b>	I
<b>COURSE TITLE</b>	Indian Constitution
<b>VERTICLE /CATEGORY</b>	E (Value Education Course)
<b>COURSE LEVEL</b>	50
<b>COURSE CODE</b>	
<b>COURSE CREDIT</b>	2
<b>HOURS PER WEEK THEORY</b>	2
<b>HOURS PER WEEK PRACTICAL/TUTORIAL</b>	

<b>COURSE OBJECTIVE</b>
<ul style="list-style-type: none"> <li>• Learners will be enabled to understand the basics of Indian Constitution.</li> <li>• Significantly the learners will understand the significance and functionality of Fundamental Rights, Fundamental Duties and Directive Principles.</li> <li>• The learners will be enabled to understand the role of Indian Judiciary in Protecting Fundamental Rights.</li> </ul>
<b>COURSE OUTCOME</b>
CO1: Learners will be empowered to understand the basic structure, nature of Indian Constitution
CO2: Learners will understand their and other citizens fundamental rights and duties towards the nation.
CO3: Learners will be equipped with the role of Indian Judiciary in protecting Fundamental Rights of citizens and will be able to describe areas of criminal justice, law and society through a critical analysis of the subject.
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## ORGANISATION OF THE COURSE

UNIT NO	COURSE UNITS	HOURS PER WEEK
1	Indian Constitution: Characteristics	10
2	Fundamental Rights, Fundamental Duties and Directive Principles of State Policy	10
3	Judiciary: Introduction to Supreme Court, Powers, and Functions of the Supreme Court Introduction to High Court Powers and Functions of the High Court Public Interest Litigation, Judicial Activism	10
TOTAL HOURS		30

## COURSE DESIGN

UNIT TITLE	OUTCOME	DESCRIPTION	PEDAGOGICAL APPROACH
INTRODUCTION TO CONSTITUTION	Learners will understand the importance of preamble in the implementation of constitution.	Constitution meaning of the term, Significance of constitution, Preamble, Features of constitution and basic structure of Indian Constitution	Chalk and talk method, Case laws
FUNDAMENTAL RIGHTS, FUNDAMENTAL DUTIES AND DIRECTIVE PRINCIPLES	Learners will understand the fundamental rights and duties towards the nation and people.	Fundamental rights (Art 12 to Art 35), Fundamental Duties and Directive Principles of state policy	Chalk and talk method, Case laws
JUDICIARY	Learners will be able to summarize the process of judicial review and identify criteria used by courts to evaluate the constitutionality of criminal law of India.	Introduction to Supreme Court, Powers, and Functions of the Supreme Court, Introduction to High Court, Powers and Functions of the High Court, Public Interest Litigation and Judicial Activism.	Chalk and talk method, Case laws.

<b>CONTINUOUS ASSESSMENT TESTS (CAT) &amp; SEMESTER END EXAMINATION (SEE)</b>			
<b>NATURE OF ASSESSMENT</b>	<b>MARKS</b>	<b>METHODOLOGY</b>	<b>COURSE OUTCOME</b>
CAT 1 *	10	Online Quiz, Open book test, Class test, Assignment and Viva	CO1
CAT 2 *	10	Online Quiz, Open book test, Class test, Assignment and Viva	CO1, CO2
CAT 3 *	10	Online Quiz, Open book test, Class test, Assignment and Viva	CO3
SEE	30	Four questions of 10 marks each (from each course unit), to be attempted any 3, 10 marks may be subdivided into two sub questions of 5 marks	CO1, CO2, CO3

\*Any Two for 20 marks

<b>ESSENTIAL READINGS</b>	Durga Das Basu- Introduction to the Constitution of India
<b>ADDITIONAL READINGS</b>	J. N. Pande – Constitution of India

Syllabus Drafting Committee  
Dr. Swati Rautela Professor and Head Department of Law  
Dr. Rajeshri Varhadi Professor and In charge Director  
Dr. Sanjay Jadhav Associate Professor  
Prof. Uma Nehare Assistant Professor

**Signature:**  
**Prof. Kavita Laghate**  
Chairman of Board of Studies in Value Education

**As Per NEP 2020**

**University of Mumbai**



**Title of the Program**

**Introduction to Cultural Activities**

**SEM I**

**Syllabus for Two Credit**

**(With effect from the academic year 2024-25)**

### Aims and Objectives

- To study the importance of cultural activities in India.
- To discuss the historical importance of cultural activities.
- To define and describe the overview of cultural practices at Indian and Global level.
- To list the various forms of cultural activities and its applied skills.
- To describe the role of organizations for organizing cultural activities in India.

### Learning Outcomes

- Understand the significance of cultural activities
- Sensitize students towards Indian culture and its preservation
- Apply the knowledge and skills of the cultural activities in their practical life
- Participate in the various cultural activities

### Modules at Glance Semester I

Module No.	Unit	Content	No. of Hours
1	I	Overview to Cultural Activities	05
	II	History of Student Cultural Activities	05
2	III	Forms / Types of Literary and Fine Arts Activities and its Applied Skills	10
	IV	Forms / Types of Performing Arts Activities and its Applied Skills	10
Total No. of Hours			30

Module No.	Unit	Content	No. of Hours
1	I	<b>1.1 Overview to Cultural Activities</b> <ul style="list-style-type: none"><li>• Definition of culture and its manifestations</li><li>• Understanding cultural diversity and inclusivity</li><li>• The role of cultural activities in preserving heritage</li><li>• Overview of Indian cultural practices</li><li>• Overview of global cultural practices</li></ul>	05
	II	<b>2.1 History of Student Cultural Activities</b> <ul style="list-style-type: none"><li>□ Role of student cultural activities</li><li>□ History of student cultural activities in India</li></ul>	05

		<ul style="list-style-type: none"> <li>• Role of AIU in preserving cultural heritage of India</li> <li>• History of student cultural activities in Maharashtra</li> <li>• Student Cultural activities at University of Mumbai</li> </ul>	
2	III	<p><b>3.1 Forms / Types of Literary and Fine Arts Activities and its Applied Skills</b></p> <p><b>3.1.1 Various Forms of Literary Arts</b></p> <ul style="list-style-type: none"> <li>• <b>Elocution:</b> Reading Skills, Soft Skills, Languages, Communication Skills, etc.</li> <li>• <b>Debate:</b> Reading Skills, Soft Skills, Languages, Communication Skills, etc.</li> <li>• <b>Story Writing:</b> Introduction, Plot, Characterization, Presentation, Relevance, Language Style, etc.</li> <li>• <b>Story Telling:</b> Introduction, Plot, Characterization, Presentation, Relevance, Language Style, etc.</li> <li>• <b>Quiz:</b> General Knowledge skills</li> </ul> <p><b>3.1.2 Various Forms of Fine Arts</b></p> <ul style="list-style-type: none"> <li>• <b>Painting:</b> Visualization, Delivery of the Subject, Composition, Colour Application, Presentation and Overall Impact</li> <li>• <b>Collage:</b> Visualization, Delivery of the Subject, Handling of Medium, Composition, Presentation and Overall Impact</li> <li>• <b>Poster Making:</b> Visualization, Delivery of the Subject, Presentation, Tagline and Overall Impact</li> <li>• <b>Clay Modeling:</b> Visualization, Delivery of the Subject, Handling of Medium, Composition, Presentation and Overall Impact</li> <li>• <b>Cartooning:</b> Visualization, Delivery of the Subject, Characters, Synchronization, Colour Application, Composition, Presentation and Overall Impact</li> <li>• <b>Rangoli:</b> Visualization, Delivery of the Subject, Colour Scheme, Elements, Presentation and Overall Impact</li> <li>• <b>Mehendi Designing:</b> Originality, Creativity, Decorative Art with Aesthetic Sense, Presentation and Overall Impact</li> </ul>	10

		<ul style="list-style-type: none"> <li>• <b>Spot Photography:</b> Impact, Composition, Technical Quality and Suitability for the Specific Theme</li> <li>• <b>Installation:</b> Visualization, Delivery of the Subject, Handling of Medium, Synchronization, Composition, Presentation and Overall Impact</li> </ul>	
	<b>IV</b>	<p><b>4.1 Forms / Types of Performing Arts Activities and its Applied Skills</b></p> <p><b>4.1.1 Various Forms of Dance</b></p> <ul style="list-style-type: none"> <li>• <b>Folk Dance:</b> History and Origin of Folk Dance In India, Types and their Uniqueness, Significance of Folk Dance, Folk Dances in Maharashtra</li> <li>• <b>Classical Dance:</b> History of Classical Dance, Types and their Peculiarities, Significance of Classical Dances in India</li> </ul> <p><b>4.1.2 Various Forms of Theatre</b></p> <ul style="list-style-type: none"> <li>• History of Indian Theatre</li> <li>• Types and their Uniqueness</li> <li>• Significance of Indian Theatre</li> <li>• <b>Various Forms of Theatre:</b> One Act Play, Skit, Mime, Mimicry</li> </ul> <p><b>4.1.3 Various Forms of Music</b></p> <ul style="list-style-type: none"> <li>• History of Indian Music,</li> <li>• Types and their Uniqueness,</li> <li>• Significance of Music in India</li> <li>• <b>Various Forms of Music:</b> Classical Singing, Light Vocal, Percussion, Non-Percussion, Nattasangeet, Western Vocal, Western Instrumental</li> </ul>	<b>10</b>

### Scheme of Evaluation

The Scheme of Examination shall be of 50 marks. It will be divided into Internal Evaluation (20 marks) and Semester End Examination (30 Marks).

### Semester I (50 Marks, 2 Credits) Internal Evaluation (20 Marks)

Sr. No.	Particulars	Marks
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1	Presentation <b>OR</b> Project <b>OR</b> Assignment	15
2	Participation in Workshop / Conference / Seminar (as decided by the Teacher) <b>OR</b> Participation in Online Workshop / Conference / Seminar (as decided by the Teacher) <b>OR</b> Field Visit <b>OR</b> Attendance	5
<b>Total</b>		<b>20</b>

#### Semester End Examination (30 Marks)

Question No.	Particulars	Marks
1	<b>Objective Type Questions (All Units)</b>	6
2	<b>Descriptive Question(s) on Unit I</b> [This question may be divided into sub questions like (a) (b) for 3 Marks + 3 Marks or 4 Marks + 2 Marks pattern]	6
3	<b>Descriptive Question(s) on Unit II</b> [This question may be divided into sub questions like (a) (b) for 3 Marks + 3 Marks or 4 Marks + 2 Marks pattern]	6
4	<b>Descriptive Question(s) on Unit III</b> [This question may be divided into sub questions like (a) (b) for 3 Marks + 3 Marks or 4 Marks + 2 Marks pattern]	6
5	<b>Descriptive Question(s) on Unit IV</b> [This question may be divided into sub questions like (a) (b) for 3 Marks + 3 Marks or 4 Marks + 2 Marks pattern]	6
<b>Total</b>		<b>30</b>

#### Reference Books

- 1) Rabindranath Tagore, The Centre of Indian Culture. Rupa and Co, India, 2017.
- 2) Chopra, J. K. Indian Heritage and Culture. Unique Publisher, India, 2013.
- 3) Patnaik Devdatta, Indian Culture, Art and Heritage. Pearson, India, 2021.
- 4) Cassady Marsh, An Introduction to the Art of Theatre: A comprehensive text- Past, Present and Future. Colorado Springs, Colo, 2017.
- 5) Pingle Bhavanrav A., History of Indian Music: with particular reference to theory and practice, Dev Publishers and Distributors, India, 2021.
- 6) Popley Herbert A., The Music of India. Central Archaeological Library, New Delhi, 1921.

- 7) Tomory Edith, History of Fine Arts in India and the West. Orient Longman, Mumbai, 1989. 8) Arthur Schopenhauer, The Art of Literature, S. Sonnenschein and co London. 1981.
- 9) M. Keith Booker, A Practical Introduction to Literary theory and Criticism. Routledge.Michigan, 1996.
- 10) Vatsyayan Kapila, Indian Classical Dance. Publications Division, Ministry of Information and Broadcasting, Govt. of India, 1992.
- 11) Phyllia S. Weikart, Teaching folk dance: successful steps. High/Scope Press, Mchigan, 1997.
- 12) Gosvami O., The story of Indian Music, its growth and synthesis. Bombay, New York, Asia Pub. House, 1961.



AC –  
Item No. –

**As Per NEP 2020**

## **University of Mumbai**



<b>Syllabus for Basket of VES</b>	
<b>Board of Studies in Value Education</b>	
<b>UG First Year Programme</b>	
<b>Semester</b>	<b>I</b>
<b>Title of Paper</b>	<b>Credits 2</b>
<b>I) Environmental Management &amp; Sustainable Development -I</b>	
<b>From the Academic Year</b>	<b>2024-25</b>

## Name of the Course: **Environmental Management & Sustainable Development -I**

Sr. No.	Heading	Particulars
1	Description the course : Including but Not limited to :	<p>Environmental awareness transcends academic boundaries. This course transcends academic boundaries, equipping you with a foundational understanding of ecosystems, biodiversity, and the human impact on natural resources and climate. Students will learn about critical issues like pollution and explore solutions for a sustainable future.</p> <p>The knowledge you gain here connects with diverse fields such as biology, economics, and even engineering. It is a foundation for further exploration in environmental science, conservation biology, and environmental policy.</p> <p>This course ignites your interest in environmental issues and opens doors to exciting careers in environmental management, conservation, and sustainable development – fields with growing demand across industries.</p> <p>Prepare for an interactive learning experience through engaging lectures, stimulating group discussions, and insightful case studies examining real-world environmental challenges and solutions.</p>
2	Vertical :	Open Elective
3	Type :	Theory
4	Credit:	2 credits / ( 1 credit = 15 Hours for Theory or 30 Hours of Practical work in a semester )
5	Hours Allotted :	30 Hours
6	Marks Allotted:	50 Marks
7	<b>Course Objectives:</b> 1. To create and disseminate knowledge to the students about environmental problems at local, regional and global scale. 2. To introduce about ecosystems, biodiversity and to make aware for the need of conservation. 3. To sensitize students towards environmental concerns, issues, and impacts of	

	<p>human population.</p> <p>4. To prepare students for successful career in environmental departments, research institutes, industries, consultancy, and NGOs, etc.</p>
8	<p><b>Course Outcomes:</b></p> <ol style="list-style-type: none"> <li>1. Use principles of Environmental Science for explaining sustainable development and its related ethical concerns</li> <li>2. Display scientific perspective for issues confronting our present day environment.</li> <li>3. Analyze the national and global environmental issues relating air, water, soil, and land use, biodiversity, and pollution.</li> <li>4. Explain the Role of an individual in relation to human population and environmental pollution.</li> </ol>
9	<p><b>Modules:-</b></p> <p><b>Unit I: Ecosystems, Biodiversity and Conservation (8 lectures)</b></p> <p>Introduction, structure, and function of ecosystems; Energy flow: food chains, food webs and ecological succession. Case studies of the following:</p> <ol style="list-style-type: none"> <li>a) Forest ecosystem</li> <li>b) Grassland ecosystem</li> <li>c) Desert ecosystem</li> <li>d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)</li> </ol> <ol style="list-style-type: none"> <li>1. Levels of biological diversity : genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns</li> <li>2. India as a mega-biodiversity nation; Endangered and endemic species of India</li> <li>3. Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.</li> <li>4. Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.</li> </ol> <p><b>Unit II: Natural Resources and Sustainable Development (7 lectures)</b></p> <p>Overview of natural resources: Definition of resource; Classification of natural resources- biotic and abiotic, renewable and non-renewable.</p> <p>Biotic resources: Major type of biotic resources- forests, grasslands, wetlands, wildlife and aquatic (fresh water and marine); Microbes as a resource; Status and challenges.</p> <p>Water resources: Types of water resources- fresh water and marine resources; Availability and use of water resources; Environmental impact of over-exploitation, issues and challenges; Water scarcity and stress; Conflicts over water.</p> <p>Soil and mineral resources: Important minerals; Mineral exploitation; Environmental problems due to extraction of minerals and use; Soil as a resource and its degradation.</p> <p>Energy resources: Sources of energy and their classification, renewable and non-renewable sources of energy; Conventional energy sources- coal, oil, natural gas, nuclear energy;</p>
	<p>Non-conventional energy sources- solar, wind, tidal, hydro, wave, ocean thermal, geothermal, biomass, hydrogen and fuel cells; Implications of energy use on the environment.</p> <p>Introduction to sustainable development: Sustainable Development Goals (SDGs)-</p>

	targets and indicators, challenges and strategies for SDGs.
	<b>Unit III: Human Communities and the Environment (8 lectures)</b>
	<ol style="list-style-type: none"> <li>1. Human population growth: Impacts on environment, human health and welfare.</li> <li>2. Resettlement and rehabilitation of project affected persons; case studies.</li> <li>3. Disaster management: floods, earthquake, cyclones and landslides.</li> <li>4. Environmental movements: Chipko, Silent valley, Bishnois of Rajasthan.</li> <li>5. Environmental ethics: Role of Indian and other religions and cultures in environmental conservation.</li> <li>6. Environmental communication and public awareness, case studies (e.g. CNG vehicles in Delhi).</li> </ol>
	<b>Unit IV: Environmental Issues; Local, Regional, and Global (7 lectures)</b>
	<p>Environmental issues and scales: Concepts of micro-, meso-, synoptic and planetary scales; Temporal and spatial extents of local, regional, and global phenomena.</p> <p>Pollution: Impact of sectoral processes on Environment, Types of Pollution- air, noise, water, soil, municipal solid waste, hazardous waste; Transboundary air pollution; Acid rain; Smog.</p> <p>Land use and Land cover change: land degradation, deforestation, desertification, urbanization.</p> <p>Biodiversity loss: past and current trends, impact.</p> <p>Global change: Ozone layer depletion; Climate change.</p>
10	<b>Text Books</b> <ol style="list-style-type: none"> <li>1. Groom, Martha J., Gary K. Meffe, and Carl Ronald Carroll. Principles of Conservation Biology. Sunderland: Sinauer Associates, 2006.</li> <li>2. Odum, E.P., Odum, H.T. &amp; Andrews, J. 1971. Fundamentals of Ecology. Philadelphia: Saunders.</li> <li>3. Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. Ecology, Environmental Science and Conservation. S. Chand Publishing, New Delhi.</li> <li>4. Chiras, D. D and Reganold, J. P. (2010). Natural Resource Conservation: Management for a Sustainable Future. 10th edition, Upper Saddle River, N. J. Benjamin/Cummins/Pearson.</li> <li>5. John W. Twidell and Anthony D. (2015). Renewable Energy Sources, 3rd Edition, Weir Publisher (ELBS)</li> <li>6. Singh, J.S., Singh, S.P. &amp; Gupta, S.R. 2006. Ecology, Environment and Resource Conservation. Anamaya Publications <a href="https://sdgs.un.org/goals">https://sdgs.un.org/goals</a></li> <li>7. Down to Earth, Centre of Science and Environment ®.</li> <li>8. Hawkins R. E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay ®.</li> <li>9. Harper, Charles L. (2017) Environment and Society, Human Perspectives on Environmental Issues 6th Edition. Routledge.</li> <li>10. Rajagopalan, R. (2011). Environmental Studies: From Crisis to Cure. India: Oxford University Press.</li> <li>11. Harris, Frances (2012) Global Environmental Issues, 2nd Edition. Wiley-Blackwell.</li> </ol>

11	<b>Reference Books</b> <ol style="list-style-type: none"> <li>1. Carson, R. 2002. Silent Spring. Houghton Mifflin Harcourt.</li> <li>2. Gadgil, M., &amp; Guha, R. 1993. This Fissured Land: An Ecological History of India. Univ. of California Press.</li> <li>3. Gleeson, B. and Low, N. (eds.) 1999. Global Ethics and Environment, London, Routledge.</li> <li>4. Gleick, P. H. 1993. Water in Crisis. Pacific Institute for Studies in Dev., Environment &amp; Security. Stockholm Env. Institute, Oxford Univ. Press.</li> </ol>
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	5. Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). 2013. Conservation Biology: Voices from the Tropics. John Wiley & Sons. 6. Thapar, V. 1998. Land of the Tiger: A Natural History of the Indian Subcontinent. 7. Warren, C. E. 1971. Biology and Water Pollution Control. WB Saunders. 8. Wilson, E. O. 2006. The Creation: An appeal to save life on earth. New York: Norton. 9. World Commission on Environment and Development. 1987. Our Common Future. Oxford University Press.	
12	<b>Internal Continuous Assessment: 40%</b>	<b>Semester End Examination: 60%</b>
13	<b>Continuous Evaluation through:</b> Quizzes, Class Tests, presentation, project, role play, creative writing, Visits, assignment etc. (at least 4)	
14	<b>Format of Question Paper:</b> for the final examination For OE: External - 30 Marks (2 Credits) Internal - 20 Marks Question Paper Format for 30 Marks Format of Question Paper: 30 Marks per paper Semester End Theory Examination:  1. Duration - These examinations shall be of one hour duration. 2. Theory question paper pattern: a. There shall be 04 questions each of 10 marks out of which students will attempt ANY THREE	

**Signature:**  
**Prof. Kavita Laghate**  
**Chairman of Board of Studies in Value Education**

## As Per NEP 2020

# University of Mumbai



<b>Syllabus for Indian Knowledge System</b>	
<b>Board of Studies in Indian Knowledge System</b>	
<b>UG First Year Programme</b>	
<b>Semester</b>	<b>I OR II</b>
<b>Title of Paper</b>	<b>Credits 2 for either I or II Semester</b>
<b>I) Indian Knowledge System</b>	
<b>From the Academic Year</b>	<b>2024-2025</b>



Sr. No.	Heading	Particulars
1	<b>Description the course : Including but Not limited to :</b>	Introduction, relevance, Usefulness, Application, interest, connection with other courses, demand in the industry, job prospects etc.
2	<b>Vertical :</b>	Major/Minor/Open Elective /Skill Enhancement / Ability Enhancement/Indian Knowledge System ( Choose By $\sqrt{\phantom{x}}$ )
3	<b>Type :</b>	Theory / Practical
4	<b>Credit:</b>	2 credits ( 1 credit = 15 Hours for Theory or 30 Hours of Practical work in a semester )
5	<b>Hours Allotted :</b>	30 Hours
6	<b>Marks Allotted:</b>	50 Marks
7	<b>Course Objectives:</b> ( List some of the course objectives ) <ol style="list-style-type: none"> <li>1. To sensitize the students about context in which they are embedded i.e. Indian culture and civilisation including its Knowledge System and Tradition.</li> <li>2. To help student to understand the knowledge, art and creative practices, skills and values in ancient Indian system.</li> <li>3. To help to study the enriched scientific Indian heritage.</li> <li>4. To introduce the contribution from Ancient Indian system &amp; tradition to modern science &amp; Technology.</li> </ol>	
8	<b>Course Outcomes:</b> ( List some of the course outcomes ) <ol style="list-style-type: none"> <li>1. Learner will understand and appreciate the rich Indian Knowledge Tradition</li> <li>2. Lerner will understand the contribution of Indians in various fields</li> <li>3. Lerner will experience increase subject-awareness and self-esteem</li> <li>4. Lerner will develop a comprehensive understanding of how all knowledge is ultimately intertwined</li> </ol>	
9	<b>Modules:-</b>	
	<b>Module 1: ( 10 Hours )</b>	
	<ol style="list-style-type: none"> <li>1. Introduction to IKS (What is knowledge System, Characteristic Features of Indian Knowledge System)</li> <li>2. Why IKS? (Macaulay's Education Policy and its impact, Need of revisiting Ancient Indian Traditions)</li> <li>3. Scope of IKS (The Universality of IKS (from Micro to Macro), development form Earliest times to 18th Century CE)</li> <li>4. Tradition of IKS (Ancient Indian Education System: Home, Gurukul, Pathashala, Universities and ancient educational centres)</li> <li>5. Relevant sites in the vicinity of the Institute (Water Management System at Kanheri, Temple Management of Ambarnath, etc.)</li> </ol>	

<b>Module 2: ( 10 Hours )</b>		
1. Medicine (Ayurveda) 2. Alchemy 3. Mathematics 4. Logic 5. Art of Governance (Arthashastra)		
<b>Module 3: (10 Hours) (Select Any FIVE out of the following)</b>		
1. Aesthetics 2. Town Planning 3. Strategic Studies 4. Krishi Shastra 5. Vyakaran & Lexicography 6. Natyashastra 7. Ancient Sports 8. Astronomy 9. Yoga and Wellbeing 10. Linguistics 11. Chitrasutra 12. Architecture 13. Taxation 14. Banking 15. Trade and Commerce		
<b>10</b>	<b>Reference Books</b> 1. Concise history of science in India- D.M. Bose, S.N Sen, B.V. Subbarayappa. 2. Positive sciences of the Ancient Hindus- Brajendranatha seal, Motilal Banrasidas, Delhi 1958. 3. History of Chemistry in Ancient India & Medieval India, P.Ray- Indian Chemicals Society, Calcutta 1956 4. Charaka Samhita- a scientific synopsis, P. Ray & H.N Gupta National Institute of Sciences of India, New Delhi 1965. 5. MacDonnell A.A- History of Sanskrit literature 6. Winternitz M- History of Indian Literature Vol. I, II & III 7. Dasgupta S.N & De S.K- History of Sanskrit literature Vol. I. 8. Ramkrishna Mission- cultural heritage of India Vol. I, II & III. 9. Majumdar R. C & Pushalkar A.D- History & culture of the Indian people, Vol. I, II & III. 10. Keith A.B- History of Sanskrit literature. 11. Varadachari V- History of Sanskrit literature Chaitanya Krishna- A new History of Sanskrit	
<b>11</b>	<b>Continuous Internal Assessment: 20 Marks</b>	<b>Semester End Examination : 30 Marks</b>
<b>12</b>	<b>Continuous Evaluation through:</b> Assignment/ Presentations/ Projects (Group/Individual) / Field Visit Report <b>10 Marks,</b> class Test / MCQ Test <b>5 Marks,</b> Overall Conduct and Class Participation <b>5 Marks</b>	
<b>13</b>	<b>Format of Question Paper: for the final examination</b> Q1. Attempt any TWO Questions out of FIVE. <b>6 Marks</b> Q2. Attempt any THREE Questions out of FIVE <b>12 Marks</b> Q3. Attempt any THREE Questions out of FIFTEEN. <b>12 Marks</b>	



Sign of the BOS  
Chairman  
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Chairman  
Name of the BOS

Sign of the  
Offg. Associate Dean  
Name of the Associate  
Dean  
Faculty of Interdisciplinary Studies  
Name of the Faculty

Sign of the  
Offg. Dean  
Name of the Offg. Dean  
Faculty of  
Interdisciplinary Studies  
Name of the Faculty



# University of Mumbai

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Academic Authorities,  
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Tel.022-68320033

Re-accredited with A ++ Grade (CGPA 3.65) by NAAC  
Category- I University Status awarded by UGC

No. AAMS\_UGS/ICC/2024-25/245

Date: 28<sup>th</sup> February, 2025

## CIRCULAR:-

Attention of all the Principals of the Affiliated Colleges, Directors of the Recognized Institutions and the Head of the University Departments is invited to this office Circular No. AAMS\_UGS/ICC/2024-25/199 dated 03<sup>rd</sup> January, 2025 relating to the Bachelor of Management Studies (BMS) Sem. I & II.

They are hereby informed that the recommendations made by the **Ad-hoc Board of Studies in Bachelor of Management Studies** at its meeting held on 30<sup>th</sup> November, 2024 and subsequently passed by the Board of Deans at its meeting held on 30<sup>th</sup> November, 2024 vide Item No.7.7 (N) have been accepted by the Academic Council at its meeting held on 4<sup>th</sup> December, 2024 vide item No.7.14 (N) introduce syllabus for Bachelor of Management Studies (BMS) Sem III & IV as per NEP 2020 was approved as per appendix with effect from the academic year 2024-25.

(The Circular is available on the University's website [www.mu.ac.in](http://www.mu.ac.in)).

MUMBAI – 400 032  
28<sup>th</sup> February, 2025

  
(Dr. Prasad Karande)  
REGISTRAR

To

All the Principals of the Affiliated Colleges, Directors of the Recognized Institutions and the Head of the University Departments.

AC./7.14(N)/04/12/2024

Copy forwarded with Compliments for information to:-

- 1) The Chairman, Board of Deans,
- 2) The Dean, Faculty of Commerce & Management,
- 3) The Chairman, Ad-hoc Board of Studies in Bachelor of Management Studies,
- 4) The Director, Board of Examinations and Evaluation,
- 5) The Director, Department of Students Development,
- 6) The Director, Department of Information & Communication Technology,
- 7) The Director, Centre for Distance and Online Education (CDOE) Vidyanagari,
- 8) The Deputy Registrar, Admission, Enrolment, Eligibility & Migration Department (AEM),

<b>Copy forwarded for information and necessary action to :-</b>	
1	The Deputy Registrar, (Admissions, Enrolment, Eligibility and Migration Dept)(AEM), <a href="mailto:dr@eligi.mu.ac.in">dr@eligi.mu.ac.in</a>
2	The Deputy Registrar, Result unit, Vidyanagari <a href="mailto:drresults@exam.mu.ac.in">drresults@exam.mu.ac.in</a>
3	The Deputy Registrar, Marks and Certificate Unit,. Vidyanagari <a href="mailto:dr.verification@mu.ac.in">dr.verification@mu.ac.in</a>
4	The Deputy Registrar, Appointment Unit, Vidyanagari <a href="mailto:dr.appointment@exam.mu.ac.in">dr.appointment@exam.mu.ac.in</a>
5	The Deputy Registrar, CAP Unit, Vidyanagari <a href="mailto:cap.exam@mu.ac.in">cap.exam@mu.ac.in</a>
6	The Deputy Registrar, College Affiliations & Development Department (CAD), <a href="mailto:deputyregistrar.uni@gmail.com">deputyregistrar.uni@gmail.com</a>
7	The Deputy Registrar, PRO, Fort, (Publication Section), <a href="mailto:Pro@mu.ac.in">Pro@mu.ac.in</a>
8	The Deputy Registrar, Executive Authorities Section (EA) <a href="mailto:eau120@fort.mu.ac.in">eau120@fort.mu.ac.in</a>  He is requested to treat this as action taken report on the concerned resolution adopted by the Academic Council referred to the above circular.
9	The Deputy Registrar, Research Administration & Promotion Cell (RAPC), <a href="mailto:rapc@mu.ac.in">rapc@mu.ac.in</a>
10	The Deputy Registrar, Academic Appointments & Quality Assurance (AAQA) dy.registrar.tau.fort.mu.ac.in <a href="mailto:ar.tau@fort.mu.ac.in">ar.tau@fort.mu.ac.in</a>
11	The Deputy Registrar, College Teachers Approval Unit (CTA), <a href="mailto:concolsection@gmail.com">concolsection@gmail.com</a>
12	The Deputy Registrars, Finance & Accounts Section, fort <a href="mailto:draccounts@fort.mu.ac.in">draccounts@fort.mu.ac.in</a>
13	The Deputy Registrar, Election Section, Fort <a href="mailto:drelection@election.mu.ac.in">drelection@election.mu.ac.in</a>
14	The Assistant Registrar, Administrative Sub-Campus Thane, <a href="mailto:thanesubcampus@mu.ac.in">thanesubcampus@mu.ac.in</a>
15	The Assistant Registrar, School of Engg. & Applied Sciences, Kalyan, <a href="mailto:ar.seask@mu.ac.in">ar.seask@mu.ac.in</a>
16	The Assistant Registrar, Ratnagiri Sub-centre, Ratnagiri, <a href="mailto:ratnagirisubcentar@gmail.com">ratnagirisubcentar@gmail.com</a>
17	The Director, Centre for Distance and Online Education (CDOE), Vidyanagari, <a href="mailto:director@idol.mu.ac.in">director@idol.mu.ac.in</a>
18	Director, Innovation, Incubation and Linkages, Dr. Sachin Laddha <a href="mailto:pinkumanno@gmail.com">pinkumanno@gmail.com</a>
19	Director, Department of Lifelong Learning and Extension (DLLE), <a href="mailto:dlleuniversityofmumbai@gmail.com">dlleuniversityofmumbai@gmail.com</a>

Copy for information :-	
1	P.A to Hon'ble Vice-Chancellor, <a href="mailto:vice-chancellor@mu.ac.in">vice-chancellor@mu.ac.in</a>
2	P.A to Pro-Vice-Chancellor <a href="mailto:pvc@fort.mu.ac.in">pvc@fort.mu.ac.in</a>
3	P.A to Registrar, <a href="mailto:registrar@fort.mu.ac.in">registrar@fort.mu.ac.in</a>
4	P.A to all Deans of all Faculties
5	P.A to Finance & Account Officers, (F & A.O), <a href="mailto:camu@accounts.mu.ac.in">camu@accounts.mu.ac.in</a>

To,

1	The Chairman, Board of Deans <a href="mailto:pvc@fort.mu.ac.in">pvc@fort.mu.ac.in</a>
2	<p><b>Faculty of Humanities,</b></p> <p><b>Dean</b></p> <p>1. Prof.Anil Singh <a href="mailto:Dranilsingh129@gmail.com">Dranilsingh129@gmail.com</a></p> <p><b>Associate Dean</b></p> <p>2. Dr.Suchitra Naik <a href="mailto:Naiksuchitra27@gmail.com">Naiksuchitra27@gmail.com</a></p> <p>3.Prof.Manisha Karne <a href="mailto:mkarne@economics.mu.ac.in">mkarne@economics.mu.ac.in</a></p> <p><b>Faculty of Commerce &amp; Management,</b></p> <p><b>Dean</b></p> <p>1. Dr.Kavita Laghate <a href="mailto:kavitalaghate@jbims.mu.ac.in">kavitalaghate@jbims.mu.ac.in</a></p> <p><b>Associate Dean</b></p> <p>2. Dr.Ravikant Balkrishna Sangurde <a href="mailto:Ravikant.s.@somaiya.edu">Ravikant.s.@somaiya.edu</a></p> <p>3. Prin.Kishori Bhagat <a href="mailto:kishoribhagat@rediffmail.com">kishoribhagat@rediffmail.com</a></p>

	<b>Faculty of Science &amp; Technology</b> <b>Dean</b> 1. Prof. Shivram Garje <a href="mailto:ssgarje@chem.mu.ac.in">ssgarje@chem.mu.ac.in</a> <b>Associate Dean</b> 2. Dr. Madhav R. Rajwade <a href="mailto:Madhavr64@gmail.com">Madhavr64@gmail.com</a> 3. Prin. Deven Shah <a href="mailto:sir.deven@gmail.com">sir.deven@gmail.com</a>
	<b>Faculty of Inter-Disciplinary Studies,</b> <b>Dean</b> 1. Dr. Anil K. Singh <a href="mailto:aksingh@trcl.org.in">aksingh@trcl.org.in</a> <b>Associate Dean</b> 2. Prin. Chadrashekhhar Ashok Chakradeo <a href="mailto:cachakradeo@gmail.com">cachakradeo@gmail.com</a>
3	Chairman, Board of Studies,
4	The Director, Board of Examinations and Evaluation, <a href="mailto:dboee@exam.mu.ac.in">dboee@exam.mu.ac.in</a>
5	The Director, Board of Students Development, <a href="mailto:dsd@mu.ac.in">dsd@mu.ac.in</a> <b>DSW</b> <a href="mailto:directr@dsw.mu.ac.in">directr@dsw.mu.ac.in</a>
6	The Director, Department of Information & Communication Technology, <a href="mailto:director.dict@mu.ac.in">director.dict@mu.ac.in</a>

**As Per NEP 2020**

# **University of Mumbai**



**Title of the U.G. Program**

**Bachelor of Management Studies (BMS)**

**Syllabus for**

**Semester – Sem.- III & IV**


**Ref: GR dated 20<sup>th</sup> April, 2023 for Credit Structure of UG**

**(With effect from the academic year 2024-25)**



(As per NEP 2020)

Sr. No.	Heading	Particulars
1	Title of program O: _____	Bachelor of Management Studies (BMS)
2	Scheme of Examination R: _____	NEP 40% Internal 60% External, Semester End Examination Individual Passing in Internal and External Examination
3	Standards of Passing R: _____	40%
4	Credit Structure R: _____	Attached herewith
5	Semesters	Sem. III & IV
6	Program Academic Level	6.5
7	Pattern	Semester
8	Status	New
9	To be implemented from Academic Year	2024-25

  
 Sign of the BOS  
 Chairman  
 Prof. Dr. Kanchan  
 Fulmali  
 BOS in BMS

Sign of the  
 Offg. Associate Dean  
 Dr. Ravikant  
 Balkrishna Sangurde  
 Faculty of Commerce



Sign of the  
 Offg. Associate  
 Dean  
 Prin. Kishori Bhagat  
 Faculty of  
 Management

Sign of the  
 Offg. Dean  
 Prof. Kavita Laghate  
 Faculty of  
 Commerce &  
 Management

**R: CU – 560 C**

5.0	III	8(2*4)		Recruitment and Selection (2) OB and HRM (2) Or Sales and Distribution Management (2) Consumer Behavior (2) Or Basics of Financial Services (2) Equity and Debt Markets (2)	2  Open Electives will be from other Departments or SWAYAM Course (2)	VSC:2  Taxation Procedures and Practices (VSC:2)	AEC:2  Business Etiquettes (AEC:2)	FP: 2C C:2  Socially or Industry relevant Field Visits & Project / NSS (2*2) (FP & CC)	20-22	UG Diploma 80- 88
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**R: CU – 560 D**

IV	8(2*4) Production and Total Quality Management (4) Introduction to RM (4)		2+@  Performance Management and Career Planning (2) Human Resource Planning (2) Or  Risk Management (2) Strategic Financial Management (2) Or  Tourism Marketing (2) Rural Marketing (2)	2 Open Electives will be from other Departments or SWAYAM Course (2)	SEC:2 Basics of Personal Finance	AEC:2  Selling and Negotiations (AEC:2)	CEP:2 CC:2  Community Engagement Project/NS S (2) (CEP:2)  CC - Student Clubs Cultural, Sports, Entrepreneurship And Report (CC:2)	20-22
Cum Cr.	20-28		10	12	6+6	8+4+2	8+ 4	80-88

Exit option; Award of UG Diploma in Major and Minor with 80-88 credits and an additional 4 credit score NSQF course /Internship OR Continue with Major and Minor



5.5	V	8(2*4)- 10(2*4+2)	4	4-6		VSC:2-4		FP/CE P:2	20-22	UG Degree
		Logistics and Supply Chain Management (4) Corporate Communication and PR (4)	Talent and Competency Management (4) Or Investment Analysis and Portfolio Management (4) Or	Strategic HRM (2) OD and Change management (2)  OR Commodity and Derivatives (2)  Innovative Financial Services (2)  OR Integrated Marketing Communication & Advertising (2) CRM (2)		Digital and Cyber Security (VSC:2)		Field project in Major/ Minor with primary data collection by students (2) (FP)		12 0- 132
		Environmental Management (2)	Product and Brand management (4)							

	VI	8(2*4)-10(2*4+2)	4	4		-	-	OJT:4	20-22	UG Degree 12 0-132
		Entrepreneurship Management (4)  Operations Research (4)  Service Sector Management (2)	Employee Compensation and Benefits (4) or Financial Markets and Institution (4) or Retail management (4)	Marketing of NPO (2) Service Marketing (2)  OR  International Finance (2) Wealth Management (2)  OR  Industrial Relations (2) Workforce Diversity and Inclusion (2)						
	CumCr	36-48	8	18-20	12	8-10 +6	8+4+2	8+6+4	120-132	

Exit option: Award of UG Degree in Major with 120-132 credits OR Continue with Major and Minor

6. 0	VII	12-14(2*4+2*2 or 3*4+2)  Strategic Management (4)  E-Commerce (4)  Business ethics (4)  + Business ethics in practice (2)	4  Global HRM (4) Or Structured Finance (4) Or International marketing (4)	RM:4					20-22	UG Honours Degree 160-176
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	VIII	12-14(2*4+2*2 or (3*4+2)  Business Analytics (4)  Conflict and Negotiati on Managem ent (4)  Design Thinking and Lateral Innovation (4)  CSR (2)	4  Organization Structure Theory and Design (4)  OR Mergers, Acquisitions and Corporate Valuations (4)  OR Marketing Research (4)					OJT:4	20-22	
	CumCr .	60-76	16	18-20 +4	12	8-10 +6	8+4+ 2	8+6+8	160- 176	

Four Year UG Honours  
Degree in Major and Minor  
with 160-176 credits

6. 0	VII	8-10 (2*4+2 or 2*4)	4	RM:4				RP:4	20-22	UG Honors with Researc h Degree 160-176
	VIII	8-10 (2*4+2 or 2*4)	4					RP:8	20-22	
	CumCr .	52-68	16	18 -20 +4	12	8-10 +6	8+4+ 2	8+6+4+ 12	160- 176	

### Semester III & IV Courses as per Approved Structure

No. of Courses	Semester III	Credits	No. of Courses	Semester IV	Credits
1	<b>Major (Mandatory)</b>				
1(A)	Business Economics	04	1(A)	Production & Total Quality Management	04
1(B)	Business Law	04	1(B)	Introduction to Research Methodology	04
2	<b>*List of Minor Courses for Semester II (Any One group from A, B or C)</b>				
2(A)	Minor A: Finance Electives		2(A)	Minor A: Finance Electives	
2(A) i	Basics of Financial Services	02	2(A) i	Risk Management	02
2(A) ii	Equity and Debt Markets	02	2(A) ii	Strategic Financial Management	02
2(B)	Minor B: Human Resources Electives		2(B)	Minor B: Human Resources Electives	
2(B) i	Recruitment and Selection	02	2(B) i	Performance Management and Career Planning	02
2(B) ii	OB & HRM	02	2(B) ii	Human Resource Planning	02
2(C)	Minor C: Marketing Electives		2(C)	Minor C: Marketing Electives	
2(C) i	Sales and Distribution Management	02	2(C) i	Tourism Marketing	02
2(C) ii	Consumer Behaviour	02	2(C) ii	Rural Marketing	02
3	<b>Vocational Skill Course (VSC)</b>				
3 (A)	Taxation Procedures and Practices	02	3 (A)	Basics of Personal Finance	02
4	<b>Ability Enhancement Course (AEC)</b>				
4 (A)	Business Etiquettes	02	4 (A)	Selling and Negotiations	02
5	<b>Co-curricular</b>				
5 (A) i	Socially or Industry relevant Field Visit and	02	5 (A) i	Community Engagement Project / NSS	02

	Activities/NSS				
5 (A) ii	Socially or Industry relevant Field Project	02	5 (A) ii	Student Clubs (Cultural/ Sports/ Entrepreneurship) and Report	02
6	Open Elective (Any one subject from following)				
6 (A)	Financial Markets Literacy 2	02	6 (A)	Stress Management	02
6 (B)	Introduction to Environmental Management	02	6 (B)	Environmental Engineering and Disaster Management	02
6 (C)	Introduction to Data Science	02	6 (C)	Ethics in practice for Students	02
6 (D)	Intellectual Property Rights and Patenting	02	6 (D)	Personality Psychology	02

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<b>Major (Mandatory)</b>	<b>17</b>
1 (A) - Business Economics	17
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<b>Minor (2 Credits) (Anyone of 2A, 2B or 2C)</b>	<b>21</b>
2 (A.1) -1. Basics of Financial Services (Minor 2)	21
2 (A.2) -2. Equity and Debt Market (Minor 2)	22
2 (B.1) - 1. Recruitment and Selection (Minor 3)	24
2 (B.2) - 2. OB and HRM (Minor 3)	25
2 (C.1) - 1. Sales & Distribution Management (Minor 1)	26
2 (C.2) - 2. Consumer Behaviour (Minor 1)	27
<b>Vocational Skill Course (2 Credits)</b>	<b>29</b>
3. Taxation Procedures and Practices (Theory)	29
<b>Ability Enhancement Course (2 Credits)</b>	<b>30</b>
4. Business Etiquettes	30
<b>Socially or Industry relevant Field Visit &amp; Project (2 + 2 Credits)</b>	<b>31</b>
5. (A.1) Socially or Industry related Field Visits & Activities	31
Socially or Industry related activities	31
5. (A.2) Socially or Industry related Field Project (2 Credits)	31
<b>Open Electives (OE) (2 Credits)</b>	<b>32</b>
6 (A) - Financial Literacy II (OE 1)	32
6 (B) - Introduction to Environmental Management	33
6 (C) - Introduction to Data Science	34
6 (D) - Intellectual Property Rights and Patenting	35
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<b>Major (Mandatory) (4 + 4 Credits)</b>	<b>37</b>
1 (A) - Production & Total Quality Management	37
1 (B) - Introduction to Research Methodology	39
<b>Minor (2 Credits Each Subject) (Anyone of 2A, 2B or 2C) (2 + 2 Credits)</b>	<b>41</b>
<b>2 A - Finance</b>	<b>41</b>
2 (A.1) -1. Risk Management (Minor 2)	41
2 (A.2) -2. Strategic Financial Management (Minor 2)	42
<b>2 B - Human Resources</b>	<b>43</b>
2 (B.1) - 1. Performance Management and Career Planning (Minor 3)	43
2 (B.2) - 2. Human Resource Planning (Minor 3)	44
<b>2 C - Marketing</b>	<b>46</b>
2 (C.1) - 1. Tourism Marketing (Minor 1)	46
2 (C.2) - 2. Rural Marketing (Minor 1)	48
<b>Skill Enhancement Course (2 Credits)</b>	<b>50</b>
3. Basics of Personal Finance	50
<b>Ability Enhancement Course (2 Credits)</b>	<b>51</b>
4. Selling and Negotiation	51
<b>Co-Curricular (2 + 2 Credits)</b>	<b>53</b>
5. (A.1) Community Engagement Project/ National Service Scheme (NSS)	53
5. (A.2) Student Clubs (Cultural/ Sports/ Entrepreneurship)	53
<b>Open Electives (OE) (2 Credits)</b>	<b>54</b>
6 (A) - Stress Management 1 (OE 1)	54
6 (B) - Environmental Engineering and Disaster Management	55
6 (C) - Ethics in practice for Students	56
6 (D) - Personality Psychology	56
<b>Scheme of Assessments for courses of 4 credits (100 Marks)</b>	<b>58</b>
<b>Scheme of Assessments for courses of 2 credits (50 Marks)</b>	<b>58</b>
<b>Scheme of Assessments for courses of 2 credits (50 Marks) Co-Curricular Course</b>	<b>58</b>

# **Semester III**



## Major (Mandatory)

### ***1 (A) - Business Economics***

(Major/ Mandatory Course - 4 Credits)

#### **Course Outcomes:**

CO1: Student should be able to define and explain the elements of economics for a managerial decision making.

CO 2: Student should be able to compare the different laws of economics and apply them in various changing situations in industry.

CO 3: Student should be able to evaluate the different market structures and situations leading towards creation of a business and economy as a whole.

#### **Course Outline:**

##### Unit 1: Introduction and Demand Analysis (15 Hours)

- Scope and Importance of Business Economics - basic tools- Opportunity Cost principle- Incremental and Marginal Concepts. Basic economic relations - functional relations: equations- Total, Average and Marginal relations- use of Marginal analysis in decision making, The basics of market demand, market supply and equilibrium price- shifts in the demand and supply curves and equilibrium
- Demand Function - nature of demand curve under different markets Meaning, significance, types and measurement of elasticity of demand (Price, income cross and promotional)- relationship between elasticity of demand and revenue concepts Demand estimation and forecasting: Meaning and significance - methods of demand estimation : survey and statistical methods (numerical illustrations on trend analysis and simple linear regression)

##### Unit 2: Supply and Production Decisions and Cost of Production (15 Hours)

- Production function: short run analysis with Law of Variable Proportions Production function with two variable inputs- isoquants, ridge lines and least cost combination of inputs- Long run production function and Laws of Returns to Scale - expansion path - Economies and diseconomies of Scale.
- Cost concepts: Accounting cost and economic cost, implicit and explicit cost, fixed and variable cost - total, average and marginal cost - Cost Output Relationship in the Short Run and Long Run (hypothetical numerical problems to be discussed), LAC and Learning curve - Break even analysis (with business applications)

### Unit 3: Market structure: Perfect competition and Monopoly and Pricing and Output Decisions under Imperfect Competition (15 Hours)

- Short run and long run equilibrium of a competitive firm and of industry - monopoly - short run and long- run equilibrium of a firm under
- Monopoly Monopolistic competition:Equilibrium of a firm under monopolistic competition, debate over role of advertising (topics to be taught using case studies from real life examples)
- Oligopolistic markets: key attributes of oligopoly - Collusive and non collusive oligopoly market - Price rigidity - Cartels and price leadership models (with practical examples)

### Unit 4: Pricing Practices (15 Hours)

- Cost oriented pricing methods: cost – plus (full cost) pricing, marginal cost pricing, Mark up pricing, discriminating pricing, multiple – product pricing - transfer pricing
- (case studies on how pricing methods are used in business world)

### ***Reference Books:***

- Mehta, P.L.: Managerial Economics – Analysis, Problem and Cases
- Hirchey .M., Managerial Economics, Thomson South western
- Salvatore, D.: Managerial Economics Principles and Worldwide Applications
- Gregory Mankiw., Principles of Economics, Thomson South western
- Samuelson & Nordhas : Economics (Tata McGraw Hill)
- Pal Sumitra, Managerial Economics cases and concepts (Macmillan)

## ***1 (B) - Business Law***

(Major/ Mandatory Course - 4 Credits)

### **Course Outcomes:**

CO 1: Understand the basic provisions of the Indian Contract Act, 1872

CO 2: Understand the basic provisions of the Sales of Goods Act, 1930

CO 3: Understand basic provisions of the Negotiable Instruments Act, 1981

CO 4: Understand the basic provisions of Consumer Protection Act, 1986

CO 5: Understand the basic provisions of Companies Act 2013

CO 6: Understand the basic provisions of Intellectual Property Rights

### **Course Outline:**

Unit 1: Contract Act, 1872 & Sale of Goods Act, 1930 (15 Hours)

- Contract Act, 1872: Essential elements of Contract; Agreement and Contract – Capacity to Contract, free consent, consideration, lawful objects/ consideration, Breach of contract. Remedies for breach of Contract.
- Sale of Goods Act, 1930: Scope of Act, Sale and Agreement to sell, essential of a valid Sale Contract – Conditions and warranties – Implied Condition and warranties, Rights of an unpaid seller.

Unit 2: Negotiable Instrument Act, 1981 & Consumer Protection Act, 1986 (15 Hours)

- Negotiable Instrument Act, 1981: Introduction of Negotiable Instruments – Characteristics of negotiable instruments, Promissory note, Bills of exchange, Cheque, Dishonour of Cheque.
- Consumer Protection Act, 1986: Objects of Consumer Protection- Introduction of Consumers, who is consumer? Meaning of the words “Goods and services” – Meaning of the words “Defects and Deficiencies of goods and services” Consumer disputes and Complaints.

Unit 3: Company Law (15 Hours)

- Company Law: What is company? – Incorporation of company – MOA, AOA, Prospectus, Meetings, Meaning of transfer and transmission of shares.
- Introduction to Companies Act 2013

#### Unit 4: Intellectual Property Rights(IPR) (15 Hours)

- Intellectual Property Rights (IPR)
- IPR definition/ objectives
- Patent definition. What is patentable? What is not patentable? Invention And its Attributes, Inventors and Applications
- Trademarks, definition, types of trademarks, infringement and passing off.
- Copyright definition and subject in which copyright exists, Originality, Meaning and Content, Authors and Owners, Rights and Restrictions.
- Geographical indications (only short notes)

#### ***Reference Books:***

- Elements of mercantile Law – N.D.Kapoor
- Business Law – P.C. Tulsian
- Business Law – SS Gulshan
- Company Law – Dr.Avtar Singh
- Indian contract Act – Dr.Avtar Singh
- Law of Intellectual Property-V.K.Taraporevala

## **Minor (2 Credits) (Anyone of 2A, 2B or 2C)**

### **2 A - Finance**

#### **2 (A.1) -1. Basics of Financial Services (Minor 2)**

##### **Course Outcomes:**

CO1: Student should be able to explain the nature and scope of various types of financial services.

CO2: Student should be able to describe of regulatory environment surrounding the financial services.

CO3: Student should be able to illustrate the role SEBI, RBI and Banks in Financial system

CO4: Student should be able to illustrate the role of NBFCs, Mutual Funds, Insurance companies and Merchant Banking Firms

##### **Course Outline:**

##### **Unit I: Financial System and Services (15 Hours)**

- An overview of Financial System, Financial Markets, Structure of Financial Market (Organised and Unorganized Market), Components of Financial System, Major Financial Intermediaries, Financial Products, Function of Financial System, Regulatory Framework of Indian Financial System(Overview of SEBI and RBI-Role and Importance as regulators).

##### **Unit II: Commercial Banks, RBI, Development Banks**

- Concept of Commercial Banks- Functions, Investment Policy of Commercial Banks, Liquidity in Banks, Asset Structure of Commercial Banks, Non-Performing Assets, Interest Rate reforms, Capital Adequacy Norms.
- Reserve Bank of India-Organisation & Management, Role And Functions
- Development Banks-Characteristics of Development Banks, Need And Emergence of Development Financial Institutions In India, Function of Development Banks
- Introduction to NBFCs, Mutual Funds, Insurance companies and Merchant Banking Firms

##### **Reference Books:**

- Khan M.Y., Indian Financial System, Tata McGraw Hill Publishing Company

- Varshney P.N. & Mittal MN, Financial System, Sultan Chand & Co
- A. Avadhani , Marketing of Financial Services
- Bhole L. M: Financial Markets and Institutions; Tata McGraw-Hill Publishing Company, New Delhi. 5. Chandra Prasanna: Financial Management: Theory and Practice; Tata McGraw Hill, New Delhi.
- Gupta Suraj B: Monetary Economics; S. Chand and Co., New Delhi.

## **2 (A.2) -2. Equity and Debt Market (Minor 2)**

### **Course Outcomes:**

CO1: Student should be able to outline the evolution of primary market and secondary equity and debt market

CO2: Students should be able to list the primary issue functions in Equity and Debt Market

CO3: Student should be able to describe various active stock exchanges in the Indian and overseas markets

CO4: Student should be able to discuss players in Equity and Debt Market

### **Course Outline:**

#### **Unit I: Introduction to Equity & Debt Market (15 Hours)**

- Shares- Meaning, types, advantages, limitations Debentures- Meaning, types, advantages, limitations Public Deposits- Meaning, advantages, limitations Borrowing from banks- types of loans, advantages, limitations
- Reserves and surplus, bonus shares, retained earnings, Dividend policy, Role of Depreciation, Importance, advantages and limitations of these sources
- Equity market – meaning & definitions of equity share; Growth of Corporate sector & simultaneous growth of equity shareholders; divorce between ownership and management in companies; development of Equity culture in India & current position.
- Debt market – Evolution of Debt markets in India; Money market & Debt markets in India; Regulatory framework in the Indian Debt market.

#### **Unit II: Dynamics of Equity & Debt Market**

- Primary: 1)IPO – methods followed (simple numerical) 2) Book building 3)Role of merchant bankers in fixing the price 4)Red herring prospectus – unique features 5)Numerical on sweat equity, ESOP & Rights issue of shares
- Secondary: 1)Definition & functions of stock exchanges 2)Evolution & growth of stock exchanges 3)Stock exchanges in India 4)NSE, BSE, OTCEI & overseas stock exchanges 5)Recent developments in stock exchanges 6)Stock market Indices
- Players in debt markets: 1)Govt. securities 2)Public sector bonds & corporate bonds 3)open market operations 4)Security trading corp. of India 5)Primary dealers in Govt. securities
- Bonds: 1)Features of bonds 2)Types of bonds

***Reference Books:***

- Allen, Larry (1970-2000). The Global Financial System.
- Ian H. Giddy (1994). Global Financial Markets. Houghton Mifflin.
- Saunders, Anthony & Cornett, Marica Millon. Financial markets & institutions: A modern perspective: TMH
- LM Bhole. Financial institutions & markets: Structure, growth & innovations. TMH (5th ed.)
- Chandra, P. (2011). Corporate Valuation and Value Creation, (1st ed). TMH



## **2 B - Human Resources**

### **2 (B.1) - 1. Recruitment and Selection (Minor 3)**

#### **Course Outcomes:**

CO1: Student should be able to describe the importance and centrality of recruitment and selection to an organization's HR System.

CO2: Student should be able to list and describe the sources of recruitment

CO3: Student should be able to describe the techniques of recruitment

CO4: Student should be able to list and explain the steps in developing an effective and valid selection interview.

CO5: Student should be able to describe the various selection tools

#### **Course Outline:**

##### **Unit I: Recruitment**

- Concepts of Recruitment- -Meaning, Objectives, Scope & Definition, Importance and relevance of Recruitment
- Source or Type of Recruitment– a) Direct/Indirect, b)Internal/ External. Internal-Notification, Promotion– Types, Transfer –Types, Reference External-Campus Recruitment, Advertisement, Job Boards Website/Portals, Internship, Placement Consultancies-Traditional (InHouse, Internal Recruitment, On Campus, Employment And Traditional Agency). Modern (Recruitment Books, Niche Recruitments, Internet Recruitment, Service Recruitment, Website and Job, Search Engine, Social Recruiting and Candidate Paid Recruiters).
- Technique of Recruitment-Traditional Vs Modern Recruitment
- Evaluation of Recruitment-Outsourcing Programme

##### **Unit II: Selection**

- Selection-Concept of Selection, Criteria for Selection, Process, Advertisement and Application (Blank Format).
- Screening-Pre and Post Criteria for Selection, Steps of Selection
- Interviewing-Types and Guidelines for Interviewer & Interviewee, Types of Selection Tests, Effective Interviewing Techniques.
- Selection Hurdles and Ways to Overcome Them

#### **Reference Books:**

- Dipak Kumar Bhattacharya - Human Resource Management

- Arun Monappa- Managing Human Resource .
- C.B. Memoria -Personnel Management
- Armstrong, Michael & Baron Angela. (2005).Handbook of Strategic HRM (1st ed.). New Delhi: Jaico Publishing House.
- Mello, Jeffrey A. (2007). Strategic Human Resource Management (2nd ed.). India: Thomson South Western.

## **2 (B.2) - 2.OB and HRM (Minor 3)**

### **Course Outcome:**

CO1: Understand different concepts of Organisational Behaviour and Process involved in managing Human Capital

CO2: Analyse the key elements of Organisational Behaviour i.e., individual, group and the organisation

CO3: Critically analyse the concepts of Human Resource Management

CO4: Describe and design HR Plans, Training Programs, Recruitment functions etc.

CO5: Work upon their own personalities, interpersonal relationships and develop the sense of organisational citizenship behaviour

### **Course Outline:**

#### **Unit I: Organisational Behaviour-I**

- Introduction to Organizational Behaviour-Concept, definitions, Evolution of OB
- Importance of Organizational Behaviour-Cross Cultural Dynamics, Creating Ethical Organizational Culture & Climate
- Individual and Group Behaviour-OB models–Autocratic, Custodial, Supportive, Collegial & SOBC in context with Indian OB
- Human Relations and Organizational Behaviour

#### **Unit II: Human Resource Management-I**

- HRM-Meaning, objectives, scope and functions
- HRP-Definition, objectives, importance, factors affecting HRP, Process of HRP, Strategies of HRM , Global HR Strategies
- HRD-Concept ,meaning, objectives, HRD functions

### **Reference Books:**

- Griffin, Ricky W: Organizational Behaviour, Houghton Mifflin Co., Boston.
- Prasad L M, Organizational Behaviour, Sultan Chand
- Khanka S. S., Organizational Behaviour, S. Chand
- P.L. Rao-International Human Resource
- Ivancevich; John and Micheol T. Matheson: Organizational Behaviour and

Management, Business Publication Inc., Texas.

- Koontz, Harold, Cyril O'Donnell, and Heinz Weihrich: Essentials of management, Tata McGraw-Hill, New Delhi.
- Luthans, Fred: Organizational Behaviour, McGraw-Hill, New York.

## **2 C - Marketing**

### **2 (C.1) - 1. Sales & Distribution Management (Minor 1)**

#### **Course Outcome:**

CO1: To understand the roles and responsibilities of sales function

CO2: To describe the basics of sales management

CO3 : To explain the distribution channel

CO4: : To plan and an effective distribution management policy

#### **Course Outline:**

##### **Unit 1: Introduction To Sales & Distribution Management**

- Sales Management:
- Meaning, Role of Sales Department, Evolution of Sales Management • Interface of Sales with Other Management Functions
- Qualities of a Sales Manager
- Sales Management: Meaning, Developments in Sales Management Effectiveness to Efficiency, Multidisciplinary Approach, Internal Marketing, Increased Use of Internet, CRM, Professionalism in Selling. • Structure of Sales Organization – Functional, Product Based, Market Based, Territory Based, Combination or Hybrid Structure
- Distribution Management:
- Meaning, Importance, Role of Distribution, Role of Intermediaries, Evolution of Distribution Channels.

##### **Unit 2: Distribution Channel Management, Management of Distribution Channel :**

- Meaning & Need
- Channel Partners- Wholesalers, Distributors and Retailers & their Functions in Distribution Channel, Difference Between a Distributor and a Wholesaler
- Choice of Distribution System – Intensive, Selective, Exclusive
- Factors Affecting Distribution Strategy – Locational Demand, Product Characteristics, Pricing Policy, Speed or Efficiency, Distribution Cost
- Channel Design & Policy
- Channel Conflicts : Meaning, Types

#### **Reference Books:**

- Nag, Sales And Distribution Management, Mcgraw Hill
- Richard R. Still, Edward W. Cundiff, Norman A.P. Govoni, Sales Management,

Pearson Education

- Krishna K. Havaladar, Vasant M. Cavale, Sales And Distribution Management – Text & Cases, Mcgraw Hill Education
- Dr.Matin Khan, Sakes And Distribution Management, Excel Books
- Kotler & Armstrong, Principles Of Marketing – South Asian Perspective, Pearson Education

## **2 (C.2) - 2. Consumer Behaviour (Minor 1)**

### **Course Outcomes:**

CO1: Able to explain the basic concepts and models of consumer behavior.

CO2: Able to analyze the effects of psychological, socio-cultural and demographic factors on the consumer decision process with their results.

CO3: Able to distinguish the relationship between consumer behavior and marketing practices.

CO4: Able to define the importance of consumer behavior for businesses

CO5: Able to define the importance of group effects in consumer behavior

### **Course Outline:**

#### **Unit 1: Introduction To Consumer Behaviour**

- Meaning of Consumer Behaviour, Features and Importance
- Types of Consumer (Institutional & Retail), Diversity of consumers and their behaviour- Types Of Consumer Behaviour
- Profiling the consumer and understanding their needs
- Consumer Decision Making Process and Determinants of Buyer
- Behaviour, factors affecting each stage, and Need recognition.

#### **Unit 2: Environmental Determinants of Consumer Behaviour & Consumer decision making models and New Trends**

- Family Influences & Social Class Influences on Buyer Behaviour
- Group Dynamics & Consumer Reference Groups, Social Class & Consumer Behaviour - Reference Groups, Opinion Leaders and Social Influences, role of opinion leaders in diffusion of innovation and in purchase process.
- Cultural Influences on Consumer Behaviour Understanding cultural and subcultural influences on individual, norms and their role, customs, traditions and value system.
- Diffusion of innovations, Process of Diffusion and Adoption, Innovation, Decision process, Innovator profiles
- E-Buying behaviour The E-buyer vis-a vis the Brick and Mortar buyer, Influences on E-buying

### **Reference Books:**

- Schiffman, L.G., Kanuk, L.L., & Kumar, S.R - Consumer Behaviour

- Solomon, M.R. - Consumer Behaviour – Buying, Having, and Being.
- Blackwell, R.D., Miniard, P.W., & Engel, J. F. - Consumer Behaviour. New Delhi: Cengage Learning.
- Hawkins, D.I., Best, R. J., Coney, K.A., & Mookerjee, A. - Consumer Behaviour – Building Marketing Strategy
- Loudan, David L and Bitta, A.J. Della Consumer Behaviour
- Kotler, P. & Keller, K. L. - Marketing Management (Global Edition)
- Nair, Suja R- Consumer Behaviour in Indian Perspective



## **Vocational Skill Course (2 Credits)**

### ***3. Taxation Procedures and Practices (Theory)***

#### **Course Outcomes:**

CO1- Acquire knowledge regarding the basic concepts of Income Tax

CO2- Able to compute the income from salary and house property

CO3- Understand the basic concepts of the Goods and Services Tax

CO4 - Understand about the powers of GST authorities regarding inspection, search and seizure

#### **Course Outline:**

Unit I: Basic Concepts and Definitions under IT Act

- Basic Concepts and Definitions under IT Act: Assessee, Previous year, Assessment year, Person, Income, Sources of income, Heads of income, Gross total income, Total income, Maximum marginal rate of tax, Tax Evasion, Tax avoidance and Tax planning

Unit II: Basic Concepts of INDIRECT TAX (GOODS & SERVICE TAX (GST))

- Nature of GST
- Taxes Submerged in GST
- Laws under GST- Central GST - State GST - Union Territories GST - Integrated GST
- Applicability of GST

#### ***Reference Books:***

- Income Tax Direct Taxes Ready Reckoner by Dr. V.K Singhania.
- Income Tax by Mr. Sanghvi. Income Tax by Mrs. Ainapure.
- Direct Taxes Law & Practice by Dr. V.K Singhania.
- GST GST Ready Reckoner by V.S Datey.
- GST Made Easy by Arpit Hidia.
- Indirect Tax Laws by S.K Mishra.

## **Ability Enhancement Course (2 Credits)**

### **4. *Business Etiquettes***

#### **Course Outcomes:**

CO1: Demonstrate an understanding of professionalism in terms of workplace behaviors and workplace relationships.

CO2: Adopt attitudes and behaviors consistent with standard workplace expectations.

CO3: Presenting oneself with finesse and making others comfortable in a business setting.

CO4: Developing basic life skills or etiquettes in order to succeed in corporate culture.

#### **Course Outline:**

##### **Unit I: Introduction to Business Etiquettes**

- Business Etiquettes- An Overview: Significance of Business Etiquettes in 21st Century Professional Advantage; Need and Importance of Professionalism
- Workplace Etiquette: Etiquette for Personal Contact- Personal Appearance, Gestures, Postures, Facial Expressions, Eye-contact, Space distancing
- E-Mail Etiquette: Significance of Netiquette, E-mail: Way of professional communication, Basic Email Etiquettes: Proper Grammar, Spelling, Punctuation, Styling and Formatting, Body of Email, Response, Privacy

##### **Unit II: Telephone, Dining Etiquettes and Multicultural Challenges**

- Telephone Etiquette: Telephone Communication Techniques -Placing Telephone calls, Answering Calls, Transferring Calls, Putting Calls on Hold, Taking Messages, Handling Rude Callers, Tactful Responses, Leaving Professional Messages; Developing Cell Phone Etiquettes; Voicemail Etiquette; Telephonic Courtesies
- Dining Etiquette: Basics of Dining Etiquettes; Basic essentials of dining table etiquettes - Napkin Etiquette, Seating arrangements, laying the table, how to use Cutlery, Posture & Behavior, Do's and Don'ts; International Dining Etiquettes.
- Multi-Cultural Challenges: Cultural Differences and their Effects on Business Etiquette

#### **Reference Books:**

- Barbara Pachter, Marjorie Brody. Complete Business Etiquette Handbook. Prentice Hall, 2015.
- Dhanavel, S.P. English and Soft Skills. Hyderabad: Orient BlackSwan, 2021.
- Koneru, Aruna. Professional Communication. Delhi: McGraw, 2008.
- Mahanand, Anand. English for Academic and Professional Skills. Delhi: McGraw,

2013. Print.

- Nancy Mitchell. Etiquette Rules : A Field Guide to Modern Manners. Wellfleet Press, 2015.
- Rani, D Sudha, TVS Reddy, D Ravi, and AS Jyotsna. A Workbook on English Grammar and Composition. Delhi: McGraw, 2016.
- Raghu Palat, Indian Business Etiquette, Jaico Books, 2015.
- Rizvi, M. Ashraf. Effective Technical Communication. Delhi: McGraw, 2018.
- Pease, Allan and Barbara Pease. The Definitive Book of Body Language. New Delhi: Manjul Publishing House, 2005.
- Tengse, Ajay R. Soft Skills: A Textbook for undergraduates, Orient BlackSwan, 2015.

**Socially or Industry relevant Field Visit & Project (2 + 2 Credits)**

## **5. (A.1) Socially or Industry related Field Visits & Activities**

### **Course Outcomes:**

- To identify practices in prospective area of work like marketing, finance, etc.
- To enhance interpersonal skills.
- To observe and list best practices opted by different companies for similar work.
- To develop critical thinking related to management of social and industrial problems.

### **Course Outline:**

Socially or Industry related activities

Students need to organise and participate in Socially or Industry related activities, Such as

- Guest Lectures
- Visits to Various Industries/Corporates/or NGOs
- Industry or Social relevant projects
- The institute will assign a faculty for leading this activity
- The evaluation of the course will be based on the report submitted by the student followed by viva-voce examination
- 25 marks for viva/presentation and 25 marks for participation in activities

## **5. (A.2) Socially or Industry related Field Project (2 Credits)**

### **Course Outcome:**

- To identify practices in prospective area of work like marketing, finance, etc.
- To enhance interpersonal skills.
- To observe and list best practices opted by different companies for similar work.
- To develop critical thinking related to management of social and industrial problems.

### **Course Outline:**

- Students need to complete primary data based field projects in Social or Industry relevant areas.
- The institute will assign a faculty mentor
- Students will submit Field Project Report of minimum 40-50 pages
- The evaluation of the course will be based on the project report submitted by the student followed by viva-voce examination
- 25 marks external examiner for viva/presentation and 25 marks for report by Faculty Mentor

## Open Electives (OE) (2 Credits)

### **6 (A) - *Financial Literacy II (OE 1)***

#### **Course Outcome:**

CO1: To Recognize the importance of one's financial situation and how it impacts their future

CO2; To Understand the fundamentals of a budget, including income, expenses, and savings.

CO3: To Discuss the implications of credit.

#### **Course Outline:**

##### Unit 1 :

##### Investment Planning and Management

- Investment opportunity and financial products
- Insurance Planning: Life and non-life including medical insurance schemes deposit accounts, Formalities to open various types of bank accounts, KYC norms. Various types of Loans: Short-term, Medium term and Long term loans. Cashless banking, e-banking, ATM, Debit and Credit cards, banking Complaints.

##### Unit 2

##### Personal Tax

- Introduction to basic Tax Structure in India for personal taxation
- Aspects of Personal tax planning
- Exemptions and deductions for individuals
- e-filing

#### References:

- Introduction to Financial Planning (4th Edition 2017)- Indian Institute of Banking 27 & Finance.
- Sinha, Madhu. Financial Planning: A Ready Reckoner July 2017, McGraw Hill.
- Halan, Monika, Lets Talk Money: You've Worked Hard for It, Now Make It Work for You, July 2018 Harper Business.
- Pandit, Amar The Only Financial Planning Book that You Will Ever Need, Network 18 Publications Ltd.

## **6 (B) - Introduction to Environmental Management**

### **Course Outcomes:**

CO1: provide definitions of environment, management, systems and organisations in relation to environmental management

CO2: describe organisations as systems and their role in environmental management

CO3: understand the usefulness of systems thinking in relation to environmental management in organisations

CO4: explain how environmental management can be used as environmental protection and how organisations can define and manage risk.

### **Course Outline:**

#### **Unit I:**

- Environment - Structure and components - Typology - Natural and Human
- Ecosystem as part of Environment - Functioning and Levels of Organization - Linkage with society and economy.
- Emerging issues of development - Environment as a source and depository of resource, products and waste.
- Sustainable use of resource - a multidisciplinary approach Importance of Environmental Studies.
- Environment - Structure and components - Typology - Natural and Human
- Ecosystem as part of Environment - Functioning and Levels of Organization - Linkage with society and economy.
- Emerging issues of development - Environment as a source and depository of resource, products and waste.
- Sustainable use of resource - a multidisciplinary approach Importance of Environmental Studies.

#### **Unit II:**

- Man environment relationship - Changing patterns - Role of technology.
- Contemporary trends of growth and distribution of world population.
- Challenges of population growth, Carrying capacity of Environment - Human Development Index as a measures of development - Patterns of human development in India.
- Environment and human health (a case study)
- Environmental problems - Causes and Effects.
- Global issues - Global climate changes, Trans - boundary movement of hazardous waste, Threats to Biodiversity (a case study)
- Regional issues - Acid rain, Desertification (a case study)
- Local issues - related to CRZ implementation, Solid waste disposal (garbage, bio-medical waste, e-waste), Flooding of low lying areas, Special Economic Zone (a case study)
- Major environmental movements in India - Role of public opinion in environmental protection - Green Business and Green Consumption.

***Reference Books:***

- Environmental Engineering & Disaster Management, by Ameta Suresh (Author), Durgawat Kiran (Author), Mehta Rajeev (Author)
- Objective Environmental Studies and Disaster Management by M. Prasanthrajan & A. Balasubramanian

## ***6 (C) - Introduction to Data Science***

### **Course Outcomes:**

CO1: Building the fundamentals of data science.

CO2: Imparting design thinking capability to build big-data

CO3: Gaining practical experience in programming tools for data sciences

CO4: Empowering students with tools and techniques used in data science

### **Course Outline:**

#### **Unit I:**

- What is Data science? Data Science life cycle ,Datafication, Exploratory Data Analysis, The Data science process, A data scientist role in this process.
- Data Preprocessing: Data Loading, Storage, and File Formats - Reading and Writing data in text format, binary data formats, interacting with html and web apis, interacting with databases; Data Wrangling: Clean, Transform, Merge, Reshape - Combining and Merging Data Sets, Reshaping and Pivoting, Data Transformation. String Manipulation; Data Aggregation.

#### **Unit II:**

- Introduction to Python: Features of Python, Data types, Operators, Input and output, Control Statements. Strings: Creating strings and basic operations on strings, string testing methods. Lists, Dictionaries, Tuple

### ***Reference Books:***

- Wes McKinney - Python for Data Analysis
- Rachel Schutt & O'neil, "Doing Data Science"
- Python For Data Analysis - O Reilly, Wes Mckinney
- Python: The Complete Reference, Martin C. Brown - McGraw Hill Education
- Joel Grus, "Data Science from Scratch: First Principles with Python"
- Matt Harrison, "Learning the Pandas Library: Python Tools for Data Munging, Analysis, and Visualization"



## **6 (D) - Intellectual Property Rights and Patenting**

### **Course Outcomes:**

CO1: Identify different types of Intellectual Properties (IPs), the right of ownership, scope of protection as well as the ways to create and to extract value from IP.

CO2: Recognize the crucial role of IP in organizations of different industrial sectors for the purposes of product and technology development.

CO3: Identify activities and constitute IP infringements and the remedies available to the IP owner and describe the precautions steps to be taken to prevent infringement of proprietary rights in products and technology development.

CO4: Be familiar with the processes of Intellectual Property Management (IPM) and Patents

### **Course Outline:**

#### **Unit I:**

- Meaning of IPR, Different category of IPR instruments - Patents, Trademarks, Copyrights, Industrial Designs, Plant variety protection, Geographical indications, Transfer of technology etc.
- Importance of IPR in Modern Global Economic Environment: Theories of IPR, Philosophical aspects of IPR laws, Need for IPR, IPR as an instrument of development
- Introduction, Magnitude of problem, Factors that create and sustain counterfeiting/piracy, International agreements, International organizations (e.g. WIPO, WTO) active in IPR enforcement Indian Scenario of IPR: Introduction, History of IPR in India, Overview of IP laws in India, Indian IPR, Administrative Machinery, Major international treaties signed by India, Procedure for submitting patent and Enforcement of IPR at national level etc.

#### **Unit II:**

- Definition of Patents, Conditions of patentability, Patentable and non-patentable inventions, Types of patent applications (e.g. Patent of addition etc), Process Patent and Product Patent, Precautions while patenting, Patent specification Patent claims, Disclosures and non-disclosures, Patent rights and infringement, Method of getting a patent
- Procedure for Filing a Patent (National and International): Legislation and Salient Features, Patent Search, Drafting and Filing Patent L1, L2, L3 Applications, Processing of patent, Patent Litigation, Patent Publication etc, Time frame and cost, Patent Licensing, Patent Infringement Patent databases: Important websites, Searching international databases

### **Reference Books:**

- Patent system and related issues at a glance, Keayla B K, National Working Group
- Intellectual Property Rights in India - V.K. Ahuja.
- A Complete Manual on Intellectual Property Rights & Cyber Laws in India Paperback - Dr. Anusuya Yadav (Author)

# Semester IV

## **Major (Mandatory) (4 + 4 Credits)**

### ***1 (A) - Production & Total Quality Management***

(Major/ Mandatory Course - 4 Credits)

#### **Course Outcomes:**

CO1: Student should be able to list basic management decisions related to production and quality management

CO2: Student should be able to describe Material Management; various techniques Inventory Management and numerical sums related to EOQ, Lead Time, Reorder Level and Safety of Stock.

CO3: Student should be able to explain the Basics of Productivity and TQM and various Product and Service Quality, SERVQUAL.

CO3: Student should be able to explain Learners will identify ISO 9000, ISO 1400, QS9000, Malcolm Baldrige, National Quality Award and Deming's Application Prize.

#### **Course Outline**

##### **Unit 1: Production Management (15 Hours)**

- Objectives, Components–Manufacturing systems: Intermittent and Continuous Production Systems.
- Product Development, Classification and Product Design.
- Plant location & Plant layout– Objectives, Principles of good product layout, types of layout.
- Importance of purchase management.

##### **Unit 2: Materials Management (15 Hours)**

- Concept, Objectives and importance of materials management Various types of Material Handling Systems.
- Inventory Management: Importance–Inventory Control Techniques ABC, VED, FSN, GOLF, XYZ, SOS, HML. EOQ: Assumptions limitations & advantages of Economic Order Quantity, Simple numerical on EOQ , Lead Time, Reorder Level, Safety Stock.

##### **Unit 3: Basics Of Productivity & TQM (15 Hours)**

- Concepts of Productivity, modes of calculating productivity. Importance Of Quality Management, factors affecting quality; TQM– concept and importance, Cost of Quality, Philosophies and Approaches To Quality: Edward Deming, J. Juran , Kaizen , P. Crosby's philosophy.

- Product & Service Quality Dimensions, SERVQUAL Characteristics of Quality, Quality Assurance, Quality Circle : Objectives Of Quality Circles, Ishikawa Fish Bone, Applications in Organizations. Simple numerical on productivity

#### Unit 4: **Quality Improvement Strategies & Certifications** (15 Hours)

- Lean Thinking, Kepner Tregor Methodology of problem solving, Sigma features, Enablers, Goals, DMAIC/DMADV.
- Taguchi's Quality Engineering, ISO 9000, ISO 1400, QS9000. Malcolm Baldrige National Quality Award(MBNQA), Deming's Application Prize.

#### ***Reference Books:***

- Production and Operations Management: R. Paneerselvam
- Production (Operations) Management: L.C. Jhamb
- K. Ashwathappa and K .Shridhar Bhatt ; Production and Operations management
- Productivity Management: Concepts and Techniques, Sawhney S.C., Tata McGraw Hill
- Srinivas Gondhalekar and Uday Salunkhe, "Productivity Techniques", Himalaya Publishing House
- Gerard Leone and Richard D. Rahn, "Productivity Techniques", Jaico Book House
- John S. Oakland, "TQM: Text with Cases", Butterworth-Heinemann
- David J. Sumanth, "Total Productivity Management (TPmgt): A systematic and quantitative approach to compete in quality, price and time", St. Lucie Press

## ***1 (B) - Introduction to Research Methodology***

(Major/ Mandatory Course -4 Credits)

### **Course Outcome:**

CO1: Student should be able to understand and comprehend the basics in research methodology and applying them in research/ project work.

CO2: This course will help them to select an appropriate research design. W

CO3: students will be able to take up and implement a research project/ study.

CO4: Student should be able to collect the data, edit it properly and analyse it accordingly.

CO5: Student should be able to develop skills in qualitative and quantitative data analysis and presentation.

### **Course Outline:**

#### **Unit 1: Introduction to Business Research Methods (15 Hours)**

- Meaning and objectives of research
- Types of research– a)Pure, Basic and Fundamental b) Applied, c)Empirical d) Scientific & Social e)Historical f) Exploratory g) Descriptive h)Causal
- Concepts in Research: Variables, Qualitative and Quantitative Research
- Stages in the research process.
- Characteristics of Good Research
- Hypothesis-Meaning, Nature, Significance, Types of Hypothesis, Sources.
- Research design– Meaning, Definition, Need and Importance, Steps in research design, Essentials of a good research design, Areas / Scope of research design and Types-Descriptive, Exploratory and causal.
- Sampling– a) meaning of sample and sampling, b) methods of sampling-i)Non Probability Sampling– Convenient, Judgment, Quota, Snowball ii) Probability– Simple Random, Stratified, Cluster, Multi Stage.

#### **Unit 2: Data Collection and Processing (15 Hours)**

- Types of data and sources-Primary and Secondary data sources
- Methods of collection of primary data
- a) Observation- i)structured and unstructured, ii) disguised and undisguised, iii)mechanical observations (use of gadgets)

- b) Experimental i)Field ii) Laboratory
- c) Interview – i) Personal Interview ii)focused group, iii) in- depth interviews - Method,
- d) Survey– Telephonic survey, Mail, E-mail, Internet survey, Social media, and Media listening.
- e) Survey instrument– i) Questionnaire designing.
- f) Types of questions– i) structured/ close ended and ii) unstructured/ open ended, iii) Dichotomous iv) Multiple Choice Questions.
- g) Scaling techniques -i) Likert scale, ii) Semantic Differential scale

### Unit 3: **Data analysis and Interpretation** (15 Hours)

- Processing of data– i) Editing- field and office editing, ii)coding– meaning and essentials, iii) tabulation – note
- Analysis of data-Meaning, Purpose, types.
- Interpretation of data-Essentials, importance and Significance of processing data
- Multivariate analysis– concept only
- Testing of hypothesis– concept and problems– i)chi square test, ii) Zandt-test (for large and small sample)

### Unit 4: **Advanced techniques in Report Writing** (15 Hours)

- Report writing – i) Meaning , importance, functions of reports, essential of a good report, content of report , steps in writing a report, types of reports, Footnotes and Bibliography
- Ethics and research
- Objectivity, Confidentiality and anonymity in Research
- Plagiarism

### **Reference Books:**

- Research for Marketing Decisions Paul E. Green, Donald S. Tull
- Marketing Research- Text and Cases Harper W. Boyd Jr. , Ralph Westfall.

- Research methodology in Social sciences, O.R.Krishnaswamy, Himalaya Publication
- Business Research Methods, Donald R Cooper, Pamela Schindler, Tata McGraw Hill
- Marketing research and applied orientation, Naresh K Malhotra, Pearson
- Statistics for management, Levin and Reuben, Prentice Hall.
- Research Methods for Management: S Shajahan, Jaico Publishing

## **Minor (2 Credits Each Subject) (Anyone of 2A, 2B or 2C) (2 + 2 Credits)**

### **2 A - Finance**

#### **2 (A.1) -1. Risk Management (Minor 2)**

##### **Course Outcomes:**

CO1: Student should be able to list the range of financial and financial related risks facing organisations

CO2: Student should be able to describe approaches to risk management through risk identification, risk measurement and risk management

CO3: Risk Management V/s Enterprise Risk Management

##### **Course Outline:**

###### **Unit I: Introduction (15 Hours)**

- Definition, Risk Process, Risk Organization, Key Risks –Interest, Market, Credit, Currency, Liquidity, Legal, Operational
- Risk Management V/s Risk Measurement – Managing Risk, Diversification, Investment Strategies and Introduction to Quantitative Risk Measurement and its Limitations
- Principals of Risk - Alpha, Beta, R squared, Standard Deviation, Risk Exposure Analysis, Risk Immunization, Risk and Summary Measures –Simulation Method, Duration Analysis, Linear and other Statistical Techniques for Internal Control

###### **Unit II: Risk Hedging Instruments and Mechanism and Enterprise Risk Management:**

- Forwards, Futures, Options, Swaps and Arbitrage Techniques, Risk Return Trade off, Markowitz Risk Return Model, Arbitrage Theory, System Audit Significance in Risk Mitigation
- Risk Management V/s Enterprise Risk Management, Integrated Enterprise Risk Management, ERM Framework, ERM Process, ERM Matrix, SWOT Analysis, Sample Risk Register

##### **Reference Book:**

- Thomas S. Coleman, Quantitative Risk Management : A Practical Guide to Financial Risk
- Steve Peterson, Investment Theory and Risk Management
- Risk Management , M/s Macmillan India Limited



- Theory & Practice of Treasury Risk Management: M/s Taxman Publications Ltd.
- Sim Segal, Corporate Value of ERM
- Dr. G Kotreshwar, Risk Management : Insurance and Derivatives, Himalaya Publishing House

## **2 (A.2) -2. Strategic Financial Management (Minor 2)**

### **Course Outcomes:**

CO1: Student should be able to explain financial strategy and control of a company.

CO2: Student should be able to describe the relevance of risk and uncertainty in making strategic decisions.

CO3: Student should be able to explain various aspects of capital budgeting.

CO4: Student should be able to apply learning in simple problems of capital budgeting, capital structure, dividend policy

### **Course Outline:**

Unit I: Dividend Decision and Capital Structure Decisions (15 Hours)

- a) Dividend Decision:  
Meaning and Forms of Dividend, Dividend-Modigliani and Miller's Approach, Walter Model, Gordon Model, Factors determining Dividend Policy, Types of Dividend Policy
- b) Capital structure decisions EBIT, EPS analysis

Unit II: Capital Budgeting and Capital Rationing

- a) Capital Budgeting:
  - Risk and Uncertainty in Capital Budgeting, Risk Adjusted Cut off Rate, Certainty Equivalent Method, Sensitivity Technique, Probability Technique, Standard Deviation Method, Co-efficient of Variation Method, Decision Tree Analysis, Construction of Decision Tree.
- b) Capital Rationing:
  - Meaning, Advantages, Disadvantages, Practical Problems

### **Reference Books:**

- C. Paramasivan & T. Subramanian, Financial Management
- IM Pandey, Financial Management
- Ravi Kishor, Financial Management
- Khan & Jain, Financial Management
- Van Horne & Wachowiz, Fundamentals of Financial Management
- Prasanna Chandra, Strategic Financial Management

## **2 B - Human Resources**

### **2 (B.1) - 1. Performance Management and Career Planning (Minor 3)**

#### **Course Outcomes:**

CO1: Student should be able to explain performance management process

CO2: Student should be able to assess performance management approach

CO3: Student should be able to create structure of a performance management system

CO4: Student should be able to explain various aspects of career planning and development process in relation to employee development program

#### **Course Outline:**

##### **Unit I: Performance Management – An Overview:**

- Performance Management– Meaning, Features, Components of Performance Management, Evolution, Objectives, Need and Importance, Scope, Performance Management Process, Prerequisites of Performance Management, Linkage of Performance Management with other HR functions, Performance Management and Performance Appraisal, Performance Management Cycle
- Best Practices in Performance Management, Future of Performance Management.
- Role of Technology in Performance Management

##### **Unit II: Career Planning and Development**

- Career Planning - Meaning, Objectives, Benefits and Limitations, Steps in Career Planning, Factors affecting Individual Career Planning, Role of Mentor in Career Planning, Requisites of Effective Career Planning
- Career Development – Meaning, Role of employer and employee in Career Development, Career Development Initiatives
- Role of Technology in Career Planning and Development
- Career Models – Pyramidal Model, Obsolescence Model, Japanese Career Model
- New Organizational Structures and Changing Career Patterns

#### **Reference Books:**

- Shashi K. Gupta, Rosy Joshi, Human Resource Management, Kalyani Publishers
- Armstrong, Michael, Baron, Performance Management, Jaico Publishers

- Robert Bacal, Performance Management, McGraw-Hill Education
- T.V. Rao, Performance Management and Appraisal Systems: HR Tools for Global Competitiveness, Response Books, New Delhi
- Davinder Sharma, Performance Appraisal and Management, Himalaya Publishing House. A.S. Kohli, T.De
- b, Performance Management, Oxford University Press.
- Herman Aguinis, Performance Management, Second edition, Pearson Education.

## ***2 (B.2) - 2.Human Resource Planning (Minor 3)***

### **Course Outcomes:**

CO1: Demonstrate an understanding of key terms, theories/concepts and practices within the field of HRP

CO2: Demonstrate competence in development and problem-solving in the area of HRP

CO3: Describe process of HRP and barriers in its effective implementation

CO4: Demonstrate an understanding of key terms, theories/concepts and practices of Job Analysis, Recruitment and Selection

### **Course Outline:**

#### **Unit I: Overview of Human Resource Planning (HRP)**

- Overview of Human Resource Planning (HRP): Human Resource Planning–
- Meaning, Features, Scope, Approaches, Levels of HRP, Types, Tools, Activities for HRP, Requirements for Effective HR Planning.
- Process of HRP- Steps in HRP, HR Demand Forecasting–Factors, Techniques – (Concepts Only) Managerial Judgement, Ratio Trend Analysis, Regression Analysis, Work Study Technique, Delphi Technique. HR Supply Forecasting– Factors, Techniques – (Concepts Only) Skills Inventories, Succession Plans, Replacement Charts, Staffing Tables.
- Barriers in Effective Implementation of HRP and Ways to Overcome Them.
- Strategic Human Resource Planning –Meaning and Objectives.
- Link between Strategic Planning and HRP through Technology.
- HR Policy –Meaning, Importance.
- HR Programme-Meaning and Contents.

#### **Unit II: Job Analysis, Recruitment and Selection:**

- Job Analysis, Recruitment and Selection:
- Job Analysis-Meaning, Features, Advantages.
- Job Design: Concept, Issues.
- Job Redesign –Meaning, Process, Benefits. Matching Human Resource Requirement and Availability through: Retention- Meaning, Strategies,

Resourcing- Meaning, Types. Flexibility – Flexible work practices,  
Downsizing- Meaning, Reasons, Layoff – Meaning, Reasons.

- Recruitment - Meaning and Factors affecting Recruitment, Ethical Issues in Recruitment and Selection.
- Employee Selection Tests: Meaning, Advantages and Limitations. • Human Resource Audit: Meaning, Need, Objectives, Process, Areas

***Reference Books:***

- Bhattacharya D.K, Human Resource Planning, Excel Books.
- John Bramham, Human Resource Planning, University Press.
- Michael Armstrong, A Handbook Of Human Resource Management Practice, Kogan Page.
- William J.Rothwell & H.C. Kazanaas, Planning & Managing Human Resources, Jaico Publishing House .
- Arun Sekhri, Human Resource Planning And Audit, Himalaya Publishing House.
- Michael J. Kavanag, Human Resource Information Systems Basics, Applications and Future Directions, Sage Publication.

## 2 C - Marketing

### 2 (C.1) - 1. Tourism Marketing (Minor 1)

#### Course Outcomes:

CO1: Explain key concepts of Tourism Marketing

CO2: Contextualize tourism within broader cultural, environmental, political and economic dimensions of society.

CO3: Critique and explain tourism practices for their implications locally and globally.

#### Course Outline:

##### Unit 1: *Introduction*

- Meaning of Tourism & Tourist, Features of Tourism, Purpose of Tourism, Adverse Effects of Tourism, Factors Influencing growth of Tourism, Classification of Tourism; Types of Tourism: Health, adventure, rural, cultural, religious, eco-Tourism, wedding Tourism, cruise Tourism.
- Tourism Marketing: Meaning, Objectives of Tourism Marketing, Importance of Tourism Marketing, Problems of Tourism Marketing.
- Bases for Segmentation in Tourism Tourist Typology: Cohens Typology, Plog's Typology
- Product Mix of Tourism Marketing: Meaning, Tourism Destination Life Cycle, Factors for tourism destination selection, launching a new tourism product, Tourism Product and Package Tour, Itinerary meaning, Types of Itinerary, Reservation meaning and process.

##### Unit 2: **Tourism Market Segmentation & Indian Tourism Industry :**

- Meaning, Need for Market Segmentation in Tourism Importance of Market Segmentation in Tourism Bases for Segmentation in Tourism Tourist Typology: Cohens Typology, Plog's Typology
- 4 'A's of Tourism
- Attraction: Meaning, Typology of Attraction, Natural, Artificial, Cultural, Social, Managed Attraction for Tourist, Peter's Inventory of Tourist
- Accommodation: Meaning, Typology of Accommodation
- Accessibility: Meaning, Transportation System for Tourism, Surface Transport, Railways and its contribution to tourism, Sea & Waterways, Airways Amenities: Meaning,

- Amenities & Facilities at the destination.
- India as a Tourist Destination: A conceptual framework, Destination Image, Building Brand India; Incredible India Campaign
- Challenges for Indian Tourism Industry

***Reference Books:***

- S.M.Jha, Tourism Marketing, Himalaya Publishing House, Second Edition, 2011
- Prasanna Kumar, Marketing of Hospitality and Tourism Services, Tata McGraw Hill, 2010
- Kshitiz Sharma, Introduction to Tourism Management, McGraw Hill Education (India) Pvt. Ltd, 2014
- Sunil Kabia, , Tourism and the developing countries, Mohit Publications, First edition, 2005
- M.V.Kulkarni, Tourism marketing, Everest Publishing House, First edition, 2005
- Alan A. Lew, A companion to tourism, Blackwell Publishing
- Krishnan K Kamra, Tourism: An Overview



## **2 (C.2) - 2. Rural Marketing (Minor 1)**

### **Course Outcome:**

CO1: Develop understanding of issues in rural markets.

CO2: Categorize issues in rural markets.

CO3: understanding the Overview and Scenario of rural marketing in India.

CO4: Analyze marketing environment, consumer behaviour, distribution channels, marketing strategies, etc. in the context of rural markets in India.

### **Course Outline:**

#### **Unit 1: *Introduction***

- Introduction to Rural Market, Definition & Scope of Rural Marketing.
- Rural Market in India-Size & Scope, Rural development as a core area, Efforts put for Rural development by government (A brief Overview).
- Emerging Profile of Rural Markets in India,
- Problems of rural market.
- Constraints in Rural Marketing and Strategies to overcome constraints
- Product Strategies, Rural Product Categories-FMCGs, Consumer Durables, Agriculture Goods & Services; Importance of Branding, Packaging and Labelling.
- Pricing Strategies & objectives
- Nature of Competition in Rural Markets, the problem of Fake Brands

#### **Unit 2: *Rural Market***

- Rural Consumer Vs Urban Consumers– a comparison.
- Characteristics of Rural Consumers.
- Rural Market Environment:
  - a) Demographics– Population, Occupation Pattern, Literacy Level;
  - b) Economic Factors-Income Generation, Expenditure Pattern, Rural Demand and Consumption Pattern, Rural Market Index; Land Use Pattern,
  - c) Rural Infrastructure -Rural Housing, Electrification, Roads

- Rural Consumer Behaviour: meaning, Factors affecting Rural Consumer Behaviour- Social factors, Cultural factors, Technological factors, Lifestyle, Personality
- Communication & Promotional Strategies. Strategy. Challenges in Rural Communication, Developing Effective Communication, Determining Communication
- Objectives, Designing the Message, Selecting the Communication Channels. Creating Advertisements for Rural Audiences. Rural Media- Mass media, Non-Conventional Media, Personalized media;

***Reference Books:***

- Badi & Badi : Rural Marketing
- Mamoria, C.B. & Badri Vishal : Agriculture problems in India
- Arora, R.C. : Integrated Rural Development
- Rajgopal : Managing Rural Business 5. Gopalaswamy, T.P. : Rural Marketing

## **Skill Enhancement Course (2 Credits)**

### ***3. Basics of Personal Finance***

#### **Course Outcome:**

CO1: Students will acquire a conceptual and analytical framework of financial planning process and the different financial instruments available along with an appreciation of their risk and returns.

CO2: Students should be able to understand and explain various approaches available to invest with a view to create wealth.

CO3: Students should be able to describe financial habits necessary for long term planning, earning, savings and investing.

#### **Course Outline:**

##### **Unit I: Understanding Personal Finance**

- Introduction
- Money Management
- Tax planning
- Managing Checking and Savings Accounts
- Maintaining Good Credit
- Credit Cards and Consumer Loans
- Vehicle and Other Major Purchases
- Obtaining Affordable Housing Income and Asset Protection
- Managing Property and Liability Risk
- Managing Health Expenses

##### **Unit II: Retirement Planning & Employees Benefits**

- Retirement need analysis techniques, Development of retirement plan, Various retirement schemes such as Employees Provident Fund (EPF), Public Provident Fund (PPF), Superannuation Fund, Gratuity, Other Pension Plan and Post- retirement counselling.

#### **Reference Books:**

- Behavioral Finance, William Forbes, Wiley
- Behavioral Finance: Psychology, Decision-Making and Markets, L. F. Ackert and R. Deaves, South-Western College Publication.
- Investor Behavior: The Psychology of Financial Planning and Investing, H K Baker and V Ricciardi, Wiley, 2018.
- Personal Finance (11th ed.), Jack Kapoor, Les Dlabay and R. J. Hughes, McGraw Hill.

## **Ability Enhancement Course (2 Credits)**

### ***4. Selling and Negotiation***

#### **Course Outcome:**

CO1: Describe the skills and competencies required to be an effective sales person

CO2: Explain key concepts of Sales Management

CO3: Explain what it takes to be a good negotiator

CO4: Describe various types of negotiation process

#### **Course Outline:**

##### **Unit I: Introduction**

- a) Sales Management:

Meaning, Role of Sales Department, Evolution of Sales Management • Interface of Sales with Other Management Functions

Qualities of a Sales Manager

Sales Management: Meaning, Developments in Sales Management Effectiveness to Efficiency, Multidisciplinary Approach, Internal Marketing, Increased Use of Internet, CRM, Professionalism in Selling.

Structure of Sales Organization – Functional, Product Based, Market Based, Territory Based, Combination or Hybrid Structure

- b) Distribution Management:

Meaning, Importance, Role of Distribution, Role of Intermediaries, Evolution of Distribution Channels.

Integration of Marketing, Sales and Distribution

##### **Unit II: Overview of Negotiation:**

- Negotiation - Meaning, Importance of Negotiation, Process, Factors/ Elements affecting negotiation, Challenges for an Effective Negotiation
- Role of Communication, Personality and Emotions in Negotiation.
- Distributive and Integrative Negotiation (concepts)

- Cross-Cultural Negotiation – Meaning, Factors influencing cross-cultural negotiations, Ways to resolve Cross Cultural negotiation.
- Types of Negotiations in Corporates/ WorkPlace – Day to Day, Employer – Employee, Negotiation between Colleagues, Commercial Negotiation, Legal Negotiations
- International Negotiations - Meaning, Factors affecting negotiation

***Reference Books:***

- Nag, Sales And Distribution Management, Mcgraw Hill
- Richard R. Still, Edward W. Cundiff, Norman A.P. Govoni, Sales Management, Pearson Education
- Krishna K. Havaladar, Vasant M. Cavale, Sales And Distribution Management – Text & Cases, Mcgraw Hill Education
- Dr.Matin Khan, Sakes And Distribution Management, Excel Books
- Kotler & Armstrong, Principles Of Marketing – South Asian Perspective, Pearson Education
- Lewicki, Saunders & Barry - Negotiation (Tata Mc Graw Hill, 5th Ed.)
- B. D. Singh - Negotiation Made Simple (Excel Books)

## **Co-Curricular (2 + 2 Credits)**

### **5. (A.1) *Community Engagement Project/ National Service Scheme (NSS)***

#### **Course Outcomes:**

CO1; Developing skills for Collaboration  
CO2: Using Effective Communication  
CO3: Developing Enhanced Self-Awareness  
CO4: Developing Leadership Development  
CO5: Creating Meaningful Interpersonal Relationships  
CO6: Developing Professionalism  
CO7: Developing context of Social Responsibility

#### **Course Outline:**

Participation in the institute driven community engagement activity or NSS Activities

- To understand the community in which they work
- To understand themselves in relation to their community;
- To identify the needs and problems of the community and involve them in problem solving process;
- To develop among themselves a sense of social and civic responsibility
- 25 marks external examiner for Reports/viva/presentation- 25 marks for participation in activities

### **5. (A.2) *Student Clubs (Cultural/ Sports/ Entrepreneurship)***

#### **Course Outcomes:**

CO1; Developing skills for Collaboration  
CO2: Using Effective Communication  
CO3: Developing Enhanced Self-Awareness  
CO4: Developing Leadership Development  
CO5: Creating Meaningful Interpersonal Relationships  
CO6: Developing Professionalism  
CO7: Developing context of Social Responsibility

**Course Outline:**

Student clubs (Cultural/ Sports/ Entrepreneurship) & Project

- Participation in any one or more of above mentioned student club
- Student needs to participate in all activities/ meetings/ discussions held by respective club coordinator
- Report needs to be submitted by the end of semester
- 25 marks external examiner for Reports/viva/presentation- 25 marks for participation in activities

## Open Electives (OE) (2 Credits)

### **6 (A) - Stress Management 1 (OE 1)**

#### **Course Outcomes:**

CO1: Understand the basic principles of stress management.

CO2: Recognize your stress triggers and how to manage them.

CO3: Develop proactive responses to stressful situations.

CO4: Use coping tips for managing stress both on and off the job.

CO4: Learn to manage stress through diet, sleep and other lifestyle factors.

#### **Course Outline:**

##### Unit 1 :

- a) Stress Management:
  - Meaning, Types of Stress at Work, Causes of Stress, Consequences of Stress
- b) Stress Management Techniques:
  - Meditation : Meaning, Techniques, Advantages, Mental Health and its Importance in Management, Brainstorming, Brain Stilling, Yoga: Meaning, Significance

##### Unit 2

- c) Leadership:
  - Meaning, Contemporary Approaches to Leadership, Joint Hindu Family Business – Leadership Qualities of Karta
- d) Motivation:
  - Meaning, Indian Approach to Motivation, Techniques

#### **Reference Books:**

- Stress management by Susan R. Gregson
- Stress management: Leading to Success By B Hiriyappa
- Strategic Stress Management: An Organizational Approach by V. Sutherland, C. Cooper
- Stress Management: An Integrated Approach to Therapy by Dorothy H.G. Cotton



- Stress Management by A. K. Rai
- Organizational Stress Management: A Strategic Approach By A. Weinberg, V. Sutherland, C. Cooper
- Stress Management by Dr. Nivedita

## **6 (B) - Environmental Engineering and Disaster Management**

### **Course Outcomes:**

CO1: Explain the importance of safe water system and its standards.

CO2: Describe the waste water treatment and its supply.

CO3: Identify the major sources, effects solid waste.

CO4: Explain the importance of disaster management.

### **Course Outline:**

#### **Unit I:**

- Introduction: Objective, scope and outcome of the course.
- Importance of safe water supply system. Domestic water requirements for urban and rural areas. Sources of Water supply. Intakes and transportation of water.
- Drinking water quality. Indian Standards of drinking water. Introduction to water treatment for safe drinking, Importance of sanitation

#### **Unit II:**

- Domestic waste water: quantity, characteristics, disposal in urban and rural areas. Sewer: types, design discharge and hydraulic design. Introduction to domestic wastewater treatment.
- Solid waste: quantity, characteristics and disposal for urban and rural areas. Introduction to air pollution. Types of pollutants, properties and their effects on living beings. BIS standards for pollutants in air and their abetments.
- Introduction to various disaster, Importance of disaster management.

### **Reference Books:**

- Environmental Engineering & Disaster Management, by Ameta Suresh (Author), Durgawat Kiran (Author), Mehta Rajeev (Author)
- OBJECTIVE ENVIRONMENTAL STUDIES AND DISASTER MANAGEMENT by M. Prasanthrajan & A. Balasubramanian
- Wastewater Engineering Treatment and Reuse - MetCalf & Eddy.
- Environmental Engineering- Peavy, Rowe, Tchobanoglous.
- Chemistry for Environmental Engineering- Sawyer, McCarty, Parkin.
- Industrial Water Pollution Control- W.W. Eckenfelder Jr.

## **6 (C) - Ethics in practice for Students**

### **Course Outcomes:**

CO1: Distinguish between ethical and non ethical situations.

CO2: Practice moral judgment in conditions of dilemma.

CO3: Relate the code of ethics to social experimentation.

CO4: Develop concepts based on moral issues and enquiry

### **Course Outline:**

#### **Unit I:**

- Knowledge is power and quest for knowledge is the real meaning of education, not quest for Degree and qualifications; Real education builds characters: Difference between Academic Qualification and Ability, Academic failure could be failure with in the class room, but not outside (that is failed in exam, past in the life!)
- Challenges for Ethical Practices in Institution of Higher Education:  
  
Ragging, Suicide and Need for Educational Counseling, Violence vs. Peaceful Protest, Conflict resolution, Plagiarism and Violation of Intellectual property Rights, Cheating in Examination and other Fraudulent Practices.

#### **Unit II:**

- Inter personal Relation and Community Life in HEI: Green Preacher and conservation of Energy, Community Life in Campus including Hostels, Local Common area, Inter personal relations (Students-Teacher, Students-Student and ManWoman, Positive Friendship).
- Ethical Leadership in Academic Institution: Concept and Traits of Leadership to provide solution, everyone has Leadership Role (not limited to position), Concept of Ethical leadership Scope of Leadership in college and Universities for- Students, Teachers and Administrators. Importance of co-curricular and extra – curricular activities.

### **References Books:**

- Benn, P. - Ethics. London: Routledge;
- Chadwick, R., Callahan, D., and Singer, P. - Encyclopaedia of Applied Ethics.
- Lafollette, H. - Ethics in Practice
- Singer, P. - A Companion to Ethics
- Singer, P. - Practical Ethics

## **6 (D) - Personality Psychology**

Course Outcomes:

CO1: Analyze the determinants of personality characteristics to better understand their effects on cognitions, emotions, and behaviour.

CO2: Apply the major personality domains and theories to better understand one's own behavior and the behavior of others.

CO3: Explain basics of Social-cultural and adjustment domain

Course Outline:

- Unit 1. Intrapsychic domain
  - a. Psychoanalytic aspects of personality. b. Psychodynamic perspective: contemporary issues c. Motives and personality: basic concepts, big three motives, d. Humanistic tradition.
- Biological domain and cognitive-behavioral domain
  - a. Genetic and personality evolutionary approach to personality. b. Physiological approaches to personality. c. Behaviorist and learning aspects of personality. d. Cognitive and cognitive-experiential aspects of personality.

Unit II:

- a. Allport, R. B. Cattell, Eysenck's three factor. b. Big-Five and Five- Factor Model: theory, evidence and applications, circumplex approach. c. Personality trait and personality disorders. d. Measurement of trait and theoretical and measurement issues, personality dispositions over time.
- Social-cultural and adjustment domain
  - a. Personality and social interaction b. Sex-gender and personality c. Culture and personality d. Stress, coping adjustment and health.

### **Reference Books:**

- Brody, N., & Ehrlichman, H. - Personality Psychology: Science of Individuality. Englewood Cliffs, NJ: Prentice Hall.
- Burger, J. M. - Personality. Wadsworth Publishing.
- Costa, P.T., & Widiger, T.A. - Personality disorders and the five- factor model of personality (2nd ed.). Washington, DC: American Psychological Association.
- Cervone, D., & Pervin, L. A. - Personality: Theory and Research (11th ed.). New York: John Wiley & Sons.
- Chamorro-Premuzic, T., & Furnham, A. - Personality and Intellectual Competence. Mahwah, NJ: Lawrence Erlbaum Associates.
- Friedman, H. S., & Schustack, M. W. - The Personality Reader (2nd ed.). Boston, MA: Allyn and Bacon.
- Hall, C. S., Lindzey, G., Campbell, J. B. - Theories of Personality. ND: J. Wiley.
- Haslam, N. - Introduction to Personality and Intelligence. London: Sage Publications.

## **Scheme of Assessments for courses of 4 credits (100 Marks)**

- The Semester End Examination will be conducted for 50 Marks.
- Internal Assessments will be conducted for 50 Marks.
- The allocation of 50 marks shall be on any three of the following basis : -  
Class test, quizzes, mid semester test, project, term paper, presentation etc may be conducted for 50 marks internal continuous assessment.

Note: A Student has to separately secure minimum 40% marks (i.e 20 out of 50) in the internal assessments and secure minimum 40% marks (i.e 20 out of 50) in the Semester End Examination in every course to be declared as Pass.

## **Scheme of Assessments for courses of 2 credits (50 Marks)**

- The Semester End Examination will be conducted for 25 Marks.
- Internal Assessments will be conducted for 25 Marks.
- The allocation of 25 marks shall be on any three of the following basis : -  
Class test, quizzes, mid semester test, project, term paper, presentation etc

Note: A Student has to separately secure minimum 40% marks (i.e 10 out of 25) in the internal assessments and secure minimum 40% marks (i.e 10 out of 25) in the Semester End Examination in every course to be declared as Pass.

## **Scheme of Assessments for courses of 2 credits (50 Marks) Co-Curricular Course**

### **Academia-Industry Relevant Activities**


- The Student needs to submit written report on the activities he/she has participated during the semester at the Semester end which will be evaluated by the faculty for 25 Marks
- Internal Assessment will be conducted for 25 Marks:
- The Allocation of 25 marks shall be on successful participation in any 3 of the following basis :-
  1. Industry Lecture, Seminars, Symposium, and Workshop
  2. Entrepreneurship activities
  3. One day/ half Day industrial visits
  4. Any other similar industry-academia activity

### **Field Project**

- Report submission of minimum 40-50 pages
- Students need to complete primary data based field projects in any area of Major or Minor of the BMS program.
- The institute will have to assign a faculty mentor
- The evaluation of the course will be based on the project report submitted by the student followed by viva-voce examination
- 25 marks external examiner for viva/presentation- 25 marks for report

### Letter Grades and Grade Points:

Semester GPA/ Programme CGPA Semester/ Programme	% of Marks	Alpha-Sign/ Letter Grade Result	Grading Point
9.00 - 10.00	90.0 - 100	O (Outstanding)	10
8.00 - < 9.00	80.0 - < 90.0	A+ (Excellent)	9
7.00 - < 8.00	70.0 - < 80.0	A (Very Good)	8
6.00 - < 7.00	60.0 - < 70.0	B+ (Good)	7
5.50 - < 6.00	55.0 - < 60.0	B (Above Average)	6
5.00 - < 5.50	50.0 - < 55.0	C (Average)	5
4.00 - < 5.00	40.0 - < 50.0	P (Pass)	4
Below 4.00	Below 40.0	F (Fail)	0
Ab (Absent)	-	Ab (Absent)	0

  
Sign of the BOS  
Chairman  
Prof. Dr. Kanchan  
Fulmali  
BOS in BMS

Sign of the  
Offg. Associate Dean  
Dr. Ravikant  
Balkrishna Sangurde  
Faculty of Commerce



Sign of the  
Offg. Associate  
Dean  
Prin. Kishori Bhagat  
Faculty of  
Management

Sign of the  
Offg. Dean  
Prof. Kavita Laghate  
Faculty of  
Commerce &  
Management