

**REVISED DIPLOMA CURRICULUM OF  
COMPUTER SCIENCE AND ENGINEERING  
(PART II)**

**For the State of Meghalaya  
(2024-25)**



**National Institute of Technical Teachers' Training & Research**  
Block – FC, Sector – III, Salt Lake City, Kolkata – 700 106

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**COMPUTER SCIENCE AND ENGINEERING**

**SEMESTER - III**

SL. No	Category of Course	Code No	Course Title	Study Scheme			Evaluation Scheme								Total Marks	Credits	
				Pre-requisite	Contact Hours/week			Theory				Practical					
					L	T	P	End Exam	Progressive Assessment			End Exam	Progressive Assessment				
									Class Test	Assignment	Attendance		Sessional	Viva voce			
1	Program Core	CSPC201	Computer Programming		2	0	0	60	20	15	5	-	-	-	100	2	
2		CSPC203	Scripting Language – Python		2	0	0	60	20	15	5	-	-	-	100	2	
3		CSPC205	Data Structures & Algorithms		3	0	0	60	20	15	5	-	-	-	100	3	
4		CSPC207	Computer System Organization		3	1	0	60	20	15	5	-	-	-	100	4	
5		CSPC209	Computer Programming Lab		0	0	4	-	-	-	-	40	40	20	100	2	
6		CSPC211	Scripting Languages Lab		0	0	4	-	-	-	-	40	40	20	100	2	
7		CSPC213	Data Structures & Algorithms Lab		0	0	4	-	-	-	-	40	40	20	100	2	
8	Internship	I-201	Internship-I		0	0	4	-	-	-	-	40	40	20	100	2	
<b>Total</b>					<b>10</b>	<b>1</b>	<b>16</b>	<b>240</b>	<b>80</b>	<b>60</b>	<b>20</b>	<b>160</b>	<b>160</b>	<b>80</b>	<b>800</b>	<b>19</b>	

**COMPUTER SCIENCE AND ENGINEERING**

**SEMESTER – IV**

SL. No	Category of Course	Code No	Course Title	Study Scheme			Evaluation Scheme									Total Marks	Credit	
				Pre-requisite	Contact Hours/ week			Theory						Practical				
					L	T	P	End Exam	Progressive Assessment			End Exam	Progressive Assessment					
									Class Test	Assignment	Attendance		Sessional	Viva voce				
1	Program Core	CSPC202	Operating Systems	CSPC205	3	0	0	60	20	15	5	-	-	-	100	3		
2		CSPC204	Introduction to DBMS	CSPC203	2	0	0	60	20	15	5	-	-	-	100	2		
3		CSPC206	Computer Networks		2	0	0	60	20	15	5	-	-	-	100	2		
4		CSPC208	SSAD/Software Engineering		3	0	0	60	20	15	5	-	-	-	100	3		
5		CSPC210	Internet of Things (IoT)		2	1	0	60	20	15	5	0	0	0	100	3		
6		CSPC212	Operating Systems Lab	CSPC213	0	0	2	-	-	-	-	40	40	20	100	1		
7		CSPC214	DBMS Lab	CSPC211	0	0	4	-	-	-	-	40	40	20	100	2		
8		CSPC216	Computer Networks Lab		0	0	4	-	-	-	-	40	40	20	100	2		
9	Open Elective	CSOE202	Disaster Management		3	0	0	60	20	15	5	-	-	-	100	3		
10	Minor Project	PR202	Minor Project		0	0	4	0	0	0	0	80	80	40	200	2		
11	Mandatory	AU202	Essence of Indian Knowledge and Tradition		2	0	0	0	0	0	0	0	0	0	0	0		
<b>Total</b>					<b>17</b>	<b>1</b>	<b>14</b>	<b>360</b>	<b>120</b>	<b>90</b>	<b>30</b>	<b>200</b>	<b>200</b>	<b>100</b>	<b>1100</b>	<b>23</b>		

## **SEMESTER - III**

## COMPUTER PROGRAMMING

L	T	P		Course Code No.: <b>CSPC201</b>
2	0	0		
<b>Total Contact hrs.:</b> Lecture: 30 Tutorial: 0 Practical: 0 <b>Credit : 2</b>			<b>Total marks: 100</b>	<b>Theory:</b> End Term Exam.: 60 P.A: 40

### Rationale:

This course enables students to develop structured solutions to problems and implementing those using computers. This involves two parts: i) Formulating a solution for a given problem as a well-defined sequence of actions, and ii) Expressing solution in a machine-readable form or a programming language. For the second part, we will learn the common units of programming languages. The first part can only be learned through the repeated practice of solving problems.

### Course Outcomes:

After completion of the course, the students will be able to

- Formulate problems using basic computational techniques
- Explain the role of various operators and statements
- Demonstrate use of Conditional Statements, Loops, Arrays, and Functions etc.
- Write code snippets to execute them.
- Exhibit recursive techniques using modular programming

### Details Course Contents:

The language for implementation of code will be C. The focus will be on problem solving and problem where these ideas can be applied. The main focus of the class will to take examples of problems where these ideas can be implemented

UNIT NO.	CONTENT	TIME ALLOTTED (HRS.)
I	Introduction to Problem Solving (computational way of thinking); Variables and Representation	4
II	Arithmetic, Relational, Logical and Bitwise Operators; Input, Output, Formatting and File I/O	6
III	Conditional Statements, Repeat Statements, Loops and Nested Loops	8
IV	Arrays and Memory Organization, Strings, Multidimensional Arrays, Functions and Parameter Passing	8
V	Recursion and Recursive solutions	4

## **Suggested Lab Work:**

This is a skill course. Topics/concepts taught in the class should be practiced in the Lab same week and practiced regularly during the semester till student becomes confident about it. Students should practice solved and unsolved problems listed in the text books. Teacher also should formulate problems and give them as assignment. This course is all about some theory and a lot of practice.

## **Reference Books:**

1. Let Us C, Yashavant Kanetkar
2. Problem Solving and Programming in C, R.S. Salaria, Khanna Publishing House
3. C Programming Absolute Beginner's Guide, Dean Miller and Greg Perry
4. The C Programming Language, Kernighan and Ritchie, Prentice Hall of India
5. Programming in ANSI C, E. Balagurusamy, Tata McGraw-Hill
6. C Programming & Data Structures, B. A. Fouruzan and R. F. Gilberg, CENGAGE Learning.
7. Outline of Programming with C, Byron Gottfried, Schaum, McGraw-Hill

## SCRIPTING LANGUAGE - PYTHON

L	T	P		Course Code No.: <b>CSPC203</b>
2	0	0		
<b>Total Contact hrs.:</b> Lecture: 30 Tutorial: 0 Practical: 0 <b>Credit : 2</b>			<b>Total marks: 100</b>	<b>Theory:</b> End Term Exam.: 60 P.A: 40

### Rationale:

This course is included for developing understanding of how to work with a scripting language.

### Course outcomes:

After completion of the course, the students will be able to

- Explain the basic features of scripting language.
- Demonstrate the usage of control structure
- Exhibit handling of Functions and modules of scripting language
- Build program with a scripting language
- Develop the ability to use framework of scripting language

### Detailed Course Content:

UNIT NO.	CONTENT	TIME ALLOTTED (HRS.)
<b>I: Introduction, Variables and Data Types</b>	History, Features, setting up path, Installation and Working with Python, Basic Syntax  Understanding Python variables, Numeric data types, Using string data type and string operations, Basic Operators, Understanding coding blocks, Defining list and list slicing, Other Data Types (Tuples, List, Dictionary - Python, Arrays, Associative Arrays/Hashes)	<b>5</b>
<b>II: Control Structures</b>	Conditional blocks using if, else and elif, For loops and iterations, while loops, Loop manipulation using continue, break and else (and pass in Python), Programming using conditional and loops block	<b>7</b>
<b>III: Functions, Modules and Packages</b>	Organizing Perl codes using functions, Organizing Perl projects into modules, Importing own module as well as external modules, Understanding Packages	<b>6</b>
<b>IV: File I/O, Text Processing, Regular Expressions</b>	Understanding read functions, Understanding write functions, Programming using file operations, Powerful pattern matching and searching, Power of pattern searching using regex	<b>6</b>

<b>V: Frameworks</b>	Frameworks - Web2Py, Django, Ruby on Rails, Struts (any one of these or any other)	<b>6</b>
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### **Suggested Lab Work:**

This is a skill course. Topics/concepts taught in the class should be practiced in the Lab same week and practiced regularly during the semester till student becomes confident about it. Students should work on solved and unsolved problems listed in the text books. Teacher also should formulate problems and give them as assignment. This course is all about some theory and a lot of practice.

### **Reference Books:**

1. Taming Python by Programming, Jeeva Jose, Khanna Publishing House
2. Starting Out with Python, Tony Gaddis, Pearson
3. Core Python Programming, Wesley J. Chun, Prentice Hall
4. Python Programming: Using Problem Solving Approach, Reema Thareja, Oxford University
5. Introduction to Computation and Programming Using Python. John V. Guttag, MIT Press.
6. Beginning Python using Python 2.6 and Python 3, James Payne, Wrox publishing
7. Practical Programming: An Introduction to Computer Science using Python 3, Paul Gries, ThePragmatic Bookshelf

## DATA STRUCTURES & ALGORITHMS

L	T	P		Course Code No.: <b>CSPC205</b>
3	0	0		
<b>Total Contact hrs.:</b> Lecture: 45 Tutorial: 0 Practical: 0 <b>Credit : 3</b>			<b>Total marks: 100</b>	<b>Theory:</b> End Term Exam.: 60 P.A: 40

### Rationale:

This course is to provide strong foundation for designing, developing and implementing solutions to computational problems through computer programs using appropriate data structures and algorithms.

### Course outcomes:

After completion of the course, students will be able to

- Explain the basic terminology of data structures
- Implement solution using linear and non-linear data structure
- Exhibit Graph Theory and its application
- Implement various sorting and searching techniques
- Solve real-life computational problems by exploiting the knowledge and skill of data structures and algorithms

### Detailed Course Content:

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (HRS.)
<b>I: Introduction and Overview</b>	Introduction, Basic Terminology, Elementary, data types, Data Structures, Data Structure Operation, Algorithms; Complexity; Time- space Tradeoff.	4
<b>II: Preliminaries</b>	Introduction, Mathematical notation and Functions, Algorithmic Notation, Control Structures, Complexity of Algorithms, Sub algorithms, Variables and Data Types.	4
<b>III: Arrays, Records and Pointers</b>	Introduction, Linear Arrays, Representation of Linear Arrays in Memory, Traversing Linear Arrays ,Inserting and Deleting, Sorting: Bubble Sort, Search: Linear Search & Binary Search, Multidimensional Arrays, Pointers; Pointer Arrays, Records; Record Structures, Representation of Records in Memory; parallel Arrays, Matrices: Spares Matrices	7
<b>IV: String Processing</b>	Introduction, Basic Terminology, Storing Strings, Character Data Type, String Operation, Word Processing, Pattern matching Algorithms.	4

<b>V: Linked Lists</b>	Introduction, Linked Lists, Representation of Linked Lists in Memory, Traversal of a Linked List, Searching a Linked List, Memory Allocation Garbage Collection, Insertion into a linked list, Deletion from a Linked List, Header Linked Lists, Two - Ways Lists	<b>5</b>
<b>VI: Stacks, Queues, Recursion</b>	Introduction, Stacks, Array Representation of Stacks, Arithmetic Expression; Polish Notation, Quicksort, an Application Stacks, Recursion, Towers of Hanoi, Implementation of Recursive Procedures by Stacks, Queues, Defuse, Priority Queues	<b>5</b>
<b>VII: Trees</b>	Introduction, Binary Trees, Representing Binary Trees in Memory, Traversing Binary Trees, Traversal Algorithms using Stacks, Header Nodes; Threads, Binary Search Trees, Trees, Searching and Inserting in a Binary Search Tree, Deleting in a Binary Search Tree, Heap, Heapsort, Path Lengths; Huffman's Algorithm, General Trees	<b>5</b>
<b>VIII: Graphs and Their Application</b>	Introduction, Graph Theory Terminology, Sequential Representation of Graphs; Adjacency matrix, path matrix, Warshall's Algorithm, Shortest Paths, Linked Representation of a Graph, Operations on Graphs, Traversing a Graph.	<b>5</b>
<b>IX: Sorting and Searching</b>	Introduction, Sorting: Inserting Sort, Selection Sort, Merging, Merge-sort, Radix Sort, Linear searching, Binary searching, Interpolation searching, Hashing.	<b>4</b>
<b>X: Introduction to File Organization</b>	Sequential, Index-Sequential and Direct file Organization	<b>2</b>

### Suggested Lab Work:

This is a skill course. Topics/concepts taught in the class should be practiced in the Lab same week and practiced regularly during the semester till student becomes confident about it. Students should work on solved and unsolved problems listed in the text books. Teacher also should formulate problems and give them as assignment. This course is all about some theory and a lot of practice.

### Reference Books:

1. Data Structures, R.S. Salaria, Khanna Book Publishing, New Delhi
2. Data Structures Using C, Reema Thareja, Oxford University Press India.
3. Classic Data Structures, Samanta Debasis, Prentice Hall of India.
4. Fundamentals of Data Structure in C, Horowitz, Ellis, Sahni, Sartaj, Anderson-Freed, Susan, University Press, India.
5. Data Structures: A Pseudo code approach with C, Richard F. Gilberg, Behrouz A. Forouzan, CENGAGE Learning, India.
6. Data Structures and Algorithms: Concepts, Techniques and Applications, G. A. V. Pai, McGraw- Hill Education, India.

## COMPUTER SYSTEM ORGANIZATION

L	T	P		Course Code. No.: <b>CSPC207</b>
3	1	0		
<b>Total Contact hrs.:</b> Lecture: 45 Tutorial: 15 Practical: 0 <b>Credit : 4</b>			<b>Total marks: 100</b>	<b>Theory:</b> End Term Exam.: 60 P.A: 40

### Rationale:

This course enables the students to have a thorough understanding of the basic structure and operation of a digital computer, its architectures and computational designs.

### Course outcomes:

After completion of the course, students will be able to

- Explain the functioning of computer system and its various subcomponents.
- Demonstrate various types of operations and processing
- Exhibit knowledge about the microprocessor
- Demonstrate assembly level language programming
- Explain various types of memory devices such as ROM, RAM, Interface Bus, etc.

### Detailed Course Content:

UNIT NO.	CONTENT	TIME ALLOTTED (HRS.)
<b>I</b>	Structure of Computers: Computer Functional units, Von-Neumann architecture, Bus structures, Basic Operational Concepts, Data representation (Fixed and Floating point), Error detecting codes. Register Transfer and Micro Operations: Register transfer, Bus and memory transfers, Arithmetic micro-operations, Logic micro-operations, Shift micro-operations, and Arithmetic logic shift unit.	<b>10</b>
<b>II</b>	Micro Programmed Control: Control memory, Address sequencing, and design of control unit. Computer Arithmetic: Addition and Subtraction, Multiplication and Division algorithms, Floating-point arithmetic operation, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline Vector Processing, Array Processors.	<b>9</b>
<b>III</b>	Introduction to Microprocessor Architecture: Instruction Set Architecture design principles from programmer's perspective. One example microprocessor (Intel, ARM, etc.).	<b>8</b>

<b>IV</b>	Assembly Language Programming: Simple programs, Assembly language programs involving logical, branch and call instructions, sorting, evaluation of arithmetic expressions, string manipulation, assembler directives, procedures and macros.	<b>8</b>
<b>V</b>	Memory and Digital Interfacing: addressing and address decoding, interfacing RAM, ROM, EPROM, programmable peripheral interface, various modes of operation and interfacing to processor, inter-facing keyboard, displays, etc.	<b>10</b>

### Reference Books:

1. Computer System Architecture, M. Moris Mano, Pearson/PHI, India.
2. Microprocessors Interface, Douglas V.Hall, Tata McGraw-Hill.
3. Computer Organization, Carl Hamacher, Zvonks Vranesic, SafeaZaky, McGraw-Hill
4. Advanced Microprocessors and Peripherals- Architecture, Programming and interfacing,A.K.Ray, K.M.Bhurchandi, Tata McGraw-Hill, New Delhi, India.
5. Computer Organization and Design: A Hardwar/Software Interface (MIPS Edition) byPatterson and Hennessy

## COMPUTER PROGRAMMING LAB

L	T	P		Course Code No.: <b>CSPC209</b>
0	0	4		
<b>Total Contact hrs.:</b> Lecture: 0 Tutorial: 0 Practical: 60 <b>Credit : 2</b>			<b>Total marks: 100</b>	<b>Practical:</b> End Term Exam.: 40 P.A: 60

### Rationale:

This Lab course is intended to practice what is taught in theory class of 'Computer Programming' and become proficient in computer programming. Computer programming is all about regular practice. Students should work on solved and unsolved problems listed in the text books, and the problems given by the teacher. Some of the topics that should necessary be covered in lab are listed below.

### Course outcomes:

After completion of the course, student will be able to

- Demonstrate program using I/ O statement and various types of operators
- Analyze various branching and looping statements
- Demonstrate arrays and strings manipulations
- Exhibit Parameter Passing techniques using modular programming approach.
- Demonstrate usage of pointers and dynamic memory allocations

### Detailed Course Content:

Sl. No.	Topics for Practice	Hours
1	Familiarization with programming environment (Editor, Compiler, etc.)	60
2	Programs using I/O statements and various operators	
3	Programs using expression evaluation and precedence	
4	Programs using decision making statements and branching statements	
5	Programs using loop statements	
6	Programs to demonstrate applications of n dimensional arrays	
7	Programs to demonstrate use of string manipulation functions	
8	Programs to demonstrate parameter passing mechanism	
9	Programs to demonstrate recursion	
10	Programs to demonstrate use of pointers	
11	Programs to demonstrate command line arguments	
12	Programs to demonstrate dynamic memory allocation	
13	Programs to demonstrate file operations	

The language of choice will be C. This is a skill course. More you practice, better it will be.

## **Reference Books:**

1. Let Us C, Yashavant Kanetkar
2. Problem Solving and Programming in C, R.S. Salaria, Khanna Publishing House
3. C Programming Absolute Beginner's Guide, Dean Miller and Greg Perry
4. The C Programming Language, Kernighan and Ritchie, Prentice Hall of India
5. Programming in ANSI C, E. Balagurusamy, Tata McGraw-Hill
6. C Programming & Data Structures, B. A. Fouruzan and R. F. Gilberg, CENGAGE Learning.

## SCRIPTING LANGUAGES LAB

L	T	P		Course Code No.: CSPC211
0	0	4		
<b>Total Contact hrs.:</b> Lecture: 0 Tutorial: 0 Practical: 60 <b>Credit : 2</b>			<b>Total marks: 100</b>	<b>Practical:</b> End Term Exam.: 40 P.A: 60

### Rationale:

This Lab course is intended to practice whatever is taught in theory class of 'Scripting Languages' and become proficient in scripting. Computer programming is all about regular practice. Students should work on solved and unsolved problems listed in the text books, and the problems given by the teacher. Some of the topics that should necessarily be covered in lab are listed below.

### Course outcomes:

At the end of the course student will be able to

- Demonstrate coding using a scripting language
- Exhibit script based Functions and modules.
- Demonstrate execution of regular expressions
- Exhibit execution of SQL queries.
- Demonstrate simple web application using scripting language.

### Course Content:

S.No.	Topics for Practice	Hours
1	Practice basic coding syntax	60
2	Write and execute scripts based on data types	
3	Write and execute Python scripts with conditionals and loops	
4	Write and execute Scripts based on Functions and Modules	
5	File Processing scripts	
6	Write and execute Regular Expressions	
7	Write and execute SQL Queries	
8	Write and execute scripts using DBI	
9	Develop a simple web application	

Teacher may choose any one scripting language. This is a skill course. More student practice and try to find solution on their own, better it will be.

## Reference Books:

1. Taming Python by Programming, Jeeva Jose, Khanna Publishing House
2. Starting Out with Python, Tony Gaddis, Pearson
3. Core Python Programming, Wesley J. Chun, Prentice Hall
4. Python Programming: Using Problem Solving Approach, Reema Thareja, Oxford University Press
5. Introduction to Computation and Programming Using Python. John V. Guttag, MIT Press.
6. Beginning Python using Python 2.6 and Python 3, James Payne, Wrox publishing
7. Practical Programming: An Introduction to Computer Science using Python 3, Paul Gries, ThePragmatic Bookshelf

## DATA STRUCTURES & ALGORITHMS LAB

L	T	P		Course Code No.: <b>CSPC213</b>
0	0	4		
<b>Total Contact hrs.:</b> Lecture: 0 Tutorial: 0 Practical: 60 <b>Credit : 2</b>			<b>Total marks: 100</b>	<b>Practical:</b> End Term Exam.: 40 P.A: 60

### Rationale:

This Lab course is intended to practice whatever is taught in theory class of ‘Data Structures’, ‘Algorithms’ and is an extension of previous course on ‘Computer Programming’. Students should work on problems listed in the text books, and the problems given by the teacher. Some of the topics that should necessarily be covered in lab are listed below. This Lab course requires a good coordination between theory course in Data Structures and Algorithms.

### Course outcomes:

After completion of the course, student will be able to

- Demonstrate creation and execution of programs for related to various sorting and searching techniques
- Implement Single and double linked list
- Implement various stack and queue operations
- Analyze Depth First and Breadth first search algorithm

### Detailed Course Content:

Sl. No.	Topics for Practice	Hours
1	Write a program using recursive and non-recursive functions to perform search operation in a given list of integers using linear search technique	60
2	Search operation in a given list of integers using binary search technique	
3	Write a program to implement insertion sorting for a given random data	
4	Write a program to implement bubble sorting for a given random data	
5	Write a program to implement quick sorting for a given random data	
6	Write a program to implement selection sorting for a given random data	
7	Write a program to implement heap sorting for a given random data	
8	Write a program to implement Hashing tables	
9	Write a program to implement single linked list	
10	Write a program to implement double linked list	
11	Write a program to implement circular linked list	
12	Write a program to Implement Stack operations using array and linked list	
13	Write a program to Implement Queue operations using array and linked list.	
14	Write a program to implement Breadth First Search (BFS)	
15	Write a program to implement Depth First Search (DFS)	
16	Write a program to implement a binary tree of integers	
17	Write a program to find the minimum depth of a binary tree	

Use 'C' as programming language for the purpose. This is a skill course. More student practice and try to find solution on their own, better it will be.

### **Reference Books:**

1. Data Structures, R.S. Salaria, Khanna Book Publishing
2. Data Structures Using C, Reema Thareja, Oxford University Press India.
3. Classic Data Structures, Samanta Debasis, Prentice Hall of India.
4. Fundamentals of Data Structure in C, Horowitz, Ellis, Sahni, Sartaj, Anderson-Freed, Susan, University Press, India.
5. Data Structures: A Pseudo code approach with C, Richard F. Gilberg, Behrouz A. Forouzan, CENGAGE Learning, India.
6. Data Structures and Algorithms: Concepts, Techniques and Applications, G.A. V. Pai, McGraw- Hill Education, India.

## INTERNSHIP-I

L 0	T 0	P 4		<b>Course Code No.: I-201</b>
<b>Total Contact hrs.:60 Credit: 2</b>			<b>Total Marks: 100</b>	<b>Evaluation Scheme:</b> End Term Exam: 40 P.A.: 60

### RATIONALE:

Internship provides an in-depth knowledge on engineering students. This internship enables the students to understand and learn the current trend in the job market. Internship provides great opportunity to get real life experience and exposure.

Students will be exposed to structured and practical learning experience that prepares individuals for their future careers, helps them make informed career choices, and equips them to build their profile for their jobs and also for their higher studies.

### INTERNSHIP PROTOCOL:

Students are required to take up an Internship/ Entrepreneurial activities / Project work/ Seminar and Inter/ Intra Institutional Training.

As per AICTE guideline the institutes have the flexibility to schedule internship, Project work, Seminar etc. according to the availability of the opportunities. Students are required to be involved in Inter/ Intra Institutional Activities viz.,

- Training with higher Institutions;
- Soft skill training organized by **Training and Placement Cell of the respective institutions;**
- Contribution at incubation/ innovation /entrepreneurship cell of the institute;
- Participation in conferences/ workshops/ competitions etc.;
- Learning at Departmental Lab/ Idea Lab/ Institutional workshop;
- Working for consultancy/ research project within the institutes and
- Participation in all the activities of Institute's Innovation Council for eg: IPR workshop/Leadership Talks/ Idea/ Design/ Innovation/ Business Completion/ Technical Expos etc.

## **SEMESTER - IV**

## OPERATING SYSTEMS

L	T	P		Curri. Ref. No.: <b>CSPC202</b>
3	0	0		
<b>Total Contact hrs.:</b> Lecture: 45 Tutorial: 0 Practical: 0 <b>Credit : 3</b> Prerequisite: CSPC205			<b>Total marks: 100</b>	<b>Theory:</b> End Term Exam.: 60 P.A: 40

### Rationale:

This course is included to introduce various ideas in implementing operating systems, particularly UNIX. Introduce to various options available so as to develop capacity to compare, contrast, and evaluate the key trade-offs between different designs choices.

### Course outcomes:

After completion of the course, students will be able to

- Explain the basic concept related to Operating System
- Explain Process Management, Memory Management & File Management in OS
- Demonstrate File Sharing & Directory Management in OS
- Explain Mass Storage and RAID System in Storage
- Analyze security in Operating System

### Detailed Course Content:

UNIT NO.	CONTENT	TIME ALLOTTED (HRS.)
<b>I</b>	Overview of Operating System, basic concepts, UNIX/LINUX Architecture, Kernel, services and systems calls, system programs.	<b>9</b>
<b>II</b>	Process Management: Process concepts, operations on processes, IPC, Process Scheduling, Multi- threaded programming Memory management: Memory allocation, Swapping, Paging, Segmentation, Virtual Memory, various faults.	<b>10</b>
<b>III</b>	File management: Concept of a file, access methods, directory structure, file system mounting, file sharing and protection, file system structure and implementation, directory implementation, free- space management, efficiency and performance. Different types of file systems	<b>9</b>
<b>IV</b>	I/O System: Mass storage structure - overview, disk structure, disk attachment, disk scheduling algorithms, swap space management, RAID types.	<b>9</b>
<b>V</b>	OS Security: Authentication, Access Control, Access Rights, System Logs	<b>8</b>

## **Reference Books:**

1. Operating System Concepts, Silberschatz and Galvin, Wiley India Limited
2. UNIX Concepts and Applications, Sumitabha Das, McGraw-Hill Education
3. Operating Systems, Internals and Design Principles, Stallings, Pearson Education, India
4. Operating System Concepts, Ekta Walia, Khanna Publishing House
5. Modern Operating Systems, Andrew S. Tanenbaum, Prentice Hall of India
6. Operating systems, Deitel & Deitel, Pearson Education, India

## INTRODUCTION TO DBMS

L	T	P		Course Code No.: <b>CSPC204</b>
2	0	0		
<b>Total Contact hrs.:</b> Lecture: 30 Tutorial: 0 Practical: 0 <b>Credit : 2</b> <b>Prerequisite: CSPC203</b>			<b>Total marks: 100</b>	<b>Theory:</b> End Term Exam.: 60 P.A: 40

### Rationale:

This course covers the development of database-driven applications using the capabilities provided by modern database management system software. The concepts include conceptual modeling, relational database design and database query languages.

### Course outcomes:

After completing the course, the students will be able to

- Explain the basic concept of Database system and Architecture
- Demonstrate Data Modeling and E-R Diagram
- Explain the Relational Data Model & Schema Definition
- Execute SQL query
- Exhibit SQL programming technique
- Explain the critical role of database system in designing several information system-based software systems or applications.

### Detailed Course Content:

As a part of the lab, project work is included.

UNIT NO.	CONTENT	TIME ALLOTTED (HRS.)
<b>I</b>	Introduction; Database System Concepts and Architecture	<b>5</b>
<b>II</b>	Data Modeling using the Entity-Relationship Model; The Enhanced Entity-Relationship (EER) model	<b>6</b>
<b>III</b>	The Relational Data Model and Relational Database Constraints; ER/EER to Relational Model map-ping; Relational Algebra and Relational Calculus	<b>7</b>
<b>IV</b>	SQL-99: Schema definition, Constraints, Queries, and Views; Security; Introduction to SQL programming Techniques	<b>7</b>
<b>V</b>	Functional dependencies and normalization for relational databases; Relational database design algorithms and further dependencies.	<b>5</b>

### **Reference Books:**

1. Fundamentals of Database Systems, Elmasri & Navathe, Pearson Education
2. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata McGraw-Hill.
3. Database System Concepts, Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw-Hill, New Delhi, India.
4. Introduction to Database Systems, C.J.Date, Pearson Education
5. Introduction to SQL, Rick F.Vander Lans, Pearson Education

## COMPUTER NETWORKS

L	T	P		Course Code No.: <b>CSPC206</b>
2	0	0		
<b>Total Contact hrs.:</b> Lecture: 30 Tutorial: 0 Practical: 0 <b>Credit : 2</b>			<b>Total marks: 100</b>	<b>Theory:</b> End Term Exam.: 60 P.A: 40

### Rationale:

This course enables the students to understand functioning of computer networks and popular networking protocols

### Course outcomes:

After completion of the course, students will be able to

- Explain OSI Reference Model
- Demonstrate the TCP/IP Protocol Suite
- Exhibit the concept of Routing and Switching
- Analyze the design issues related to Computer Networks
- Demonstrate functioning of various components of Computer Networks

### Detailed Course Content:

UNIT NO.	CONTENT	TIME ALLOTTED (HRS.)
<b>I</b>	Introduction to computer networks; Network Models- OSI Reference Model, TCP/IP Model;	<b>5</b>
<b>II</b>	Transmission Media – principles, issues and examples; Wired Media – Coaxial, UTP, STP, Fiber Optic Cables; Wireless Media – HF, VHF, UHF, Microwave, Ku Band; Network topologies; Data Link Layer –design issues, example protocols (Ethernet, WLAN, Bluetooth); Switching Techniques;	<b>8</b>
<b>III</b>	Network Layer - design issues, example protocols (IPv4); Routing - principles/issues, algorithms (Distance-vector, Link-state) and protocols (RIP, OSPF);	<b>7</b>
<b>IV</b>	Transport Layer - design issues, example protocols (TCP); Application Layer Protocols (SMTP, DNS).	<b>4</b>
<b>V</b>	Functioning of Network Devices – NIC, Hub, Switch, Router, Wi-Fi Devices; Network Management System and example protocol (SNMP).	<b>6</b>

**Reference Books:**

1. Computer Networks, 4<sup>th</sup> Edition (or later), Andrew S. Tanenbaum, PHI
2. TCP/IP Illustrated, Volume-1, W. Richard Stevens, Addison Wesley
3. Data and Computer Communications, William Stallings, PHI
4. An Engineering Approach to Computer Networking, S. Keshav, Addison Wesley/Pearson
5. An Integrated Approach to Computer Networks, Bhavneet Sidhu, Khanna Publishing House

## SSAD/SOFTWARE ENGINEERING

L	T	P		Course Code No.: <b>CSPC208</b>
3	0	0		
<b>Total Contact hrs.:</b> Lecture: 45 Tutorial: 0 Practical: 0 <b>Credit : 3</b>			<b>Total marks: 100</b>	<b>Theory:</b> End Term Exam.: 60 P.A: 40

### Rationale:

This course is to inculcate essential technology and software engineering knowledge and skills essential to build a reasonably complex usable and maintainable software iteratively. It emphasizes on structured approach to handle software development and enhance communication skills.

### Course outcomes:

After completion of the course, students will be able to

- Explain the concepts of Software Engineering
- Demonstrate the requirement Analysis
- Explain the Project Development Life Cycle
- Exhibit the Project Management Techniques
- Explain black box testing and white box testing

### Course Content:

As per the course design, concepts learned as part of this course will/should be used in the Minor Project (Proj.202). These two courses should go hand in hand to be effective.

UNIT NO. & TITLE	CONTENT	TIME ALLOTTED (HRS.)
<b>I</b>	Introduction to Software Engineering, Lifecycle, Process Models - Traditional v/s Agile processes.	<b>10</b>
<b>II</b>	Development Activities - Requirements Gathering and Analysis, Design Concepts, Software architecture and Architectural styles, Basic UI design, Effective Coding and Debugging techniques.	<b>15</b>
<b>III</b>	Software Testing Basics, Unit, Integration, System and Acceptance Testing, Introduction to various testing techniques (e.g. Stress testing), Writing and executing test cases, Quality Assurance.	<b>10</b>
<b>IV</b>	Project Management - Project management concepts, Configuration and Release Management, Version Control and its tools (Git), Release Planning, Change Management, Software Maintenance, and Project Metrics.	<b>10</b>

**Reference Books:**

1. Software Engineering – A Practitioner’s Approach, 7th Edition, Roger Pressman.
2. Software engineering, Ian Sommerville, Pearson Education
3. An Integrated Approach to Software Engineering, Pankaj Jalote, Springer Verlag
4. Software Engineering, Nasib Singh Gill, Khanna Book Publishing Co. India.
5. Software Engineering, K. K. Agarval, Yogesh Singh, New Age International Publishers

## INTERNET OF THINGS (IOT)

L	T	P		Course Code No.: CSPC210
2	1	0		
<b>Total Contact hrs.:</b> Lecture: 30 Tutorial: 15 Practical: 0 <b>Credit : 3</b>			<b>Total marks: 100</b>	<b>Theory:</b> End Term Exam.: 60 P.A: 40

### Rationale:

Internet of Things (IoT) is presently an important technology with wide ranging interest from Government, academia and industry. IoT cuts across different application domain verticals ranging from civilian to defense sectors which includes agriculture, space, health care, manufacturing, construction, water, mining, etc. Today it is possible to build different IoT solutions such as shopping system, infrastructure management in both urban and rural areas, remote health monitoring and emergency notification systems, and transportation systems. Therefore, it is very important to learn the fundamentals of this emerging technology.

### Course outcomes:

After completion of the course, students will be able to

- Explain the basic concept of IoT
- Demonstrate Networking & Communication Protocols in IoT.
- Execute basic program in Arduino
- Implement application related to IoT
- Demonstrate basic implementation skills using Raspberry PI

### Detailed Course Content:

UNIT NO.	CONTENT	TIME ALLOTTED (HRS.)
<b>I</b>	Introduction to IoT; Sensing; Actuation	<b>7</b>
<b>II</b>	Basics of IoT Networking, Communication Protocols, Sensor networks	<b>8</b>
<b>III</b>	Introduction to Arduino programming, Integration of Sensors/Actuators to Arduino	<b>8</b>
<b>IV</b>	Implementation of IoT with Raspberry Pi; Data Handling Analytics	<b>7</b>

### Reference Books:

1. [https://nptel.ac.in/noc/individual\\_course.php?id=noc17-cs22](https://nptel.ac.in/noc/individual_course.php?id=noc17-cs22)  
 “The Internet of Things: Enabling Technologies, Platforms, and Use Cases”, by Pethuru Raj and Anupama C. Raman (CRC Press)
2. Internet of Things by Dr. Jeeva Jose, Khanna Publishing House (Edition 2017)
3. “Internet of Things: A Hands-on Approach”, by Arshdeep Bahga and Vijay Madisetti (Universities Press)
4. *Internet of Things: Architecture and Design Principles*, Raj Kamal, McGraw Hill
5. Research papers

## OPERATING SYSTEMS LAB

L	T	P		Course Code No.: <b>CSPC212</b>
0	0	2		
<b>Total Contact hrs.:</b> Lecture: 0 Tutorial: 0 Practical: 30 <b>Credit : 1</b> <b>Pre-requisite: CSPC213</b>			<b>Total marks: 100</b>	<b>Practical:</b> End Term Exam.: 40 P.A: 60

### Rationale:

This Lab course is intended to practice and do experiment on concepts taught in theory class of 'Operating Systems' and gain insight into functioning of the Operating Systems.

### Course outcomes:

After completion of the course, students will be able to

- Execute various commands related to OS
- Implement and execute IPC
- Simulate CPU Scheduling using various algorithm
- Simulate Bankers algorithm for Deadlock Avoidance and Prevention
- Simulate Page replacement technique

### Detailed Course Content:

Sl. No.	Topics for Practice	Hours
1	Revision practice of various commands like man, cp, mv, ln, rm, unlink, mkdir, rmdir, etc. and many more that were learnt in IT Workshop course and later.	30
2	Implement two way process communication using pipes	
3	Implement message queue form of IPC	
4	Implement shared memory and semaphore form of IPC	
5	Simulate the CPU scheduling algorithms - Round Robin, SJF, FCFS, priority	
6	Simulate Bankers algorithm for Deadlock Avoidance and Prevention	
7	Simulate all FIFO Page Replacement Algorithm using C program	
8	Simulate all LRU Page Replacement Algorithms using C program	
9	Simulate Paging Technique of Memory Management	
10	Practice various commands/utilities such as catnl, uniq, tee, pg, comm, cmp, diff, tr, tar, cpio, mount, umount, find, umask, ulimit, sort, grep, egrep,fgrep cut, paste, join, du, df , ps, who, etc. and many more.	

This is a skill course. More student practice and try to find solution on their own, better it will be.

## **Reference Books:**

1. Operating System Concepts, Silberschatz, Abraham and Galvin, Peter, Wiley India Limited
2. UNIX Concepts and Applications, Sumitabha Das, McGraw-Hill Education
3. Operating System Concepts, Ekta Walia, Khanna Publishing House

## DBMS LAB

L	T	P		Course Code No.: <b>CSPC214</b>
0	0	4		
<b>Total Contact hrs.:</b> Lecture: 0 Tutorial: 0 Practical: 60 <b>Credit : 2</b> <b>Prerequisites: CSPC211</b>			<b>Total marks: 100</b>	<b>Practical:</b> End Term Exam.: 40 P.A: 60

### Rationale:

This Lab course is intended to practice whatever is taught in theory class of 'Introduction to DBMS'. A few sample case studies are listed with some suggested activities. More case studies may be added to this list. Students need to develop these case studies, apply all relevant concepts learnt in theory class as the course progress, and identify activities/operations that may be performed on the database. It will be a good idea to also use concepts learnt in the course on Software Engineering/SSAD.

### Course outcomes:

After completing the course, the students will be able to

- Demonstrate creation of tables
- Exhibit select, display update and delete procedure in the database
- Demonstrate writing triggers and update records
- Study and explain various case studies related to DBMS
- Demonstrate Normalization in the DBMS system

### Detailed Course Content:

Sl. No.	Topics for Practice	Hours
1	Case Study-1: Employee database – 'Create' employee table, 'Select' and display an employee matching a given condition, 'Delete' duplicate records, delete rows using triggers, insert and update records, find net salary, etc.	10
2	Case Study-2: Visitor Management database	10
3	Case Study-3: Students Academic database	10
4	Case Study-4: Inventory Management System database	12
5	Case study-5: Bank Operations database	10
6	Case Study-6: Bus Operator (Roadways) – Do related activities such as prepare E-R Model, Relational Model, do Normalisation, Create Tables, Insert data, Delete Data, Query database, create stored procedures, etc.	8

This is a skill course. More student practice and try to find solution on their own, better it will be.

## **Reference Books:**

1. Elmasri & Navathe, Fundamentals of Database Systems, Pearson Education
2. Raghurama Krishnan, Johannes Gehrke, Database Management Systems, Tata McGraw-Hill, New Delhi, India.
3. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, Database System Concepts, McGraw-Hill, New Delhi, India.
4. Introduction to Database Systems, C.J.Date, Pearson Education
5. Introduction to SQL, Rick F.Vander Lans, Pearson Education

## COMPUTER NETWORKS LAB

L	T	P		Course Code No.: <b>CSPC216</b>
0	0	4		
<b>Total Contact hrs.:</b> Lecture: 0 Tutorial: 0 Practical: 60 <b>Credit : 2</b>			<b>Total marks: 100</b>	<b>Practical:</b> End Term Exam.: 60 P.A: 40

### Rationale:

This Lab course is intended to practice whatever is taught in theory class of 'Computer Networks'. Some of the things that should necessary be covered in lab are network issues, limitations, how to configure and to connect computers.

### Course outcomes:

After completion of the course, students will be able to

- Identify various cables used in the computer networks
- Exhibit crimping, punching and splicing operation
- Demonstrate verification of cables using LAN testers
- Exhibit configuration of LAN using PC, Laptops and Mobile devices
- Identify various Network equipment like HUB, SWITCH, Router, WIFI ACCESS-POINT
- Demonstrate Network simulation tools

### Detailed Course Content:

Sl. No.	Topics for Practice	Hour
1	Showing various types of networking cables and connectors, identifying them clearly	4
2	Looking at specifications of cables and connectors of various vendors on Internet, find out differences.	4
3	Making patch cords using different types of cables and connectors - crimping, splicing, etc.	6
4	Demonstration of different type of cable testers, using them for testing patch cords pre-prepared by the students in Lab and standard cables prepared by professionals	6
5	Configuring computing devices (PC, Laptop, Mobile, etc.) for network, exploring different options and their impact - IP address, gateway, DNS, security options, etc.	10
6	Showing various networking devices - NICs, Hub, Switch, Router, Wi-Fi access point, etc.	4
7	Looking at specifications of various networking devices various companies on Internet, find out differences.	6
8	Network simulation tool (e.g. Cisco Packet Tracer)	8

9	Setting up a small wired LAN in the Lab	6
10	Setting up a small wireless LAN in the Lab	6

This is a skill course. More student practice and try to find solution on their own, better it will be.

### **Reference Books:**

1. Cisco press books on CCNA
2. User manual of networking devices available in the lab
3. Wiki pages on networking devices

**OPEN ELECTIVE:****DISASTER MANAGEMENT**

L	T	P		Course Code No.: <b>CSOE202</b>
3	0	0		
<b>Total Contact hrs.:</b> Lecture: 45 Tutorial: 0 Practical: 0 <b>Credit : 3</b>			<b>Total marks: 100</b>	<b>Theory:</b> End Term Exam.: 60 P.A: 40

**Rationale:**

This course is included in the curriculum to enable the students to learn about various types of natural and man-made disasters. It gives an exposure of pre- and post-disaster management for some of the disasters. It helps the students to know various information and organizations in disaster management in India and also exposes them to technological tools and their role in disaster management

**Course outcomes:**

After competing this course, student will be able to

- Identify various types of disasters
- Discuss the precautions and awareness regarding various disasters
- Decide first action to be taken under various disasters
- Identify the organizations in India, which are dealing with disasters
- Select IT tools to help in disaster management

**Detailed Course Content:**

<b>UNIT NO. &amp; TITLE</b>	<b>CONTENT</b>	<b>TIME ALLOTTED (HRS.)</b>
<b>I: Understanding Disaster</b>	Understanding the Concepts and definitions of Disaster, Hazard, Vulnerability, Risk, Capacity - Disaster and Development, and disaster management.	05
<b>II: Types, Trends, Causes, Consequences and Control of Disasters</b>	Geological Disasters (earthquakes, landslides, tsunami, mining); Hydro-Meteorological Disasters (floods, cyclones, lightning, thunder-storms, hail storms, avalanches, droughts, cold and heat waves) Biological Disasters (epidemics, pest attacks, forest fire);  Technological Disasters (chemical, industrial, radiological, nuclear) and Manmade Disasters (building collapse, rural and urban fire, road and rail accidents, nuclear, radiological, chemicals and biological disasters) Global Disaster Trends - Emerging Risks of Disasters - Climate Change and Urban Disasters.	<b>10</b>

<b>III: Disaster Management Cycle and Framework</b>	<p>Disaster Management Cycle – Paradigm Shift in Disaster Management.</p> <p>Pre-Disaster – Risk Assessment and Analysis, Risk Mapping, zonation and Micro zonation, Prevention and Mitigation of Disasters, Early Warning System; Preparedness, Capacity Development; Awareness.</p> <p>During Disaster – Evacuation – Disaster Communication – Search and Rescue – Emergency Operation Centre – Incident Command System – Relief and Rehabilitation –</p> <p>Post-disaster – Damage and Needs Assessment, Restoration of Critical Infrastructure – Early Recovery – Reconstruction and Redevelopment; IDNDR, Yokohama Strategy, Hyogo Framework of Action.</p>	<b>10</b>
<b>IV Disaster Management in India</b>	<p>Disaster Profile of India – Mega Disasters of India and Lessons Learnt.</p> <p>Disaster Management Act 2005 – Institutional and Financial Mechanism, National Policy on Disaster Management, National Guidelines and Plans on Disaster Management; Role of Government (local, state and national), Non-Government and Inter Governmental Agencies</p>	<b>10</b>
<b>V: Applications of Science and Technology for Disaster Management</b>	<p>Geo-informatics in Disaster Management (RS, GIS, GPS and RS).</p> <p>Disaster Communication System (Early Warning and Its Dissemination).</p> <p>Land Use Planning and Development Regulations, Disaster Safe Designs and Constructions, Structural and Non Structural Mitigation of Disasters</p> <p>S&amp;T Institutions for Disaster Management in India</p>	<b>10</b>

## References

1. Publications of National Disaster Management Authority (NDMA) on Various Templates and Guidelines for Disaster Management
2. Bhandani, R. K., An overview on natural & man-made disasters and their reduction, CSIR, New Delhi
3. Srivastava, H. N., and Gupta G. D., Management of Natural Disasters in developing countries, Daya Publishers, Delhi
4. Alexander, David, Natural Disasters, Kluwer Academic London
5. Ghosh, G. K., Disaster Management, A P H Publishing Corporation
6. Murthy, D. B. N., Disaster Management: Text & Case Studies, Deep & Deep Pvt. Ltd.

## MINOR PROJECT

L 0	T 0	P 4	<b>Course Code. No.: PR 202</b>
<b>Total Contact hrs.:</b>		<b>Total Marks: 100</b>	<b>Practical:</b>
<b>Practical</b>	<b>: 60</b>		End Term Exam. :80
<b>Credit</b>	<b>: 2</b>		P.A. : 120

### RATIONALE

Minor Project offers students an opportunity to apply theoretical knowledge in a practical setting, thereby enhancing their technical skill and problem solving skill. This course has been designed for students to understand the basics of carrying out any engineering project which includes Literature survey, methodology, setting up objective and scope of the project work.

### COURSE OUTCOMES:

After completing this course, student will be able to:

- Identify the objective and scope of work
- Undertake interdisciplinary literature survey.
- Prepare methodology of the project work.
- Demonstrate necessary field and laboratory experiments.
- Handle necessary equipment.

### COURSE CONTENT DETAILS

UNIT NO.	CONTENT	HOURS
<b>UNIT -I</b>	<b>Objective and Scope of work</b> <ul style="list-style-type: none"> <li>• Introduction to the project.</li> <li>• Clear statement of project objectives.</li> <li>• Explanation of the scope and limitations of the project.</li> <li>• Justification for why the project is important or relevant.</li> </ul>	<b>12</b>
<b>UNIT -II</b>	<b>Literature Survey</b> <ul style="list-style-type: none"> <li>• Review of existing literature and research related to the project.</li> <li>• Identification of gaps in current knowledge.</li> <li>• Discussion of relevant theories, models, and previous work in the field.</li> <li>• Proper citations and references to sources.</li> </ul>	<b>12</b>
<b>UNIT -III</b>	<b>Methodology</b> <ul style="list-style-type: none"> <li>• Detailed explanation of the research methods and approaches to be used.</li> <li>• Description of data collection techniques (if applicable).</li> <li>• Explanation of any experiments or simulations to be conducted.</li> <li>• Ethical considerations and research ethics, if applicable.</li> </ul>	<b>12</b>
<b>UNIT -IV</b>	<b>Handling of Instruments and Experiments</b> <ul style="list-style-type: none"> <li>• Description of the tools, equipment, or software to be used.</li> <li>• Details on how experiments or simulations will be conducted.</li> <li>• Safety precautions and protocols, if relevant.</li> <li>• Data collection and analysis methods.</li> </ul>	<b>12</b>

<b>UNIT -V</b>	<b>Comprehensive Progress Presentation</b> <ul style="list-style-type: none"><li>• Regular progress reports or presentations to track the development of the project.</li><li>• Presentation of findings, data, and results obtained so far.</li><li>• Discussion of any challenges encountered and how they were addressed.</li><li>• Feedback received from mentors or advisors and any adjustments made to the project plan.</li></ul>	<b>12</b>
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## ESSENCE OF INDIAN KNOWLEDGE & TRADITION

L	T	P		Course Code No.: <b>AU202</b>
2	0	0		
<b>Total Contact hrs.: 30</b> <b>Credit : 0</b>				<b>Progressive Assessment only</b>

### RATIONALE:

Considering the need of protecting Indian knowledge and tradition, the diploma level students of Automobile Engineering should be facilitated the concepts Indian traditional knowledge and to make them understand the importance of roots of knowledge system and methods of application in today's life and how to protect traditional knowledge system. Interpretation of the concepts of Intellectual property to protect the traditional knowledge as well as importance of Traditional knowledge in Agriculture and Medicine must be known.

### COURSE OUTCOME:

On successful completion of the course, students will be able to:

- Discuss the concepts of traditional Indian knowledge and roots of knowledge system and indigenous knowledge system
- Explain the technique of protection of traditional Indian knowledge
- Discuss legal frameworks of traditional knowledge
- State intellectual property rights
- State traditional knowledge in Different Sectors

### COURSE CONTENT

UNIT	TOPIC/SUB-TOPIC	HRS.	TOTAL HRS.
1	Introduction to traditional knowledge: Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge (Unani / Siddha/ Ayurveda), Indigenous Knowledge (IK), characteristics, traditional knowledge vis-a-vis indigenous knowledge, traditional knowledge of Meghalaya	07	<b>30</b>
2	Protection of traditional knowledge (TK): The need for protecting traditional knowledge, Significance of TK Protection, value of TK in global economy, Role of Government to harness TK.	07	
3	Legal framework and TK: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, Plant Varieties Protection and Farmer's Rights Act, 2001 (PPVFR Act); The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016.	06	
4	Traditional knowledge and intellectual property: Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge, Geographical Indications (GI).	04	
5	Traditional Knowledge in Different Sectors: Traditional knowledge and engineering, Traditional medicine system, TK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK	06	

**REFERENCE BOOKS:**

1. Traditional Knowledge System in India, by Amit Jha, 2009.
2. "Knowledge Traditions and Practices of India" Kapil Kapoor.
3. Madhya Himalayi Sanskriti mein Gyan, Vigyan evam Paravigyan by Prof PC Pandey.

**Suggested Online Link:**

Web Links:

1. <https://www.youtube.com/watch?v=LZP1StpYEPM>
2. <http://nptel.ac.in/courses/12110600/>