Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Name of the Faculty: Science & Technology

CHOICE BASED CREDIT SYSTEM

Syllabus Structure: B. Tech. (Information Technology)

S.Y. B.Tech (Information Technology) w.e.f. Academic Year 2021-22

T.Y. B.Tech (Information Technology) w.e.f. Academic Year 2022-23

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

FACULTY OF SCIENCE & TECHNOLOGY

B. Tech. Information Technology

Program Educational Objectives (PEOs):

1. Graduates will exhibit strong fundamental knowledge and skills in the field of Information Technology to pursue successful professional careers and higher studies and research.

2. Graduates will exhibit capabilities to understand and resolve the various societal issues through their problem solving skills.

3. Graduates will be sensitive to ethical, societal and environmental issues while serving at their professional work and society.

Program Outcomes (POs)

B. Tech. Information Technology

(A) PROGRAM OUTCOME (POs)

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet- the specified need switch appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex problems**: User research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and teamwork**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

B. Tech. Information Technology

PSO1: Student will be able to apply fundamentals of mathematics, algorithms and computational systems to Information Technology.

PSO2: Student will be able to provide a solution to the problem in the areas of Networking, Database management, System Software, Web Technology, Information Security and Thrust areas.

PSO3: Student will be able to design and develop IT solution for societal problem/s, while encouraging usage of Free Open Source Software (FOSS).

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR
FACULTY OF SCIENCE AND TECHNOLOGY
Credit System Structure of S.Y.B.Tech.(Information Technology) Semester –I
wef. 2021-2022

Course Code	Theory Course Name	Engagement Hours			Credits	FA	SA		Total
		L	T	P		ESE	ISE	ICA	
IT211	Applied Mathematics-I	3	1		4	70	30	25	125
IT212	Discrete Mathematical Structures	3	1		4	70	30	25	125
IT213	Data structures	3			3	70	30		100
IT214	Computer Graphics	3			3	70	30		100
IT215	Microprocessors	3			3	70	30		100
IT216	Python Programming	2			2		25		25
	Sub Total	**17**	**2**		**19**	**350**	**175**	**50**	**575**
	Environmental studies	2							
	Laboratory/Workshop					**ESE POE**			
IT213	Data structures			2	1	50		25	75
IT214	Computer Graphics			2	1			25	25
IT215	Microprocessors			2	1			25	25
IT216	Python Programming			2	1	50		25	75
	Sub Total			**8**	**4**	**100**		**100**	**200**
	Grand Total	**19**	**2**	**8**	**23**	**450**	**175**	**150**	**775**

Abbreviations: L- Lectures, P –Practical, T- Tutorial, D- Drawing, ISE -Internal Tests, ESE - University Examination (Theory & / POE & / Oral examination), ICA- Internal Continuous Assessment.

Note:

(1) The number of students in a practical/Tutorial batch shall be 20. New batch shall be formed if the number of remaining students (after forming batches of 20) exceeds 9.

(2) Internal Continuous Assessment (ICA): ICA shall be a continuous process based on the performance of the student in assignments, class tests, quizzes, attendance and interaction during theory and lab sessions, journal writing, report presentation etc., as applicable

(3) Student is required to study and pass Environmental Science subject in Second Year of B. Tech. information Technology to become eligible for award of degree.

6

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR
FACULTY OF SCIENCE AND TECHNOLOGY
Credit System Structure of S.Y.B.Tech.(Information Technology) Semester – II
wef. 2021-2022

Course Code	Theory Course Name	Engagement Hours			Credits	FA	SA		Total
		L	T	P		ESE	ISE	ICA	
IT221	Applied Mathematics-II	3	1		4	70	30	25	125
IT222	Theory of Computation	3	1		4	70	30	25	125
IT223	Computer Organization and Architecture	3			3	70	30		100
IT224	Computer Networks	3			3	70	30		100
IT225	OOP using Java	2			2		25		25
	Sub Total	**14**	**2**	**0**	**16**	**280**	**145**	**50**	**475**
	Environmental studies	2				50			50
	Laboratory/Workshop					**ESE POE**			
IT223	Computer Organization and Architecture			2	1			25	25
IT224	Computer Networks			2	1	50		25	75
IT225	OOP using Java			4	2	50		25	75
	Sub Total	**0**	**0**	**8**	**4**	**100**		**75**	**175**
	Grand Total	**16**	**2**	**8**	**20**	**380**	**145**	**125**	**650**

Abbreviations: L- Lectures, P –Practical, T- Tutorial, D- Drawing, ISE -Internal Tests, ESE - University Examination (Theory & / POE & / Oral examination), ICA- Internal Continuous Assessment.

Note:

(1) The number of students in a Practical/Tutorial batch shall be 20. New batch shall be formed if the number of remaining students (after forming batches of 20) exceeds 9.

(2) Internal Continuous Assessment (ICA): ICA shall be a continuous process based on the performance of the student in assignments, class tests, quizzes, attendance and interaction during theory and lab sessions, journal writing, report presentation etc., as applicable.

(3) Student is required to study and pass Environmental Science subject in Second Year of B. Tech. Information Technology to become eligible for award of degree.

(4) Vocational Training (evaluated at Final Year B. Tech. Semester VII) of minimum 15 days shall be completed in vacation/s after S.Y.B.Tech. Semester IV but before Final Year B.Tech. Semester VII & the report shall be submitted and evaluated in Final Year B.Tech. Semester VII

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR
FACULTY OF SCIENCE AND TECHNOLOGY
Credit System Structure of T.Y.B.Tech.(Information Technology) Semester-I
wef. 2022-2023

Course Code	Theory Course Name	Engagement Hours			Credits	FA	SA		Total
		L	T	P		ESE	ISE	ICA	
IT311	System Software	3			3	70	30		100
IT312	Operating Systems	3			3	70	30		100
IT313	Database Engineering	3			3	70	30		100
IT314	Design and Analysis of Algorithms	3			3	70	30		100
IT315	Mobile Application Development	2			2		25		25
SL31A	Self Learning Module I (HSS)				1	50			50
	Sub Total	**14**	**0**	**0**	**15**	**330**	**145**		**475**
	Seminar			**2***	**1**			**50**	**50**
	Laboratory/Workshop					**ESE POE**			
IT311	System Software			2	1			25	25
IT312	Operating Systems			2	1			25	25
IT313	Database Engineering			2	1	50		25	75
IT314	Design and Analysis of Algorithm			2	1	50		25	75
IT315	Mobile Application Development			2	1	50		25	75
	Sub Total	**0**	**0**	**10**	**5**	**150**	**0**	**125**	**275**
	Grand Total	**14**	**0**	**10**	**20**	**480**	**145**	**125**	**750**

Abbreviations: L- Lectures, P –Practical, T- Tutorial, D- Drawing. *- Alternate week, ISE -Internal Tests, ESE – University Examination (Theory & / POE & / Oral examination), ICA- Internal Continuous Assessment.

- **Indicates over and above curriculum**

Note

1. Batch size for the practical/tutorial shall be of 15 students. On forming the batches, if the strength of remaining **7** student exceeds 7, then a new batch shall be formed.

2. Vocational Training (evaluated at Final Year B. Tech. Semester VII) of minimum 15 days shall be completed in vacation/s after S.Y. B.Tech. Semester IV but before Final Year B.Tech. Semester VII & the report shall be submitted and evaluated in Final Year B.Tech. Semester VII

3. ICA assessment shall be a continuous process based on student's performance in – class tests, assignments, homework, subject seminars, quizzes, laboratory books and their interaction and attendance for theory and lab sessions as applicable.

4 **Self-Learning Module I at T.Y. B.Tech. – I**

Curriculum for Humanities and Social Sciences, Self Learning Module - I is common for all under graduate engineering programs.

A. Student can select & enroll a Self Learning Module I Course from PAH Solapur University, Solapur HSS Course List (SL31-A) and appear for university examination.

SL31-A: P. A. H. Solapur University, Solapur: HSS Course List

1. Economics	4. Stress and Coping
2. Intellectual Property Rights for Technology Development and Management	5. Professional Ethics & Human Value
3. Introduction to Sociology	

OR

B. Student can select and enroll for university approved minimum eight weeks NPTEL SWYAM / Industry MOOC / coursera / edX / any other HSS course (SL31-B), complete its assignments and appear for certificate examination conducted by approved authority. The list of courses as shown in Table SL31-B will be updated from time to time by University authorities. Latest updated list will be valid for selection of self learning Module-I (HSS) courses.

More details about NPTEL are available at http://nptel.ac.in

SL31-B: University approved NPTEL- HSS course List

1. Soft skills	15. Management of Inventory Systems
2. Introduction to Modern India Political Thought	16. Economic Growth and Development
3. Intellectual Property	17. Ethic in Engineering Practice
4. Technical English for Engineers	18. Corporate Social Responsibility
5. Developing Soft Skills and Personality	19. Marketing Management –I
6. Educational Leadership	20. Marketing Research and Analysis
7. Microeconomics: Theory & Applications	21. Selected Topics in Decision Modeling
8. Engineering Economics	22. Innovation, Business Models and Entrepreneurship
9. Human Resource Development	23. Simulation of Business Systems: An Applied Approach
10. Project Management for managers	24. Sustainability through Green Manufacturing Systems: An Applied Approach
11. Data Analysis and Decision Making - I	25. Total Quality Management - I
12. E-Business	26. Introduction to Operations Research
13. Working Capital Management	27. Knowledge Management
14. Industrial Safety Engineering	

**Credit System Structure of T.Y.B.Tech.(Information Technology)
Semester-II
wef. 2022-2023**

Course Code	Theory Course Name	Engagement Hours			Credits	FA	SA		Total
		L	T	P		ESE	ISE	ICA	
IT321	Artificial Intelligence	3			3	70	30		100
IT322	Object Oriented Modeling & Design	3			3	70	30		100
IT323	Software Engineering	3	2		5	70	30	25	125
IT324 A to C	Professional Elective-I	3			3	70	30		100
IT325	Web UI and UX Technology	2			2	--	25		25
ITOE326 A to C	Open Elective	2			2	50			50
	Sub Total	**16**	**2**	**0**	**18**	**330**	**145**	**25**	**500**
	Laboratory/Workshop					**ESE POE**			
IT321	Artificial Intelligence			2	1			25	25
IT322	Object Oriented Modeling & Design			2	1			25	25
IT324	Professional Elective-I			2	1			25	25
IT325	Web UI and UX Technology			2	1	50		25	75
IT327	Mini Project			2	1	50		25	75
	Sub Total	**0**	**0**	**10**	**5**	**100**	**0**	**125**	**225**
	Grand Total	**16**	**2**	**10**	**23**	**430**	**145**	**150**	**725**

Abbreviations: L- Lectures, P –Practical, T- Tutorial, D- Drawing, ISE -Internal Tests,

ESE - University Examination (Theory &/POE &/Oral examination), ICA- Internal

Continuous Assessment.

IT 324	Professional Elective – I	ITOE326	Open Elective
A	Cloud Computing	A	Principles of Management: Practicing Ethics, Responsibility, Sustainability
B	Augmented Reality/Virtual Reality	B	Engineering Economics and Management
C	Network Security	C	Disaster Management

Note

1. Batch size for the practical /tutorial shall be of 15 students. On forming the batches, if the strength of remaining student exceeds 7, then a new batch shall be formed.

2. Vocational Training (evaluated at Final Year B. Tech. Semester VII) of minimum 15 days shall be completed in vacation/s after S.Y. B.Tech. Semester IV but before Final Year B.Tech. Semester VII & the report shall be submitted and evaluated in Final Year B.Tech. Semester VII

3. ICA assessment shall be a continuous process based on student's

performance in – class tests, assignments, homework, subject seminars, quizzes, laboratory books and their interaction and attendance for theory and lab sessions as applicable.

4. Mini Project shall consist of developing software, based on various tools & technologies.

5. Project groups shall not be of more than **five** students.

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR
FACULTY OF SCIENCE AND TECHNOLOGY
T. Y. B. Tech. (Information Technology), Semester-I
IT311 : SYSTEM SOFTWARE

Teaching Scheme	**Examination Scheme**
Lectures – 3 Hrs./week, 3 Credits	ESE – 70 Marks
Practical – 2 Hrs./week, 1 Credit	ISE – 30 Marks
	ICA – 25 Marks

Introduction:

This course introduces different language processors. It deals with methods used to analyze, synthesize, design and develop prototypes of language processors. It introduces some tools to be used to develop language processors.

Course Prerequisite:

Student shall have undergone a course on Discrete Mathematical Structures and Theory ofComputation.

Course Outcomes:

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

1. Describe various System Software and simulate them using a programming language.
2. Demonstrate and distinguish logical design perspective of System Software.
3. Use Language Processor Development Tools to build System software.

SECTION - I

Unit 1: Introduction of System Software   **(06)**

Introduction, language processing activities, Fundamentals of language processing, Fundamentalsof language Specification, Language Processor Development Tools

Unit 2: Compilation and Analysis   **(10)**

Aspects of compilation, Phases of Compiler, Lexical Analysis: Role of a Lexical analyzer, input buffering, specification and recognition of tokens, finite automata implications, designing a lexical analyzer generator. Syntax Analysis: Role of Parser, Writing grammars for context free environments, Top-down parsing, Recursive descent and predictive parsers (LL), Bottom-Up parsing, Operator precedence parsing, LR, SLR and LALR parsers.

Unit 3: Assemblers, Macros and Macro Processors   **(08)**

Elements of assembly language programming, A simple assembly scheme, Pass structure of assemblers, design of a two pass assembler. Macro definition and call, Macro Expansion, Nested macro calls

Unit 4: Code Generation and Optimization (10)

Code Generation: Issues in design of a code generator and target machine, Run time storage management, Basic blocks and flow graphs, Next use information and simple code generator, Issues of register allocation, assignment and basic blocks, code generation from Dags and the dynamic code generation algorithm.

Code Optimization: Sources of optimization, Peephole optimization and basic blocks, loops in flow graphs, Data flow analysis and equations, code improving transformation and aliases, Data flow analysis and algorithms, symbolic debugging of optimized code.

Unit 5: Linkers (06)

Relocation and linking concepts, design of a linker, Self-relocating programs, A Linker for MS DOS, Linking for overlays

Unit 6: Loaders (05)

Function of loader, general loader scheme, Absolute loader, Subroutine Linkages, Relocating loader, Direct linking loader, Dynamic loading, Design of an Absolute Loader, Design of direct linking loader.

Internal Continuous Assessment (ICA):

ICA should consist of 8-10 lab assignments from following list –
1. Symbol table generation for given input *.c file.
2. Implementation of Macro and Nested macros.
3. Design and implementation of 1 pass assemblers.
4. Design and implementation of 2 pass assemblers.
5. Design Lex specifications for the tokens – keywords, identifiers, numbers, operators, whitespaces.
6. Implement any one of the code optimization techniques.
7. Implementation of Toy-code generator.
8. Simulation of linkers.
9. Simulation of loaders

Text Books:
1. System Programming and operating systems – D.M. Dhamdhere2nd Edition (TMGH)
2. Compilers - Principles, Techniques and Tools - A.V. Aho, R. Shethi and J.D. Ullman(Pearson Education.)
3. System Programming - J. J. Donovan (Mc-Graw Hill)

Reference Books:
1. System Software- An Introduction to Systems Programming- 3rd Edition- Leland L.Beck(Pearson Education)
2. Compiler Construction - Dhamdere (Mc-Millan)
3. Compiler Construction – Principles & Practice – Ken Louden (Cengage Learning)
4. Compiler Design in C – Allen I. Holub (PHI / Pearson Education)
5. Compiler Construction - Barret, Bates, Couch (Galgotia)
6. Unix Programming - Pepkin Pike.
7. Crafting a compiler with C – Charls Fischer, Richard LeBlane (Pearson Education)

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR
FACULTY OF SCIENCE AND TECHNOLOGY
T. Y. B. Tech. (Information Technology), Semester- I
IT312 : OPERATING SYSTEMS

Teaching Scheme	Examination Scheme
Lectures– 3 Hrs./week, 3 Credits	ESE – 70 Marks
Practical-2 Hrs./week, 1 Credit	ISE – 30 Marks
	ICA – 25 Marks

Introduction:

This course introduces Fundamentals and basic knowledge of an operating system. It also covers the details Process Management, deadlock, Memory Management, Unix System commands, and Introduction to Shell programming and awk programming

Course Prerequisite:

Students should have knowledge of Computer Systems and basics of C programming language.

Course Outcome

1. Comprehend the features of operating system to formulate its role and responsibilities.
2. Use different process scheduling algorithm and synchronization techniques to avoid deadlock.
3. Apply memory management techniques for CPU performance.
4. Execute various Unix commands and write shell and awk script

SECTION-I

Unit 1 – Introduction (05)

Operating system definition, Simple Batch System, Multiprogrammed Batch System, Time Sharing System, Personal Computer System, Parallel System, Real Time System, and System Calls.

Unit 2 - Process (06)

Process Concept, Process Scheduling, Operations on processes, Cooperating Processes, Threads, Inter-Process communication

Unit 3 - Process Scheduling (06)

Basic concept, Scheduling Criteria, Scheduling Algorithms, Multiple processor scheduling

Unit 4 - Inter-process synchronization (05)

Background, The critical section problem, Peterson's algorithm, Synchronization Hardware, Semaphores, Classical problems of synchronization, Monitors.

SECTION –II

Unit 5 - Deadlocks (07)

System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock, combined approach to deadlock.

Unit 6 - Memory Management (06)

Background, Logical Versus Physical Address space, Swapping, Contiguous Allocation, Paging,Segmentation, Segmentation with paging.

Unit 7 - Virtual Memory (05)

Background, Demand paging, Page replacement, Page replacement
algorithms, Allocation offrames, thrashing (Only concept).
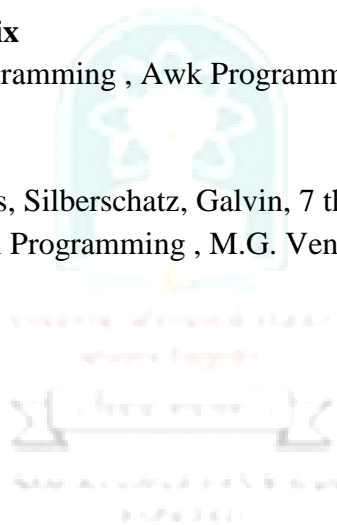
Unit 8- Introduction to Unix (05)

Unix Commands , Shell Programming , Awk Programming

Text Books:

1. Operating System concepts, Silberschatz, Galvin, 7 th or 8th Edition (John Wiley).
2. Introduction to Unix Shell Programming , M.G. Venkateshmurthy

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR
FACULTY OF SCIENCE AND TECHNOLOGY
T. Y. B. Tech. (Information Technology), Semester- I
IT313 : DATABASE ENGINEERING

Teaching Scheme	**Examination Scheme**
Lectures: 3 Hrs/week, 3 Credits	ESE: 70 Marks
Practical: 2 Hrs/week, 1 Credit	ISE : 30 Marks
	ICA: 25 Marks
	POE: 50 Marks

Introduction:

In today's data-driven economy, no computer science or business curriculum would be complete without a course in databases and data management system. This course emphasizes the understanding of the fundamentals of relational database system including data models, database architectures, normalization, data integrity, security and data manipulation. It also provides studentswith theoretical knowledge and practical skills in the use of databases and database management systems with the help of Structured Query language (SQL).It ends with covering database transaction and recovery concepts. Upon completion, students should be able to design and implement normalized database structures by creating simple database.

Course Prerequisite:

No prerequisite knowledge of databases is required but basic understanding of data-structures andalgorithms is assumed. Any general purpose programming language knowledge is needed.

Course Objectives:

1. To understand the basics of database design, structure, implementation and applications.
2. To develop the logical design of the database using data modeling concepts such as entityrelationship diagrams.
3. To study and use Structured Query Language to query, update, and manage a database.
4. To apply normalization techniques to normalize the database.
5. To familiarize the students with the fundamentals of database transaction processing and learn techniques for concurrency control and recovery methods along with different indexing techniques.

Course Outcomes:

At the end of this course, the student will be able to -
1. Apply the principles of database system and relational query language.
2. Design database using E-R modelling and apply normalization techniques on a given scenario.
3. Formulate SQL queries to perform CRUD operations.
4. Apply appropriate indexing technique to optimize the performance of the database.
5. Demonstrate transaction processing techniques.

SECTION – I

Unit 1: Introduction (04)

Database System Applications, Purpose of Database Systems, View of data, Database Languages, Data Storage and Querying, Database Architectures, Database users and administrators, history of databases system.

Unit 2: Database Design and E-R Model (10)

Overview of design process, E-R Model, Constraints, Removing redundant attributes in entity sets,E-R diagrams, Reduction to relational schema, E-R design issues, and Extended E-R features.Relational Model: Structure of relational databases, Database schema, keys, Schema diagrams,Relational Query languages, Relational algebra, Tuple Relational Calculus, Domain RelationalCalculus.

Unit 3: SQL and Advanced SQL (10)

SQL : Overview, SQL data definition, Basic structure of SQL Queries, Additional basic operations, Set operations, NULL values, Aggregate functions, Nested sub queries, Modification of the databases , Join operations, Views, Transactions, Integrity constraints, SQL data types and schemas,Authorization, Advanced SQL : Embedded SQL, Functions and Procedures, Triggers.

Unit 4: Relational Database Design (10)

Features of good Relational Designs, Atomic Domains, First Normal Form, Decomposition using Functional dependencies, Second Normal Form, BCNF, Third Normal Form, Functional-dependency theory, Fourth Normal Form.

SECTION – II

Unit 5: Indexing and Hashing (08)

Basic Concepts, Ordered Indices, B+ Tree Index Files, B Tree Index Files, Multiple Key Access, Static Hashing, Dynamic Hashing, Comparison of Indexing and Hashing, Bitmap indices, Index definition in SQL

Unit 6: Transactions (06)

Transaction concepts, A simple transaction Model, Storage structure, Transaction Atomicity andDurability, Transaction Isolation, Serializability, Transaction Isolation and Atomicity.

Unit 7: Concurrency Control (06)

Lock based protocol, Deadlock handling, Multiple granularity, Time Stamp-based protocols,Validation based protocols.

Unit 8: Recovery System (06)

Failure Classification, Storage, Recovery and Atomicity, Recovery algorithms, Buffer management.

Course Instructions:

Assignments 2 to 4 should be implemented in MySQL/Oracle/ PostGreSQL.Assignments 6 to 11 should be implemented in C++/Java.

Internal Continuous Assessment (ICA):

It should consist of 8-10 laboratory assignments as follows:

1. E-R Diagrams: Draw E-R diagram for any specific database application and create a datadictionary for the same.
2. a) Basic SQL DDL commands: write simple queries in SQL on above database application forschema creation and updation.
   b) SQL DML commands: insert, update, select command with different clauses, queries usingaggregates, grouping and ordering.
3. a) Nested sub queries, Joins and Set operations: write queries in SQL using concept of nestedsub queries, join and different set operations.
4. a) Views, Integrity constraints and Authorization: queries for creating views, different integrityconstraints and authorization commands.
   b) Advanced SQL: queries on embedded SQL, functions and procedures, triggers
5. Convert the created database into 1NF, 2NF, 3NF and BCNF.
6. Given a set of functional dependencies, find canonical cover and closure of functionaldependency.
7. Write a Java program for database (created in expt-2) connectivity using JDBC.
8. Write a program to implement B+ tree index (n=3 or n=5) on the database previously created.
9. Write a program to implement dynamic hashing on the database previously created.
10. Write a program to simulate log based protocol using immediate or deferred databasemodification.
11. Write a program to simulate any one concurrency control protocol.

Text Book:

1. Database system concepts by Abraham Silberschatz, Henry F. Korth, S. Sudarshan (McGrawHill International Edition) sixth edition.

Reference books:

1. Fundamentals of Database systems by Ramez ElMasri, S. B. Navathe (Pearson Education) Fifthedition.
2. Database Management Systems by Ramkrishnan Gehreke (Tata McGraw Hill) third edition.
3. Principles of Database Systems by J. D. Ullman (Galgotia Publications)
4. SQL The Complete Reference, 3rd Edition by James R Groff, Paul N. Weinberg and AndyOppel
5. Database system concepts by Peter Rob, Carlos Coronel (Cengage Learning) ninth edition.

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR
FACULTY OF SCIENCE AND TECHNOLOGY
T. Y. B. Tech. (Information Technology), Semester- I
IT314 : DESIGN AND ANALYSIS OF ALGORITHM

Teaching Scheme	**Examination Scheme**
Lectures– 3 Hrs./week, 3 Credits	ESE –70 Marks
Practical– 2 Hrs./week, 1 Credit	ISE – 30 Marks
	ICA –25 Marks
	POE- 50 Marks

Introduction :

This course introduces the algorithms, strategies of algorithm and analysis of algorithm which will help to compare and determine good algorithm.

Course Prerequisite:

Student should have knowledge of basic programming. They should also have basic knowledge of data structure and graph theory.

Course Outcomes:

At the end of the course, students will be able to -

1. Derive time and space complexity of a given algorithm

2. Select appropriate algorithm design paradigm for a problem.

3. Apply algorithm design paradigm for a problem.

4. Describe and distinguish complexity classes of problems

SECTION-I

Unit 1 – Introduction (08)

Algorithm Specification: Pseudo code Conventions, Recursive Algorithm, Performance Analysis: Space Complexity, Time Complexity, Calculating worst case, best case and average case complexities, complexities Asymptotic Notations, Performance Measurement

Unit 2 - Divide and Conquer (07)

The general method, Binary search, Finding the maximum and Minimum, Quicksort, Selection Sort, Merge Sort.

Unit 3 - The Greedy method (08)

The general method, Knapsack Problem, Job Sequencing with deadlines, Minimum –cost spanning trees – Prim's and Kruskal's Algorithms, Optimal storage on tapes, Optimal merge patterns, Single source shortest paths

Unit 4 - Dynamic Programming   (08)

The general method, Multistage graphs, All pair shortest paths, Optimal binary search trees, 0/1Knap sack, Reliability design, The Traveling Sales person problem. Flow shop scheduling

Unit 5 – Backtracking   (07)

The general method, 8-queen problem, sum of subsets, Knapsack Problem, Hamilton Cycle, andGraph Coloring.

Unit 6 - NP-Hard and NP-Complete problems   (07)

Tractable and Intractable Problems: Computability. The Halting problem, Computability classes –P, Np- class, NP-complete and NP-hard, Standard NP-complete problems, NP-Hard Problem (OnlyBasics problems)

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Internal Continuous Assessment (ICA) :

ICA shall consist of minimum ten practical assignment problems.

1) The nature of the problems shall be with objectives to assess student's ability to

   a. Compare and choose an appropriate algorithm design paradigm on time and spacecomplexity

   b. Apply algorithm design paradigm to provide a solution to the problem using either C,C++,Python, Java or any other programming language the student is proficient in.

   c. Effectively assess performance of provided solutions w.r.t programming language's runtimeimplementation.

Text Book:

1. Fundamentals of Computer Algorithms, Horowitz, Sahni & Rajasekaran (Galgotia Publications)

2. Fundamental of Algorithm, Gilles Brassard, Paul Bratley (Pearson Publication)

3. Introduction to Algorithms, Thomas Cormen (Pearson Publication)

Reference books :

1. Introduction to Design and Analysis of Algorithm, Goodman (McGrawhill)

2. Design and analysis of algorithms, Aho, Hopfcraft and Ullman (Addison wesley)

3. Design & Analysis of Algorithms, Sharma, Khanna Publishing House, N.Delhi

4. Design& Analysis of Algorithms, S. Sridhar, Oxford

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR
FACULTY OF SCIENCE AND TECHNOLOGY
T. Y. B. Tech. (Information Technology), Semester- I
IT315 : MOBILE APPLICATION DEVELOPMENT

Teaching Scheme	Examination Scheme
Lectures– 2 Hrs./week, 2 Credits	ISE – 25 Marks
Practical – 2 Hrs./week, 1 Credit	ICA - 25 Marks
	POE – 50 Marks

Introduction: Mobile application development course will build your skills in creating mobile apps for Android platform as well as for Cross platform. This course includes Android application development and Xamarin Application development with basic User Interface design, basic building blocks, data handling, Testing mobile apps and how to take app to the market.

Course Prerequisite: Knowledge of programming paradigms and object-oriented programmingprinciples.

Course Outcomes:

At the end of this course students will be able to

1. Select suitable development practices for a mobile application
2. Build cross platform mobile application for a given problem scenario.
3. Choose suitable method of testing, signing, packaging and distribution for a mobile application.

Mobile application development for Android using Java/Kotlin

Section-I

Unit 1 - USER INTERFACE DESIGN (04)

Activity, Activity states, Activity Life Cycle, UI Resources, Layout Resources, String Resources, Image Resources, UI Elements and Events, Interaction between Activities, Exchanging data among activity, Fragments, Life Cycle of Fragments, Interaction between Fragments.

Unit 2 - MOBILE APPLICATION FUNCTIONALITY (04)

Beyond UI, App functionality beyond user interface - Threads, Asynchronous Tasks, Services – states and life cycle, Intent and Bound Service, Notifications, Intents and Intent Resolution, Broadcast receivers, Telephony and SMS APIs.

Unit 3 - NATIVE DATA HANDLING (04)

Native data handling On-device File I/O, data persistent and access using shared preferences, mobile databases such as SQLite and implementation for CRUD, and enterprise data access (via Internet/Intranet).

21

Unit 4 - TESTING & DISTRIBUTION OF MOBILE APPS (02)

Debugging mobile apps, White box testing, Black box testing, and Unit testing for Android. Versioning, signing and packaging mobile apps, distributing apps on mobile market place, Google play store.

Unit 5 - C# PROGRAMMING GUIDE (04)

Inside a C# Program, Main() and Command-Line Arguments, Statements, Expressions, and Operators, Types, Classes and Structs, Interfaces, Inheritance and Polymorphism in C#, Delegates, Arrays, Strings, Properties, Indexers, Events, Generics, Iterators, Namespaces, Assemblies in .NET, Attributes, Collections, Exceptions and Exception Handling, Multi-threading.

Unit 6 - GETTING STARTED WITH XAMARIN (04)

Introducing native cross-platform applications with Xamarin, Hello MVVM—creating a simple cross-platform app using MVVM, MVVM—the model-view–view model design pattern, Hello again, MVVM—understanding and enhancing our simple MVVM app, An introduction to multithreading for Xamarin apps.

ISE Evaluation: ISE Evaluation for the course will consists of three hands on tests based onthetopics mentioned in the syllabus.

Internal Continuous Assessment (ICA): Minimum 10 assignments requiring students todesign, develop and test cross platform mobile applications for real world problem/use- case/scenario.

Text Books:
1. Android Application Development - All in one for Dummies, Barry Burd
2. Mobile Apps Development, Anubhav Pradhan, Anil V Deshpande
3. Xamarin in Action: Creating native cross-platform mobile apps by Jim Bennett, ManningPublications; 1st edition.

Reference books:
1. Android Developer Tools Essentials by Mike Wolfson (O'Reilly Media)
2. Embedded Android-Porting, Extending, and Customizing, Karim Yaghmour, (O'Reilly
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   Media)

e-resources :
1. Android Developer Resources: http://developer.android.com
2. Xamarin documentation - Xamarin | Microsoft Docs: https://docs.microsoft.com/en-gb/xamarin/

Modalities for conducting End Semester Examination/Practical Oral

☐   **Examination (POE):** Practical and Oral Examination will be conducted by a panel of examiners assigned byuniversity. A pair of examiners shall assess a

☐   batch @36 students in a day.

The chairman shall prepare problem statements for a batch adhering to following guidelines:

1. At least Four Problem statements shall be set for a batch.

2. Problem statements shall be set in the context of course outcomes as defined in the course.

3. Problem Statements shall not be direct statements stating implement concept/topic etc.

4. Problem Statements shall be based on real world problem/use case/scenario etc.

5. Problem statement shall be at the minimum cognitive level of 'Apply' & above.

6. Problem Statements must be well described with no ambiguity and shall be of unseen nature.

7. Problem statements formulated shall be solvable by faculty in 2 hours and average studentsin 2.5 hrs in the examination duration.
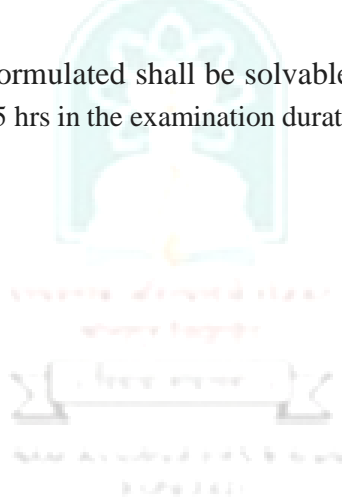
SELF LEARNING -I(HSS)
SL31A:ECONOMICS

Teaching Scheme:	**Examination Scheme:**
Credits: 1 Credits	ESE : 50 Marks

Course Objectives:
1. To explain to students various theories of economics such as demand supply, production and Cost.
2. To acquaint students with fundamentals of microeconomics.
3. To introduce to students concept of inflation with their causes, consequence and remedies.
4. To acquaint students with basics of international trade, foreign exchange.

Course Outcomes:
At the end of this course, Students will be able to,
1. Identify the basic economic problems, resource constraints
2. Apply various theories of economics for explaining economic growth
3. Identify causes of inflation, consequence and can explain remedies
4. To assess the impact of international trade and foreign exchange on Indian economy

Unit 1: Introduction
History of Economic thought, Basic Economic problems, Resource Constraints and Welfare maximization, Nature of Economics: Positive and Normative Economics, Micro and MacroEconomics, Basic concepts in Economics, The role of State in economic activity, Market andGovernment failures, New economic Policy in India.

Unit 2: Theories of Economics
Theory of utility and consumer's choice, Theories of Demand, supply and market equilibrium, Theories of firm, production and costs, Market structures, Perfect and imperfect competitions, oligopoly, monopoly.

Unit 3: Macroeconomics
An overview of Macroeconomics, measurement and determination of national income,Consumption, saving and investment

Unit 4: Banking & Inflation.
Commercial and Central Banking, Relationship between money, output and prices, Inflation causes,consequences and remedies

Unit 5: International Influences on Economics

International Trade, foreign exchange and balance payments, stabilization policies, Monetary,Fiscal and exchange rate policies

Text books:

1. Economics: P.A. Samuelson & W.D Nordhaus, McGraw Hill, New York, 1995
2. Modern Microeconomics : A. Koutsoyiannis, Macmillan,1975

Reference Books:

1. Microeconomics: R. Pindyck and D.L. Rubinfield, Macmillan New York, 1989
2. Microeconomics: Gordon, 4th edition, Little Brown & Co., Boston,1987
3. The Organization of Industry: William F. Shughart II, Richard D. Irwin, Illinois, 1990

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FACULTY OF SCIENCE AND TECHNOLOGY
T.Y. B. Tech. (Information Technology),Semester- I
SELF LEARNING -I(HSS)
SL31A :INTELLECTUAL PROPERTY RIGHTS FOR
TECHNOLOGY DEVELOPMENT AND MANAGEMENT

Teaching Scheme:	Examination Scheme:
Credits: 1 Credits	ESE : 50 Marks

Course Objectives:

1. To introduce to student the legal and ethical importance of intellectual property associatedwith research and intellectual works.
2. To make student understand the overview of the process of acquiring the patent copyrightsfor the innovative works.
3. To make student aware of Indian IPR system and role of WTO in protecting Property Rights.
4. To make student aware about the plagiarism in the thesis, research papers etc.

Course Outcomes:

At the end of this course, Students will be able to,

1. Explain importance of the intellectual property rights associated with research andintellectual works.
2. Explain the overview of process of acquiring the patents and copyrights for the innovativeworks.
3. Elaborate the role of Indian IPR system and role of WTO in protecting IntellectualProperty Rights.
4. Explain how to avoid the plagiarism in the thesis, research papers etc.

Unit 1: Introduction to IPR

Dynamics of Knowledge evolution, creation of ownership domains in the knowledge space using various instruments of IPR

Unit 2: IPR for Engineers and Managers

Outlines concepts of confidentiality and information security, explores their role in technology development and transfer integrating Intellectual Property in project planning, execution & commercialization,

Unit 3: IPR and R&D

Discussion on the shifting paradigms of R&D and their linkage to IPR, Introduction to concepts of Valuation of IP & Value Realization,

Unit 4: IPR for India

Comparison the Indian IPR system with international IPR frameworks especially in the context of WTO, followed by a few sessions on IPR litigations both for the enforcement of rights and businessstrategy

Unit 5: IPR and Contemporary Issues

Discussion on contentious issues of current interest such as Biotechnology and Intellectual Property, Protection of Traditional Knowledge, IPR and Electronic Commerce, TRIPS and Access to Medicines, Copyright issues in creative works, etc

Text books:

1. Prabuddha Ganguli: Intellectual Property Rights Unleashing the Knowledge Economy.TataMcGraw Hill, New Delhi, 2001
2. Prabuddha Ganguli: Gearing Up for Patents The Indian Scenario. Universities Press India
3. Ltd., Hyderabad, 1998
4. P. Narayan: Patent Law. Eastern Law Co., Calcutta

Reference Books:

1. Global Dimensions of Intellectual Property Rights in Science and Technology, Author:National Research Council , National Academies Press, 1993.
2. Technology Transfer: Intellectual Property Rights, C Sri Krishna, ICFAI University press(2008)
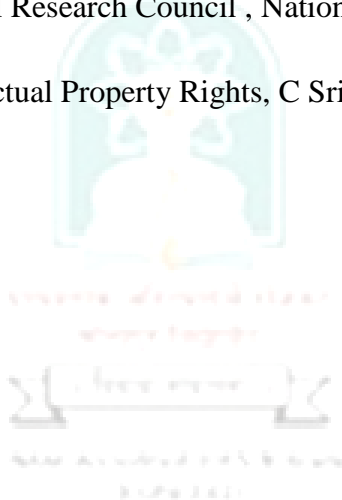
SELF LEARNING -I(HSS)
SL31A :INTRODUCTION TO SOCIOLOGY

Teaching Scheme:	**Examination Scheme:**
Credits: 1 Credits	ESE : 50 Marks

Course Objectives:
1. To introduce to student various social phenomena.
2. To make student aware of effect of urbanization on society.
3. To instill social intuition for better society among student.
4. To make student conscious about impact of modernization on society.

Course Outcomes:
At the end of this course, Students will be able to,
1. Interpret the effect of various social phenomena on sociology.
2. Elaborate the role of urbanization on the society.
3. Evaluate the need of social intuition for better society.
4. Evaluate the role of modernization, industrialization, environmental/ecological changes in thedevelopment of society.

Unit 1: Introduction to Sociology
What is sociology, some sociological concepts: social structure, status, role, norms, values etc., Socialization, and culture and change , Social stratification - various approaches and concept of social mobility

Unit 2: Population and Sociology
Population and society - Trends of demographic change in India and the world, Human Ecology, Trends of Urbanization in the developing countries and the world.

Unit 3:Social Institutions
Major social institutions - Family and marriage, caste and tribe and organizations:
i. Formal organization (bureaucracy)
ii. Informal Organization

Unit 4: Social Changes
Processes of social change- Modernization (including Sanskritization), industrialization,environmental/ecological changes and development

Unit 5: Social Movements
Social movements - protest movements, reformist movement and radical movements in India

Text books:
1. Sociology, L. Broom, P. Selznick and D. Dorrock, 11th Edn. 1990 (Harper International).
2. Sociology: Themes and Perspectives, M. Haralambos, Oxford University Press, 1980.
3. General Introduction to Sociology, Guy Rocher, A, MacMillan, 1982.

Reference Books:
1. Social movements in India, vols. 1-2, 1984, M.S.A. Rao, Manohar Publications.
2. Society in India, David Mandelbaum, 1990, Popular Publications.
3. Social change in modern India, M.N. Srinivas, 1991, Orient Longman Publications.

Teaching Scheme:	Examination Scheme:
Credits: 1 Credits	ESE : 50 Marks

Course Objectives:
1. To make student aware about nature of stress and its various sources.
2. To make student attentive to effect of various stress.
3. To introduce to student about various means to cope up with stress.
4. To introduce to students basic stress management techniques.

Course Outcomes:
At the end of this course, Students will be able to,
1. Explain nature of stress and identify various sources of stress.
2. Elaborate the effects of medical, psychological and behavioral stress.
3. Explain how social support can mitigate the stress.
4. Explain various stress management techniques.

Unit 1: Introduction to Stress
Concept of stress-current and historical status, the nature of the stress response

Unit 2: Sources of Stress
Common sources of stress biological, personality and environmental

Unit 3: Coping with Stress
Coping styles defensive behaviors and problem-solving. Consequences of stress - medical,psychological and behavioral

Unit 4: Social Support
The role of social support in mitigating stress

Unit 5: Introduction to Stress Management
Stress management techniques-relaxation, meditation, cognitive restructuring, self-control, bio-feedback and time management, Preparing stress profile of a student

Text books:
1. Walt, S. "Stress Management for Wellness". Harcourt Brace & Jovanovich, N.York, 1994.
2. D. Girdano and G. Everly., "Controlling Stress and Tension", Prentice-Hall, 1986.
3. Monat and R. Lazarus, "Stress and Coping: An Anthology", Columbia Univ. Press, 1985.

Reference Books:

1. Weisman, "The Coping Capacity", Human Services Press, 1984.
2. Stress and Coping: The Indian Experience, D.M. Pestonjee, SAGE India; Second edition, 1998

SELF LEARNING -I(HSS)
SL31A :PROFESSIONAL ETHICS & HUMAN VALUES

Teaching Scheme: **Examination Scheme:**

Credits: 1 Credits   ESE : 50 Marks

Course Objectives:

1. To emphasize importance of human values among student.
2. To introduce to student engineering ethics for professional practice.
3. To make student aware about safety, responsibility and professional rights in professionalPractice.
4. To make student attentive to code of ethics of global professional organizations such asASME, ASCE, and IEEE.

Course Outcomes:

At the end of this course, Students will be able to,

1. Explain importance of human values in modern society.
2. Explain how to integrate engineering ethics in their professional practice.
3. Explain about safety measures, responsibility and professional rights in professionalPractice.
4. Explain the code of ethics of Global organizations such as ASME, ASCE, and IEEE.

Unit 1: Human Values

Morals, Values and Ethics, Integrity, Work Ethics, Service Learning, Civic Virtue, Respect for others, Living Peacefully, Caring, sharing, Honesty, Courage, Valuing Time, Cooperation, Commitment, Empathy, Self-Confidence, Character, spirituality

Unit 2: Engineering Ethics

Senses of engineering ethics, Variety of Moral Issues, Types of inquiry, Moral Dilemmas Moral Autonomy, Kohlberg's Theory, Gilligan's Theory, Consensus and Controversy, Models of Professional Roles, Theories about Right Action, Self Interest , Customs and Religion.

Unit 3: Safety, Responsibilities and Rights

Safety and Risk, Assessment of safety and Risk, Risk Benefit Analysis and Reducing Risk, The Three Mile Island and Chernobyl Case Studies. Collegiality and Loyalty, Respect for Authority, Collective Bargaining, Confidentiality, Conflicts of Interest, Occupational Crime, Whistle Blowing, Professional Rights – Employee Rights, Intellectual Property Rights (IPR) – Discrimination

Unit 4: Global Issues

Multinational Corporations, Environmental Ethics, Computer Ethics, Weapons Development, Engineers as Managers, Consulting Engineers, Engineers as Expert Witnesses and Advisors,Sample Code of Ethics of ASME, ASCE, IEEE, Institution of Engineers (India), etc.

Text books:

1. Bayles, M.D.: Professional Ethics, California: Wadsworth Publishing Company, 1981.
2. Koehn, D.: The Ground of Professional Ethics, Routledge, 1995.
3. R.S. Naagarazan, A Text Book of Professional Ethics & Human
Values, New AgeInternational, 2006

Reference Books:

1. Camenisch, P.F.: Grounding Professional Ethics in a Pluralistic
Society, N.Y.: HavenPublications, 1983.
2. Wuest, D.E.: Professional Ethics and Social Responsibility, Rowman & Littlefield, 1994

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR
FACULTY OF SCIENCE AND TECHNOLOGY
T. Y. B. Tech. (Information Technology), Semester- II
IT321 : ARTIFICIAL INTELLIGENCE

Teaching Scheme	**Examination Scheme**
Lectures– 3 Hrs/week, 3 Credits	ESE – 70 Marks
Practical – 2 Hrs/week, 1 Credit	ISE – 30 Marks
	ICA - 25 Marks

Introduction:

This course presents a basic introduction to the techniques used in developing Artificial Intelligent systems. It is a walkthrough to problem spaces and search algorithms, Knowledge representation, reasoning, logic programming and applications of Artificial Intelligence.

Course Prerequisite :

Student shall have some exposure to algorithms and programming.

Course Outcomes: At the end of the course students will be able to

1. Formulate and solve sequence of actions for an agent as a search problem.
2. Infer from represented knowledge using logical and probabilistic reasoning methods
3. Solve agent decision problems using probability theory
4. Comprehend forms of learning and demonstrate their working.

SECTION - I

Unit 1 – Overview (06)

Foundations, scope, problems, and approaches of AI. **Intelligent agents:**
reactive, deliberative,goal-driven, utility-driven, and learning agents

Unit 2 - Problem-solving through Search (07)

Forward and backward, state-space, blind, heuristic, problem-reduction, A, A*, AO*, minimax,constraint propagation, neural, stochastic, and evolutionary search algorithms, sample applications.

Unit 3 - Knowledge Representation and Reasoning (07)

Ontologies, foundations of knowledge representation and reasoning, representing and reasoningabout objects, relations, events, actions, time, and space; first order logic, situation calculus,description logics, reasoning with defaults, reasoning about knowledge, sample applications.

Unit 4 - Representing and Reasoning with Uncertain Knowledge (07)

Probability, connection to logic, independence, Bayes rule, Bayesian networks, probabilisticinference, and sample applications.

Unit 5 - Decision-Making (06)

Basics of utility theory, decision theory, sequential theory, decision problems, elementary, game, sample applications.

Unit 6 - Learning and Knowledge Acquisition (07)

Forms of Learning: Supervised, Unsupervised, Semi-supervised.
Statistical learning,ReinforcementLearning: Q-learning, sample applications.

Unit 7 - Conclusions (05)

Philosophical Foundations, AI: The Present and Future.

- -

Internal Continuous Assessment (ICA):

ICA should consist minimum 10 assignments using any programming language with openlyavailable tools, frameworks and resources based on the following topics.

- Intelligent agents
- Problem solving through search
- First order logic
- Bayesian Networks
- Decision and Game theory
- Statistical Learning
- Q-learning.

In addition to above students shall undertake a case study on **"Applications of AI: The Present and Future"**

Text Book:

1. Artificial Intelligence: A Modern Approach, Stuart Russell and Peter Norvig, 3rdEdition, Prentice Hall
2. A First Course in Artificial Intelligence, Deepak Khemani, McGraw Hill Education (India)
3. Introduction to Artificial Intelligence & Expert Systems, Dan W Patterson, PHI.

Reference Book:

Artificial Intelligence, Elaine Rich and Kevin Knight, Tata McGraw Hill

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FACULTY OF SCIENCE AND TECHNOLOGY
T. Y. B. Tech. (Information Technology), Semester- II
IT322 : OBJECT ORIENTED MODELING & DESIGN

Teaching Scheme	Examination Scheme
Lectures : 3 Hours /Week, 3 Credits	ESE – 70 Marks
Practical : 2 Hours/Week, 1 Credit	ISE – 30 Marks
	ICA – 25 Marks

Introduction: This course presents Object Oriented approaches to software development based on modeling objects from the real world and then using the model to build a language independent design organized around those objects. These techniques promote better understanding of requirements, cleaner designs and more maintainable systems.

Course Prerequisite: Student shall have undergone an introductory course on Object oriented Design and Programming.

Course Objectives:
1. To introduce basics of object-oriented modeling.
2. To design models of real world problems using object modeling technique.
3. To learn and use Unified Modeling Language to design real world problems.

Course Outcomes:
After completing this course the student will be able to :
1. Demonstrate basics of Object Oriented Modeling..
2. Design models for real world problems using Object Modeling Technique.
3. Design UML Diagrams for real world problems..

SECTION-I

Unit 1: Introduction to Object Oriented approach and Object Modeling.   10 Hrs
Object oriented development and themes, evidence for usefulness, modeling as a Design Technique. Objects, classes, links and associations, generalization and inheritance, grouping constructs, aggregation, abstract classes, generalization as extension and restriction, multiple inheritance, metadata, candidate keys and inheritance

Unit2: Dynamic and Functional Modeling   06 Hrs
Events, states, operations, concurrency, nested state diagrams, advanced dynamic modeling concepts, relation of object and dynamic models, DFD, relation of functional to object and dynamic models.

Unit 3: Implementation of OMT   06 Hrs
Use of programming language and database system, Object oriented style, feature of object-oriented languages, Applications of OMT like object diagram compiler, Computer animation.

36

Unit 4: Structural Modeling using UML   **08 Hrs**
Classes, Relationships, Common mechanisms. Diagrams, Class   Diagrams, Interfaces, Types
and Roles, Packages, Instances and Object Diagram.

Unit 5: Behavioral Modeling using UML   **08 Hrs**
Interactions, Use cases, Use case diagram, Interaction Diagrams and Activity diagrams, Events
and signals, State Machines, Processes and Threads, Time and space, State chart diagrams.

Unit 6: Architectural Modeling using UML   **07 Hrs**
Components, Deployment, Collaboration, Patterns and Frame works, Component diagrams and
Deployment Diagrams.

Internal Continuous Assessment (ICA):
Student should design the following systems using :
1.   Object Modeling Technique(OMT)
2.   Unified Modeling Language(UML)
   a) Hospital Management System
   b) College Automation System
   c) Hotel Management System
   d) Banking System
   e) Library Information System
   f) Railway Reservation System
   g) Water Management System
   h) Supermarket Information System

Text Books:
   1. Object oriented Modeling and Design: Rambaugh, Premerlani, Eddy, Lorenson (PHI)
   2. The Unified Modeling Language User Guide: Grady Booch, Jeams Rambaugh,
                                      Ivar Jacotson (Addison Wesley)
Reference Books :
      1. Practical Object Oriented Design with UML – Mark Priestley.
      2. UML-In a Nut Shell – Sinon Alhair

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR
FACULTY OF SCIENCE AND TECHNOLOGY
T. Y. B. Tech. (Information Technology), Semester- II
IT323: SOFTWARE ENGINEERING

Teaching Scheme	Examination Scheme
Lecture: 3 Hrs/week, 3 Credits	ESE: 70 Marks
Tutorial : 2 Hrs./Week 2 Credits	ISE: 30 Marks
	ICA : 25 Marks

Introduction:

Software engineering is a discipline that allows user to apply engineering and computer science concepts in the development and maintenance of reliable, usable, and dependable software. The course is designed to present software engineering concepts and principles in parallel with the software development life cycle. This course gives an introduction to software engineering and major methodologies followed by software modeling using Unified Modeling Language (UML), a standardized general-purpose modeling language used to create visual models of object-oriented software.

Course prerequisite: Strong technical focus with the practice engineering knowledge,Skills and adequate knowledge of programming language.

COURSE OUTCOMES: The Student will be able to

1. Select and apply the appropriate lifecycle model for software development.
2. Prepare SRS and SDS accordingly for a given problem.
3. Select and apply appropriate software testing method.
4. Ensure the quality of a product by applying the quality management process.

SECTION-I

Unit 1 - Introduction to Software Engineering (11)

Introduction, The Problem Domain, Software Engineering Challenges and Approach, Software Process, Characteristics of Software Process, Software Development Process Models: Waterfall model, Prototype model, Iterative development model: Incremental Model, Spiral model, Rational unified Process model, Time Boxing model, Agile process model.

Unit 2 - Software Requirement Analysis & Specification (06)

Need of SRS, Characteristics of Good SRS, Requirement Process, Requirements specification, Functional Specification with Use Cases, Other Approaches for Analysis: Data Flow Diagram, Entity Relationship Diagram,

Unit 3 - Software Architecture and Design (08)

Introduction to Software Design, Software Architecture: Role of Software Architecture, Architecture Views, Component & Connector View, Architecture Style for Component & Connector view, Documenting Architecture Design,Design Concepts: Design Principles,

38

Conceptual Design and Technical Design, Coupling, Cohesion, Open Closed Principle, Function-Oriented Design, Object Oriented Design, High Level Design, Detailed Design, Verification, Metrics.

SECTION-II

Unit 4 - Testing   (04)

Testing Fundamentals, Testing Process, Black-Box Testing, White-Box Testing, Object-Oriented Software testing methods, Functional testing, Unit testing, System testing, User satisfaction testing.

Unit 5 - Project Planning and Management   (08)

Project management process, The Inspection and Audit Process, Software Configuration Management process, Effort estimation, Project Schedule and Staffing, Quality planning: Quality Concepts, Qualitative quality management planning. CMM project management process, Risk Management Planning, Project Monitoring Plan, Detailed Scheduling.

Unit 6 - Agile Project Management   (08)

Introduction to APM, Implementation, Iterative Project Management Life Cycle, Adaptive Project Management Life Cycle, Adaptive & Integrating the APM toolkit, The Science of Scrum, New Management Responsibilities.

Text Books:

1. An Integrated Approach to Software Engineering- 3rdedition: Pankaj Jalote (NarosaPublishers)
2. Effective Project Management Traditional, Agile, Extreme, Robert K. Wysocki WILEYINDIA, 6th edition.

Reference Books :

1. Ian Sommerville, software engineering, Pearson education Asia, 6th edition
2. Software Engineering Fundamentals –Ali Behforooz and Frederick j. Hudson (OxfordUniversity Press).
3. Project Management with Scrum By Ken Schwaber.

T. Y. B. Tech. (Information Technology), Semester- II
PROFESSIONAL ELECTIVE-I
IT324A : CLOUD COMPUTING

Teaching Scheme	Examination Scheme
Lectures: 3 Hours /Week, 3 credits	ESE - 70 Marks
Practical: 2 Hour/Week, 1 credit	ISE - 30 Marks
	ICA - 25 marks

- -

Introduction :

Cloud computing has recently emerged as one of the buzzwords in the ICT industry. Numerous IT vendors are promising to offer computation, storage, and application hosting services and to provide coverage in several continents, offering service-level agreements (SLA)-backed performance and uptime promises for their services.

The course introduces to introduction to Cloud Computing, Virtual Machines Provisioning and Migration Services, understanding Services and Applications by Type, Integration of Private and Public Clouds, Understanding of Cloud Security, Legal Issues in Cloud Computing.

- -

Prerequisites :

Programming Skills, Database fundamentals & SQL, Operating Systems and Networking.

COURSE OUTCOMES:

At the end of this course, students will be able to

1. Analyze various hardware & software to choose appropriate one for implementation of cloud environment.
2. Identify different cloud based solutions to meet a set of given requirements.
3. Determine financial and technological implications for selecting cloud computingplatforms.
4. Identify Security and Privacy concerns in cloud computing for data management.

- -

SECTION I

Unit 1:Introduction to Cloud Computing BU   (8)

Cloud Computing in a Nutshell, Roots of Cloud Computing, Layers and Types of Clouds,Desired Features of a Cloud, Cloud Infrastructure Management, Infrastructure as a Service Providers, Platform as a Service Providers, Challenges and Risks, Migrating into a Cloud, Introduction, Broad Approaches to Migrating into the Cloud, The Seven-Step Model ofMigration into a Cloud.

Unit 2: Virtual Machines Provisioning and Migration Services   (7)

Virtual Machines Provisioning and Manageability, Virtual Machine Migration Services, VMProvisioning and Migration in Action, Provisioning in the Cloud Context

Unit-3 Understanding Services and Applications by Type   (8)

Defining Infrastructure as a Service (IaaS), IaaS workloads, Pods, aggregation, and silos, Defining Platform as a Service (PaaS), Defining Software as a Service (SaaS), SaaS characteristics, Open SaaS and SOA, Salesforce.com and CRM SaaS, Defining Identity as a Service, What is an identity? Networked identity service classes, Identity system codes of conduct, IDaaS interoperability, User authentication Authorization markup languages, Defining Compliance as a Service (CaaS)

SECTION II

Unit 4:—Integration of Private and Public Clouds   (8)

Aneka: Introduction, Technologies and Tools for Cloud Computing, Aneka Cloud Platform, Aneka Resource Provisioning Service, Hybrid Cloud Implementation. Comet: Come tCloud Architecture, Autonomic Behavior of Comet Cloud, Overview of Comet Cloud-basedApplications,

Unit 5: Understanding of Cloud Security   (8)

Securing the Cloud, The security boundary, Security service boundary, Security mapping, Securing Data, Brokered cloud storage access, Storage location and tenancy, Encryption Auditing and compliance, Establishing Identity and Presence, Identity protocol standards, Windows Azure identity standards

Unit 6: Legal Issues in Cloud Computing   (6)

Introduction, Data Privacy and Security Issues, Cloud Contracting models, Jurisdictional Issues Raised by Virtualization and Data Location, Commercial and Business Considerations—A Cloud User's Viewpoint.

Internal Continuous Assessment (ICA):

Minimum 10 assignments must be of nature, which require students to identify and implement the use case scenarios for Cloud and Cloud enabled technologies mentionedabove.

Text Book:

1. Cloud Computing: Principles and paradigms By Raj Kumar Buyya, ames Broberg, Andrezei M.Goscinski, 2011 Cloud Computing, By Michael Miller, 2008.
   Download E-bbok
   http://dhoto.lecturer.pens.ac.id/lecture_notes/internet_of_things/CLOUD%20COMPUTI NG%20Principles%20and%20Paradigms.pdf

2. Cloud Computing Bible by Barrie Sosinsky by Wiley Publications

   https://arpitapatel.files.wordpress.com/2014/10/cloud-computing-bible1.pdf

3. Cloud Computing for dummies, By Judith Hurwitz, Robin Bllor, Marcia Kaufman, FernHalper, 2009. Download E-book

4. Cloud Computing: Black Book, by KalishJayaswal, J. Kallakurchi, Donald J. Houde,Dr.Deven Shah Kogent learning Solutions Inc. Dreamtech press

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Reference Book:

1. Cloud Security, A comprehensive Guide to Secure Cloud Computing by Krutz, RonaldL.;
   Vines, Russell Dean

2. Cloud computing: Implementation, management and security By Rittinghouse, John, W.

3. Mastering Cloud Computing, Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi,McGraw Hill, 2013

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR
FACULTY OF SCIENCE AND TECHNOLOGY
T. Y. B. Tech. (Information Technology), Semester- II
PROFESSIONAL ELECTIVE-I
IT324B : AUGMENTED REALITY AND VIRTUAL REALITY

Teaching Scheme	Examination Scheme
Lectures: 3 Hours /Week, 3 credits	ESE - 70 Marks
Practical: 2 Hour/Week, 1 credit	ISE - 30 Marks
	ICA - 25 Marks

Introduction:

This course will introduce Virtual Reality and Augmented Realty, with an emphasis on designing interactive virtual and augmented reality experiences. This will course will cover the history of the area, fundamental theory, interaction techniques, and specific application areas.

Prerequisite:

Basic Programming knowledge

COURSE OUTCOMES:

After completion of course, students would be able:

1. To demonstrate the basic concept and framework of virtual reality
2. To analyse the hardware and software requirements for VR and AR
3. To use the different 3D interaction techniques.
4. To design 3D interfaces
5. To explore VR & AR applications

Unit 1 (10)

Virtual reality and virtual environments: the historical development of VR, scientific landmarks computer graphics, real-time computer graphics, virtual environments, requirements for VR, benefits of virtual reality.

Hardware technologies for 3D user interfaces: visual displays, auditory displays, haptic displays, choosing output devices for 3D user interfaces.

Unit 2 (14)

3D user interface input hardware: input device characteristics, desktop input devices, tracking devices, 3d mice, special purpose input devices, direct human input, home - brewed input devices, choosing input devices for 3D interfaces.

Software technologies: database - world space, world coordinate, world environment, objects - geometry, position / orientation, hierarchy, bounding volume, scripts and other attributes, VR environment - VR database, tessellated data, LODs, Cullers and Occluders, lights and cameras, scripts, interaction - simple, feedback, graphical user interface, control panel, 2D

controls, hardware controls, room / stage / area descriptions, world authoring and playback, VR toolkits, available software in the market.

Unit 3   **(8)**
3D interaction techniques: 3D manipulation tasks, manipulation techniques and input devices,interaction techniques for 3D manipulation, design guidelines – 3D travel tasks, travel techniques, design guidelines - theoretical foundations of way finding, user centered way finding support, environment centered way finding support, evaluating way finding aids, design guidelines - system control, classification, graphical menus, voice commands, Gestrual commands, tools, mutimodal system control techniques, design guidelines, case study: mixing system control methods, symbolic input tasks, symbolic input techniques, design guidelines, beyond text and number entry.

Unit 4   **(7)**
Designing and developing 3D user interfaces: strategies for designing and developing guidelines and evaluation.
Advances in 3D user interfaces: 3D user interfaces for the real world, AR interfaces as3Ddata browsers, 3D augmented reality interfaces, augmented surfaces and tangible interfaces, agents in AR, transitional AR-VR interfaces - the future of 3D user interfaces, questions of3D UI technology, 3d interaction techniques, 3d UI design and development, 3D UI evaluation and other issues.

Unit 5   **(4)**
Virtual reality applications: engineering, architecture, education, medicine, entertainment, science, training.

Text Books/References:
1. Paul Mealy, Virtual & Augmented Reality for Dummies, John Wiley & Sons.
2. Alan B Craig, William R Sherman and Jeffrey D Will, "Developing Virtual Reality
3. Applications: Foundations of Effective Design", Morgan Kaufmann.
4. Jan Erik Solem, Programming Computer Vision with Python, ShroffPublisher/O'ReillyPublisher
5. Gerard Jounghyun Kim, "Designing Virtual Systems: The Structured Approach".
6. Doug A Bowman, Ernest Kuijff, Joseph J LaViola, Jr and Ivan Poupyrev, "3D User
7. Interfaces, Theory and Practice", Addison Wesley, USA

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FACULTY OF SCIENCE AND TECHNOLOGY
T. Y. B. Tech. (Information Technology), Semester- II
PROFESSIONAL E ELECTIVE -I
IT324C: NETWORK SECURITY

Teaching Scheme	Examination Scheme
Lectures: 3 Hrs/week, 3 Credits	ESE: 70 Marks
Practical : 2 Hrs/week, 1 Credit	ISE: 30 Marks
	ICA : 25 Marks

Introduction :
Network security is a broad term that covers a multitude of technologies, devices and processes. In its simplest term, it is a set of rules and configurations designed to protect the integrity, confidentiality and accessibility of computer networks and data using both software and hardware technologies.

Prerequisites :
Knowledge of networking fundamentals and technologies.

COURSE OUTCOMES :
At the end of course the student will be able to

1. Describe the issues addressed by Network Security and understand the concepts ofcryptography and Network security.
2. Apply cryptographic techniques and algorithms to provide security to the transmittedinformation.
3. Analyze the concepts of Authentication and Hash functions.
4. Analyze System level security issues.

SECTION - I

Unit – 1   **(08)**

Introduction: OSI Security Architecture, Classical Encryption techniques: Symmetric Cipher Model, Substitution Techniques, Transportation Techniques. Block Ciphers and Data Encryption Standards: Traditional Block Cipher Structure, The Data Encryption Standard, A DES Example, The Strength of DES. Advanced Encryption Standard: AES.

Unit – 2   **(08)**

Public Key Cryptography and RSA: Principles of Public-Key Cryptosystems, The RSA Algorithm. Other Public-Key Cryptosystems: Diffie-Hellman Key Exchange, Elgamal Cryptographic System, Elliptic Curve Arithmetic, Elliptic Curve Cryptography

Unit – 3 (06)

Cryptographic Hash Functions: Applications of Cryptographic Hash Functions, Two Simple Hash Functions, Hash Functions Based on Cipher Block Chaining, Secure Hash Algorithm (SHA), SHA-3.

SECTION - II

Unit – 4 (08)

Message Authentication Codes: Message Authentication Requirements, Message Authentication Functions, Requirements for Message Authentication Codes, Security of MACs, MACs Based on Hash Functions: HMAC, MACs Based on Block Ciphers: DAA and CMAC, Authenticated Encryption: CCM and GCM, Pseudorandom Number Generation Using Hash Functions and MACs. Digital Signatures: Digital Signatures, Elgamal Digital Signature Scheme, Schnorr Digital Signature Scheme, NIST Digital Signature Algorithm,

Unit – 5 (8)

Network Access Control and Cloud Security: Network Access Control, Extensible Authentication Protocol, IEEE 802.1X Port-Based Network Access Control. Wireless Network Security: Wireless Security, Mobile Device Security, IEEE 802.11 Wireless LAN Overview

Unit – 6 (6)

Electronic Mail Security: Internet Mail Architecture, Email Formats, Email Threats and Comprehensive Email Security, S/MIME, Pretty Good Privacy, DNSSEC, DNS-Based Authentication of Named Entities, Sender Policy Framework, Domain Keys Identified Mail. IP Security: Overview, IP Security Policy, Encapsulating Security Payload, Combining Security Associations, Internet Key Exchange.

Text Books :

1. Cryptography And Network Security - Principles and Practices, William Stallings Pearson Education Limited, 7th Edition, 2017. ISBN-13: 978-0134444284 ISBN-10:0134444280.

2. Cryptography and Network Security, Behrouz A. Forouzan, Tata McGraw-Hill, 2008, ISBN-13: 978-0-13-187319-3. RV College of Engineering® Digital Communication Engineering 10

3. Computer Security: Principles and Practice, William Stallings, Lawrie Brown, Pearson Education Limited, 4th Edition. ISBN-10: 9780134794105.

4. Cryptography and Network Security, Atul Kahate, Tata McGraw-Hill, 2003, ISBN-81:203-2186-3.

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR FACULTY OF SCIENCE AND TECHNOLOGY

T. Y. B. Tech. (Information Technology), Semester- II

IT325: WEB UI AND UX TECHNOLOGY

Teaching Scheme	Examination Scheme
Lectures: 2 lectures/ week, 2 credits	ISE: 25 marks
Practical: 2 practical / week, 1 credits	ICA: 25 marks
	POE:50 marks

Introduction:

Web Technology alludes to the different tools and techniques that are used during the process of communication between various sorts of gadgets over the web or internet. This course includes different technologies which help to build front end and back end for websites and web applications.

COURSE OBJECTIVES:

1. Inculcate skills necessary to design, develop and style a web-based user interface.
2. Develop ability to identify appropriate client/server-side scripting web technologiessuitable for a given use case.
3. Develop skills required to create light weight, efficient and scalable browser-based APIsweb applications

COURSE OUTCOMES:

At the end of course, students will be able to

1. Design web pages using HTML, CSS and JavaScript
2. Analyse client/server-side scripting technologies to meet requirements of webapplication and choose an appropriate one.
3. Develop web application using client/server-side scripting technologies for a givenproblem.

SECTION I

Unit 1: UI Design (05)

HTML5: Features of HTML5, designing frontend using HTML5, Designing Graphics using Canvas API, Web storage (Session and local storage).

CSS3: Features of CSS3, Styling frontend using CSS3

JavaScript: Syntax and Semantics of JavaScript, Document Object Model, Event Handling, Browser Object Model, Form handling and validations. Object-Oriented Techniques in JavaScript. XML

JSON: Introduction to AJAX. Introduction to JQuery and D3 JS

Unit 2: REACT JS   (05)

Introduction, Fundamentals of React JS, Working with Lists and Conditionals, Styling React Components and Elements, Debugging React apps, Understanding Http Requests in React in context of AJAX

Unit 3: Electron JS   (05)

Introduction, Fundamentals of Electron JS, Creating cross platform applications, Deploymentof Electron JS application

SECTION II

Unit 4: RESTful Web Services   (05)

REST and the Rebirth of HTTP, RESTful Architectural Principles, The Object Model, Modelthe URIs, Defining the Data Format, Assigning HTTP Methods, JAX-RS

Unit 5: Introduction to Server-side JS Framework – Node.js   (05)

Introduction - What is Node JS, Architecture, Feature of Node JS, Installation and setup, creating web servers with HTTP (Request & Response), Event Handling, GET & POST implementation - Connect to NoSQL Database using Node JS, Implementation of CRUD operations.

Unit 6: PHP and MySQL   (05)

Introduction to PHP 5 and PHP 6, variables and constants, program flow, functions, arraysand files and directories, Forms and Databases, integration with MySQL applications on PHP

Internal Continuous Assessment (ICA):

1. Minimum 12 assignments based on above topics.
2. Objective of assignments should be to test students' understanding and assess theirability to put into practice the concepts and terminologies learned.
3. Assignments must be of nature, which require students to identify the use casescenarios for using technologies mentioned in the syllabus.

Text Books /Reference Books:

1. Ben Frain," Responsive Web Design with HTML5 and CSS3", Packt Publication
2. Jon Duckett, "JavaScript and jQuery: Interactive Front-End WebDevelopment"
3. Official documentation of OpenAPI standardhttp://spec.openapis.org/oas/v3.0.3
4. Official documentation of Node.js:https://nodejs.org/en/
5. Official documentation of Electron JShttps://www.electronjs.org/docs
6. Official documentation of React JShttps://reactjs.org/docs/getting-started.html
7. Official documentation of PHPhttps://www.php.net/docs.php
8. Web link for MongoDB: https://www.mongodb.com/

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T. Y. B. Tech. (Information Technology), Semester- II
OPEN ELECTIVE
**ITOE326A: PRINCIPLES OF MANAGEMENT: PRACTICING
ETHICS, RESPONSIBILITY, SUSTAINABILITY**

Teaching Scheme	Examination Scheme
Lectures : 2 lectures/week, 2 Credits	ESE – 50 Marks

Introduction:

This course introduces to the concepts of Ethics, Responsibility, Sustainability. Having a clear management structure in place is vital for any successful organization. Efficient and well intentioned management sets the tone for the rest of the staff. It is common for the attitude approach of managers to filter through the entire organization, so having managers working in an exemplary way is an excellent.

Course Prerequisite: Basics of ethics

Course Outcomes:

Students will be able to

1. Develop cognizance of engineering ethics and professionalism.
2. Comprehend the knowledge of professional responsibilities.
3. Identify technological solution for global sustainability and sustainable development.

SECTION I

Unit 1 - Engineering Ethics (07)

Introduction, Definition of Engineering Ethics, Sense of Engineering Ethics, Varity of Moral issues, Type of Inquery,Moral Dilemmas, Moral Autonomy, Theories of Moral Autonomy. Computer Ethics: Power Relationships, Property and Privacy.

Unit 2 - Profession, Professional and Professionalism (08)

Models of Professional Roles, Profession, Professional and Professionalism Professional Responsibility: Self direction virtues, Public spirited virtues, Team work virtues andProficiency virtues. Engineers as responsible experimenters.

SECTION II

Unit 3 - Technology Solution for Global Sustainability (07)

Resource Innovation, Resource Conservation, Resource Recycling, Switch over to RenewableResources, Resource Technology Symbiosis, Indian mission mode initiatives, Indian watermission, Indian energy mission and Indian Environment mission.

Unit 4: Economic & Governance of Sustainable Development   (08)

Basis of economic sustainability, Munasinghe hypotheses of sustainability, Economics of exhaustible resources, Some further economic critique, Consumers Cost and benefit from environment   change, Some   reflection   on   environment accounting, Governance for sustainable   development,   Corporate   governance   for sustainable development, Visionary agenda for sustainable world.

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Text Books:

1. Professional Ethics and Human Values –M.P.Raghavan

2. Sustainable Development :Environment ,Energy &Water Resources:M.K.Ghosh Roy

3. Demand-side management from a sustainable development perspective-
    Pierre Baillargen& Annie Caron.

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Reference book:

1. Principles of Management: P.C.Tripathi and P.N.Reddy
2. Ethics,Indian Ethos and Management –S.Balachandran,K.C.R.Raja and B.K.Nair
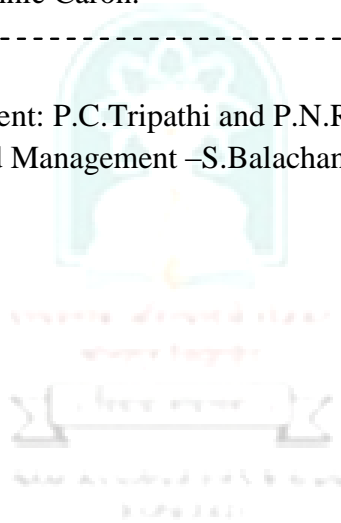
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ITOE326B: ENGINEERING ECONOMICS AND MANAGEMENT

Teaching Scheme	**Examination Scheme**
Lectures : 2 lectures/week, 2 Credits	ESE – 50 Marks

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COURSE OUTCOME:

At the end of the course, students will be able to

1. Demonstrate To basics of Economics and Management applied to engineering.
2. Apply concepts & principles of Economics with respect to a firm/organization Underdifferent market conditions.
3. Apply concepts and principles of management to real world applications.

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SECTION-I

Unit 1: **Introduction to Economics** (04)

Definitions, Nature, Scope, Difference between Microeconomics & Macroeconomics Theory of Demand & Supply; meaning, determinants, law of demand, law of supply, equilibrium between demand & supply Elasticity; elasticity of demand, price elasticity, income elasticity,cross elasticity

Unit 2: Theory of production (04)

Production function, meaning, factors of production (meaning & characteristics of Land, Labour, capital & entrepreneur), Law of variable proportions & law of returns to scale Cost; meaning, short run & long run cost, fixed cost, variable cost, total cost, average cost, marginal cost, opportunity cost. Break even analysis; meaning, explanation, numerical

Unit 3 : Markets and Money (05)

Types of markets & their characteristics (Perfect Competition, Monopoly, Monopolistic Completion, Oligopoly) National Income; stock and flow concept, NI at current price & constant price, GNP, GDP, NNP,NDP, Personal income, disposal income. Basic economic problems;

Monetary policy- meaning, objectives, tools, fiscal policy-meaning, objectives, tools Banking; meaning, types, functions, Central Bank- RBI; its functions, concepts; CRR, bank rate, repo rate, reverse repo rate, SLR

SECTION-II

Unit 4 : Introduction to Management (06)

Definitions, Nature, scope Management & administration, skill, types and roles of managers Management Principles; Scientific principles, Administrative principles, Maslow's Hierarchy

of needs theory, Functions of Management; Planning, Organizing, Staffing, Directing, Controlling (meaning, nature and importance) Organizational Structures; meaning, principles of organization, types-formal and informal, line, line & staff, matrix, hybrid (explanation with merits and demerits), span of control, departmentalization

Unit 5: Introduction to Marketing Management (05)

Marketing Mix, concepts of marketing, demand forecasting and methods, market segmentation Introduction to Finance Management; meaning, scope, sources, functions

Unit 6: Introduction to Production Management (06)

Definitions, objectives, functions, plant layout-types & factors affecting it, plant location-factors affecting it. Introduction to Human Resource Management; definitions, objectives of manpower planning, process, sources of recruitment, process of selection, Corporate Social Responsibility; meaning, importance Business Ethics; meaning, importance.

Text Books :
1. Engineering Economics, R.Paneerselvam, PHI publication
2. Fundamentals of Management: Essential Concepts and Applications, Pearson Education,Robbins S.P. and Decenzo David A.
3. Economics: Principles of Economics, N Gregory Mankiw, Cengage Learning

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Reference Books:
1. Principles and Practices of Management by L.M.Prasad
2. Principles of Management by Tripathy and Reddy
3. Modern Economic Theory, By Dr. K. K. Dewett & M. H. Navalur, S. Chand Publications

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T. Y. B. Tech. (Information Technology), Semester- II
OPEN ELECTIVE
ITOE326C: DISATER MANAGEMENT

Teaching Scheme	Examination Scheme
Lectures : 2 lectures/week, 2 Credits	ESE – 50 Marks

COURSE OUTCOMES

The students will be able to

1. Classify the types of disasters, its causes and impact on environment and society.
2. Acquaint a awareness regarding prevention or reduction of losses that occur due tohazards, disaster and emergencies.
3. Apply various disaster mitigation, preparedness and management techniques

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SECTION-I

Unit- 1 : Introduction to Disaster Management   (5)

Concept of Disaster, Causes and Types of Disasters, Summary of Types of Disasters, Dimensions of Natural and Anthropogenic Disasters, Aims of Disaster Management, Principles and Components of Disaster Management.

Unit-2 : Disaster Management and Planning   (5)

Nature, Scope and Management Process, Policy of Disaster Management, Types of Plans:Management by Objectives, SWOT Analysis, Hazard and Vulnerability Analysis, IdentifyingCrisis Situations: A Framework, Organisational Structure and Design, Authority, Delegationand Decentralisation.

Unit-3 : Disaster Mitigation   (4)

Disaster Mitigation: Meaning and Concept, Structural Mitigation, Non-Structural Mitigation, Disaster Mitigation Strategies, Importance of Information and Communication in Disaster Mitigation, Emerging Trends in Disaster Mitigation.

SECTION-II

Unit-4 : Disaster Preparedness   (4)

Introduction to Disaster Preparedness, The Three A's of Disaster Preparedness, Principles of Disaster Preparedness, Steps of Disaster Preparedness, Organisational Structure for Disaster Preparedness, Essential Services Preparedness and Logistical Readiness, Contingency Planning.

Unit-5 : Disaster Response   (5)

Aims of Response, Control Process and Measurement, Security Issues, Profile of an Effective

Crisis Leader, Leading at the Time of Crisis: Competencies and Challenges, Evacuation and Migration, Administering First-Aid, Handling of Injured at Hospitals: Challenges and Issues, Mobilization and Restoration of Essential Services, Search and Rescue Work.

Unit-6 : Disaster Recovery **(5)**

Introduction to Medium- and Long-Term Recovery Aspects, Community Participation in Defining Objectives and Their Priorities, Identifying and Ascertaining Impact of Disaster, Participative Rehabilitation: Physical and Social Infrastructure, Social and Economic Rehabilitation: Capacity Building for Reconstruction and Rehabilitation, Recovery and Rebuilding Works.

Text Books:
1. Disaster Management Dr. Mrinalini Pandey, WILEY, Publishers, ISBN: 9788126549245
2. Disaster Management S.C.Sharma Khanna Book Publishers, ISBN: 9789386173386
3. Disaster Management, R.B. Singh, Rawat Publication, New Delhi, 2000.

References:
1. Disaster Management in India – A Status Report, National Disaster ManagementDivision, Ministry of Home Affairs, Govt. of India, 2004.
2. Disaster Management and Preparedness, Collins Larry R. and Scheind Thomas D.(2000)., Taylor and Francis, 2000
3. Tushar Bhattacharya, Disaster Science and Management, McGraw Hill India EducationPvt. Ltd., 2012. ISBN-10: 1259007367, ISBN-13: 978-1259007361]
4. Kapur Anu Vulnerable India: A Geographical Study of Disasters, IIAS and SagePublishers, New Delhi, 2010.

IT327 : MINI PROJECT

Teaching Scheme	Examination Scheme
Practical: 2 practical / week, 1 credits	ICA: 25 Marks
	POE:50 Marks

Course Outcomes:

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

1. Identify and select problem of societal relevance in selected domain.
2. Design system architecture with due consideration of environment, sustainability andethics.
3. Develop the solution to the problem using tools, resources and frameworks.
4. Engage in teamwork and communicate effectively, while observing professionalethics.
5. Inculcate habit of self study and lifelong learning.

Note:

1. A group shall be formed of preferably 4 students.
2. Students shall be given projects in Hardware, Software, Embedded or any contemporarytopic.
3. A guide will be allotted to each group.