

Punyashlok Ahilyadevi Holkar Solapur University, Solapur



Name of the Faculty: Science & Technology

CHOICE BASED CREDIT SYSTEM

Syllabus: COMPUTER SCIENCE ENGINEERING

Name of the Course: M.Tech.- Semester I, II, III & IV
(Syllabus to be implemented from w.e.f. 2018-19 & 2019-20)



FACULTY OF SCIENCE & TECHNOLOGY

M.Tech. (COMPUTER SCIENCE & ENGINEERING)

Four Semester Course

Choice Based Credit System

Semester-III

Sr. No.	Subject	Teaching Scheme		Credits			Evaluation Scheme			
		L	P	Credits (L)	Credits (P)	Total Credits	Scheme	Theory Marks	ICA-P Marks	Total Marks
1	Self Learning Course	\$	--	3.0	--	3.0	ISE	30	--	100
							ESE	70	--	
2	Open Elective Course#	3	--	3.0	--	3.0	ISE	30	--	100
							ESE	70	--	
3	Dissertation Phase-I : Synopsis Submission Seminar*		@4	--	3.0	3.0	ISE	--	100	100
							ESE	--		
4	Dissertation Phase-II : ICA*	--	--	--	3.0	3.0	ISE	--	100	100
							ESE	--		
5	Dissertation Phase-II : Progress Seminar*	--	--	--	3.0	3.0	ISE	--		100
							ESE	--	100	
Total		3	4	6.0	9.0	15.0		200	300	500

L- Lectures, P-Practical, T-Tutorial, ISE- In Semester Evaluation, ESE – End Semester Evaluation, ICA- Internal Continuous Assessment

Note -

- \$- Being a Self Learning Course, student shall prepare for examination as per specified syllabus
- *- For all activities related to dissertation Phase I (synopsis submission seminar and progress seminar) student must interact regularly every week with the adviser.
- # - This course is common for all branches of Technology (i.e. for all M.Tech. Programs)
- Synopsis submission seminar shall cover detailed synopsis of the proposed work. Student shall submit synopsis of the dissertation work only after delivering this seminar.
- Progress seminar shall be delivered capturing details of the work done by student for dissertation
- Student shall deliver all seminars using modern presentation tools. A hard copy of the report shall be submitted to the department before delivering the seminar. A PDF copy of the report must be submitted to the adviser along with other details if any
- @ Indicates contact hours of students for interaction with adviser.
- Details of modes of assessment of seminar and dissertation shall be as specified in 7(III) of PG Engineering Ordinance of P.A.H. Solapur University, Solapur

Self Learning Course	
Sr. No.	Subject
1	Big Data
2	Computer Network Administration
3	Open Source Technologies
4	Usability Engineering

Open Elective Course	
Sr. No.	Subjects
1	Business Analytics
2	Operation Research
3	Cost Management of Engineering Projects
4	Non Conventional Energy

- New Self Learning Courses and New Open Elective Courses may be added as and when required



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FACULTY OF SCIENCE & TECHNOLOGY
M.Tech. (COMPUTER SCIENCE & ENGINEERING)

Four Semester Course
Choice Based Credit System

Semester-III

1. Self Learning Course – i. Big Data

Examination Scheme

Credits: 3

ISE: 30 marks

ESE: 70 marks

SECTION-I

Unit 1: Introduction to Big Data Analytics: Introduction and importance of Big Data, Fundamentals, Examining Big Data types, Characteristics.

Unit 2 Technology Foundation of Big Data: Big Data Technology, Digging into Big Data Technology components , Virtualization and Big Data ,Examining Cloud and Big Data, Information Management in Big Data.

Unit 3: Big Data Management: Operational Databases, MapReduce Fundamentals, Exploring world of Hadoop , Hadoop Foundation and ecosystem , Appliances and Big Data Warehouses.

SECTION II

Unit 4: The MapReduce and Software Stack: Algorithms using MapReduce, Extensions to MapReduce, The communication Cost Model, The Complexity Theory for MapReduce.

Unit 5: Big Data Solutions in Real World: The importance of Bigdata to Business, Analyzing Data in Motion: A Real-World View, Improving Business Processes with Big Data Analytics:A Real-World View, Data Privacy and Ethics in Big Data.

Unit 6: Ethics of Big Data: Big Data Big Impact, Values and Actions, Current practices, Aligning Values and Actions.

Textbooks:

1. Big Data For Dummies By Judith Hurwitz, Alan Nugent , Fern Halper , Marcia Kaufman : John Wiley & Sons
2. Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses (Wiley CIO) By Michael Minelli, Michele Chambers, Ambiga Dhiraj : John Wiley & Sons
3. Ethics of Big Data: Balancing Risk and Innovation By Kord Davis, O'reilly Media
4. Mining of Massive Datasets by Anand Rajaraman, Jure Leskovec, Jeffrey D. Ullman, Cambridge University Press.

Reference Books:

1. Hadoop: The Definitive Guide, 3rd Edition , By Tom White , O'reilly Media
2. Big Data Now: 2012 Edition Publisher: O'Reilly Media.
3. Too Big to Ignore: The Business Case for Big Data (Wiley and SAS Business Series) By Phil Simon, Wiley 1e.



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FACULTY OF SCIENCE & TECHNOLOGY
M.Tech. (COMPUTER SCIENCE & ENGINEERING)

Four Semester Course
Choice Based Credit System
Semester-III

1. Self Learning Course – ii. Computer Network Administration

Examination Scheme

Credits: 3

ISE: 30 marks

ESE: 70 marks

SECTION-I

1. Data Communication and network management overview:

Analogy of telephone network management, Data and telecommunication network, distributed computing environment, TCP/IP based networks – Internet and intranet, communication protocols and standards, challenges of information technology manager Network management – goals, organization and functions, network and system management, network management system platform, current status and future of network management.

2. Basic foundation:

Standards, models and languages: Network management standards, network management model, organization model, information model, communication model, ASN.1, Encoding structure, macros, and functional model.

3. SNMP 1 network management:

Organization and information models: Managed network, International organization and standard SNMP model, organization model, system overview, information models

Section II

4. SNMP v1 network management:

Communication and functional models, SNMP model, functional model, Major changes in SNMP v2 and v3

5. SNMP Management:

RMON – Remote monitoring, RMON, SMI & MIB, RMON1, RMOPN2, ATM Remote monitoring, case study of internet traffic using RMON.

6. Network management tools and systems:

Network management tools, network statistics measurement systems, network management systems, commercial network management systems, System management, Enterprise management solutions.

Text Books:

1. Network Management principles and practice – Mani Subramanian (Pearson Edition)
2. SNMP – SNMPv2 , SNMPv3 & RMON 1 – William Stalling (Pearson Edition)
3. Network Administration – Steve Wisniewski.

Reference Books:

1. Network Management – Concepts & Practice: A Hands-on Approach by J. Richard Burke (Pearson Education)
2. Network Management, MIBs & MPLS, Principles, Design & Implementation/Stephen B. Morris (Pearson Education).
3. TCP/IP Protocol Suite – B.A. Forouzan (TMH Edition)



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M.Tech. (COMPUTER SCIENCE & ENGINEERING)

Four Semester Course
Choice Based Credit System
Semester-III

1. Self Learning Course – iii. Open Source Technologies

Examination Scheme

Credits: 3

ISE: 30 marks

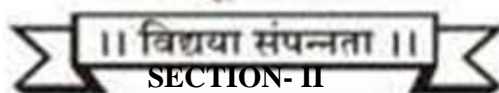
ESE: 70 marks

SECTION – I

Unit 1 OST (Open Source Technologies) Overview: Evolution & development of OST and contemporary technologies, Factors leading to its growth. Open Source Initiative (OSI), Free Software Foundation and the GNU Project, principle and methodologies, Indian Contexts of OST, Applications, Pros and cons of OST.

Unit 2 Open Source Licenses: The MIT License, The BSD License, The Apache License, v1.1 and v2.0, The Academic Free License , Application and Philosophy of MIT and BSD Licenses, GNU General Public License, GNU Lesser General Public License, The Mozilla Public License, Application and Philosophy of GNU GPL and GNU LGPL, Artistic and Creative Commons Licenses

Unit 3 Legal Impacts of Open Source Technologies: Entering Contracts, Statutory Developments Related to Software Contracts, The Self-Enforcing Nature of Open Source and Free Software Licenses, The Global Scope of Open Source and Free Software Licensing, Community Enforcement of Open Source and Free Software Licenses, Compatible and Incompatible Licensing: Multiple and Cross Licensing.



SECTION- II

Unit 4 Introduction of Linux: Overview of Linux Operating System, Linux Distribution, Graphical Environment and Terminal Windows, Linux Graphical Desktop , File System Concepts, Managing File with Graphical Utilities. Linux OS variants, Case study of Ubuntu 12.04.x and BOSS (Bharat Operating System Solutions) Linux.

Unit 5 Open Source Web servers and RDBMS:

Open Source Web servers: Installation, configuration and administration under Windows and Linux environment: of Apache, Nginx, Apache Tomcat.

Open Source RDBMS: Installation, configuration and administration under Windows and Linux environment: MySQL, PostgreSQL.

Unit 6 Popular Open Source Softwares: Installation, customization and maintenance of Open Source Content management Systems: Drupal, Wordpress , Joomla , Umbraco , Liferay Portal, Alfresco. Installation, Customization and Maintenance of Open Source Learning management Systems: Moodle, ATutor.

Textbooks:

1. Understanding Open Source and Free Software Licensing - By Andrew M. St. Laurent, Oreily Media. (e-Resource available at: <http://oreilly.com/openbook/osfreesoft/book/index.html>)
2. Apache HTTP Server Documentation Version 2.2 by Apache Software Foundation
3. MySQL 5.5 Reference Manual (Chapter 2 and 3 of manual) (e-Resource)
4. The Complete Guide to Linux System Administration by Nicholas Wells, Cengage Learning.
5. Official Documentation of ATutor, Moodle, Drupal, Joomla, Wordpress, Liferay Portal, Alfresco, Umbraco. (e-Resources)

Reference Books:

1. BOSS Linux: <http://bosslinux.in>
2. (NRCFOSS) initiative of the Department of Information Technology, Ministry of Communications & Information Technology, Government of India, <http://www.nrcfoss.org.in/>
3. Open Source: Technology and Policy By Fadi P. Deek and James A. M. McHugh , Cambridge University Press.





PUNYASHLOK AHILYADEVJI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR
FACULTY OF SCIENCE & TECHNOLOGY
M.Tech. (COMPUTER SCIENCE & ENGINEERING)

Four Semester Course
Choice Based Credit System
Semester-III

1. Self Learning Course – iv. Usability Engineering

Examination Scheme

Credits: 3

ISE: 30 marks

ESE: 70 marks

SECTION- I

Unit – 1 Usability - Introduction

What is Usability? benefits and cost savings, usability slogans, attributes of system acceptability, definition of usability, usability trade-Offs , categories of users and individual user differences, generations of user interfaces, scenario-based usability engineering case study - A Virtual Science Fair.

Unit – 2 The Usability Engineering Lifecycle

User research and requirements analysis - know the user, user-profile questionnaire, field-study methods, contextual inquiry and analysis, hierarchical task analysis, ethnography, cultural probe, affinity diagramming, persona, scenarios of use, use cases.

Iterative Design - setting usability criteria or goals, participatory design (getting users involved), guidelines and heuristic evaluation, prototyping and scenarios , examples of problem scenarios, iterative design, interface evaluation, meta methods.

Unit – 3 Information Design and Interaction Design

Information design - Information architecture concepts, stages of action in human-computer interaction, perceiving information, interpreting information, making sense of information.

Interaction Design - selecting system goal, planning action sequence, executing action sequence, case study of information and interaction design

User Interface Design - Goals of UID, User Interface Models , conceptual model and mock-ups of GUI, choosing prototyping alternatives - paper prototyping, rapid prototyping, storyboarding, wireframes, Cost/benefit of good interface design , Case Study.

SECTION- II

Unit – 4 Usability Evaluation

Developing usability specifications for evaluation - case study, criteria for user feedback techniques, formative and summative techniques of evaluation

Usability Inspections (testing without users) - heuristic evaluation, user-interface guideline reviews, cognitive walkthrough, model-based analysis

Usability Testing (testing with users) - developing usability or test specifications with case study , test goals and test plans , getting test users, choosing experimenters, ethical aspects of tests with human subjects, test tasks, stages of a test, performance measurement, thinking-aloud testing, usability laboratories, remote evaluation

Methods beyond testing - observation, user satisfaction questionnaire (rating scale), interviews, system usability scale (SUS), focus groups, logging actual use, user feedback, choosing a methods.

Unit – 5 User-Interface and Usability Standards

User benefits, vendor benefits, dangers of standards, principles of good UI design, national-international standards, internationalization - international GUI, guidelines for internationalization , localization and multilocale interfaces, UI standards - control standards, window standards, dialog box standards, message box standards, device interaction standards, feedback standards, developing style guides and toolkits , user documentation- manuals, tutorials, information in the interface.

Unit – 6 Recent Advances And Trends

Theoretical solutions, technological solutions, CAUSE tools, emerging paradigms of user interaction-collaborative systems, ubiquitous computing , intelligent user-interfaces, simulation and virtual reality , case study , usability issues in organizations- case studies , organizational roles and structures, ethics of usability, web analytics.

Text Books

1. Nielsen, J. (1994), “Usability Engineering”, Elsevier.
2. Rosson, M. B., & Carroll, J. M. (2001), “ Usability Engineering: Scenario-Based development of human-computer interaction”, Elsevier.
3. Mayhew, D. (1999), “The Usability Engineering Lifecycle: A Practitioner's Handbook for user interface design”, Morgan Kaufmann

Reference Books

1. Cooper A. et. al. (2007), “ The Essentials of Interaction Design”, Wiley
2. Cooper, A. (1995),” The Essentials of User Interface Design”, IDG Books, New Delhi
3. Schneiderman, B. (2005), “ Designing the User Interface”, Pearson Education, New Delhi
4. Dix A. et. al.(1993), “ Human - Computer Interaction”, Prentice Hall, USA
5. Mandel, T. , “ Elements of User Interface Design”, John Wiley & Sons
6. Rogers et. al (2011), “ Interaction Design”, John Wiley & Sons
7. Norman, D. (1988), “The Design of Everyday Things”, Basic Books.
8. Donna Spencer<, “A Practical Guide to Information Architecture”
9. Galitz, W. (2002), “The Essential Guide To User Interface Design”, Wiley.

Web-links

1. <http://www.usabilitybok.org/>
2. <http://www.usability.gov/>
3. http://www.webmonkey.com/2010/02/information_architecture_tutorial/
4. <http://www.measuringu.com/>
5. <http://user.medunigraz.at/andreas.holzinger/holzinger%20de/usability%20holzinger.html>

Mode of Assessment

(i) Assessment of Theory Courses: (Self Learning Course)

(a) A student shall be evaluated with 30% weightage for his/her academic performance in a theory course for In-Semester Evaluation (ISE) and with 70% weightage for End-Semester Examination (ESE) which is University Examination.

(b) ISE shall be based on student's performance in Mid-term tests, Class-tests, assignments, viva-voce, quizzes, subject seminars, field visit, case studies, subject mini project etc. The mode of In-Semester Evaluation (ISE) shall be decided from various assessment components mentioned in

Table-A given hereunder and the same shall be announced by the Course Instructor at the beginning of the course.

In-Semester Evaluation is a process of continuous assessment. The formative and summative assessment components are combined to generate 30% weightage marks for In-Semester Evaluation (ISE).

Table – A: Assessment components

Sr. No.	Assessment Component	Max. Marks
1	Mid-Term Written Test conducted & evaluated at Institute Level (Mandatory)	15
2	Written Test conducted & evaluated at Institute Level or One or more Appropriate Activities related to course curriculum and conducted & evaluated at institute level, which includes–, assignments, viva-voce, quizzes, subject seminars with report writing, field visit, subject mini project, application software training, case study with report writing.	15 15

(c) ESE shall be University Examination of three hours duration for each theory course carrying 70% weightage and shall be held as per the schedule declared by the university for that semester.

(d) All examinations and evaluations shall be compulsory. Credits for a course shall be awarded only if the student satisfies evaluation criteria and acquire the necessary minimum grade.

(e) Minimum performance of 40% in ISE and ESE **separately** shall be required to get the passing grade.



Punyashlok Ahilyadevi Holkar Solapur University, Solapur
M.Tech. (Computer Science and Engineering)
Semester-III

2. Open Elective Course- i. Business Analytics

Teaching Scheme

Lectures - 3 Hours/week, 3 Credits

Examination Scheme

ESE- 70 Marks

ISE- 30 Marks

SECTION-I

Unit 1: Introduction

(4 Hrs)

What Is Business Analytics? Business Analytics Process, Relation of BA process and Organization decision making process

What is Data Mining? Data Mining and Related Terms, Big Data, Data Science, Terminology and Notation in Data mining

Unit 2: Overview of the Data Mining Process

(5 Hrs)

Core Ideas in Data Mining, Classification, Prediction, Association Rules and Recommendation Systems, Predictive Analytics, Data Reduction and Dimension Reduction, Data Exploration and Visualization, Supervised and Unsupervised Learning, Steps in Data Mining, Organization of Data sets

Unit 3: Data Visualization

(5 Hrs)

Uses of Data Visualization, Basic Charts: Bar Charts, Line Graphs, and Scatter Plots, Distribution Plots: Box plots and Histograms, Heat maps: Visualizing Correlations and Missing Values

Multidimensional Visualization: Adding Variables: Color, Size, Shape, Multiple Panels, and Animation

Manipulations: Rescaling, Aggregation and Hierarchies, Zooming, Filtering, Reference: Trend Lines and Labels, Scaling up to Large Datasets

Unit 4: Dimension Reduction

(4 Hrs)

Introduction, Curse of Dimensionality, Data Summaries, Summary Statistics, Aggregation and Pivot Tables, Correlation Analysis, Reducing the Number of Categories in Categorical Variables, Converting a Categorical Variable to a Numerical Variable, Principal Components Analysis

SECTION-II

Unit 5: Performance Evaluation

(5 Hrs)

Evaluating Predictive Performance, Naive Benchmark: The Average, Prediction Accuracy Measures Comparing Training and Validation Performance, Lift Chart, Judging Classifier Performance, Benchmark: The Naive Rule, Class Separation, The Confusion (Classification) Matrix, Using the Validation Data, Accuracy Measures

Unit 6: Multiple Linear Regression

(4 Hrs)

Explanatory vs. Predictive Modeling, Estimating the Regression Equation and Prediction, Variable Selection in Linear Regression, Reducing the Number of Predictors

Unit 7: Classification & Regression Trees

(5 Hrs)

Introduction, Classification Trees, Recursive Partitioning, Measures of Impurity, Tree Structure, Classifying a New Record, Evaluating the Performance of a Classification Tree, Naive Bayes Classifier

Regression Trees : Prediction, Measuring Impurity, Evaluating Performance

Advantages and Weaknesses of a Tree

Unit 8: Clustering

(4 Hrs)

Introduction, Feature selection for clustering: Filter models and Wrapper models, k-Means algorithm

- **In Semester Evaluation (ISE)**

ISE shall be based upon minimum 6 assignments based on curriculum and consisting of literature survey, case study, data compilation and analysis etc.

- **Reference Books**

1. Data Mining for Business Analytics - Concepts, Techniques, And Applications In R, Galit Shmueli Peter C. Bruce Inbal Yahav Nitin R. Patel Kenneth C. Lichtendahl, Jr., Wiley Publication
https://edu.kpfu.ru/pluginfile.php/274079/mod_resource/content/2/DatMiningBusAnalytics.pdf
2. Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data by EMC Education Services (2015)
3. Business Analytics – Principles, Concepts and Applications, Marc J. Schniederjans, Dara G. Schniederjans, Christopher M. Starkey, Pearson Education Limited
4. Data Mining : The Textbook, Charu C. Agrawal, Springer Publications





Punyashlok Ahilyabai Holkar Solapur University, Solapur
M.Tech. (Computer Science and Engineering)
Semester-III
2. Open Elective Course- ii. Operations Research

Teaching Scheme

Lectures –3 Hours/week, 3 Credits

Examination Scheme

ESE- 70 Marks

ISE- 30 Marks

Course Objectives

The course aims to train the students -

1. To formulate the appropriate O.R. model
2. To use quantitative techniques in solving the real life problems
3. To evaluate alternative courses of actions in actual decision making under conditions of uncertainty.

Course outcomes :

At the end of this course the students shall be able to

1. Formulate the real life managerial problems in an appropriate mathematical model
2. Provide the optimum solution to the real life problems within the constraints.
3. Use network techniques in project management
4. To evaluate alternative courses of actions in actual decision making under conditions of uncertainty using Simulation techniques.

SECTION-I

Unit 1:

OR Models, model formulation, Linear Programming models, Graphical solution, Simplex techniques, Two Phase method

(5 Hrs)

Unit 2:

Duality theory - Properties of Primal and Dual Optimal Solutions, Duality Simplex method, Shadow Price- Sensitivity analysis

(5 Hrs)

Unit 3:

Simulation Techniques - Need of Simulation techniques , Monto-Carlo Simulation, random number concept, applications of Simulation technique

(5 Hrs.)

Unit 4:

Queuing Models - Introduction, Structure of queuing system, Terminology (Kendal's Notations) and Applications. Queuing Model M/M/1: /FIFO,

(3 Hrs.)

SECTION II

Unit 5 :

Inventory control - Inventory costs, Economic order quantity, deterministic models with or without shortages - probabilistic models - Price break model, Selective Inventory management techniques.

(5 Hrs.)

Unit 6:

Replacement analysis - Replacement models - Replacement policy for items considering change in money value with time - Individual replacement policy - Group replacement policy

(5 Hrs.)

Unit 7:

(3 Hrs.)

Network flow models - Minimal Spanning Tree problems -Shortest route problems - Dijkstra's algorithm - Maximal Flow problem

Unit 8 :

(5 Hrs.)

PERT and CPM Networks - floats and applications -
Network crashing - Cost optimization - Resource allocation and scheduling

• **In Semester Evaluation (ISE)**

ISE shall be based upon minimum 5 assignments and at least one case study.

Reference Book

1. Operations Research by Hillier and Lieberman TMGH
2. Hamdy Taha, "Operations Research – An Introduction", 7th edition PHI (2003)
3. S. D. Sharma, "Operation Research", Kedarnath and Rannalt Pub.
4. Hira and Gupta, "Operation Research", S. Chand and Co.
5. N.D. Vohra, "Quantitative Techniques in Management", TMGH
6. Shrinath L.S. : PERT and CPM – Affiliate East West Press
7. Anand Sharma "Quantitative Techniques for decision making", Himalaya Publishing house
8. Billy E. Gillet "Introduction to Operation Research" TMGH
9. R. Panneerselvan "Operations Research", PHI





Punyashlok Ahilyadevi Holkar Solapur University, Solapur
M.Tech. (Computer Science and Engineering)

Semester-III

2. Open Elective Course: iii. Cost Management of Engineering Projects

Teaching Scheme:

Lectures: 3 hours per week

Credits: 3

Examination Assessment Scheme:

ESE: 70 marks

ISE: 30 marks

Course objectives:-

The course aims to train the students to apply scientific principles and techniques to

1. Cost estimating of engineering project
2. Control Cost of the various elements of engineering project
3. Carry out value analysis

Course outcomes:-

At the end of this course the students shall be able to

1. Analyze various elements of the cost associated with the engineering project
2. Measure and assess the performance of engineering projects
3. Control the cost of project
4. carry out value analysis in an engineering project

Unit no.	Details	Contact Hours
<i>Section-I</i>		
1	Cost : Cost Elements - Pricing , Materials ,Labor , Engineering , Equipment, Parts and Tools; Economic Costs ; Cost Analysis: Direct Cost, indirect Cost, Overhead, allowance, Contingency	8
2	Cost Estimating : Estimating Models; Parametric estimating- modular estimating, parametric model , Analogous estimating- ratio estimating, The Three-quarters rule, The Square root rule, Two-Thirds rule, Range estimating	7
3	Progress & Cost Control : Progress Measurement and Earned Values; Earned Value for Variable Budgets; Tracking Cost and Schedule Performance;	7
<i>Section-II</i>		
4	Cost Management: Causes of Change, Feed Forward Techniques, Impact of schedule on cost, Lifecycle costs, Impact of project risk, integrated cost management programme	8
5	Value Management: Concept of Value ,Dimensions and Measures of Value , Overview of Value Management, Definition' Scope, Key Principles of VM , Key Attributes of VM ,Value Management Terms , Need for Value Management in Projects , The Value Management Approach ,Cross-functional Framework ' Use of Functions, Structured Decision Process, The VM Process, Benefits of Value Management, Other VM requirements Relationship between Project Value and Risk, Value Management as an Aid to Risk Assessment	7

6	Value Analysis: Earned Value Management for assessing project performance, Earned Value Management , Earned Value Management Model, Fundamentals of Earned Value, EVM Terminology, Relevancy of Earned Value Management, Conducting an Earned Value Analysis , Performing an Earned Value Assessment, Managing a Portfolio of Projects with Earned Value Management, Important Issues in the Effective Use of Earned Value Management, Integrating Cost and Value in Projects.	7
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Reference Book:-

1. Project Estimating and Cost Management By Parivs F. Rad PhD, PMP
2. Project Cost Management guide from PMBOK 5th edition
3. Project Scheduling and Cost Control: Planning, Monitoring and Controlling the Baseline by James Taylor
4. Systems Life Cycle Costing: Economic Analysis, Estimation, and Management, John V. Farr, Draft Textbook, Version 1.0.
5. COST AND VALUE MANAGEMENT IN PROJECTS Ray R. Venkataraman and Jeffrey K. Pinto John Wiley & Sons, Inc Inc., Hoboken, New Jersey
6. American Association of Cost Engineers, “SKILLS AND KNOWLEDGE OF COST ENGINEERING”, 1996
7. Cost Management of Capital Projects (Cost Engineering) by Kurt Heinze – International Edition, August 28, 1996





Punyashlok Ahilyadevi Holkar Solapur University, Solapur
M.Tech. (Computer Science and Engineering)

Semester-III

2. Open Elective Course- iv. Non Conventional Energy

Teaching Scheme

Lectures –3 Hours/week, 3 Credits

Examination Scheme

ESE- 70 Marks

ISE- 30 Marks

SECTION-I

Unit 1: Energy Resources (5 Hrs)

Energy, economy and social development, Indian scenario, conventional energy sources- electric, nuclear, hydroelectric, environmental aspects, renewable energy sources, comparison between conventional and non conventional energy sources

Unit 2: Energy Conservation and Efficiency (5 Hrs)

Energy efficiency, conservation, energy audit, cogeneration, schemes to promote conservation and efficiency, new technologies, energy conservation opportunities, distributed energy systems

Unit 3: Energy Storage (3 Hrs)

Introduction, necessity, specifications of energy storage devices, methods of energy storage

Unit 4: Solar Thermal Energy (5 Hrs)

Introduction to solar radiation and energy, solar thermal energy collectors, solar thermal systems- water heater, distillation, power plant, cookers, kilns, air conditioning, greenhouse, furnace, dryer, industrial heating

SECTION-II

Unit 5: Solar Photovoltaic System (5 Hrs)

Solar cell fundamentals, characteristics, design consideration, classification, module and arrays, maximizing the output and load matching, balance of system, applications

Unit 6: Wind Energy (5 Hrs)

Fundamentals, wind energy estimation, turbines: types, construction and characteristics, modes of power generation, wind energy conversion system, wind –diesel hybrid system, wind energy storage, environmental aspects, applications

Unit 7: Biomass Energy (4 Hrs)

Fundamentals, resources, conversion technologies, urban waste to energy conversion, gasification, ethanol, biogas

Unit 8: Emerging Technologies (4 Hrs)

Fuel cell, classification, comparisons, fuel for fuel cells, efficiency and VI characteristics, fuel cell power plant, hydrogen as energy carrier

• **In Semester Evaluation (ISE)**

ISE shall be based upon minimum 6 assignments based on curriculum and consisting of literature survey, case study, data compilation and analysis etc.

- **Reference Books**

1. Non-Conventional Energy Resources, B H Khan, McGraw Hill Education, Third Edition
2. Renewable Energy Sources and Emerging Technologies, D P Kothari, K C Singal, Rakesh Ranjan, PHI Learning Pvt. Ltd., Second Edition





Punyashlok Ahilyadevi Holkar Solapur University, Solapur
M.Tech. (Computer Science and Engineering)
Semester-III

3. Dissertation Phase – I : Synopsis Submission Seminar

Teaching Scheme

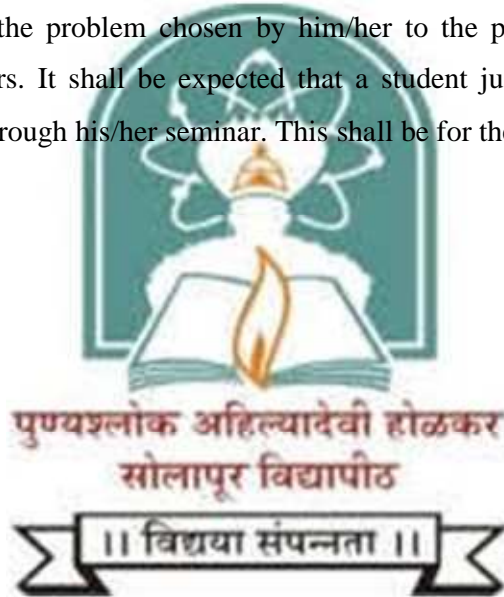
Practical: 4 Hrs/Week

Examination Scheme

Credits:3

ISE: 100 marks

Phase I Synopsis Submission Seminar (ISE): A student shall be expected to carry out intensive literature survey for a period of about two months in the field of interest and to select a topic for his/her dissertation in consultation with the faculty adviser assigned. The student shall then submit a report and deliver a seminar on the problem chosen by him/her to the panel of three departmental PG recognized faculty members. It shall be expected that a student justifies the gravity and also the relevance of the problem through his/her seminar. This shall be for the approval of synopsis.





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M.Tech. (Computer Science and Engineering)
Semester-III

4. Dissertation Phase – II : ICA

Examination Scheme

Credits:3

ICA : 100 marks

Phase II Term Work (ICA)

Phase II evaluation consists of term-work evaluation (ICA) based on the efforts put in by the student to carry out his/her work & the results obtained thereof.

5. Dissertation Phase – II : Progress Seminar

Examination Scheme

Credits:3

ESE : 100 marks

Phase II Progress Seminar Presentation (ESE):

The End Semester Evaluation (ESE) consisting of submission of progress report and presentation of progress seminar followed by demonstration before a panel three departmental PG recognized faculty members.

Guidelines for Assessment of Dissertation Phase I & II

1. Quality of Literature survey and Novelty in the problem
2. Clarity of Problem definition and Feasibility of problem solution
3. Clarity of objective and scope



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Choice Based Credit System
Semester-IV

Sr. No.	Subject	Teaching Scheme		Credits			Evaluation Scheme		
		L	P	Credits (L)	Credits (P)	Total Credits	Scheme	ICA-P Marks	Total Marks
1	Dissertation Phase-III : Progress Seminar #	--	@4	--	3.0	3.0	ISE	100	100
2	Dissertation Phase-IV : #	--	@2	--	6.0	6.0	--	200	200
3	Final Submission of the Dissertation and Viva-voce	--	--	--	6.0	6.0	ESE	200	200
	Total	--	6	--	15.0	15.0		500	500

Note –

- #- For all activities related to dissertation Phase III and Phase IV student must interact regularly every week with the adviser.
- Progress seminar shall be delivered capturing details of the work done by student for dissertation.
- Student shall deliver all seminars using modern presentation tools. A hard copy of the report shall be submitted to the Department before delivering the seminar. A PDF copy of the report must be submitted to the adviser along with other details if any.
- Student must submit a hard copy of Project Report to the department
- @ indicates contact hours of the student for interaction with the adviser.
- Details of modes of assessment of seminar and dissertation shall be as specified in 7 (III) of PG Engineering Ordinance of P.A.H. Solapur University, Solapur.



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1. Dissertation Phase – III : Progress Seminar

Teaching Scheme

Practical: 4 Hrs/Week

Examination Scheme

Credits: 3

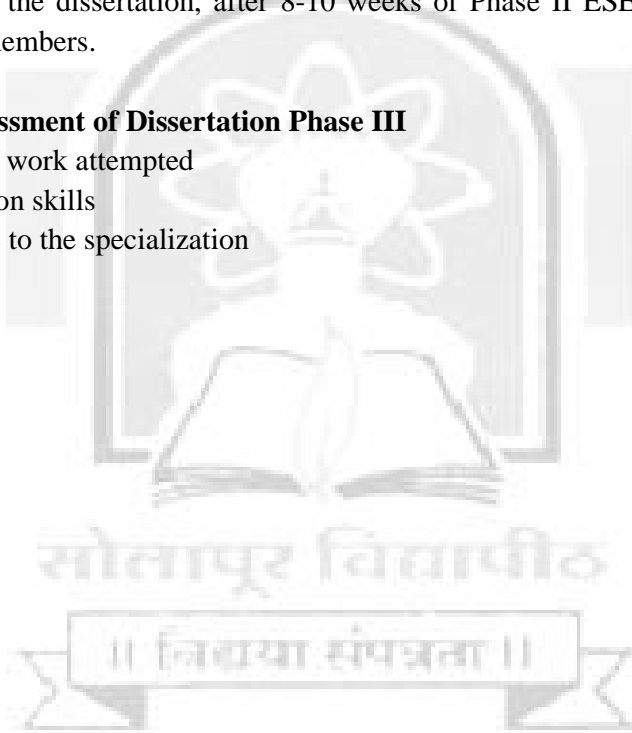
ISE: 100 marks

Phase III Term Work and Progress Seminar Presentation and report (ISE):

The student who has cleared his/her Phase II evaluation shall submit a report and present the status of work carried out on the dissertation, after 8-10 weeks of Phase II ESE, to three departmental PG recognized faculty members.

Guidelines for Assessment of Dissertation Phase III

1. Quality of work attempted
2. Presentation skills
3. Relevance to the specialization







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2. Dissertation Phase – IV : Termwork

Teaching Scheme

Practical: 2 Hrs/Week

Examination Scheme

Credits: 6

ICA: 200 marks

After completing the dissertation work to the satisfaction, the student shall submit the dissertation report in the prescribed format to the university.

Guidelines for Assessment of Dissertation Phase IV Termwork

1. Fulfilment of objectives
2. Validation of results
3. Quality of Written Presentation

- **Students should publish at least one paper based on his/her work in reputed International Journal (desirably in Referred Journal)**





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Semester - IV

3. Final Presentation and Viva-voce

Examination Scheme

Credits: 6

ESE: 200 marks

Final Presentation and Viva-voce (ESE):

Open defense of the student on his/her dissertation shall be arranged by the university. This defense shall be in front of the panel of examiners as appointed by university authority.

