

1.3.2 - Syllabus of the courses.

Course Code	Course Name	Theory	Practical	Tutorial	Theory	TW /Practical	Tutorial	Total
ITL501	Internet Programming Lab	--	2	--	--	1	--	1

Course Code	Course Name	Examination Scheme						
		Theory Marks				Term Work	Oral & Practical	Total
		Internal assessment			End Sem. Exam			
		Test 1	Test 2	Avg. of two Tests				
ITL501	Internet Programming Lab	--	--	--	--	25	25	50

Lab Objectives: Students will try;

1. To Acquire knowledge and Skills for creation of Web Site considering both client- and server-side Programming.
2. To create Web application using tools and techniques used in industry.
3. To learn the characteristics of RIA
4. To Demonstrate Amazon/Google or Yahoo mashup
5. To be well versed with XML and web services Technologies.
6. To be familiarized with open source Frameworks for web development.

Lab Outcomes: Students will learn to;

1. Design a basic web site using HTML5 and CSS3 to demonstrate responsive web design.
2. Implement dynamic web pages with validation using JavaScript objects by applying different event handling mechanism.
3. Use AJAX Programming Technique to develop RIA
4. Develop simple web application using server side PHP programming and Database Connectivity using MySQL.
5. Build well-formed XML Document and implement Web Service using Java.
6. Demonstrate simple web application using Python Django Framework.


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Hardware and Software requirements:

Hardware Requirements	Software Requirements	Other Requirements
PC With following Configuration 1. Intel Core i3/i5/i7 Processor 2. 4 GB RAM 3. 500 GB Harddisk	1. Windows or Linux Desktop OS 2. HTML5 compatible web browsers(Chrome, Opera, Firefox, Safari etc) 3. HTML,CSS editors like Dreamweaver, Notepad++ etc. 4. Netbeans or Eclipse IDE 5. XAMPP	1. Internet Connection installation of web frameworks

Prerequisite: Basics of Java and Python Programming

Guidelines

1. The mini project work is to be conducted by a group of three students
2. Each group will be associated with a subject Incharge/ mini project mentor. The group should meet with the concerned faculty during Laboratory hours and the progress of work discussed must be documented.
3. The students may do will visit different websites to identify their website topic for the mini project.
4. Each group will identify the Hardware and software requirement for their mini project problem statement.
5. Mini Project consists of Responsive Website Development.
6. Which includes following points
 - a. Introduction to RWD frame work?
 - b. Identify tools
 - c. CSS preprocessor
 - d. Construction and design of skeleton for website
 - e. Enhancing CSS3 and HTML5 in website
 - f. Server Side Programming: website using server side scripting in PHP and database connectivity using MySQL (PHP framework like Laravel/Joomla can be used)
 - g. XML ,XSL and Web Services

- h. Developing RIA using AJAX including -> browser built-in XMLHttpRequest object (to request data from a web server) and JavaScript and HTML DOM (to display or use the data) Building Amazon/Yahoo /Google Web Mashups for the website.
- i. Website Security
- j. Develop full website and launch it.

7. Each group may present their work in various project competitions and paper presentations.

8. A detailed report is to be prepared as per guidelines given by the concerned faculty.

Text Books:

1. Responsive Web Design by Example Beginner's Guide by Thoriq Firdaus, PACKT
2. Responsive Web Design with HTML5 and CSS3 PACKT
3. Professional Rich Internet Application : AJAX and Beyond WROX press

References:

1. Laravel: Up and Running, By Matt Stauffer O'Reilly Media.
2. Advanced Internet Technologies (includes practicals) ,Deven Shah ,Dreamtech publication
3. Django By Example By Antonio Melé,Pakt Publication

Term Work:

Term Work shall consist of full Mini Project on above guidelines/syllabus. Also Term work Journal must include at least 2 assignments.

Term Work Marks: 25 Marks (Total marks) – 15 Marks (Mini Project) + 5 Marks (Assignments) + 5 Marks (Attendance)

Oral Exam: An Oral exam will be held based on the Mini Project and Presentation.


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Course Code	Course Name	Theory	Practical	Tutorial	Theory	TW/ Practical	Tutorial	Total
ITL504	IOT (Mini Project) Lab	--	2	--	--	1	--	1

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Oral & Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test2	Avg. of two Tests					
ITL504	IOT (Mini Project) Lab	--	--	--	--	25	--	25	50

Lab Objectives: Students will try to:

1. Address the real world problems and find the required solution.
2. Design the problem solution as per the requirement analysis done.
3. Study the basic concepts of programming/ hardware/ emulator for Raspberry pi/Arduino/ ARM Cortex/ Intel Galileo etc.
4. Fabricate and implement the mini project intended solution for project based learning.
5. Build and test the mini project successfully.
6. Improve the team building, communication and management skills of the students.

Lab Outcomes: Student will be able to:

1. Identify the requirements for the real world problems.
2. Conduct a survey of several available literatures in the preferred field of study.
3. Study and enhance software/ hardware skills.
4. Demonstrate and build the project successfully by hardware requirements, coding, emulating and testing.
5. To report and present the findings of the study conducted in the preferred domain
6. Demonstrate an ability to work in teams and manage the conduct of the research study.

Guidelines

1. The mini project work is to be conducted by a group of three students
2. Each group will be associated with a subject Incharge/ mini project mentor. The group should meet with the concerned faculty during Laboratory hours and the progress of work discussed must be documented.
3. The students may do survey for different application using Raspberry pi/Arduino/ ARM Cortex/ Intel Galileo etc topics for the mini project.

4. Each group will identify the Hardware and software requirement for their mini project problem statement.
5. Prototype/Design your own circuit board using Raspberry pi/Arduino/ ARM Cortex/ Intel Galileo etc.
6. Installation, configure and manage your Raspberry pi/Arduino/ ARM Cortex/ Intel Galileo etc board/kit.
7. Work with operating system and do coding to for input devices on board.
8. The project assessment for term work will be done at least two times at department level by giving presentation to panel members which consist of at least three (3) members as Internal examiners (including the project guide/mentor) appointed by the Head of the department of respective Programme.
9. Create and interface using Web to publish or remotely access the data on Internet.
10. Each group along with the concerned faculty shall identify a potential problem statement, on which the study and implementation is to be conducted.
11. Each group may present their work in various project competitions and paper presentations.
12. A detailed report is to be prepared as per guidelines given by the concerned faculty.

Text Books:

1. Massimo Banzi, "Getting Started with Arduino", O'reilly, 2nd edition
2. Simon Monk, "Raspberry Pi Cookbook", O'reilly
3. Raspberry Pi User Guide

References:

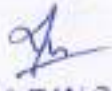
1. Internet of Things (A Hands-on-Approach) , Vijay Madiseti , Arshdeep Bahga

Term Work:

Term Work shall consist of full Mini Project on above guidelines/syllabus. Also Term work Journal must include at least 2 assignments.

Term Work Marks: 25 Marks (Total marks) = 15 Marks (Mini Project) + 5 Marks (Assignments) + 5 Marks (Attendance)

Oral Exam: An Oral exam will be held based on the Mini Project and Presentation.


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Course Code	Course Name	Theory	Practical	Tutorial	Theory	Practical /Oral	Tutorial	Total
ITL601	Software Design Lab	--	02	--	--	1	--	1

Course Code	Course Name	Examination Scheme								
		Theory Marks				End Sem. Exam	Term Work	Oral & Practical	Oral	Total
		Internal assessment			Avg. of two Tests					
		Test1	Test2							
ITL601	Software Design Lab	--	--	--	--	25	--	25	50	

Course Objectives: Students will try to:

- 1 Learn basic concepts of UML.
- 2 Master the vocabulary, rules, and idioms of the UML and learn how to model it effectively.
- 3 Understand how to apply the UML to solve a number of common modeling problems.
- 4 Model the systems, from concept to executable artifact, using object-oriented techniques.
- 5 Apply the knowledge of Software engineering and project management.
- 6 Understand the software development process using tool.

Course Outcomes: Students will be able to:

1. Sketch a Modeling with UML.
2. Deploy Structural Modeling.
3. Deploy Behavioral Modeling.
4. Deploy Architectural Modeling.
5. Examine estimation about schedule and cost for project development.
6. Select project development tool.

Prerequisite: Object oriented Concept, Java programming language.

Requirement:-

Hardware	Software
PC i3 or above.	IBM Rational Rose Modeler, Dia, StarUML (Any One) Orange Scrum, Xampp, GitHub

Guidelines

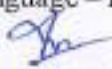
1. Students should take one case study as a mini project work which is to be conducted by a group of three students
2. Each group will be associated with a subject Incharge/ mini project mentor. The group should meet with the concerned faculty during Laboratory hours and the progress of work discussed must be documented.
3. The students must be able to identify Object oriented Technologies, Basic expression of Classes, Attributes and operations.
4. Students must develop a Conceptual Model of the UML for above case study.
5. Students should define Classes, Relationships, Class Diagrams, Advanced Classes and Relationship, Object Diagrams for above case study.
6. Students should define Use Cases, Use case Diagrams, Activity Diagrams, Interaction Diagrams, State Chart Diagrams for above case study.
7. Students should define Components, Deployment, Collaborations, Component Diagrams, Deployment Diagrams for above case study
8. Students should define SRS, WBS, Network Diagram, Gantt Chart, Cost Estimation Techniques
9. Demonstration it using Scrum Tool
10. Each group may present their work in various project competitions and paper presentations.
11. A detailed report is to be prepared as per guidelines given by the concerned faculty.

Text Books:

1. "The Unified Modeling Language User Guide" by Grady Booch, James Rumbaugh, Ivar Jacobson, Pearson Publication, ISBN 978-81-7758-372-4
2. Jack T. Marchewka, Information Technology Project Management, 4th edition, Wiley India, 2009.

References:

1. UML – Tutorial "www.tutorialspoints.com/uml/"
2. "An Introduction to Object-Oriented Analysis: Objects and UML in plain English" by Davis William Brown, Wiley, Second Edition
3. "Fundamentals of Object-Oriented Design in UML", Meilir Page-Jones, Pearson Education
4. UML in 24 Hours
5. UML Basics— an Introduction to the Unified Modeling Language – IBM
"www.ibm.com › Learn › Rational"


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Term Work:

Term Work shall consist of full Mini Project on above guidelines/syllabus. Also Term work Journal must include at least 2 assignments.

Term Work Marks: 25 Marks (Total marks) = 15 Marks (Case Study) + 5 Marks (Assignments) + 5 Marks (Attendance)

Oral Exam: An Oral exam will be held based on the Case Study and Presentation.



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Course Code	Course Name	Theory	Practical	Tutorial	Theory	Practical /Oral	Tutorial	Total
ITL602	Business Intelligence lab	--	02	--	--	01	--	01

Course Code	Course Name	Examination Scheme								
		Theory Marks				End Sem. Exam	Term Work	Oral & Practical	Oral	Total
		Internal assessment			Avg. of two Tests					
		Test1	Test2							
ITL602	Business Intelligence Lab	--	--	--	--	25	--	25	50	

Lab Objectives: Students will try:

1. To introduce the concept of data Mining as an important tool for enterprise data management and as a cutting edge technology for building competitive advantage.
2. To enable students to effectively identify sources of data and process it for data mining
3. To make students well versed in all data mining algorithms, methods, and tools.
4. To learn how to gather and analyze large sets of data to gain useful business understanding.
5. To impart skills that can enable students to approach business problems analytically by identifying opportunities to derive business value from data.
6. To identify and compare the performance of business.

Lab Outcomes: Students should be able to:

1. Identify sources of Data for mining and perform data exploration
2. Organize and prepare the data needed for data mining algorithms in terms of attributes and class inputs, training, validating, and testing files.
3. Implement the appropriate data mining methods like classification, clustering or association mining on large data sets using open source tools like WEKA
4. Implement various data mining algorithms from scratch using languages like Python/ Java etc.
5. Evaluate and compare performance of some available BI packages
6. Apply BI to solve practical problems : Analyze the problem domain, use the data collected in enterprise apply the appropriate data mining technique, interpret and visualize the results and provide decision support.

Prerequisite: Object oriented Concept, Java programming language.

Requirement:-

Hardware	Software
PC i3 or above.	Open source data mining and BI tools like WEKA, Rapid Miner, Pentaho.

Detailed syllabus:

Module	Detailed Content	Hours	LO Mapping
I & II	2 tutorials a) Solving exercises in Data Exploration b) Solving exercises in Data preprocessing	04	LO 1 LO 2
III	-Using open source tools Implement a) Classifiers b) Clustering Algorithms c) Association Mining Algorithms	06	LO 3
IV	a) Implementation of any one classifier using languages like JAVA/ python/R b) Implementation of any one clustering algorithm using languages like JAVA/ python c) Implementation of any one association mining algorithm using languages like JAVA/ python	06	LO 4
V	Detailed case study of any one BI tool (open source tools like Pentaho can be used) (paper Assignment)	04	LO 5
VI	Business Intelligence Mini Project Each group assigned one new case study for this; BI report must be prepared outlining the following steps: a) Problem definition, Identifying which data mining task is needed b) Identify and use a standard data mining dataset available for the problem. Some links for data mining datasets are: WEKA site, UCI Machine Learning Repository, KDD site, KDD Cup etc. c) Implement the data mining algorithm of choice	06	LO 6

	d) Interpret and visualize the results e) Provide clearly the BI decision that is to be taken as a result of mining.		
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Text Books:

1. Han, Kamber, "Data Mining Concepts and Techniques", Morgan Kaufmann 3rd Edition.
2. G. Shmueli, N.R. Patel, P.C. Bruce, "Data Mining for Business Intelligence: Concepts, Techniques, and Applications in Microsoft Office Excel with XLMiner", 1st Edition, Wiley India.

References:

1. P. N. Tan, M. Steinbach, Vipin Kumar, "Introduction to Data Mining", Pearson Education.
2. WEKA, RapidMiner Pentaho resources from the Web.

Term Work:

Term Work shall consist of at least 10 to 12 practical's based on the below list. Also Term work Journal must include at least 2 assignments.

Term Work Marks: 25 Marks (Total marks) = 15 Marks (Experiment) + 5 Marks (Assignments) + 5 Marks (Attendance)

Oral Exam: An Oral exam will be held based on the above syllabus.



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Course Code	Course Name	Theory	Practical	Tutorial	Theory	Practical & Oral	Tutorial	Total
ITL604	Sensor Network Lab	--	02	--	--	1	--	1

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical & Oral	Oral	Total
		Internal assessment			End Sem. Exam				
		Test 1	Test2	Avg. of two Tests					
ITL.604	Sensor Network Lab	--	--	--	--	25	--	25	50

Lab Objectives: Students will try:

1. To learn different types of sensors from Motes families.
2. To design the problem solution as per the requirement analysis done using Motes sensors.
3. To study the basic concepts of programming/sensors/ emulator like cooja etc.
4. To design and implement the mini project intended solution for project based learning.
5. To build and test the mini project successfully.
6. To improve the team building, communication and management skills of the students.

Lab Outcomes: Student will be able to:

1. Identify the requirements for the real world problems.
2. Conduct a survey of several available literatures in the preferred field of study.
3. Study and enhance software/ hardware skills.
4. Demonstrate and build the project successfully by hardware/sensor requirements, coding, emulating and testing.
5. To report and present the findings of the study conducted in the preferred domain
6. Demonstrate an ability to work in teams and manage the conduct of the research study.

Guidelines

1. The mini project work is to be conducted by a group of three students
2. Each group will be associated with a subject Incharge/ mini project mentor. The group should meet with the concerned faculty during Laboratory hours and the progress of work discussed must be documented.
3. The students may do survey for different application using different types of sensors for their mini project.

4. Each group will identify the Hardware (Motes from different Motes families) & sensor configuration and software requirement for their mini project problem statement.
5. Design your own circuit board using multiple sensors etc.
6. Installation, configure and manage your sensors in such away so that they can communicate with each other.
7. Work with operating system, emulator like contiki cooja and do coding to for input devices on sensors.
8. Create and interface using Mobile/Web to publish or remotely access the data on Internet.
9. Each group along with the concerned faculty shall identify a potential problem statement, on which the study and implementation is to be conducted.
10. Each group may present their work in various project competitions and paper presentations.
11. A detailed report is to be prepared as per guidelines given by the concerned faculty.

Text Books:

1. Fundamentals of Sensor Network Programming: Applications and Technology, By S. Sitharama Iyengar, Nandan Parameshwaran, Vir V. Phoha, N. Balakrishnan, Chuka D. Okoye, Wiley publication.
2. Contiki Cooja User Guide.

References:

1. Internet of Things (A Hands-on-Approach) , Vijay Madisetti , Arshdeep Bahga
2. A comparative review of wireless sensor network mote technologies, IEEE paper 2009

Term Work:

Term Work shall consist of full Mini Project on above guidelines/syllabus. Also Term work Journal must include at least 2 assignments.

Term Work Marks: 25 Marks (Total marks) = 15 Marks (Mini Project) + 5 Marks (Assignments) + 5 Marks (Attendance)

Oral Exam: An Oral exam will be held based on the Mini Project and Presentation.



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Sri Chandrasekarendra Saraswathy Vidyapuram
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Course Code	Course Name	Theory	Practical	Tutorial	Theory	Practical / Oral	Tutorial	Total
ITM605	Mini-Project	--	04	--	--	2	--	2

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical & Oral	Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test2	Avg. of two Tests					
ITM605	Mini-Project	--	--	--	--	25	--	25	50

Lab Objectives: Students will try:

1. To offer students a glimpse into real world problems and challenges that need IT based solutions
2. To enable students to create very precise specifications of the IT solution to be designed.
3. To introduce students to the vast array of literature available of the various research challenges in the field of IT
4. To create awareness among the students of the characteristics of several domain areas where IT can be effectively used.
5. To enable students to use all concepts of IT in creating a solution for a problem
6. To improve the team building, communication and management skills of the students.

Lab Outcomes: Student will be able to:

1. Discover potential research areas in the field of IT
2. Conduct a survey of several available literature in the preferred field of study
3. Compare and contrast the several existing solutions for research challenge
4. Demonstrate an ability to work in teams and manage the conduct of the research study.
5. Formulate and propose a plan for creating a solution for the research plan identified
6. To report and present the findings of the study conducted in the preferred domain

Guidelines

1. The project work is to be conducted by a group of three students
2. Each group will be associated with a project mentor/guide. The group should meet with the project mentor/guide periodically and record of the meetings and work discussed must be documented.

3. Department has to allocate half day for the project work in VI semester, 1 day in VII semester and 2 day in VIII semester every week.
4. To encourage project based learning in the curriculum students may identify their technical domain area in semester VI and can perform the Mini-project in the VI semester or students may do literature survey
5. Each group along with its guide/mentor shall identify a potential research area/problem domain, on which the study is to be conducted.
6. Each team will do a rigorous literature survey of the problem domain by reading and understanding at least 3-5 research papers from current good quality national/international journals/conferences. (Papers selected must be indexed by Scopus/IEEE/Springer/ACM etc.). The list of papers surveyed must be clearly documented.
7. The project assessment for term work will be done at least two times at department level by giving presentation to panel members which consist of at least three (3) members as Internal examiners (including the project guide/mentor) appointed by the Head of the department of respective Programme.
8. A report is to be prepared summarizing the findings of the literature survey. A comparative evaluation of the different techniques surveyed is also to be done.
9. Teams must analyze all the results obtained by comparing with other standard techniques.
10. Every team must publish their work in national / international conference/journals (if possible publish in Scopus indexed journals).
11. The team will finally propose a plan for project work to be continued in the final year.
12. Semester VII to carry out the project good quality project and all these project part

Evaluation

1. Each team has to give presentation/demo to the Internal Panel and External examiner.
2. Each team will prepare a report that will summarize the results of the literature survey and the project proposal. The list of papers surveyed must be clearly documented.
3. Each group will be jointly evaluated by a team of Internal and External Examiners approved by the University of Mumbai.
4. Oral exam will be conduct on the project done by the students.

Term Work:

Term Work shall consist of full Mini Project on above guidelines/syllabus.

Term Work Marks: 25 Marks (Total marks) = 20 Marks (Mini Project) + 5 Marks (Attendance)

Oral Exam: An Oral exam will be held based on the Mini Project and Presentation.

Course Code	Course Name	Theory	Practical	Tutorial	Theory	Practical & Oral	Tutorial	Total
ITL701	Network Design Lab	--	2	--	--	2	--	02

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Oral	Practical & Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test2	Avg. of two Tests					
ITL701	Network Design Lab	--	--	--	--	25	25	--	50


Lab Objectives: Students will try:

1. To be familiarized with the requirements of an enterprise and address its major design areas
2. To recognize the hierarchical network model for the enterprise
3. Identify the networking devices and their configurations required for the design and also prepare a bill of materials
4. Propose a design for the Server Farm of an enterprise network and discuss up gradations if needed.
5. Provide suitable IP addressing plan and best possible routing protocol for an enterprise network.
6. Construct a suitable design for an enterprise network and test it using a tool.

Lab Outcomes: Students will be able to:

1. Understand the requirements of an enterprise and outline its major design areas
2. Identify functional areas to construct high level modules for enterprise architecture and analyze them.
3. Identify the networking devices, prepare a bill of materials and configure the devices as per the Core, Access and Distribution layers
4. Design the Server Farm for an enterprise network and discuss up gradations if needed.
5. Identify and select the technology for Remote site Connectivity, suitable IP addressing plan and routing protocol for an enterprise network.
6. Test and monitor the enterprise network using a tool

Prerequisite: Computer Networks.


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Guidelines

1. The case study of college campus Network must be designed as a mini project work which is to be conducted by a group of three students
2. Each group will be associated with a subject Incharge/ mini project mentor. The group should meet with the concerned faculty during Laboratory hours and the progress of work discussed must be documented.
3. The students must understand the requirements of a College campus enterprise network.
4. The students must outline the major design areas of a College campus enterprise network.
5. The students must identify the functional areas and construct high level modules for the College campus enterprise architecture.
6. The students must analyze the existing College campus enterprise network and propose up gradations to existing infrastructure.
7. The students must identify the network devices required and their locations to design a College campus enterprise network.
8. The students must configure the network devices required as per the Core Layer, Access Layer and Distribution Layer.
9. The students must Design the Server Farm for enterprise network using a configuration tool and also discuss if any other improvement is required.
10. The students must Prepare a bill of materials of all the networking devices. Develop a Request for Proposal-RFP for the enterprise network
11. The students must identify the technology for Remote Site connectivity and evaluate it as per the application requirements of the college campus enterprise network.
12. Propose a suitable IP addressing plan for the enterprise network.
13. Determine a suitable routing protocol for the enterprise network.
14. Create and Test the designed college campus enterprise network using a tool.
15. Use Nagios tool for enterprise infrastructure monitoring tool
16. Each group may present their work in various project competitions and paper presentations.
17. A detailed report is to be prepared as per guidelines given by the concerned faculty.

Text Books:

1. Authorized Self-Study Guide, Designing for Cisco Internetwork Solutions (DESGN), Second Edition, Cisco Press-Diane Teare.
2. Designing and Supporting Computer Networks, CCNA Discovery Learning Guide (Cisco Systems Networking Academy Program) Paperback – 2008, Kenneth Stewart, Aubrey Adams, Allan Reid, Jim Lorenz.

References:


1. I. Top-Down Network Design (Networking Technology) 3rd Edition, Priscilla Oppenheimer, Cisco Press Book
2. Network Planning and Design Guide Paperback – 2000, Shaun Hummel

Term Work:

Term Work shall consist of full Mini Project on above guidelines/syllabus. Also Term work Journal must include at least 2 assignments.

Term Work Marks: 25 Marks (Total marks) = 15 Marks (Mini Project) + 5 Marks (Assignments) + 5 Marks (Attendance)

Oral Exam: An Oral exam will be held based on the Mini Project and Presentation.


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Course Code	Course Name	Theory	Practical	Tutorial	Theory	Practical /Oral	Tutorial	Total
ITL703	Intelligence System Lab	--	2	--	--	1	--	01

Course Code	Course Name	Examination Scheme								
		Theory Marks					Term Work	Oral & Practical	Oral	Total
		Internal assessment			End Sem. Exam					
		Test1	Test2	Avg. of two Tests						
ITL703	Intelligence System Lab	--	--	--	--	25	--	25	50	

Course Objectives: Students will try:

1. To introduce the concepts of a Rational Intelligent Agent and the different types of Agents that can be designed to solve problems
2. To impart basic proficiency in representing difficult real life problems in a state space representation so as to solve them using AI techniques.
3. To make students understand various AI methods like searching and game playing and how to apply them to solve real applications
4. To explain to students the basic issues of knowledge representation and Logic so as to build inference engines
5. To impart a basic understanding of some of the more advanced topics of AI such as planning.
6. To understand Bayes networks, natural language processing and introduce concept of cognitive computing.

Course Outcomes: Students will be able to:

1. Design the building blocks of an Intelligent Agent using PEAS representation .
2. Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search or game based techniques to solve them.
3. Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systems for Game Playing
4. Attain the capability to represent various real life problem domains using logic based techniques and use this to perform inference or planning.
5. Formulate and solve problems with uncertain information using Bayesian approaches.
6. Apply concept Natural Language processing and cognitive computing for creation of domain specific ChatBots.

Hardware	Software
PC i3 or above configuration.	Java Python

Detailed syllabus:

Module No.	Detailed Content	Hours	LO Mapping
I	Tutorial exercise for a) Design of Intelligent System using PEAS. b) Problem Definition with State Space Representation	2	LO 1, LO 2
11	Implementation of Uninformed and Informed Search Algorithms.	6	LO 2
111	Implementation of CSP and Game playing algorithms .	4	LO 3
IV	a) Assignment on Predicate Logic, for forward and backward reasoning and resolution. b) Design of a Planning system using STRIPS.	4	LO 4
V	Implementation of Bayes' Belief Network.	2	LO 5
VI	ini project onstruction of a domain specific chatBot using Natural Language processing techniques. Applications can include : Medical diagnosis, Personal Shopping Assistant, travel Agent , Trouble shooting etc.)	8	LO6

Text Books:

1. Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, 2nd Edition, Pearson Education.
2. Judith S. Hurwitz, Marcia Kaufman, Adrian Bowles, Cognitive Computing and Big Data Analytics, Wiley India

References:

1. George Luger, AI-Structures and Strategies for Complex Problem Solving., 4/e, 2002, Pearson Education.
2. John Kelly , Steve Hamm, Smart Machines - IBM's Watson and the Era of Cognitive Computing, Columbia Business School Publishing

Term Work:

Term Work shall consist of at least 10 to 12 practical's based on the above list. Also Term work Journal must include at least 2 assignments.

Term Work Marks: 25 Marks (Total marks) = 20 Marks (Experiment + Mini-Project) + 5 Marks (Attendance) **Oral Exam:** An Oral exam will be held based on the above syllabus.

Course Code	Course Name	Theory	Practical	Tutorial	Theory	Practical & Oral	Tutorial	Total
ITL704	Android Apps Development Lab		2			1		1

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical & Oral	Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test2	Avg. of twoTests					
ITL704	Android Apps Development Lab	--	--	--	--	25	--	25	50

Hardware	Software
PC i3 or above configuration.	Java Android SDK

Lab Objectives: Students will try:

1. To gain knowledge of installing Android Studio and Cross Platform Integrated Development Environment.
2. To learn designing of User Interface and Layouts for Android App.
3. To learn how to use intents to broadcast data within and between Applications.
4. To use Content providers and Handle Databases using SQLite.
5. To introduce Android APIs for Camera and Location Based Service.
6. To discuss various security issues with Android Platform.


Lab Outcomes: Students will be able to:

1. Experiment on Integrated Development Environment for Android Application Development.
2. Design and Implement User Interfaces and Layouts of Android App.
3. Use Intents for activity and broadcasting data in Android App.
4. Design and Implement Database Application and Content Providers.
5. Experiment with Camera and Location Based service.
6. Develop Android App with Security features.

Prerequisite: Java Programming, Internet Programming.

Guidelines

1. The mini project work is to be conducted by a group of three students


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 Sector-V, Nerul, Navi Mumbai-400706

2. Each group will be associated with a subject Incharge/ mini project mentor. The group should meet with the concerned faculty during Laboratory hours and the progress of work discussed must be documented.
3. The students may do survey for different application which they can create Apps using Android.
4. Students will do Installation, configuration of Android Studio & to create AVD and also try for Cross platform Integrated Development Environment (Any Open Source Tool).
5. Students will try to Design and implement following points in their Mini Project (Android Apps)
 - a. Widget box for Android phone.
 - b. Use Layouts
 - c. Use Intents
 - d. Use Activity
 - e. Use SQLite
 - f. Use Camera
 - g. Use Location API
 - h. Generate APK file
6. Each group along with the concerned faculty shall identify a potential problem statement for Apps development, on which the study and implementation is to be conducted.
7. Each group may present their work in various project competitions and paper presentations.
8. A detailed report is to be prepared as per guidelines given by the concerned faculty.

Text Books:

1. Professional Android 4 Application Development by wrox publication
2. Android Cookbook by o'reilly
3. Beginning Android Development Wrox Press

References:

1. Android Application Development For Dummies, 2nd Edition by MichaelBurton, DonnFelker
2. Android Security –attack and defenses, AbhishekDubey and AnmolMisra by CRC Press

Term Work:

Term Work shall consist of full Mini Project on above guidelines/syllabus. Also Term work Journal must include at least 2 assignments.

Term Work Marks: 25 Marks (Total marks) = 15 Marks (Mini Project) + 5 Marks (Assignments) + 5 Marks (Attendance)

Oral Exam: An Oral exam will be held based on the Mini Project and Presentation.

Course Code	Course Name	Theory	Practical	Tutorial	Theory	Practical & Oral	Tutorial	Total
ITL801	Big Data Lab	--	02	--	--	01	--	01

Course Code	Course Name	Examination Scheme								
		Theory Marks				End Sem. Exam	Term Work	Oral & Practical	Oral	Total
		Internal assessment								
		Test1	Test2	Avg. of two Tests						
ITL801	Big Data Lab	--	--	--	--	25	--	25	50	

Lab Objectives: Students will try:


1. To introduce the tools required to manage and analyze big data like Hadoop, NoSql
2. To impart knowledge of Map reduce paradigm to solve complex problems Map-Reduce.
3. To introduce several new algorithms for big data mining like classification, clustering and finding frequent patterns.
4. To introduce to the students several types of big data like social media, web graphs and data streams.
5. To identify various sources of Big data
6. To enable students to have skills that will help them to solve complex real-world problems in for decision support.

Lab Outcomes: Students will be able to:

1. Demonstrate capability to use Big Data Frameworks like Hadoop
2. Program applications using tools like Hive, pig, , NO SQL and MongoDB for Big data Applications
3. Construct scalable algorithms for large Datasets using Map Reduce techniques
4. Implement algorithms for Clustering, Classifying and finding associations in Big Data
5. Design and implement algorithms to analyze Big data like streams, Web Graphs and Social Media data and construct recommendation systems.
6. Apply the knowledge of Big Data gained to fully develop a BDA applications for real life applications.

Prerequisite: Java, Python

Requirement


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Hardware	Software
PC i3 or above, 8 GB RAM	Virtual Machine, Hadoop Frame work, NOSQL and MongoDB Compilers

Detailed syllabus:

Module	Detailed Content	Hours 2hrs	LO Mapping
1	Assignment on Study of Hadoop ecosystem	02	LO 1
2	Programming exercises on Hadoop Using Hive, Pig, Hbase Sqoop NOSQL, MongoDB	04	LO 2
3	Implementing simple algorithms in Map-Reduce Matrix multiplication, Aggregates, joins, sorting, searching etc.	04	LO3
4	Implementing Algorithms using MapReduce (Any 2) <ul style="list-style-type: none"> Implementing Frequent Item set Mining Implementing Clustering algorithms Implementing Classification Algorithms 	06	LO 4
5	Big Data Applications (Any 2) <ul style="list-style-type: none"> Implementing Analytics on data streams Implementing Social Network Analysis Algorithms Implementing Web Graph Algorithms Implementing recommendation Engines 	05	LO 5
6	Final Project One real life large data application to be implemented (Use standard datasets available on the web) a) Twitter data analysis b) Fraud Detection c) Text mining d) Recommendation Engines (list of datasets also given in the text book)	05	LO 5 LO 6

Text Books:

1. Radha Shankarmani, M Vijayalakshmi, "Big Data Analytics", Wiley Publications,
2. Alex Holmes "Hadoop in Practice", Manning Press, Dreamtech Press,
3. Professional NoSQL Paperback, by Shashank Tiwari, Dreamtech Press
4. MongoDB: The Definitive Guide Paperback, Kristina Chodorow (Author), Michael Dirolf, O'Reilly Publications

References:


1. Analytics in a Big Data World: The Essential Guide to Data Science and its Applications, Bart Baesens , WILEY Big Data Series.
2. Hadoop: The Definitive Guide by Tom White, O'Reilly Publications
3. Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data by EMC Education Services
4. NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence by Pramod J. Sadalage, Addison Wesley

Term Work:

Term Work shall consist of at least 10 to 12 practical's based on the above list. Also Term work Journal must include at least 2 assignments.

Term Work Marks: 25 Marks (Total marks) = 15 Marks (Experiment) + 5 Marks (Assignments) + 5 Marks (Attendance)

Oral Exam: An Oral exam will be held based on the above syllabus.



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Course Code	Course Name	Theory	Practical	Tutorial	Theory	Practical & Oral	Tutorial	Total
ITL802	Internet of Everything Lab	--	02	--	--	1	--	1

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical & Oral	Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test2	Avg. of two Tests					
ITL802	Internet of Everything Lab	--	--	--	--	25	--	25	50

Hardware and Software requirements:

Hardware Requirements	Software Requirements	Other Requirements
PC With following Configuration 1. Intel Core i3/i5/i7 Processor 2. 4 GB RAM 3. 500 GB Hard disk	1. Ubuntu or Linux Desktop OS 2. VMware 3. Cooja contiki or any open source software 4. Cupcarbon	1. Internet Connection

Lab Objectives: Students will try:

1. To learn different types of sensors from Motes families.
2. To design the problem solution as per the requirement analysis done using Motes sensors.
3. To study the basic concepts of programming/sensors/ emulator like cooja etc.
4. To design and implement the mini project intended solution for project based learning.
5. To build and test the mini project successfully.
6. To improve the team building, communication and management skills of the students.

Lab Outcomes: Student will be able to:

1. Identify the requirements for the real world problems.
2. Conduct a survey of several available literatures in the preferred field of study.
3. Study and enhance software/ hardware skills.

4. Demonstrate and build the project successfully by hardware/sensor requirements, coding, emulating and testing.
5. To report and present the findings of the study conducted in the preferred domain
6. Demonstrate an ability to work in teams and manage the conduct of the research study.

Prerequisite: Basics of Java and Python Programming

Guidelines

1. The mini project work is to be conducted by a group of three students
2. Each group will be associated with a subject Incharge/ mini project mentor. The group should meet with the concerned faculty during Laboratory hours and the progress of work discussed must be documented.
3. The students must understand the
 - a. Concept
 - b. Importance
 - c. Interdisciplinary
 - d. Challenges
 - e. Various applications/smart objects
 - f. Major Players/Industry, Standards.
4. The students must understand the IoT Architecture:
 - a. Node Structure: Sensing, Processing, Communication, Powering
 - b. Networking: Topologies, Layer/Stack architecture
 - c. Communication Technologies: Introduction to ZigBee, BLE, WiFi, LTE, IEEE 802.11ah, Discuss data rate, range, power, computations/bandwidth, QoS
 - d. Smartness - Signal Processing/Analytics: Impact on Power/Energy savings, dynamic networks, simple case studies
 - e. IoT Fabricator: Introduction to Embedded electronics, fabricating electronics, Communication Network requirements, Data processing challenges – recreation, IP/security, Challenges
 - f. Hands-on in IoT: Projects based on some Hardware (Raspberry pi, Arduino, Intel, IITH Mote, Smartphones), Software (Contiki, TinyOS, Android), IoT Fabricator etc. can be used.
5. The students may do will visit different websites to identify their IOT topic for the mini project.
6. The students may do survey for different application using different types of sensors for their mini project.



7. Each group will identify the Hardware (Motes from different Motes families) & sensor configuration and software requirement for their mini project problem statement.
8. Design your own circuit board using multiple sensors etc.
9. Installation, configure and manage your sensors in such away so that they can communicate with each other.
10. Work with operating system, emulator like contiki cooja and do coding to for input devices on sensors.
11. Each group will identify the Hardware and software requirement for their mini project problem statement.
12. Create and interface using Mobile/Web to publish or remotely access the data on Internet.
13. Each group along with the concerned faculty shall identify a potential problem statement, on which the study and implementation is to be conducted.
14. Each group may present their work in various project competitions and paper presentations.
15. A detailed report is to be prepared as per guidelines given by the concerned faculty.

Text Books:

1. Interconnecting Smart Objects with IP: The Next Internet, Jean-Philippe Vasseur, Adam Dunkels, Morgan Kuffmann
2. Designing the Internet of Things , Adrian McEwen (Author), Hakim Cassimally
3. Internet of Things: Converging Technologies for Smart Environments and Integrated Ecosystems, Dr. Ovidiu Vermesan, Dr. Peter Friess, River Publishers
4. Internet of Things (A Hands-on-Approach) , Vijay Madiseti , Arshdeep Bahga

References:


1. 6LoWPAN: The Wireless Embedded Internet, Zach Shelby, Carsten Bormann, Wiley
2. Building the internet of things with ipv6 and mipv6, The Evolving World of M2M Communications, Daniel Minoli John Wiley & Sons
3. Contiki Cooja User Guide.
4. Fundamentals of Sensor Network Programming: Applications and Technology, By S. Sitharama Iyengar, Nandan Parameshwaran, Vir V. Phoha, N. Balakrishnan, Chuka D. Okoye, Wiley publication.
5. Recent research/white papers

Term Work:

Term Work shall consist of full Mini Project on above guidelines/syllabus. Also Term work Journal must include at least 2 assignments.

Term Work Marks: 25 Marks (Total marks) = 15 Marks (Mini Project) + 5 Marks (Assignments) + 5 Marks (Attendance)

Oral Exam: An Oral exam will be held based on the Mini Project and Presentation.


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Course Code	Course Name	Theory	Practical	Tutorial	Theory	Practical & Oral	Tutorial	Total
ITL804	R Programming Lab	--	02	--	--	01	--	01

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical & oral	Oral	Total
		Internal assessment			End Sem. Exam				
		Test 1	Test 2	Avg. of two Tests					
ITL804	R Programming Lab	--	--	--	--	25	25	--	50

Lab Objectives: Students will try:

1. To provide an overview of a new language R used for data science.
2. To introduce students to the R programming environment and related eco-system and thus provide them with an in-demand skill-set, in both the research and business environments
3. To introduce the extended R ecosystem of libraries and packages
4. To demonstrate usage of as standard Programming Language.
5. To familiarize students with how various statistics like mean median etc. can be collected for data exploration in R
6. To enable students to use R to conduct analytics on large real life datasets.

Lab Outcomes: students will be able to:

1. Install and use R for simple programming tasks.
2. Extend the functionality of R by using add-on packages
3. Extract data from files and other sources and perform various data manipulation tasks on them.
4. Code statistical functions in R.
5. Use R Graphics and Tables to visualize results of various statistical operations on data .
6. Apply the knowledge of R gained to data Analytics for real life applications.

SOFTWARE requirements:

1. The R statistical software program. Available from: <https://www.r-project.org/>
2. RStudio an Integrated Development Environment (IDE) for R. Available from: <https://www.rstudio.com/>

Detailed syllabus:

Module	Detailed Content	Hours	LO Mapping
0	Prerequisites - Any programming Language like Java Python. Basic statistics. Data Mining Algorithms	--	--
I	Introduction: Installing R on personal machines. installing R and RStudio. <ul style="list-style-type: none"> The basic functionality of R will be demonstrated, Variable types in R. Numeric variables, strings and factors. Accessing the help system. Retrieving R packages. Basic data types and operations: numbers, characters and composites. Data entry and exporting data 	02	LO 1, LO 2, LO 3
II	Data structures: vectors, matrices, lists and data frames.	04	LO1, LO 3
III	R as a programming language: <ul style="list-style-type: none"> Grouping, loops and conditional execution, Functions Exploratory data analysis <ul style="list-style-type: none"> Range, summary, mean, variance, median, standard deviation, histogram, box plot, scatterplot 	04	LO 1, LO 4
IV	Graphics in R <ul style="list-style-type: none"> Graphics and tables Working with larger datasets Building tables with aggregate Introduction to ggplot2 graphics 	06	LO 3
V	Regression and correlation <ul style="list-style-type: none"> Simple regression and correlation, Multiple regression Tabular data and analysis of Categorical data 	02	LO 4
VI	for Data Science (Mini Project) Implementing a mini project using any data mining or big data analytics algorithm in R <ul style="list-style-type: none"> Extracting data from a large Dataset Exploratory analysis Using Mining algorithm Visualizations and interpretation of results 	06	LO 5, LO 6

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Text Books:

1. URL: <https://cran.r-project.org/doc/manuals/r-release/R-intro.pdf> (Online Resources)
2. R Cookbook Paperback – 2011 by Tector Paul O Reilly Publications
3. Beginning R: The Statistical Programming Language by Dr. Mark Gardener, Wiley Publications
4. R Programming For Dummies by Joris Meys Andrie de Vries, Wiley Publications

References:

1. Hands-On Programming with R by Grolemond, O Reilly Publications
2. R for Everyone: Advanced Analytics and Graphics, 1e by Lander, Pearson Ltd.
3. R for Data Science Learning Dan Toomey December 2014 Packt Publishing Limited

Term Work:

Term Work shall consist of experiment on above guidelines/syllabus. Also Term work Journal must include at least 2 assignments.

Term Work Marks: 25 Marks (Total marks) = 15 Marks (Experiment) + 5 Marks (Assignments) + 5 Marks (Attendance)

Practical & Oral Exam: An Oral exam will be held based on the above syllabus.



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Subject Code	Subject Name	Credits
CPL605	Network Programming Laboratory	02

Laboratory Course Outcomes:

Learner will be able to :

1. Configure Linux Network
2. View and edit routing tables
3. Configure Linux Router
4. Configure Linux FTP server
5. Install and Configure DNS server
6. Install and configure web server

Module	Detailed content	Hours
1	Study of Networking Commands (Ping, Tracert, TELNET, nslookup, netstat, ARP, RARP) and Network Configuration Files.	2
2	Linux Network Configuration. i. Configuring NIC's IP Address. ii. Determining IP Address and MAC Address using if-config command. iii. Changing IP Address using ifconfig. iv. Static IP Address and Configuration by Editing. v. Determining IP Address using DHCP. vi. Configuring Hostname in /etc/hosts file.	4
3	Setting up multiple IP Addresses on a single LAN.	2
4	Using netstat and route commands to do the following. i. View current routing table. ii. Add and delete routes. iii. Change default gateway.	2
5	Using GUI configuration Tools to add /configure Ethernet Card.	2
6	Configuring Linux as a router by enabling IP Forwarding.	2
7	Configuring remote login Services, telnet & ssh.	2


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	i. To install and configure TELNET server. ii. To set up SSH and connect to remote machine.	
8	To configure Linux FTP server using VSFTPD. i. Set up anonymous access of FTP server. ii. Enable individual logins and add FTP users with Read-only access. iii. Transfer Files.	2
9	To install and configure DNS server.	2
10	To install and configure Web server.	2
11	Design TCP iterative Client and Server application to reverse the given input sentence.	2
12	Design TCP concurrent Client and Server application to reverse the given input sentence.	2
13	Design TCP Client and Server application to transfer file.	2
14	Design a TCP concurrent Server to convert a given text into upper case using multiplexing system call "select".	2
15	Design a TCP concurrent Server to echo given set of sentences using Poll functions.	2
16	Design UDP Client and Server application to reverse the given input sentence.	2
17	Design UDP Client Server to transfer a file.	2
18	Design using Poll Client Server application to multiplex TCP and UDP requests for converting a given text into upper case.	2
19	Design a RPC application to add and subtract a given pair of integers.	2
20	Program to determine the host ByteOrder	2
21	Program to set and get socket options	2

Format of Laboratory Course:

The format for the Laboratory Course is

1. Atleast 8 small experiments based on above syllabus
2. One group Mini project

A group of 3 students ; 4 Batches per class.

The scope of the miniproject should be such that it completes in 15 hours of actual working.

Termwork Assessment:


Laboratory Experiment: 10

Mini Project presentation : 10

Attendance : 05

End Semester Examination:

Oral examination is to be conducted by pair of internal and external examiners


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Course Code	Course/Subject Name	Credits
MEL402	Fluid Mechanics*	1

Objectives:

1. To study measurement as well as calibration principles
2. To practically verify the concepts learnt in theory course

Outcomes: Learner will be able to...

1. Calibrate different gauges
2. Measure hydrostatic forces
3. Verify the Archimedes Principle
4. Calibrate Venturimeter, Orificemeter and Pitot tube
5. Verify the Bernoulli's Principle
6. Read manometers and maintain them.

(a) List of Experiments: Any 6 experiments to be performed.

Expt no	Experiment	Hrs
1	Calibration of Pressure Gauges	2
2	Measurement of Hydrostatic Pressures	2
3	Verification of Archimedes' Principle	2
4	Calibration of Venturimeter/ Orificemeter/Nozzlemeter/ Pitot tube	2
5	Determine the friction factor for Pipes	2
6	Determination of major and minor losses in Pipe systems	2
7	Verification of Bernoulli's Equation	2
8	Experiment on Laminar flow in pipes	2
9	Calculation of Lift and Drag over an aerofoil	2
10	Determine the pressure profile over an aerofoil	2

- (b) Mini Project: A mini project along with a brief report in which a group of students (maximum 4) will design/ fabricate/ assemble a unit or software based simulation to demonstrate any principle in Fluid Mechanics.

Assessment:

Term work Mark distribution will be as follows:

Laboratory work	15 marks
Mini Project	05 marks
Attendance	05 marks

End Semester Practical/Oral Examination:

1. Pair of Internal and External Examiner should conduct practical/viva based on contents. Distribution of marks for practical/viva examination shall be as follows:

Practical performance	15 marks
Viva	10 marks
2. Evaluation of practical examination to be done based on the experiment performed and the output of the experiment during practical examination
3. Students work along with evaluation report to be preserved till the next examination

Course Code	Course Name	Credits
MEL 404	Kinematics of Machinery*	01

Objectives:

1. To familiarise with various mechanisms and inversions
2. To acquaint with basics of power transmission systems

Outcomes: Learner will be able to...

1. Draw velocity diagram by instantaneous center method
2. Draw velocity and acceleration diagrams for four bar mechanism by relative method.
3. Draw velocity and acceleration diagrams for Slider crank mechanism by relative method
4. Draw Cam profile for the specific follower motion
5. Plot displacement-time, velocity-time, acceleration-time cam profiles
6. Develop and build mechanisms to provide specific motion

Term Work: (Comprises a and b)

a) List of Experiments


Sr No	Details	Lab Session
1	Analysis of velocity of mechanisms by Instantaneous Center of Rotation – 3 to 5 problems	2 Hrs
2	Analysis of velocity of mechanism by Relative method – 3 to 5 problems	4 Hrs
3	Analysis of Velocity & Acceleration of mechanism by Relative method – 3 to 5 problems	4 Hrs
4	Motion analysis and plotting of displacement-time, velocity-time and acceleration-time, jerk-time and layout of cam profiles - 2 to 3 problems	4 Hrs
5	Mini project on design and fabrication of any one mechanism for a group of maximum 4 students	6 Hrs

b) Assignments: Minimum two problems on each of the following topics:

- i) Brakes
- ii) Chains and belts
- iii) Gear and gear trains

Distribution of marks for Term Work shall be as follows:

Laboratory work	:	15marks.
Assignments	:	05 Marks
Attendance	:	05 marks.


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Course Code	Course Name	Credits
MEL801	Design of Mechanical Systems	1

Objectives:

1. To familiarise with the concept of system and methodology of system design
2. To study system design of various systems such as snatch block, belt conveyors, engine system, pumps and machine tool gearbox
3. To familiarise with the standard codes of professional practices in designing the various systems

Outcomes: Learner will be able to...

1. Apply the concept of system design.
2. Design of hoisting mechanism of EOT crane,
3. Design belt conveyor systems
4. Design pumps for the given applications
5. Design engine components such as cylinder, piston, connecting rod and crankshaft
6. Design of machine tool gearbox

Term Work: Comprises a& b

a) Term work - Shall consist of

1. Design and detailed assembly drawing (computer aided drawing on A3 size sheets) of minimum two design problems, from the following:
 - i) Design of hoisting mechanisms
 - ii) Design of belt conveyors
 - iii) Design of pumps
2. **Course Project:** Students in a group of two to four should be able to apply and integrate the knowledge gained during the course. Design and preparation of working drawings of any system having minimum 5 to 6 components is expected.

b) Assignment: Exercises on following topics in the form of design calculations with sketches and / or drawings.

1. Engine design
2. Design of gearbox

The distribution of marks for term work shall be as follows:

- Exercises and Drawing sheets : 10 marks.
- Assignments : 05 marks
- Course Project : 05 marks.
- Attendance : 05 Marks.

Assessment:

End Semester Practical/Oral examination:

1. Each student will be given a small task of design based on syllabus, which will be assessed by pair of examiners during the oral examination.
2. Distribution of marks for practical-oral examination shall be as follows:

Design Task:	15 marks
Oral:	10 marks
3. Evaluation of practical/oral examination to be done based on the performance of design task
4. Students work along with evaluation report to be preserved till the next examination

Subject Code	Subject Name	Teaching Scheme (Hrs.)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/Pracs	Tutorial	Total
ECL501	Microprocessors & Peripherals Interfacing Laboratory	--	02	--	--	1	--	1

Subject Code	Subject Name	Examination Scheme									
		Theory Marks					End Sem. Exam	Term Work	Practical & Oral	Oral	Total
		Internal assessment			Avg. Of Test 1 and Test 2	--					
		Test 1	Test2	Test 2							
ECL501	Microprocessors & Peripherals Interfacing Laboratory	--	--	--	--	--	25	25	--	50	

Suggested Experiment List

Experiments can be conducted on Assembler, Emulator or Hardware kits, in Assembly language.

- To write an assembly language program to perform 8-bit addition using multiple addressing modes, viz., direct, indirect, register, etc. addressing mode.
- To write an assembly language program to perform 16-bit Logical operations, viz., AND, OR, XOR, NAND, etc.
- To write an assembly language program to perform 32-bit Subtraction
- To write an assembly language program to generate 10 msec delay using software (register) and 8254
- To write an assembly language program to move 10 memory locations using String Instruction
- To write an assembly language subroutine (program) that takes a number as input and returns the square of it
- To write an assembly language program for interfaced 7 segment display or keypad or both, through 8255
- To write an assembly language program to read and save value from ADC
- To write an assembly language program to generate square / triangular / ramp waveforms using DAC
- To write an assembly language program for performing floating point division using 8087
- To write an assembly language program to use INT 21h DOS Functions, viz. read character, write character, get system date, etc

Note: Mini Project can be considered as a part of termwork (Topic based on syllabus)

Term Work:

At least 08 Experiments including 02 simulations covering entire syllabus must be given during the "Laboratory session batch wise". Computation/simulation based experiments are also encouraged. The experiments should be students centric and attempt should be made to make experiments more meaningful, interesting and innovative. Application oriented one mini-project can be conducted for maximum batch of four students.

Term work assessment must be based on the overall performance of the student with every experiments/tutorials and mini-projects (if included) are graded from time to time. The grades will be converted to marks as per "Choice Based Credit and Grading System" manual and should be added and averaged. Based on above scheme grading and term work assessment should be done.

The practical and oral examination will be based on entire syllabus.



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Sri Chandrasekarendra Saraswathy Vidyapuram
Sector-V, Nerul, Navi Mumbai-400706

Subject Code	Subject Name	Teaching Scheme (Hrs.)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/Pracs	Tutorial	Total
ECL502	Digital Communication Laboratory	--	02	--	--	1	--	1

Subject Code	Subject Name	Examination Scheme								
		Theory Marks					Term Work	Practical & Oral	Oral	Total
		Internal assessment			End Sem. Exam					
		Test 1	Test 2	Avg. Of Test 1 and Test 2						
ECL502	Digital Communication Laboratory	--	--	--	--	25	25	--	50	

Experiments should be performed on Bread-board or on experimentation kits.

Suggested Experiment List

- To understand sampling theorem and reconstruction
- To understand Various line codes
- To observe the performance of Return to Zero (RZ) types of line code
- To observe the performance of Non- Return to Zero (NRZ) types of line code
- Modulation and Demodulation of Binary Amplitude Shift Keying
- Modulation and Demodulation of Binary Frequency Shift Keying
- Modulation and Demodulation of Binary Phase Shift Keying
- Modulation and Demodulation of Quadrature Phase Shift Keying
- To observe the effect of signal Distortion using EYE-Diagram
- To Study and perform Linear Block codes
- To Study and perform cyclic codes

Note: Mini Project can be considered as a part of termwork (Topic based on syllabus)

Term Work:

At least 08 Experiments including 02 simulations covering entire syllabus must be given during the "Laboratory session batch wise". Computation/simulation based experiments are also encouraged. The experiments should be students centric and attempt should be made to make experiments more meaningful, interesting and innovative. Application oriented one mini-project can be conducted for maximum batch of four students.

Term work assessment must be based on the overall performance of the student with every

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The practical and oral examination will be based on entire syllabus.



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Subject Code	Subject Name	Teaching Scheme (Hrs.)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/Pracs	Tutorial	Total
ECL503	Business Communication & Ethics Laboratory	2 (classwise)	2 (batch wise)	--	--	2	--	2

Subject Code	Subject Name	Examination Scheme								
		Theory Marks					Term Work	Practical & Oral	Oral	Total
		Internal assessment			End Sem. Exam					
		Test 1	Test 2	Avg. Of Test 1 and Test 2						
ECL503	Business Communication & Ethics Laboratory	--	--	--	--	50	--	--	50	

Course objectives:

To teach the students

- To inculcate professional and ethical attitude.
- To enhance effective communication and interpersonal skills.
- To build multidisciplinary approach towards all life tasks.

Course outcomes:

After successful completion of the course student will be able to

- Design a technical document using precise language, suitable vocabulary and apt style.
- Develop the life skills/ interpersonal skills to progress professionally by building stronger relationships.
- Demonstrate awareness of contemporary issues knowledge of professional and ethical responsibilities.
- Apply the traits of a suitable candidate for a job/higher education, upon being trained in the techniques of holding a group discussion, facing interviews and writing resume/SOP.
- Deliver formal presentations effectively implementing the verbal and non-verbal skills.

Module No.	Unit No.	Topics	Hrs.
1.0		Report Writing	05
	1.1	Objectives of Report Writing	
	1.2	Language and Style in a report	
	1.3	Types : Informative and Interpretative (Analytical, Survey and Feasibility) and Formats of reports (Memo, Letter, Short and Long Report)	
2.0		Technical Writing	03
	2.1	Technical Paper Writing (IEEE Format)	
	2.2	Proposal Writing	
3.0		Introduction to Interpersonal Skills	09
	3.1	Emotional Intelligence	
	3.2	Leadership and Motivation	
	3.3	Team Building	
	3.4	Assertiveness	
	3.5	Conflict Resolution and Negotiation Skills	
	3.6	Time Management	
	3.7	Decision Making	
4.0		Meetings & Documentations	02
	4.1	Strategies for conducting effective meetings	
	4.2	Notice, Agenda and Minutes of a meeting	
	4.3	Business meeting etiquettes	
5.0		Introduction to Corporate Ethics	02
	5.1	Professional and work ethics (responsible use of social media - Facebook, WA, Twitter etc.)	
	5.2	Introduction to Intellectual Property Rights	
	5.3	Ethical codes of conduct in business and corporate activities (Personal ethics, conflicting values, choosing a moral response and making ethical decisions)	
6.0		Employment Skills	07
	6.1	Group Discussion	
	6.2	Resume Writing	
	6.3	Interview Skills	
	6.4	Presentation Skills	
	6.5	Statement of Purpose	
		Total	28

References

1. Fred Luthans, "Organizational Behavior", McGraw Hill, edition
2. Lesiker and Petit, "Report Writing for Business", McGraw Hill, edition
3. Huckin and Olsen, "Technical Writing and Professional Communication", McGraw Hill
4. Wallace and Masters, "Personal Development for Life and Work", Thomson Learning, 12th edition
5. Heta Murphy, "Effective Business Communication", Mc Graw Hill, edition
6. Sharma R.C. and Krishna Mohan, "Business Correspondence and Report Writing", Tata McGraw-Hill Education
7. Ghosh, B. N., "Managing Soft Skills for Personality Development", Tata McGraw Hill.
8. Lehman, Dufrene, Sinha, "BCOM", Cengage Learning, 2nd edition
9. Bell, Smith, "Management Communication" Wiley India Edition, 3rd edition.
10. Dr. Alex, K., "Soft Skills", S Chand and Company
11. Subramaniam, R., "Professional Ethics" Oxford University Press.
12. Robbins Stephens P., "Organizational Behavior", Pearson Education
13. <https://grad.ucla.edu/asis/agep/advsoystem.pdf>

List of Assignments:

1. Report Writing (Theory)
2. Technical Proposal
3. Technical Paper Writing (Paraphrasing a published IEEE Technical Paper)
4. Interpersonal Skills (Group activities and Role plays)
5. Interpersonal Skills (Documentation in the form of soft copy or hard copy)
6. Meetings and Documentation (Notice, Agenda, Minutes of Mock Meetings)
7. Corporate ethics (Case studies, Role plays)
8. Writing Resume and Statement of Purpose

Term Work:

Term work will consist of all assignments from the list. The distribution of marks for term Work will be as follows:

Book Report.....	(10) Marks
Assignments	(10) Marks
Project Report Presentation.....	(15) Marks
Group Discussion.....	(10) Marks
Attendance	(05) Marks
TOTAL:	(50) Marks

Subject Code	Subject Name	Teaching Scheme (Hrs.)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/Pracs	Tutorial	Total
ECL504	Open Source technology for Communication Lab	--	2	--	--	1	--	1

Subject Code	Subject Name	Examination Scheme								
		Theory Marks					Term Work	Practical & Oral	Oral	Total
		Internal assessment			End Sem. Exam					
		Test 1	Test 2	Avg. Of Test 1 and Test 2						
ECL504	Open Source technology for Communication Lab	--	--	--	--	25	25	--	50	

Prerequisites:

- Principals of Communication Engineering
- Digital System Design
- Signals and Systems
- Electronics Circuits and Devices

Course objectives:

- Introduction to open source tools for communication lab.
- To simulate and analyze the various parameters of communication systems.
- To understand and implement the communication system/sub system.

Course outcomes:

After successful completion of the course student will be able to

- Learn open source programming tools for communication technology.
- Simulate and analyze the performance of communication system.
- Implement the communication system/subsystem.

Sample List of Experiments:

Note: These are few examples of experiments; teachers may prepare their own list.

Sr. No	Title	Resource
1	Installation of a. Python, NumPy and commPy or b. Octave or c. Scilab or d. Xilinx using HDL Or e. LT SPICE Or f. SEQUEL Note: Any one tool or a combination of tools.	See the E-resource Links
2	Write a program to represent analog signal to digital signal (A to D conversion)	http://www.scilab.in/files/textbooks/ProfSenthikumar/DC.pdf
3	Write a program to generate basic functions a. Unit Impulse Signal b. Unit Step Signal c. Generate Ramp Signal d. Exponential Sequence e. Generate Sine Sequence f. Cos Sequence	See the E-resource Links
4	Write a program to perform convolution and correlation on the given signal.	See the E-resource Links
5	Plot the ASK, FSK and PSK Waveforms using scilab/python	See the E-resource Links
6	Write a program to apply Low/High Pass Filter on the given signal.	See the E-resource Links
7	Write a program to read a speech signal and plot it and play it.	See the E-resource Links

8	Write a program to apply Low/High Pass Filter on the given signal.	See the E-resource Links
9	Write a code to design Butterworth/Chebyshev filter using Scilab/Octave/Python.	See the E-resource Links
10	Write a program to calculate Hamming distance using Scilab/python.	See the E-resource Links
11	Encoding and decoding of convolutional codes	1. https://github.com/veeresh1/CommPy/blob/master/commPy/examples/conv_encode_decode.py 2. https://media.readthedocs.org/pdf/commPy/latest/commPy.pdf
12	Design and programming of 1-bit Full adder and testing using Testbench.	See the E-resource Links
13	Design and programming of 4-bit adder using Full adder and testing using Testbench	See the E-resource Links
14	Design and programming of 8:1 Mux and testing using Testbench	See the E-resource Links
15	Design and programming of 3:8 Decoder and testing using Testbench	See the E-resource Links
16	Design and programming of D Latch and D Flip Flop and testing using Testbench	See the E-resource Links
17	Design and programming of T FF and testing using Testbench	See the E-resource Links
18	Design and programming of Counter and testing using Testbench	See the E-resource Links
19	Design and programming of RAM and testing using Testbench	See the E-resource Links
20	Design and Programming of FSM and testing using	See the E-resource Links

	Testbench	
21	Design and Simulation of Basic diode Circuits like Clipper, Clapper, Voltage Doubler using Sequel or LT Spice	See the E-resource Links
22	Design and simulation of single stage and Multistage BJT amplifier using Sequel or LT SPICE	See the E-resource Links
23	Design and simulation of Differential amplifier and current mirror circuit using Sequel or LT SPICE	See the E-resource Links
24	Design and Simulation of Basic Op-circuits like Inverting amplifier, Non-Inverting amplifier, Difference amplifier, I to V convertor, V to I Convertor etc using Sequel or LT SPICE.	See the E-resource Links
25	Design and Simulation of oscillators and Filters using Op-amp using LT SPICE or Sequel.	See the E-resource Links
26	Simulation of non-linear applications of Op-amp like Schmitt Trigger, Window Detector, Precision Rectifier, Square Wave Generator etc using LT SPICE or Sequel.	See the E-resource Links

List of Mini projects:

Note: These are few examples of mini projects; teachers may prepare their own list.

1. Implementing liner block code of (7,4).
2. Implementing FSK TX and RX.
3. Implementing Nyquist criteria with noisy environment.

Suggested List of Mini Projects on Xilinx using HDL Programming

4. 16 bit Multiplier
5. 32 Bit CLA adder
6. Shift and Add Multiplier
7. GCD Calculator
8. 3-bit FIR Filter design
9. 4 Bit ALU
10. 4-bit Comparator
11. 2's Complement adder

Suggested List of Mini Projects using LT SPICE or SEQUEL

12. Audio Equalizer using Op-amp.
13. Strain Guage amplifier Circuit.
14. Synchronous DC-DC Buck Converter.
15. RTD based 4 to 20mA transmitter circuit.

Online Repository Sites:

1. Google Drive
2. GitHub
3. Code Guru

E-Resources:

1. Spoken Tutorial : <http://spoken-tutorial.org/>
2. Scilab: <http://www.scilab.org/>
3. Octave: <https://www.gnu.org/software/octave/>
4. Python: <https://www.python.org/>
5. Xilinx using HDL: <https://www.xilinx.com/products/design-tools/ise-design-suite/ise-webpack.html>
6. LT SPICE : <http://www.linear.com/designtools/software/>
7. SEQUEL: <https://www.ee.iitb.ac.in/~sequel/>

Note: Mini Project can be considered as a part of termwork (Topic based on syllabus)

Term Work:

At least 08 Experiments covering entire syllabus must be given during the "Laboratory session batch wise". Computation/simulation based experiments are also encouraged. The experiments should be students centric and attempt should be made to make experiments more meaningful, interesting and innovative. Application oriented one mini-project can be conducted for maximum batch of four students.

Term work assessment must be based on the overall performance of the student with every experiments/tutorials and mini-projects (if included) are graded from time to time. The grades will be converted to marks as per "Choice Based Credit and Grading System" manual and should be added and averaged. Based on above scheme grading and term work assessment should be done.

The practical and oral examination will be based on entire syllabus.


Subject Code	Subject Name	Teaching Scheme (Hrs.)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/Praes	Tutorial	Total
ECLDLO 5011	Microelectronics Laboratory	--	--	02	--	1	--	1

Subject Code	Subject Name	Examination Scheme								
		Theory Marks				End Sem. Exam	Term Work	Practical & Oral	Oral	Total
		Internal assessment			Avg. Of Test 1 and Test 2					
		Test 1	Test2							
ECLDLO 5011	Microelectronics Laboratory	--	--	--	--	25	--	--	25	

Term Work:

At least 08 tutorials covering entire syllabus must be given during the "Tutorial session batch wise"

Term work assessment must be based on the overall performance of the student with every tutorial graded from time to time. The grades will be converted to marks as per "Choice Based Credit and Grading System" manual and should be added and averaged. Based on above scheme grading and term work assessment should be done.


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Subject Code	Subject Name	Teaching Scheme (Hrs.)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/Pracs	Tutorial	Total
ECLDLO 5012	TV & Video Laboratory	--	--	02	--	1	--	1

Subject Code	Subject Name	Examination Scheme									
		Theory Marks					End Sem. Exam	Term Work	Practical & Oral	Oral	Total
		Internal assessment			Avg. Of Test 1 and Test 2	--					
		Test 1	Test2	Test 1 and Test 2							
ECLDLO 5012	TV & Video Laboratory	--	--	--	--	25	--	--	25		

Suggested List of Experiments

- To study CVS
- Measurement of horizontal and vertical scanning frequency
- To study sound section of TV receiver
- To study receiver sections by using fault simulation switches
- To study DTH receiver
- To study HDTV
- To study set top box trainer
- To study LCD display
- To study LED display

Term Work:

At least 8 Practicals/ Tutorials covering entire syllabus must be given during the "Laboratory session batch wise". Computation/simulation based experiments are also encouraged. The experiments should be students centric and attempt should be made to make experiments more meaningful, interesting and innovative. Application oriented one mini-project can be conducted for maximum batch of four students.

Term work assessment must be based on the overall performance of the student with every experiments/tutorials and mini-projects (if included) are graded from time to time. The grades will be converted to marks as per "Choice Based Credit and Grading System" manual and should be added and averaged. Based on above scheme grading and term work assessment should be done.

Subject Code	Subject Name	Teaching Scheme (Hrs.)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/Pracs	Tutorial	Total
ECLDLO 5013	Finite Automata Theory	--	--	02	--	1	--	1

Subject Code	Subject Name	Examination Scheme									
		Theory Marks					End Sem. Exam	Term Work	Practical & Oral	Oral	Total
		Internal assessment			Avg. Of Test 1 and Test 2	--					
		Test 1	Test2	Test 1 and Test 2							
ECLDLO 5013	Finite Automata Theory	--	--	--	--	25	--	--	25		

List of Mini Projects:

1. Combinational circuits
2. Synchronous sequential circuits (Finite state machine)
3. Asynchronous sequential circuits (Finite state machine)
4. Algorithmic state machine

Note: Mini Project can be considered as a part of term-work.

Term Work:

At least 8 Tutorials covering entire syllabus must be given during the "Laboratory session batch wise". Computation/simulation based experiments are also encouraged. The experiments should be students centric and attempt should be made to make experiments more meaningful, interesting and innovative. Application oriented one mini-project can be conducted for maximum batch of four students.

Term work assessment must be based on the overall performance of the student with every experiments/tutorials and mini-projects (if included) are graded from time to time. The grades will be converted to marks as per "Choice Based Credit and Grading System" manual and should be added and averaged. Based on above scheme grading and term work assessment should be done.

Subject Code	Subject Name	Teaching Scheme (Hrs.)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/Pracs	Tutorial	Total
ECLDLO 5014	Data Compression & Encryption	--	02	--	--	1	--	1

Subject Code	Subject Name	Examination Scheme									
		Theory Marks					End Sem. Exam	Term Work	Practical & Oral	Oral	Total
		Internal assessment			Avg. Of Test 1 and Test 2						
		Test 1	Test2								
ECLDLO 5014	Data Compression & Encryption	--	--	--	--	--	25	--	--	25	

Suggested Practical List:

- Huffman Code.
- Adaptive Huffman Code.
- Arithmetic Code.
- LZW Compression and Decompression.
- Companding Implementation.
- Implementation of DCT.
- RSA and MD5 Algorithm.
- Packet Analyzer.
- PGP (Pretty Good Privacy).
- Vulnerability Scanner.
- Intrusion Detection System.
- Firewall.
- SSL.


Note: Mini Project can be considered as a part of term-work.

Term Work:

At least 08 Experiments covering entire syllabus must be given during the "Laboratory session batch wise". Computation/simulation based experiments are also encouraged. The experiments should be students centric and attempt should be made to make experiments more meaningful,

interesting and innovative. Application oriented one mini-project can be conducted for maximum batch of four students.

Term work assessment must be based on the overall performance of the student with every experiments/tutorials and mini-projects (if included) are graded from time to time. The grades will be converted to marks as per "**Choice Based Credit and Grading System**" manual and should be added and averaged. Based on above scheme grading and term work assessment should be done.


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Subject Code	Subject Name	Teaching Scheme (Hrs.)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/Praes	Tutorial	Total
ECL601	Microcontroller & Applications Laboratory	--	02	--	--	1	--	1

Subject Code	Subject Name	Examination Scheme								
		Theory Marks				End Sem. Exam	Term Work	Practical & Oral	Oral	Total
		Internal assessment			Avg. Of Test 1 and Test 2					
		Test 1	Test 2							
ECL601	Microcontroller & Applications Laboratory	--	--	--	--	25	25	--	50	

Suggested Experiment List

1. Perform Arithmetic and Logical Operations
2. Transfer of data bytes between Internal and External Memory
3. Experiments based on General Purpose Input-Output, Timers, Interrupts, Delay, etc
4. Interfacing of LED, LCD, Stepper Motor, UART

Mini project based on any application related to 8051 or ARM7 can be implemented.

Note: Mini Project can be considered as a part of term-work.

Term Work:

At least 08 Experiments including 02 simulations covering entire syllabus must be given during the "Laboratory session batch wise". Computation/simulation based experiments are also encouraged. The experiments should be students centric and attempt should be made to make experiments more meaningful, interesting and innovative. Application oriented one mini-project can be conducted for maximum batch of four students.

Term work assessment must be based on the overall performance of the student with every experiments/tutorials and mini-projects (if included) are graded from time to time. The grades will be converted to marks as per "Choice Based Credit and Grading System" manual and should be added and averaged. Based on above scheme grading and term work assessment should be done.

The practical and oral examination will be based on entire syllabus.

Subject Code	Subject Name	Teaching Scheme (Hrs.)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/Pracs	Tutorial	Total
ECL602	Computer Communication Network Laboratory	--	02	--	--	1	--	1

Subject Code	Subject Name	Examination Scheme								
		Theory Marks					Term Work	Practical & Oral	Oral	Total
		Internal assessment			End Sem. Exam					
		Test 1	Test 2	Avg. Of Test 1 and Test 2						
ECL602	Computer Communication Network Laboratory	--	--	--	--	25	25	--	50	

Suggested Experiment List

1. Create a Virtual Network using NETKIT emulator and use networking commands like route, arp, netstat, traceroute, ping on created topology.
2. To study installation and configuration of NS 2.35 simulator.
3. Design a connectionless and connection oriented network topology for static routing and dynamic routing with the help of NS2 simulator.
4. To study three way handshaking process as well as working process for connection oriented Protocols like FTP, TELNET and analysing packets generated by using packet capturing tool like tcpdump
5. To implement stream socket that can serve multiple clients at the same time.
6. To study requirements and scope of Subnetting and Network Translation by using Netkit Emulator.
7. Case Study: To study installation of linux operating system by using DHCP, TFTP and any repository server like HTTP, FTP or NFS.

Note: Small Project can be considered as a part of term-work.

Term Work:

At least 08 Experiments including 02 simulations covering entire syllabus must be given during the "Laboratory session batch wise". Computation/simulation based experiments are also encouraged. The experiments should be students centric and attempt should be made to make experiments more meaningful, interesting and innovative. Application oriented one mini-project can be conducted for maximum batch of four students.

Term work assessment must be based on the overall performance of the student with every experiments/tutorials and mini-projects (if included) are graded from time to time. The grades will be converted to marks as per “Choice Based Credit and Grading System” manual and should be added and averaged. Based on above scheme grading and term work assessment should be done.

The practical and oral examination will be based on entire syllabus.



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Sector-V, Nerul, Navi Mumbai-400706

Subject Code	Subject Name	Teaching Scheme (Hrs.)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/Pracs	Tutorial	Total
ECL603	Antenna & Radio Wave Propagation Laboratory	--	02	--	--	1	--	1

Subject Code	Subject Name	Examination Scheme								
		Theory Marks					Term Work	Practical & Oral	Oral	Total
		Internal assessment			End Sem. Exam					
		Test 1	Test2	Avg. Of Test 1 and Test 2						
ECL603	Antenna & Radio Wave Propagation Laboratory	--	--	--	--	25	25	--	50	

Suggested Experiment List

- Introduction to different Antenna parameters and its importance
- Introduction to Different Antenna Types
- Study of Radiation pattern of dipole, folded dipole and Monopole antenna
- Study of Antenna Arrays – N element array for given angle, Parametric study for various arrays parameters
- Study of Yagi-Uda Antenna
- Study of Aperture Antennas – Horn / Reflector Antennas
- Design, implementation and Pattern measurement of Regular shape MSA
- Case Study of Recent reported variations of Antenna types (Paper from reputed journal is to be referred and thoroughly study and present the report, maximum four students per group)

Note: Small Project can be considered as a part of term-work.

Term Work:

At least 08 Experiments including 02 simulations covering entire syllabus must be given during the "Laboratory session batch wise". Computation/simulation based experiments are also encouraged. The experiments should be students centric and attempt should be made to make experiments more meaningful, interesting and innovative. Application oriented one mini-project can be conducted for maximum batch of four students.



Term work assessment must be based on the overall performance of the student with every experiments/tutorials and mini-projects (if included) are graded from time to time. The grades will be converted to marks as per "Choice Based Credit and Grading System" manual and should be added and averaged. Based on above scheme grading and term work assessment should be done.

The practical and oral examination will be based on entire syllabus.



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Subject Code	Subject Name	Teaching Scheme (Hrs.)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/Pracs	Tutorial	Total
ECL604	Image Processing and Machine Vision Laboratory	--	02	--	--	1	--	1

Subject Code	Subject Name	Examination Scheme									
		Theory Marks					End Sem. Exam	Term Work	Practical & Oral	Oral	Total
		Internal assessment			Avg. Of Test 1 and Test 2	--					
		Test 1	Test2	Test 1 and Test 2							
ECL604	Image Processing and Machine Vision Laboratory	--	--	--	--	--	25	25	--	50	

Suggested Experiment List

- At least 8 programs written in C/MATLAB software

Note: Small Project can be considered as a part of term-work.

Term Work:

At least 08 Experiments including 02 simulations covering entire syllabus must be given during the "Laboratory session batch wise". Computation/simulation based experiments are also encouraged. The experiments should be students centric and attempt should be made to make experiments more meaningful, interesting and innovative. Application oriented one mini-project can be conducted for maximum batch of four students.

Term work assessment must be based on the overall performance of the student with every experiments/tutorials and mini-projects (if included) are graded from time to time. The grades will be converted to marks as per "Choice Based Credit and Grading System" manual and should be added and averaged. Based on above scheme grading and term work assessment should be done.

The practical and oral examination will be based on entire syllabus.

Subject Code	Subject Name	Teaching Scheme (Hrs.)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/Pracs	Tutorial	Total
ECLDLO 6021	Digital VLSI Design Laboratory	--	02	--	--	1	--	1

Subject Code	Subject Name	Examination Scheme								
		Theory Marks					Term Work	Practical & Oral	Oral	Total
		Internal assessment			End Sem. Exam					
		Test 1	Test 2	Avg. Of Test 1 and Test 2						
ECLDLO 6021	Digital VLSI Design Laboratory	--	--	--	--	25	--	--	25	

Suggested Experiment List

- At least 08 experiments covering entire syllabus of Digital VLSI should be set to have well predefined inference and conclusion.
- The first 05 experiments as described below can be conducted by using Free or Professional tools
 - 01 experiments on Layouts of NAND and NOR gates to understand design rules
 - 01 experiment on Layout design of logical expression
 - 01 experiments on NAND/NOR gate implementation using at least 03 design styles
 - 02 experiment on Multiplexer/Decoder/Flip flop/Memory etc design
- Last 03 experiments on HDL

Note: Small Project can be considered as a part of term-work.

Term Work:

At least 08 Experiments including 02 simulations covering entire syllabus must be given during the "Laboratory session batch wise". Computation/simulation based experiments are also encouraged. The experiments should be students centric and attempt should be made to make experiments more meaningful, interesting and innovative. Application oriented one mini-project can be conducted for maximum batch of four students.

Term work assessment must be based on the overall performance of the student with every experiments/tutorials and mini-projects (if included) are graded from time to time. The grades will be converted to marks as per "Choice Based Credit and Grading System" manual and should be added and averaged. Based on above scheme grading and term work assessment should be done.

Subject Code	Subject Name	Teaching Scheme (Hrs.)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/Pracs	Tutorial	Total
ECLDLO 6022	Radar Engineering Laboratory	--	02	--	--	1	--	1


Subject Code	Subject Name	Examination Scheme								
		Theory Marks					Term Work	Practical & Oral	Oral	Total
		Internal assessment			End Sem. Exam					
		Test 1	Test2	Avg. Of Test 1 and Test 2						
ECLDLO 6022	Radar Engineering Laboratory	--	--	--	--	25	--	--	25	

Note: Small Project can be considered as a part of term-work.

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 Sri Chandrasukharendra Saraswathy Vidyapuram
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Subject Code	Subject Name	Teaching Scheme (Hrs.)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/Pracs	Tutorial	Total
ECLDLO 6023	Database Management System Laboratory	--	02	--	--	1	--	1

Subject Code	Subject Name	Examination Scheme								
		Theory Marks					Term Work	Practical & Oral	Oral	Total
		Internal assessment			End Sem. Exam					
		Test 1	Test 2	Avg. Of Test 1 and Test 2						
ECLDLO 6023	Database Management System Laboratory	--	--	--	--	25	--	--	25	

Suggested Experiment List

- Design a Database and create required tables. For e.g. Bank, College Database
- Apply the constraints like Primary Key, Foreign key, NOT NULL to the tables.
- Write a sql statement for implementing ALTER, UPDATE and DELETE
- Write the queries to implement the joins
- Write the query for implementing the following functions: MAX (), MIN (), AVG (), COUNT ()
- Write the query to implement the concept of Integrity constrains
- Write the query to create the views
- Perform the queries for triggers
- Perform the following operation for demonstrating the insertion, updation and deletion using the referential integrity constraints
- Write the query for creating the users and their role

List of Mini projects:

Note: These are few examples of mini projects; teachers may prepare their own list.

1. Library Management System
2. Hospital Management System
3. Pharmacy Management System
4. Human Resource Database Management System in Java
5. Student Database Management System
6. Employee Management System
7. Inventory Control Management Database

8. Pay Roll Management System
9. Railway System Database
10. Airline Reservation System
11. Blood Donation System
12. School Management System

Online Repository Sites:

1. Google Drive
2. GitHub
3. Code Guru

Note: Small Project can be considered as a part of term-work.

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Subject Code	Subject Name	Teaching Scheme (Hrs.)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/Pracs	Tutorial	Total
ECLDLO 6024	Audio Processing Laboratory	--	02	--	--	1	--	1

Subject Code	Subject Name	Examination Scheme								
		Theory Marks					Term Work	Practical & Oral	Oral	Total
		Internal assessment			End Sem. Exam					
		Test 1	Test 2	Avg. Of Test 1 and Test 2						
ECLDLO 6024	Audio Processing Laboratory	--	--	--	--	25	--	--	25	

Note: Small Project can be considered as a part of term-work.


Term Work:

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Term work assessment must be based on the overall performance of the student with every experiments/tutorials and mini-projects (if included) are graded from time to time. The grades will be converted to marks as per "Choice Based Credit and Grading System" manual and should be added and averaged. Based on above scheme grading and term work assessment should be done.

Course Code	Course/Subject Name	Credits
CPL501	Web Technologies Laboratory	2

Module	Detailed Contents	Lab Sessions
01	<p>Title: Create HTML Forms, Use of various HTML Tag on Web Forms.</p> <p>Concept: Designing of effective web site, Introduction of different Web Technologies : HTML, and Different HTML Tag.</p> <p>Objective: objective of this module is to provide students an overview of the concepts Web Technologies, and HTML.</p> <p>Scope: Designing static client side web page using various HTML tags.</p> <p>Technology: HTML</p>	01
02	<p>Title: Use of CSS on HTML Form.</p> <p>Concept: Cascaded Style Sheets</p> <p>Objective: In this module student will learn, defining a CSS and unstarng its purpose different syntax and types of CSS.</p> <p>Scope: Creating web pages and use CSS to control the layout pages.</p> <p>Technology: HTML with Cascade Style Sheet</p>	01
03	<p>Title: Use of Java Script functions on Web Forms and Use of Dynamic HTML Page.</p> <p>Concept: Scripting Languages, Dynamic web pages</p> <p>Objective: in this lab student will learn how to define client side scripting and understand its advantages and disadvantages. Embedding JavaScript code into HTML document using script tag, and will understand dynamic HTML.</p> <p>Scope: Create animation using JavaScript.</p> <p>Technology: HTML with JavaScript.</p>	02
04	<p>Title: Creation of Web page with the help of Quanta Plus /Aptana /Kompozer.</p> <p>Concept: Web development Environment</p> <p>Objective: This module students will learn how will introduce editors for development of web pages.</p> <p>Scope: Development of web pages using any web tool.</p> <p>Technology: Quanta Plus /Aptana /Kompozer</p>	03



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05	<p>Title: Write an XML file marksheet.xml representing your semester mark sheet.</p> <p>Concept: Extensible Mark up Language (XML)</p> <p>Objective: is to learn about basics of XML and how it can be used to store information away from the mechanism of processing or formatting of such data. Will also learn how to build simple XML files and be able to manipulate and refer to them.</p> <p>Scope: is to creating an XML file in that it must include basic syntax of an XML doc and DTD for the same.</p>	03
06	<p>Title: server side scripting. Use HTML form to accept the two numbers N1 and N2 and using PHP program display only prime numbers in between N1 and N2.</p> <p>Concept: Server side scripting, introduction to PHP</p> <p>Objective: this lab gives a basic introduction of to PHP and dynamic programming on the server side.</p> <p>Scope: creating a server side script using PHP, decisions, looping</p> <p>Technology: PHP, HTML</p>	03

Term work Assessment:

Term work will consist of small assignments testing all the technologies included in syllabus and a Mini project solving an appropriate problem using the above technology

The distribution of marks for term work shall be as follows:


• Assignments:	(20)	Marks.
• Project Report Presentation.....	(15)	Marks.
• Group Discussion.....	(10)	Marks.
• Attendance	(05)	Marks
TOTAL:	(50)	Marks.

End Semester Examination:

Oral examination is to be conducted by pair of internal and external examiners based on the mini projects undertaken by student groups.

Text Books:

1. Ralph Moseley ,M.T. Savaliya "Developing Web Applications ", Willy India,Second Edition , ISBN:978-81-265-3867-6
2. "Web Technology Black Book ",Dreamtech Press, First Edition, ISBN 978-7722-997


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