



UTTARAKHAND BOARD OF TECHNICAL EDUCATION
JOINT ENTRANCE EXAMINATION AND TRAINING, RESEARCH DEVELOPMENT CELL, DEHRADUN
STUDY AND EVALUATION SCHEME FOR DIPLOMA PROGRAMME

BRANCH NAME- INFORMATION TECHNOLOGY

SEMESTER – V

Subject Code	Subject	L	T	P	T O T	EVALUATION SCHEME						Total Marks	Credit Point
						Internal		External					
		Period/Weeks		Theory		Practical		Total	Hrs.				
		Max Marks	Max Marks	Max Marks	Hrs.	Max Marks	Hrs.						
055002	Software Engineering*	5	-	-	5	30	-	70	2.5	-	-	100	5
055004	Android Application Development	5	-	4	9	30	30	70	2.5	60	3	190	6
055001	Java Programming*	5	-	4	9	30	30	70	2.5	60	3	190	6
125001	E-Commerce	6	-	-	6	40	-	70	2.5	-	-	110	6
125002	Minor Project	-	-	15	15	-	80	-	-	200	3	280	7
125052	Industrial Exposure (assessment at Inst. Level)+	-	-	-	-	-	25	-	-	-	-	25	2
125053	Industrial Training	-	-	-	-	-	30	-	-	50	3	80	2
015054	General Proficiency#	-	-	4	4	-	25	-	-	-	-	25	1
Total		21	-	27	48	130	220	280	-	370	-	1000	35

** Common with diploma programme in Chemical Technology (Paint) and Chemical Technology (Rubber & Plastic).

General Proficiency will comprise of various Co-curricular activities like games, hobby clubs, seminars, declamation contests, extension lectures, field visits, NCC, NSS and cultural activities, G.K., general study, elementary math and discipline.

++ Industrial visit compulsory at minimum two industries or departments.

Note- 1- Each period will be of 50 minutes. 2- Session will be of 16 weeks. 3- Effective teaching will be of at least 12.5 weeks.

Branch Code - 12



**FIFTH SEMESTER
INFORMATION TECHNOLOGY**

SOFTWARE ENGINEERING

Subject Code : 055002

L	T	P
5	-	-

RATIONALE

Software Engineering deals with reliability and quality assurance of the software under development. It provides framework for development of quality software product. The course enables the students to write specifications for software system understand the importance of good software, design and develop test plans from design specifications. The course also covers other important aspects of software Engineering such as software life cycle, requirement analysis and documentation, characteristics of good design, design techniques, testing, software implementation and maintenance etc.

OBJECTIVES

On completion subject, the students must be able to

- Define Software Engineering.
- Understand the characteristics of Software Engineering.
- Explain different software development models.
- Learn about the phases of software development cycle.
- Understand the significance of requirement analysis.
- Know various tools and techniques used for requirement analysis.
- Understand the different types of project metrics.
- Understand different software estimation techniques.
- Explain about software maintenance.
- Need for software maintenance.
- Identify and manage risks.
- Describe testing and types of testing used in software engg. like black box and white box testing.
- Understand the concepts of Software quality and quality assurance.

DETAILED CONTENTS

1. Introduction To Software Engineering: (15 Periods)

Basics of Software Engineering : Need for Software Engineering – Definition– Software Characteristics – Software Myths – Program versus Software Products, Software Development Life Cycle Models: Introduction–Waterfall Model – Prototyping model – Spiral Model – Iterative

Enhancement model - RAD model- Object Oriented Model - Advantages and Disadvantages of above models – Comparison of various models., Software Requirement Analysis (SRS) : Value of good SRS – Requirement Process – Requirement Specification – Desirable characteristics of an SRS– Components of an SRS – Structures of a requirements documents - Problems in SRS – Requirements gathering

2. Software Design and Planning : (20 Periods)

Software Design : Definition of software design – Objectives of software design – Process of software design – Architectural design – Modular design – Structure chart – Coupling and Cohesion – Different types–Interface design – Design of Human Computer Interface , Software Planning: Software metrics - Definition – Types of metrics – Product and Project metrics – Function point and feature point metrics – Software project estimation –Steps for estimation – Reason for poor and inaccurate estimation – Project estimation guidelines – Models for estimation – COCOMO Model .

3. Software Maintenance and Risk Management : (15 Periods)

Software Maintenance: Software as an evolution entity – Software configuration management activities – Change control process –Software version control – Software configuration management – Need for maintenance–Categories of maintenance– Maintenance cost – Factors affecting the effort, Risk management: Definition of risk – Basics for different types of software risks – Monitoring of risks – Risk management – Risk avoidance – Risk detection

4. Software Quality Assurance: (15 Periods)

Software Quality Assurance : Verification and validation – SQA - Objectives and Goals – SQA plan - Definition of software quality – Classification of software qualities - Software quality attributes – Important qualities of software products - Importance of software quality – SEI – CMM - Five levels -ISO 9000 – Need for ISO Certification – Benefits of ISO 9000 certification – Limitation of ISO 9000 certification – Uses of ISO - Salient features of ISO 9000 Requirements – Introduction to ISO9126, Software Reliability : Definition – Reliability terminologies , Reliability measurement process

5. Software Testing: (15 Periods)

Software Testing : Introduction to testing – Testing principles – Testing

objectives – Test Oracles - Basic terms used in testing – Fault – Error – Failure - Test cases – Black box and white box testing – Advantages and disadvantages of above testing – Methods for Block box testing strategies – Methods for white box testing strategies. ,Unit testing - Integration tests – System testing Software Testing strategies: Static testing strategies – Formal technical reviews – Code

REFERENCE BOOK

1. Software Engineering, Ian Sommerville Pearson Education Sixth Edition
2. Fundamentals of Software Engineering Rajib Mall PHI Learning Pvt Limited, New Delhi 28th Printing – August 2011
3. Software Engineering, Bharat Bhusan Agarwal, Sumit Prakash Tayal Firewall Media, New Delhi Second Edition 2008
4. Software Testing, K. Mustafa and R. A. Khan Narosa Publishing House, New Delhi Reprint 2009
5. Software Quality, R. A. Khan, K. Mustafa and SI Narosa Publishing House, New Delhi Reprint 2008

SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Period)	Marks Allocation
1	15	15
2	20	20
3	15	10
4	15	10
5	15	15
Total	80	70

ANDROID APPLICATION DEVELOPMENT

Subject Code : 055004

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RATIONALE

Android Application Development provides you maximum customization feature. Since Android is an open-source platform, it provides a supreme customization feature for Android Application Development and this is the reason that Android Application Development is very popular.

DETAILED CONTENTS

1. Explain the concept of Open source mobile technology : (16 Periods)

Mobile technology: Overview of Android - An Open Platform for Mobile development, Open Handset Alliance, Use Android for mobile app development, Android Marketplaces, Android Development Environment setup, Android development Framework - Android-SDK, Eclipse Emulators / Android AVD, Creating & setting up custom Android emulator, Android Project Framework and its applications.

2. Describe Android architecture framework: (10 Periods)

- 2.1 Linux Kernel
- 2.2 Libraries
- 2.3 Android Runtime
- 2.4 Application Framework
- 2.5 Applications
- 2.6 Android Startup and Zygote
- 2.7 Android Debug bridge
- 2.8 Android Permission model
- 2.9 Android Manifest File

3. Design Android UI Layout: (14 Periods)

- 3.1 Android application components Intent, Activity, Activity Life cycle, Broadcast receivers, Services and Manifest
- 3.2 Create Application and new Activities
- 3.3 Expressions and Flow control, Android Manifest

- 3.4 Simple UI -Layouts and Layout properties • Fundamental Android UI Design • Introducing Layouts • Creating new Layouts • Drawable Resources • Resolution and density independence (px, dp, sp), XML Introduction to GUI objects viz. • Push Button • Text / Labels • Edit Text • Toggle Button • Weight Sum • Padding

4. Develop Event driven Programming in Android : (8 Periods)

- 4.1 Event driven Programming in Android (Text Edit, Button clicked etc.)
- 4.2 Creating a splash screen
- 4.3 Android Activity Life cycle
- 4.4 Introduction to threads in Android.

5. Develop application with menus and dialog boxes : (16 Periods)

- 5.1 Menu: Custom Vs. System Menus
- 5.2 Creating and Using Handset menu Button (Hardware)
- 5.3 Android Themes, Dialog, create an Alter Dialog
- 5.4 Toast in Android, List & Adapters
- 5.5 Android Manifest.xml File

6. Develop applications with database : (16 Periods)

- 6.1 SQ Lite: Open Helper and create database
- 6.2 Open and close a database

REFERENCE BOOK

- 1 Professional Android 2 Application Development, Reto Meier Wiley India Pvt Ltd
- 2 Beginning Android, Mark L Murphy Wiley India Pvt Ltd
- 3 Professional Android, Sayed Y. Hashimi and Satya Komatineni Wiley India Pvt Ltd

LAB EXERCISES

- 1. Study of Installation and configuration of Android Development Framework.
- 2. Study of Various Android Development Environment (IDE)
- 3. Design an Application in Android Environment representing a Simple Calculator

4. Develop an application for working with Menus and screen Navigation
5. Develop an Application demonstrating internal storage to store private data on the device memory.
6. Design a simple to-do list application using SQLite
7. Develop an application for connecting to the internet and sending email.
8. Develop an application for working with graphics and animations
9. Develop an application for working with location based service.
10. Develop an application for working with device camera.

SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Period)	Marks Allocation
1	16	12
2	10	10
3	14	12
4	8	10
5	16	12
6	16	14
Total	80	70

Subject Code : 055001

L	T	P
5	-	4

RATIONALE

Today almost every branch of computer science is feeling presence of object - orientation. Object oriented technology is successfully incorporated in various fields of computer science. Since its arrival on the scene in 1995, the Java has been accepted as one of the primary programming language. This subject is designed to give you exposure to basic concepts of object - oriented technology. This subject will help in learning to write programs in Java using object - oriented paradigm. Approach in this subject is to take Java as a language that is used as a primary tool in many different areas of programming work.

OBJECTIVES

On completion of the following units of syllabus contents, the students must be able to

- Know the paradigms of programming languages.
- Understand the concepts of Object Oriented Programming.
- State the benefits and applications of Object Oriented Programming.
- Know the history of development of Java.
- Comprehend the features and tokens of Java.
- Explain about the control structures used in Java.
- Use of Arrays and Vectors in Java Program.
- Demonstrate the use of string and String Buffers.
- Define Class with the attributes and methods.
- Understand the need for interfaces.
- Implement Interfaces in classes.
- Create packages.
- Write simple Applets.
- List the types of AWT Components and types of exceptions.
- Handle the errors using exceptions.
- Understand the concepts of multithreading.
- Develop multithreaded programs in Java.
- Define stream and list the types of streams.

DETAILED CONTENTS

1. Basics and Language Fundamentals : (15 Periods)

Java features, Java Runtime Environment, Java Virtual Machine (JVM), Java-API, Java Programs, Essential Elements of a Java Application, Compiling and Running an Application, Lexical Tokens, Identifiers, Keywords, Literals- Integer & Floating Point Literals, Boolean Literals, Character Literals, String Literals, White Spaces, Comments, Primitive data types- Integer Types, Char Types, Floating Types, Boolean Types, Class Declaration, Variable Declaration- Declaring and Initializing Variables of Primitive Type, Command Line Arguments, Comments, Arithmetic and Logical Operators, Evaluation of Expressions, Type casting-Widening and Narrowing,

2. Declarations, Control Structures, Arrays: (15 Periods)

Control Statements: - if else statement, nested if else statement, switch statement, while, do-while and for loop, break and continue.

Enumerated Types:- Declaring Type safe Enums, Declaring Enum Constructors and Members, Implicit static methods for Enum Types, Inherited Methods from the Enum Class, Extending Enum Types.

Arrays: - Declaring Array Variables, Constructing an Array, Initializing an Array, Anonymous Arrays, Multidimensional Arrays, String Array, String Methods, String Buffer Class.

3. Classes, Interfaces and Access Control: (20 Periods)

Class and Objects: Class Declarations, Method Declaration, Constructors-Default and Overloaded Constructors, Defining a class, Instance Members, Static Members, Primitive and Reference Variable, Initial Values for Variables, Lifetime of Variable, Objects, Invoking Methods, Instance Initializer Block, Static Initializer Block, Methods Creating objects, Accessing class members, Constructors, Method Overloading, Static members, Nesting of Methods, this keyword, Command line input,

Parameter Passing: Passing Primitive and Reference Values, Passing Array, final parameters, Variable Arity Methods- Calling Varargs Methods, Non-Varargs Method Calls, The main method.

Access Control:- Packages- Defining Package, Using Packages, Compiling Code onto Package, Running Code from Package, Scope Rules- Class scope for Members, Block Scope for Local Variables, abstract classes, final classes, Member Accessibility Modifiers- public, private Default and protected accessibility for members, Other Modifiers for Members- static Members, final Members, abstract Methods, synchronized Methods, native Methods, transient field, volatile Field.

Inheritance:- Inheritance, Inheritance Hierarchy, Overriding methods, Hiding Methods- Field Hiding, Static Method Hiding, this and super Constructor Call, Chaining Constructors using this and super, Inheritance vs Aggregation, Reference casting- instance of Operator, Cast Operator.

Abstract Class and Interface: Abstract Class, Abstract method Declarations, Extending Abstract Class, Defining interface, Extending Interface, Implementing Interfaces, Extending Interfaces, Interface References, Constants in Interface, Default values for Members, Default Accessibility Modifiers for Members.

4. Applets and Awt Controls : (15 Periods)

Applets: Introduction –Applet Life cycle –Creating & Executing an Applet – Applet tags in HTML –Parameter tag –Aligning the display - Graphics Class: Drawing and filling lines – Rectangles – Polygon – Circles – Arcs – Line Graphs – Drawing Bar charts AWT Components and Event Handlers: Abstract window tool kit – Event Handlers – Event Listeners – AWT Controls and Event Handling: Labels –Text Component –Action Event – Buttons –Check Boxes –Item Event - Choice –Scrollbars –Layout Managers- Input Events –Menus

5. Exception Handling, Multi Threads I/O Streams: (15 Periods)

Exception Handling: Exception, Advantages of Exception Handling, Checked Exceptions, try-catch-finally Construct, try-finally Construct, Throwing an exception, Throws Clause.

Multithreading: Thread Class, Creating Threads, Life of a Thread, Defining & Running Thread, Thread Methods, Thread Priority, Synchronization, Implementing Runnable interface, Thread Scheduling.

JDBC- Architecture of JDBC- Two-tier Architecture, Three-tier Architecture, JDBC drivers, Connect a Java Application to Database.

I/O STREAMS: Basics Concepts, Input and Output Stream, File Input and Output Stream, Printwriter Class, Write Method, Read and Readline Method.

TEXT BOOK

1. Programming with Java, E. Balagurusamy Tata Mc-Graw Hill, New Delhi 5th Edition
2. Java, A Beginner's Guide Herbert Schildt Oracle Press 6thEdition

LIST OF PRACTICALS

1. Write a Java program to display the count of all commands line arguments and list each in a line

2. Write a program to find out sum of digits of given number
3. Write a program to display multiplication table in row, column format
4. Write a program to
 - a) To find whether the given number is prime or not
 - b) To display all prime numbers in a given range of numbers
5. Write a program to create an array of integers and accept a number. Check whether it exists in the array. Create your own exception with appropriate error message and raise the exception when the element is not found in the array.
6. Write a program to copy a file to another file using java.io package Classes.
7. Write a program to get a file at runtime and display the number of lines, words and characters in that file.
8. Programming exercise on Arrays and String
9. Programming exercise on inheritance
10. Write Program for exception handling
11. Write programs for Multithreading
12. Programming exercise on Java applets
13. Write program for Java Data base connectivity

SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Period)	Marks Allocation
1	15	12
2	15	12
3	20	20
4	15	13
5	15	13
Total	80	70

Subject Code : 125001

L	T	P
6	-	-

RATIONALE

“Electronic Commerce” or “Doing, business online” is becoming critical in three inter-related dimensions. Customer-to-business interactions, customer-to-customer, intra-business interactions and business-to-business interactions. Electronic Commerce facilitates the network form of organization where small flexible firms rely on other partner companies for component supplies and product distribution to meet changing customer demand more effectively. The transaction management aspect of electronic commerce enables firms to reduce costs by enabling better coordination in sales, production and distribution processes and automated supply chain network. Electronic Data Interchange (EDI), Electronic Mail and Electronic Fund Transfer (EFT), streamline business process, reduces paperwork and increase automation. The course will enable the students to understand e-commerce, its applications, the processes and the security issues.

DETAILED CONTENTS**1. Introduction: (12 Periods)**

Electronic commerce and physical commerce, The DIGITAL phenomenon, Looking at e-commerce from different perspectives, Different types of e-commerce, Examples of the types of e-commerce, Some e-commerce scenarios, Effect of e-commerce, Advantages of e-commerce, Myths about e-commerce development and implementation

2. Architectural Frame Work : (12 Periods)

Web architecture – web browser, HTTP, TCP/IP, Web server, HTML, CGI Scripts, Standards – EDIFACT, EDI

3. Security Issues : (15 Periods)

Firewalls and proxy application gateways, Secure Electronic Transaction (SET), public and private key encryption, digital signatures and digital certificates, Secure Socket Layer (SSL)

4. Electronic Payment Systems: Applications: (15 Periods)

Digital cash, electronic signatures, Debit cards at Point of Sale (POS), Smart Cards, Online Credit Card based Systems, Electronic Fund Transfer (EFT), Payment gateways

5. Electronic Commerce Applications: (15 Periods)

E-Commerce Banking, Online shopping, Business Models and Revenue Models, On-line publishing, E-commerce in retailing industry, Digital Copyrights, Electronic Data Interchange, Electronic Fund Transfer, Electronic Bulletin Boards, Electronic Catalogue

6. E-Services & Tools for E-Commerce: (12 Periods)

Cold fusion, e-shop etc., E-Governance, issues, latest scenario of e-commerce in India, resources required for implementing an E-Governance project, guidelines etc.

7. Enterprise Resource Planning (ERP) : (15 Periods)

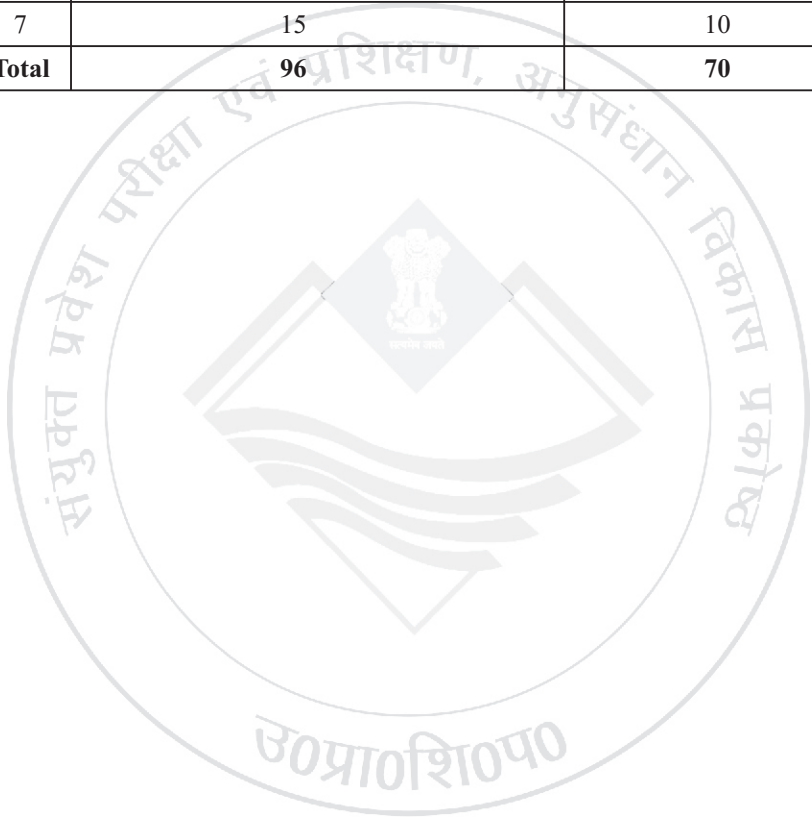
Overview, features & Benefit of ERP, Business Process Reengineering, LAP, Supply chain Management. ERP & E-Commerce, Future Directives- in ERP, ERP and Internet, Critical Success and failure factors, Integrating ERP into organizational culture

REFERENCE BOOK

1. Electronic Commerce – A Manager’s Guide by Ravi Kalakota and Andrew B. Whinston; Addison Wesley (Singapore) Pvt Ltd, New Delhi.
2. “E-Business – Roadmap for Success” by Ravi Kalakota and Maxia Robinson; Addison Wesley (Singapore) Pvt Ltd, New Delhi
3. E-Business (R) Evolution by Amor; Addison Wesley (Singapore) Pvt Ltd, New Delhi.
4. Ontiers of Electronic Commerce by Ravi Kalakota and Andrew B. Whinston; Addison Wesley (Singapore) Pvt Ltd, New Delhi
5. E-Business with Net Commerce (with CD) by Shurety; Addison Wesley (Singapore) Pvt Ltd, New Delhi
6. Enterprise Resource Planning: Integrating Applications And Business, Erin Callaway

SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Period)	Marks Allocation
1	12	9
2	12	9
3	15	11
4	15	11
5	15	11
6	12	9
7	15	10
Total	96	70



MINOR PROJECT

Subject Code : 125002

L	T	P
-	-	15

RATIONALE:

Minor project work aims at exposing the students to the various industries dealing with computers. It is expected from them to get acquainted with computer environment possess desired attitudes. For this purpose student during middle of the course are required to be sent for a period of two to four weeks at a stretch in different establishments. Depending upon the interest of students they are sent for exposure to:

OBJECTIVES:

- Implement the theoretical and practical knowledge gained through the curriculum into an application suitable for a real practical working environment preferably in an industrial environment
- Develop software packages or applications to implement the actual needs of the community.
- Get exposure on industrial environment and its workethics.
- Understand what is entrepreneurship and how to become an entrepreneur.
- Learn and understand the gap between the technological knowledge acquired through curriculum and the actual industrial need and to compensate it by acquiring additional knowledge as required.
- Carry out cooperative learning through synchronous guided discussions within the class in key dates, asynchronous document sharing and discussions, as well as to prepare collaborative edition of the final project report.
- Expose students to the field of computing and to gain experience in software design.
- Understand and gain knowledge about disaster management.

GUIDELINES FOR PROJECT FORMULATION

The project work constitutes a major component in most of the professional programmes and it is to be carried out with due care and should be executed with seriousness by the candidates.

Batch Size : Maximum 6 students per batch

TYPE OF PROJECT

As majority of the students are expected to work out a real life project in some industry/research and development laboratories/educational institutions/software companies, it is suggested that the project is to be chosen which should have some direct relevance in day-to-day activities of the candidates in his/her institution. Students are encouraged to work in the areas listed at the end. However, it is not mandatory for a student to work on a real life project. The student can formulate a project problem with the help of Guide.

PROJECT PROPOSAL (SYNOPSIS)

The project proposal should be prepared in consultation with your guide during fifth semester. The project proposal should clearly state the project objectives and the environment of the proposed project to be undertaken. The project work should compulsorily include the software development. The project proposal should contain complete details in the following form:

1. Title of the Project.
2. Introduction and Objectives of the Project.
3. Project Category (DBMS/OOPS/Networking/Multimedia/Artificial Intelligence / Expert Systems etc.).
4. Tools / Platform, Hardware and Software Requirement specifications.
5. Analysis (DFDs at least up to second level , ER Diagrams/ Class Diagrams/ Database Design etc. as per the project requirements).
6. A complete structure which includes:
 - Number of modules and their description to provide an estimation of the student's effort on the project.
 - Data Structures as per the project requirements for all the modules.
 - Process logic of each module.
 - Testing process to be used.
 - Reports generation (Mention tentative content of report).
7. Are you doing this project for any Industry/Client? Mention Yes/No. If Yes, Mention the Name and Address of the Industry or Client.

8. Future scope and further enhancement of the project. Also mention limitation of the project.

PROJECT PROPOSAL SUBMISSION AND APPROVAL

After finalizing the topic and the selection of the guide, students should be submitting the Project Proposal to the HOD along with the synopsis and bio-data of the guide. Incomplete project proposals in any respect will be immediately rejected. The project synopsis will be sent to project monitoring committee for final approval.

SUGGESTIVE AREAS OF PROJECT WORK:

- Database Management Systems
- Software Engineering and Software Development
- Web page Designing
- Digital Image Processing
- Computer Graphics and Animation
- Multimedia Systems
- Computer Networks
- Artificial Intelligence
- Internet and e-commerce
- Computer Security and Cryptography
- Computer hardware and embedded systems
- Improving existing systems /equipments.
- Any other related area found worth.

INTERNAL ASSESSMENT:

The internal assessment should be calculated based on the review of the progress of the work done by the student periodically as follows.

Detail of assessment	Period of assessment	Max.Marks
First Review	6TH	30
Second Review	14TH	30
Attendance	Entire semester	20
TOTAL		80

EVALUATION FOR BOARD EXAMINATION:

Details of Mark allocation	Max Marks
Marks for Report Preparation, Demo, Viva-voce	100
Marks for answers of 4 questions which is to be set by the external examiner from the given question bank consisting of questions in the following two topics Disaster Management and Environmental Management.	100
Total	200





LEARNING OUT COMES AND MEANS OF ASSESSMENT

BRANCH NAME – INFORMATION TECHNOLOGY

SEMESTER – V

S.No.	Title of Subject/Unit	Learning Outcomes	Means of Assessment
1	Software Engineering*	At the end of the course, the student will be able to develop clear understanding of development of quality software. This subject will provide hands on experience and good working knowledge of software design techniques, testing, implementation and maintenance.	Assignments, Power Point Presentation, Class Test, Mid Term Examination & Semester examination.
2	Android Application Development*	At the end of the course, the student will be able to develop clear understanding of Android operating system and android application. This subject will provide hands on experience and good working knowledge in android application programming, XML etc.	Assignments, Power Point Presentation, Class Test, Mid Term Examination & Semester examination. Practical assessment is done through Program execution and testing, Practical Records and Viva voce.
3	Java Programming*	At the end of the course, the student will be able to develop clear understanding of principles and concepts of Object Oriented Programming. This subject will provide acquaintance with fundamental concepts of Java Programming and different tools of Java language.	Assignments, Power Point Presentation, Class Test, Mid Term Examination & Semester examination. Practical assessment is done through Program execution and testing, Practical Records and Viva voce.
4	E-Commerce	At the end of the course, the student will be able to develop clear understanding of foundations and importance of E-commerce. This subject will provide hands on experience and good working knowledge in POS, EFT, Digital Cash, ERP, Debit cards, Smart Cards and E-Services.	Assignments, Power Point Presentation, Class Test, Mid Term Examination & Semester examination.

5	Minor Project	Project work aims to exposing the student skills to the various industries dealing with computer and software's. In Minor project student will develop software packages or applications to implement the actual need of the community.	Time to time review of project work at every stage, Running status of project, Power Point Presentation, Report and Viva voce.
6	Industrial Training	Vocational Training in industry will provide an opportunity to students to explore their skills and knowledge in Software/Hardware development Companies and enables them to integrate theory with practice.	Report, Power Point Presentation and Viva voce .

