Estd. 1962
"A++" Accredited by
NAAC (2021)
With CGPA 3.52

SHIVAJI UNIVERSITY, KOLHAPUR - 416004, MAHARASHTRA

PHONE:EPABX-2609000, www.unishivaji.ac.in, bos@unishivaji.ac.in

शिवाजी विद्यापीठ, कोल्हापूर -४१६००४,महाराष्ट्र

दूरध्वनी-ईपीएबीएक्स -२६०९०००, अभ्यासमंडळे विभाग दुरध्वनी ०२३१—२६०९०९४

Ref../SU/BOS/Com & Mgmt./212 **Date : 10/04/2024**

To,

The Principal/Co-ordinator/Director
All Affiliated M. Com IT Colleges/Institutions,
Shivaji University, Kolhapur

Subject : Regarding Syllabi of M. Com. IT Part II(Sem III/IV) Choice Based Credit System (CBCS) degree programme under the Faculty of Commerce & Management as per National Education Policy, 2020

Sir/Madam,

With reference to the subject mentioned above, I am directed to inform you that the University authorities have accepted and granted approval to the revised Syllabi of **M. Com. IT (Information Technology) Part II (Sem III/IV) Choice Based Credit System (CBCS)** under the Faculty of Commerce & Management as per National Education Policy, 2020

This syllabi shall be implemented from the academic **year 2024-2025** onwards. A soft copy containing the syllabus is attached herewith and it is also available on university website www.unishivaji.ac.in (Online Syllabus).

You are therefore, requested to bring this to the notice of all Students and Teachers concerned.

Thanking you,

Yours faithfully,

(Dr. S. M. Kubal)
Dy. Registrar

Encl : As above

Copy to,

1. Dean, Faculty of Commerce & Management
2. Chairman, Board of Studies

} for information

3. Director, BOEE
4. Appointment Section
5. P. G. Admission Section
6. O. E. 1 Section
7. Affiliation Section (U.G./P.G.)
8. Computer Center/I.T.
9. Eligibility Section
10. Distance Education, SUK

} for information and necessary action.

11. P.G. Seminer Section

SHIVAJI UNIVERSITY, KOLHAPUR.

Estd. 1962

NAAC "A++" Grade

Faculty of Commerce and Management

Syllabus For

M. Com. Part II (IT) (CBCS)

Information Technology (Sem III & IV) NEP 2020

(To be implemented from June 2024 onwards)

(Subject to the modifications that will be made from time to time)

M. Com. (IT) Programme Structure for Semester III and IV

Semester-III

Teaching Scheme							**Examination Scheme**					
Sr. No.	Theory(TH)				Practical (PR)		Semester-end Examination(SEE)			InternalAssessment (IA)		
	Course Type	No. of Lectures Per Week	Hours	Credits	Hrs	Credits	Paper Hours	Max	Min	Internal	Max	Min
1	DSC9	4	4	4	--	-	3	80	32	--	20	08
2	DSC10	4	4	4	--	-	3	80	32	--	20	08
3	DSC11	4	4	4	--	-	3	80	32	--	20	08
4	DSC12	--	--	--	2	2	2	--	--	--	50	20
5	DSE3	4	4	4	--	-	3	80	32	--	20	08
6	RP	--	--	--	4	4	VV#	100	32	--	--	--
Total		16	16	16	6	6		420	--	--	130	
										SEE+IA: 420+130=550		

Semester–IV

Teaching Scheme							**Examination Scheme**					
Sr. No.	Theory (TH)				Practical (PR)		Semester-end Examination (SEE)			Internal Assessment (IA)		
	Course Type	No. of Lectures Per Week	Hours	Credits	Hrs	Credits	Paper Hours	Max	Min	Internal	Max	Min
1	DSC13	4	4	4	--	--	3	80	32	--	20	08
2	DSC14	4	4	4	--	--	3	80	32	--	20	08
3	DSC15	4	4	4	--	--	3	80	32	--	20	08
4	DSE4	4	4	4	--	--	3	80	32	--	20	08
6	RP	-	-	-	6	6	VV#	100	40	VV#	50	20
Total		16	16	16	6	6		420			130	
										SEE +IA: 420+ 130 = 550		
SemesterIII andIV		32	32	32	12	12		840	--	SEE +IA: 840+260= 1100		
Total credits required for completing. M.COM. (IT) II: 44 credits												

RS*=Report Submission: Certified Submission of Dissertation/OJT Report/ Project Report

VV#=Viva-Voce/Presentation

Structure: The Structure of M.Com. IT Programme is given below:

<table>
<tr><td rowspan="2">Year</td><td rowspan="2">Level</td><td rowspan="2">Sem. (2Yr)</td><td colspan="2">Major</td><td rowspan="2">RM</td><td rowspan="2">OJT/ FP</td><td rowspan="2">RP</td><td rowspan="2">Cum. Credit</td></tr>
<tr><td>Mandatory</td><td>Electives</td></tr>
<tr><td rowspan="5">II</td><td rowspan="5">6.5</td><td rowspan="2">Sem.III</td><td>DSC9: R Programming (4)
DSC10: Data Analytics (4)
DSC11: IT Security (4)
DSC12: Lab Work based on DSC9 (2)</td><td>DSE3.1 Industry Automation (4)
DSE3.2: Business Data Processing (4)
DSE3.3: Business Process Outsourcing.</td><td></td><td></td><td>RP (4)</td><td>22</td></tr>
<tr><td>14</td><td>04</td><td>-</td><td>-</td><td>04</td><td>22</td></tr>
<tr><td rowspan="3"></td><td>DSC13: Advance Java (4)
DSC14: AI and Management (4)
DSC15: Mobile Computing (4)</td><td>DSE4.1: Ethical Hacking (4)
DSE4.2: Digital Forensics (4)
DSE4.3: Data Center Management (4)</td><td></td><td></td><td>RP (6)</td><td></td></tr>
<tr><td>12</td><td>04</td><td>-</td><td>-</td><td>06</td><td>22</td></tr>
<tr><td>26</td><td>08</td><td>-</td><td>-</td><td>10</td><td>44</td></tr>
<tr><td></td><td></td><td></td><td>54</td><td>16</td><td>04</td><td>04</td><td>10</td><td>88</td></tr>
<tr><td colspan="9">Award of P.G. Degree (88 Credits) [for 2 year P.G. after 3 year UG programme or one year after 4 year UG programme]</td></tr>
</table>

M.Com. (IT) Part-II Semester-III
Paper DSC9: R PROGRAMMING

Course Outcomes	**The student will be able to:** 1. Understand the basics of Fundamentals of R. 2. Implement the loading, retrieval techniques of data using R. 3. Identify how data is analyzed using R 4. Apply Data visualization techniques using statistic functions in R..		
Marks:100	Total Hours of Teaching: 60	External: 80	Internal: 20
Unit No.	**Description**		**No. of Periods**
Unit 1	**Introduction to R:** What is R? – Why R? – Advantages of R over Other Programming Languages - R Studio: R command Prompt, R script file, comments – Handling Packages in R: Installing a R Package, Few commands to get started: installed.packages(), packageDescription(), help(), find.package(), library() - Input and Output – Entering Data from keyboard – Printing fewer digits or more digits – Special Values functions : NA, Inf and –inf.		15
Unit 2	**R Data Types**: Vectors, Lists, Matrices, Arrays, Factors, Data Frame – **R - Variables:** Variable assignment, Data types of Variable, Finding Variable ls(), Deleting Variables - **R Operators**: Arithmetic Operators, Relational Operators, Logical Operator, Assignment Operators, Miscellaneous Operators - **R Decision Making:** if statement, if – else statement, if – else if statement, switch statement – **R Loops:** repeat loop, while loop, for loop - Loop control statement: break statement, next statement.		15
Unit 3	**R-Function** : function definition, Built in functions: mean(), paste(), sum(), min(), max(), seq(), user-defined function, calling a function, calling a function without an argument, calling a function with argument values - **R-Strings** – Manipulating Text in Data: substr(), strsplit(), paste(), grep(), toupper(), tolower()		15
Unit 4	**Data Frames** –Create Data Frame, Data Frame Access, Understanding Data in Data Frames: dim(), nrow(), ncol(), str(), Summary(), names(), head(), tail(), edit() functions - Extract Data from Data Frame, Add Column, Add Row - Joining columns and rows in a Data frame rbind() and cbind() – Merging Data frames merge(), Input as a CSV file, Reading a CSV File, Reading the Excel file.		15
	REFERENCES 1. Sandip Rakshit, R Programming for Beginners, McGraw Hill Education (India), 2017,ISBN : 978-93-5260-455-5. 2. Seema Acharya, Data Analytics using R, McGrawHill Education (India), 2018, ISBN:978-93-5260-524-8. 3. Tutorials Point (I) simply easy learning, Online Tutorial Library (2018), *R Programming*, Retrieved from https://www.tutorialspoint.com/r/r_tutorial.pdf. 4. Andrie de Vries, Joris Meys, R for Dummies A Wiley Brand, 2nd Edition, John Wiley and Sons, Inc, 2015, ISBN: 978-1-119-05580-8		

M.Com. (IT) Part-II Semester-III Paper DSC10: Data Analytics			
Course Outcomes	**The student will be able to:** 1. **Explore** the fundamental concepts of data analytics 2. **Understand** ethics regarding privacy, data sharing and decision-making 3. **Apply** various python elements used in data analytics process 4. **Identify** various tools Visualize and present the data.		
Marks:100	Total Hours of Teaching: 60	External: 80	Internal: 20
Unit No.	**Description**		**No. of Periods**
Unit 1	**Introduction** Introduction to Data Analytics: Sources and nature of data, classification of data (structured, semi-structured, unstructured), characteristics of data, need of data analytics, evolution of analytic scalability, analytic process and tools, analysis vs reporting, modern data analytic tools, applications of data analytics.		15
Unit 2	**Data Analytics Lifecycle:** Need, key roles for successful analytic projects, various phases of data analytics lifecycle – discovery, data preparation, model planning, model building, communicating results, operationalization.		15
Unit 3	**Frequent Itemsets and Clustering:** Mining frequent itemsets, market based modelling, Apriori algorithm, handling large data sets in main memory, limited pass algorithm, counting frequent itemsets in a stream, clustering techniques: hierarchical, K-means, clustering high dimensional data, frequent pattern based clustering methods		15
Unit 4	**Data Analytics Frame Works:** MapReduce, Hadoop, Pig, Hive, HBase, MapR, NoSQL Databases, Hadoop Distributed File Systems, Visualization: Visual data analysis techniques, Interaction techniques, Systems and applications.		15
	References: 1. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer 2. Anand Rajaraman and Jeffrey David Ullman, Mining of Massive Datasets, Cambridge University Press. 3. John Garrett,Data Analytics for IT Networks : Developing Innovative Use Cases, Pearson Education Curriculum & Evaluation Scheme IT & CSI (V & VI semester) 23 4. Bill Franks, Taming the Big Data Tidal wave: Finding Opportunities in Huge Data Streams with Advanced Analytics, John Wiley & Sons. 5. Frank J Ohlhorst, “Big Data Analytics: Turning Big Data into Big Money”, Wiley and SAS Business Series 6. Colleen Mccue, “Data Mining and Predictive Analysis: Intelligence Gathering and Crime Analysis”, Elsevier 7. Michael Berthold, David J. Hand,” Intelligent Data Analysis”, Springer 8. Paul Zikopoulos, Chris Eaton, Paul Zikopoulos, “Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data”, McGraw Hill 9. Trevor Hastie, Robert Tibshirani, Jerome Friedman, "The Elements of Statistical Learning", Springer		

<table>
<tr><td colspan="4">M.Com. (IT) Part-II Semester-III
Paper DSC11: IT Security</td></tr>
<tr><td>Course Outcomes</td><td colspan="2">The student will be able to:
1. Understand the concept and need of IT security,
2. Identify different security threats to information systems.
3. Describe security controls used for IS security.
4. Understand provisions in IT Act 2000 and Design Security policy for IT Enabled Organization.</td><td></td></tr>
<tr><td>Marks:100</td><td>Total Hours of Teaching: 60</td><td>External: 80</td><td>Internal: 20</td></tr>
<tr><td>Unit No.</td><td colspan="2">Description</td><td>No. of Periods</td></tr>
<tr><td>Unit 1</td><td colspan="2">Introduction to IT Security
Definition of Information System Security, Basics– Introduction, Need, Significance and Challenges of IT Security, IT Assets - Physical Assets (Servers, Workstations, Peripherals, Smartphones, Networking Devices, Information Technology Equipment, Storage Devices, Supplies, IT Personnel) and Logical Assets (Software, Data and Information) Information security dimensions- confidentiality, integrity and Availability</td><td>15</td></tr>
<tr><td>Unit 2</td><td colspan="2">Security Threats
Introduction and types of security threats, sources of threats, Cyber Crimes.
Security Attacks- Passive attacks (Network Analysis; eavesdropping; Traffic control), Active attacks (Phishing, Sniffing, spoofing, Denial of service attack), Malicious Code (Virus, Malware, Worm, Trojan horse), Keyboard loggers, Web tracking, Perpetrators (Hackers; Crackers)
Other Security Threats- Acts of God (Natural disaster), environmental hazards, Theft, User error, Hardware failure, Software failure.</td><td>15</td></tr>
<tr><td>Unit 3</td><td colspan="2">IT Security Control Measures
Identification, Access Controls/Authentication: Password Protection, Biometric verification, Intrusion detection and prevention system, Multilevel authentication.
Antivirus, Recovery software and services, Data backups, Malware detectors, Logs. Cryptography-Types of Cryptography, Digital signature and certificate. Firewall System, Deception Technology, Control Measures for Internet Security.</td><td>15</td></tr>
<tr><td>Unit 4</td><td colspan="2">IT Act and Security Standards
IT Act 2000 and features of IT Act, Amendments in IT Act, Cyber-crimes under Information Technology Act 2000, Legal issues and challenges, Cyber security standards IS Audit and Security Policy</td><td>15</td></tr>
<tr><td></td><td colspan="2">Reference Books:
1. Mark Stamp's Information Security: Principles and Practice (WIND) Paperback – by Deven N. Shah, Wiley.
2. Information Systems Security: Security Management, Metrics, Frameworks and Best Practices by Nina Godbole,</td><td></td></tr>
</table>

	Wiley, 2nd edition 3. Michael T. Simpson, Kent Backman, James Corley ―Hands‑On Ethical Hacking and Network Defense, 2016 4. Steven DeFino, Barry Kaufman, Nick Valenteen―Official Certified Ethical Hacker Review Guide, 2015 5. William Stallings, ―Principle of Computer Security, McGraw Hill Education, Fourth Edition, 2016. 6. Atul Kahate,―Cryptography and Network Security, Tata McGraw-Hill, 2003 7. Essential Computer Security: Everyone's Guide to Email, Internet and Wireless security", by Tony Bradley, Syngress Publication 2006 8. Information & Network Security for GTU, I.A. Dhotre V. S. Bagad, Technical Publication, Edition 2018 9. Cyber law: The Law of the Internet and Information Technology, Brian Craig. 10. Information System Audit and Control by Ron Weber	

M.Com. (IT) Part-II Semester-III
Paper DSC12: Lab Based on DSC9

Course Outcomes	**The student will be able to:** 1. Enable to build programming logic and thereby developing skills in Programming 2. Understand how to organize data and analyze data using real time examples		
Marks:50	Total Hours of Practical: 30	External: --	Internal: 50

1. Write a program to check whether a year (integer) entered by the user is a leap year or not?
2. Write an R program to find the sum of natural numbers without formula using the if–else statement and the while loop.
3. Write a program that prints the grades of the students according to the marks obtained. The grading of the marks should be as follows.

Marks	Grades
800-1000	A+
700 – 800	A
500 – 700	B+
400-500	B
150 – 400	C
Less than 150	D

4. Create a data frame that stores the marks of any three subjects for 10 students.Find out the total marks, average, maximum marks and minimum marks of every subject.
5. Write the steps to import data from Excel to CSV files and apply data viewer functions like rm(),dim(), head(), tail(), sorting, filtering, searching to view few set of rows.
6. Write an R program to create a Data Frame with following details and do the following operations.'

itemCode	itemCategory	ItemPrice
1001	Electronics	700
1002	Desktop Supplies	300
1003	Office Supplies	350
1004	USB	400
1005	CD Drive	800

   a. Subset the Data frame and display the details of only those items whose price is greater than or equal to 350.
   b. Subset the Data frame and display only the items where the category is either "Office Supplies" or "Desktop Supplies"
   c. Create another Data Frame called "item-details" with three different fields itemCode, ItemQtyonHand and ItemReorderLvl and merge the two frames.
7. Design a data frame in R for storing about 20 employee details. Create a CSV file named "input.csv" that defines all the required information about the employee such as id, name, salary, start_date, dept. Import into R and do the following analysis.
   a. Find the total number rows & columns
   b. Find the maximum salary
   c. Retrieve the details of the employee with maximum salary
   d. Retrieve all the employees working in the IT Department
   e. Retrieve the employees in the IT Department whose salary is greater than 20000 and write these details into another file "output.csv".

M.Com. (IT) Part-II Semester III
Paper DSE3.1: Industry Automation

Course Outcomes	**The student will be able to:** 1. Understand the basic concepts of Industry 4.0 and the other related fields. 2. Understand cyber physical system and the emerging applications. 3. Analyze the different energy storage systems 4. Implement the industry 4.0 to solve industrial problems.	
Marks:100	Total Hours of Teaching: 60 External: 80	Internal: 20
Unit No.	**Description**	**No. of Periods**
Unit 1	**Introduction to Industrial Automation** Automation in Production System, Principles and Strategies of Automation, Basic Elements of an Automated System, Advanced Automation Functions, Levels of Automations.	15
Unit 2	**Introduction to Industry 4.0** Introduction, Historical Context, General framework, Application areas, Dissemination of Industry 4.0 and the disciplines that contribute to its development, Artificial intelligence, The Internet of Things and Industrial Internet of Things, Additive manufacturing, Robotization and automation, Current situation of Industry 4.0. Introduction to Industry 4.0 to Industry 5.0 Advances	15
Unit 3	**Industry 4.0 and Cyber Physical System** Introduction to Cyber Physical Systems (CPS), Architecture of CPS-Components, Data science and technology for CPS, Emerging applications in CPS in different fields. Case study: Application of CPS in health care domain.	15
Unit 4	**Smart Applications** Understanding Smart Appliances -Smart Operation-Smart Monitoring-Smart Energy Savings-Smart Maintenance, Case study-Smart Cars, Self-Driving Cars, Introducing Google‘s Self-Driving Car, Intellectual Property Rights.	15
	Reference Books 1. Jean-Claude André, —Industry 4.0‖, Wiley- ISTE, July 2019, ISBN: 781786304827,2019. 2. Diego Galar Pascual, Pasquale Daponte, Uday Kumar, —Handbook of Industry 4.0 and SMART Systems‖ Taylor and Francis,2020 3. Miller M, —The internet of things: How smart TVs, smart cars, smart homes, and smart cities are changing the world‖, Pearson Education, 2015, ISBN: 9780134021300. 4. Pengwei Du and Ning Lu, —Energy storage for smart grids: planning and operation for renewable and variable energy resources (VERs)‖, Academic Press, 2018,(Reprint edition), ISBN-13:978-0128100714 5. Hossam A. Gabbar, —Smart Energy Grid Engineering‖, Academic Press, 2017, ISBN 978- 0-12-805343-0. 6. Mini S. Thomas, John Douglas McDonald, —Power System SCADA and Smart Grids‖, CRC Press, 2017.	

M.Com. (IT) Part-II Semester III Paper DSE3.2: **Business data Processing**			
Course Outcomes	**The student will be able to:** 1. Understand the basic concepts of Data processing 2. Understand the basics of Data Modeling and its tools. 3. Identify the different issues of transaction processing concepts. 4. Implement the solutions for concurrency control.		
Marks:100	Total Hours of Teaching: 60	External: 80	Internal: 20
Unit No.	**Description**		**No. of Periods**
Unit 1	**Data Processing** Concepts of data and information, characteristics of information, various business functions, economics of business data processing, impact of data processing on business organizations, information and product flow in production environment, concepts of records and files, various types of file organizations, data capturing, data preparation, data verification and validation, and data editing, use of computers in data processing and in carrying out business functions,		15
Unit 2	**Data Modeling:** ER model concepts, notation for ER diagram, mapping constraints, keys, concepts of super key, candidate key, primary key, generalization, aggregation, reduction of an ER diagrams to tables, extended ER model, relationships of higher degree.		15
Unit 3	**Transaction Processing Concept:** Transaction System, Testing of Serializability, Serializability of Schedules, Conflict & View Serializable Schedule, Recoverability, Recovery from Transaction Failures, Log Based Recovery, Checkpoints, Deadlock Handling. Distributed Database: Distributed Data Storage, Concurrency Control, Directory System.		15
Unit 4	**Concurrency Control Techniques**: Concurrency control, locking techniques for concurrency control, time stamping protocols for concurrency control, validation based protocol, multiple granularity, multi-version schemes, recovery with concurrent transaction.		15
	References 1. Foster Provost & Tom Fawcett, Data Science for Business; O'Reilly Media Publishing House 2. Bhadka Harsad and Sharma Priyanka, Business Data Processing, LAP Lambert Academic Publishers. 3. Paul Beynon Davies, "Database System", Palgrave Macmillan. 4. Singh, S.K., "Database System Concepts – design & application", Pearson Education. 5. O'Neil, "Databases", Elsevier Pub. 6. Coronel, Morris and Rob, "Database Principles: Fundamentals of Design, Implementation and Management", Cengage Learning. 7. Shraman Shah, "Oracle for Professional", SPD.		

<table>
<tr><td colspan="4">M.Com. (IT) Part-II Semester III
Paper DSE3.3: Business Process Outsourcing</td></tr>
<tr><td>Course Outcomes</td><td colspan="2">The student will be able to:
1. Understand the basic concepts of Business Process Outsourcing
2. Understand the structure of BPO Industry.
3. Identify the different services of transaction processing in BPO.
4. Analyze the emerging trends in BPO.</td><td></td></tr>
<tr><td>Marks:100</td><td>Total Hours of Teaching: 60</td><td>External: 80</td><td>Internal: 20</td></tr>
<tr><td>Unit No.</td><td colspan="2">Description</td><td>No. of Periods</td></tr>
<tr><td>Unit 1</td><td colspan="2">Business Process Outsourcing (BPO)
Basics – Benefits of BPO – Growth Drivers – BPO Models and Types of Vendors – Offshore BPO – Evolution Destinations – Challenges of Off shoring – BPO Companies in India.</td><td>15</td></tr>
<tr><td>Unit 2</td><td colspan="2">BPO Industry
Employment Opportunities – Employee Structure – Skill Set Required – Compensation Levels – Contact Centre BPO – Types of Call Centres – Technology – Components and working of a Call center – Issues and Problems – Case Study – Intelenet Global.</td><td>15</td></tr>
<tr><td>Unit 3</td><td colspan="2">Transaction Processing in BPO
Elements of Back Office Serivces – Financial Services – Insurance – Case Studies – Datamatics – Hinjuja TMT, Human Resource BPO – Reasons for outsourcing HR – Activities involved in HR BPO – HR Outsourcing Trends – Career in HR BPO – Emerging BPO Domains – Media and Entertainment BPO – Publishing BPO.</td><td>15</td></tr>
<tr><td>Unit 4</td><td colspan="2">Emerging Trends in BPO
Concepts, Advantages and Limitations-Franchising, Aggregators, Knowledge Process Outsourcing (KPO): BPO v/s KPO, KPO Types, KPO Services, KPOs in India, Advantages of KPO, Limitations of KPO, Digital Economy.</td><td>15</td></tr>
<tr><td></td><td colspan="2">Refernces
1. Business Process Outsourcing Sarika Kulkarni Jaico Publishing House, Delhi 2005
2. Reference Book:
3. BPO DIGEST Deepak Shikapur Ameya (Inspiring Books) 2004
4. Bingham, J. Mastering data processing. Macmillan Publishing House.
5. Clifton, HD. System analysis for business data processing. India: Prentice Hall Publication.
6. Kulkarni, Sarika. (2005). Business process outsourcing. Delhi: Jaico Publishing House.
7. Knowledge Process Outsourcing A Complete Guide – 2020, Gerardus Blokdyk
8. BPO/KPO Management: An Industry Perspective, R. Gopal, Pradip Manjrekar, Excel Books July 2008</td><td></td></tr>
</table>

M.Com. (IT) Part-II Semester-III RP: Research Project			
Course Outcomes	**The student will be able to:** 1. Identify different functional areas in business organization for IT implementation. 2. Analyze the different operations in functional area for effective IT implementation. 3. Find the need of IT framework for implementation of Information System in business organization. 4. Prepare Project report suggesting Information System to be implemented in business organization including its need.		
Marks:100		External: 100	Internal: --

Student has to prepare the project report under the guidance of allotted guide.

Student should prepare research project related to identifying the need and suggesting the IT implementation in various functional areas of management with respect to any organization. (Commercial Organisation/ NGO, Government or Semi-Government organisation, cooperative society, bank, local authority etc.)

Student should submit two typed copies to the college (One copy for the college and another copy for his/her personal record. Students may prepare additional copies for the guide etc.)

A viva- voce examination will be conducted after the Semester III examination.

Committee will be appointed by the University for Project Evaluation and viva-voice.

A committee will consist of 3 members. (One expert is internal and two are external)

Project Report is to be evaluated for 100 marks by committee.

60 Marks for project work and 40 Marks for Viva-Voce.

GUIDELINES FOR PROJECT WORK:

1. A student has to take project work at the Semester III
2. Research project should be done individually.
2. Student should take guidance from allotted guide.
3. Two copies of “Project Work” should be submitted to the principal of the college in stipulated time.
4. The nature of project work should be such that it could be useful for organization/industry.
5. The project report shall be duly assessed by the external committee appointed by university.
6. Student should not use logos and name of company on the project report pages.
7. Header and Footer shall consist of University name and Institute name respectively.
   No other information should be included in the Header and Footer.
8. Use of colours in text matter should be avoided.

STRUCTURE OF PROJECT REPORT

Preface

a) Certificate of the college
b) Declaration by Guide
c) Declaration of Students
d) Acknowledgement
e) Contents/ index (Heading of the chapter, page numbers, sub headings of the chapter.)

Chapter I – Introduction to the study & Research Methodology

1.1 Introduction
1.2 Objective and importance of the study

1.3 Scope of the study
1.4 Research Methodology

Chapter II – Theoretical Background

Chapter III – Introduction to the Organisation
a. Name of the unit
b. Location or address of the unit
c. Brief history of the unit and present position
d. IT Infrastructure in organisation
e. Organization chart

Chapter IV – Analysis and Interpretation of Data

Chapter V – Findings, Suggestions and Conclusions

APPENDICES
The document charts, questionnaires, tables, schedules etc which are actually referred to in the body of the project report (Chapters I to V) are to be included under appendix or appendices as follows:
a. Questionnaires used for collecting information.
b. Schedules used for collecting information.
c. Tables formed for presenting the data.
d. Documents/forms etc., referred to in the body of the project report.
e. Diagram, graphs etc. referred to in the body of the project report.
f. Guide student meeting record form.

BIBLIOGRAPHY
Bibliography means list of books, journals, published work actually referred to or used in the writing of the project report.
The bibliography has to be written in a specific manner as follows.
The name of author (surname followed by initials), title of the book, year of publication, place of publication, number of the edition, name of the publisher, pages referred to.
Or bibliography should be written following international standards as APA or MLM system.

FORMAT OF PROJECT REPORT
a. Paper:
The Report shall be typed on white paper, A4 size, for the final submission.
The report to be submitted must be original and subsequent copies may be photocopied on any paper.

b. Typing:
The typing shall be of standard letter size, 1.5 spaced and on both side of the paper.
(Normal text should have Times New Roman, Font size 12. Headings can have bigger size)

c. Margins:
The typing must be done in the following margins:
Left -----1.5 inch, Right ------ 1 inch
Top ----- 1 inch, Bottom ----- 1 inch

<table>
<tr><td colspan="5" align="center">M.Com. (IT) Part-II Semester-IV
Paper DSC13: Advance Java</td></tr>
<tr><td align="center">Course Outcomes</td><td colspan="4">After completion of this course student should be able to
1. Develop GUI based Java Applications using Swing.
2. Understand the concept of JDBC, Servlet and its life cycle.
3. Design and develop JSP applications using JSP tags.
4. Apply JDBC Technology to develop the Small Applications using database.</td></tr>
<tr><td>Marks:100</td><td>Total Hours of Teaching: 60</td><td>University Exam: 80</td><td colspan="2">Internal: 20</td></tr>
<tr><td colspan="5">Syllabus Contents:</td></tr>
<tr><td>Unit 1:</td><td colspan="3">Swing and Event Handling
Swing: Components hierarchy, Panes, Individual Swings componentssuch as JButton, JTextField, JTextArea, JRadioButton, JCheckbox, JMenu, JColorChooser.
Event Handling: Event-Handling Mechanism with Swing, Event Classes and its methods, Adapter Classes, Working with Listeners</td><td>15 Periods</td></tr>
<tr><td>Unit 2:</td><td colspan="3">JDBC
JDBC: Driver, Database Connection Steps, DriverManager Class, Statement Interface, ResultSet Interface, Transactions, Batch Processing, RowSet Interface, CRUD operations</td><td>15 Periods</td></tr>
<tr><td>Unit 3:</td><td colspan="3">Servlet:
Using IDE’S NetBeans/Eclipse for Java Development, Servlet OverviewLife cycle of Servlet, Handling Web Form Data in Servlets, Dynamically including Content in Servlets, Session Tracking – Cookies, Session ID, Hidden Form Field, URL Rewriting, HTTPSession, Servlet Filters, Accessing Databases using Servlets.</td><td>15Periods</td></tr>
<tr><td>Unit 4:</td><td colspan="3">JSP
Basics of JSP, Life cycle of JSP, JSP API,JSP in Eclipse and other IDE's, Life cycle of JSP Page. Scripting elements, scriptlet tag, expression tag, declaration tag, Implicit Objects, Directive Elements, Action Elements, MVC in JSP, Custom tags</td><td></td></tr>
<tr><td></td><td colspan="3">Reference Books:
1. Java-The Complete Reference, Herbert Schildt, 11th Edition, McGraw Hill Education
2. JDBC, Servlets and JSP Black Book, K. Santosh Kumar, Dreamtech Press India Pvt. Ltd,
3. Beginning Java 8 APIs, Extensions and Libraries: Swing, JavaFX, JavaScript, JDBC and Network Programming APIs, 1st Edition, Kishori Sharan, Apress
4. EnterpriseJavaBeans,FourthEdition,O'Reilly,2004
5. Beginning JSP, JSF and Tomcat web development, Giulio Zambon, Apress, 2007</td><td></td></tr>
</table>

<table>
<tr><td colspan="5">M.Com. (IT) Part-II Semester-IV
Paper DSC14: AI and Management</td></tr>
<tr><td>Course Outcomes</td><td colspan="4">After completion of this course student should be able to
1. To understand different problem solving techniques in AI.
2. To Analyze the process of developing Expert System
3. To identify different AI based models used for data analysis
4. To determine the role of AI in management</td></tr>
<tr><td>Marks:100</td><td>Total Hours of Teaching: 60</td><td>University Exam: 80</td><td colspan="2">Internal: 20</td></tr>
<tr><td colspan="5">Syllabus Contents:</td></tr>
<tr><td>Unit 1:</td><td colspan="3">AI Problem solving:
Introduction to AI, heuristic techniques, Generate and-test, Hill climbing, Best-First Search problem reduction, constraint satisfaction, Mean-Ends analysis Knowledge representation – mapping between facts and representations, Approaches to knowledge representation, Issues in knowledge representations, searching techniques.</td><td>15 Periods</td></tr>
<tr><td>Unit 2:</td><td colspan="3">Expert System:
Introduction and Characteristics of Expert system, Advantages and disadvantages, Applications of Expert system, Components of Expert Systems, Rule based knowledge representation techniques , Inference Engine, Forward chaining, backward chaining, Factors associated with development of an Expert System, Expert system life cycle. Introduction to Expert system shell.</td><td>15 Periods</td></tr>
<tr><td>Unit 3:</td><td colspan="3">AI Models:
Introduction Fuzzy Sets, Fuzzy Rules, Linguistic Variables and hedges Operations of Fuzzy sets, Fuzzy inference, Certainty factor Artificial Neural Network: The Neural as a simple computing element, The perception Multilayer Neural network, Application of Neural Network.</td><td>15 Periods</td></tr>
<tr><td>Unit 4:</td><td colspan="3">AI applications in Management
Information Retrieval, Information Extraction, Natural Language Processing, Machine Translation, Speech Recognition, Robotics, Sales Funnel Analysis, Planning and Perception, Customer Segmentation and Value, Future of Artificial Intelligence.</td><td>15 Periods</td></tr>
<tr><td></td><td colspan="3">Reference Books:
1. E. Rich and K. Knight, "Artificial Intelligence", Tata McGraw Hill. 2. Sivanandam Principles of Soft Computing, 2ed, w/cd, wiley
3. E. Charnaik and D. McDermott, "Introduction to artificial Intelligence", Addison-Wesley Publishing Company.
4. Dan W. Patterson, “Introduction to Artificial Intelligence and Expert Systems”,PHI.
5. Nils J. Nilson, “Principles of Artificial Intelligence”, Narosa Publishing Co.
6. W.F. Clofisin and C.S. Mellish, “Programming in PROLOG”, Narosa Publishing Co.
7. M. Chandwick and J.A. Hannah, “Expert Systems for Personal Computers”, Galgotia Publications Pvt. Ltd.
8. M.Sasikumar,S.Ramani etc. “Rule based Expert System”, Narosa Publishing House.</td><td></td></tr>
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<tr><td colspan="4">M.Com. (IT) Part-II Semester-IV
Paper DSC15: Mobile Computing</td></tr>
<tr><td>Marks:100</td><td>Total Hours of Teaching: 60</td><td>External: 80</td><td>Internal: 20</td></tr>
<tr><td>Course Outcomes</td><td colspan="3">CO1: Understand the building blocks of Mobile Operating Systems
CO2: Analyze different elements of Android Development Environment
CO3: Illustrate the structure of Mobile Applications using Android
CO4: Identify different components used in Mobile Applications using Android</td></tr>
<tr><td>Unit No.</td><td colspan="2">Description</td><td>No. of Periods</td></tr>
<tr><td>Unit I:
.</td><td colspan="2">Introduction to Mobile Operating System
Mobile operating system, Operating system structure, Constraints and Restrictions, Features: Multitasking Scheduling, Memory Allocation, File System Interface, Keypad Interface, I/O Interface, Protection and Security,Multimediafeatures.BriefhistoryofAndroid,Differenttypes of mobile applications</td><td>15</td></tr>
<tr><td>Unit II:</td><td colspan="2">Android Development Environment
Introduction to Mobile development IDE's, Setting up development environment, Android Software Development, Working with the AndroidManifest.xml, Dalvik Virtual Machine & .apk file extension, Android Architecture, Building a sample Android application using Android Studio. Android Project Structure, Working with emulator.</td><td>15</td></tr>
<tr><td>Unit III:</td><td colspan="2">Android Application Framework
Layouts & Drawable Resources, Basic Building blocks - Activities and Activity life cycle, UI Components-Views & Notifications, Components for communication -Intents & type of Intents, Android API levels (versions & version names), Developing sample Application</td><td>15</td></tr>
<tr><td>Unit IV:</td><td colspan="2">Basic UI design
Form widgets, Text Fields, Layouts, Option menu, Context menu, Sub menu, Time and Date, Images and media, Composite, Alert Dialogs & Toast, Popup, Introduction to SQLite Programming, SQLite Database.</td><td>15</td></tr>
<tr><td colspan="4">Reference Books:
1. Anubhav Pradhan, Anil V Deshpande, “Mobile Apps Development” Edition:I
2. Teach Yourself Android Application Development In 24 Hours, Edition:I, Publication:SAMS
3. Jeff McWherter, Scott Gowell “Professional Mobile Application Development”, John Wiley & Sons, 2012.</td></tr>
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<tr><td colspan="4">M.Com. (IT) Part-II Semester-IV
Paper DSE4.1: Ethical Hacking</td></tr>
<tr><td>Marks:100</td><td>Total Hours of Teaching: 60</td><td>External: 80</td><td>Internal: 20</td></tr>
<tr><td>Course Outcomes</td><td colspan="2">After completion of the course, students should be able to:
1. Understand the risks in the computer systems and networks.
2. Identify and analyze problems in computer and networks security.
3. Identify security vulnerabilities and weaknesses
4. Develop security mechanisms to protect computer systems and networks.</td><td></td></tr>
<tr><td>Unit No.</td><td colspan="2">Description</td><td>No. of Periods</td></tr>
<tr><td>Unit1</td><td colspan="2">Ethical Hacking
Introduction to Ethical Hacking, Objective of Ethical Hacking, Need of Ethical hacking, Significance of ethical hacking for effective security management, Types of Hackers, Black Hat vs. Grey Hat vs. White Hat (Ethical) hacking</td><td>15</td></tr>
<tr><td>Unit 2</td><td colspan="2">Reconnaissance, Scanning and Enumeration
Attacks and Vulnerabilities, Asset, Access Control, CIA, Authentication, Authorization, Risk, Attack Surface, Security-Functionality-Ease of Use Triangle
Introduction to Reconnaissance: Active and Passive Reconnaissance
Introduction to Scanning and Enumeration: Scanning IP Address, Network and It’s Services, Enumerating Open Ports - HTTP/S, SMB, SNMP, SMPT, Finding Vulnerabilities and It’s Proof-of-Concept (POC)</td><td>15</td></tr>
<tr><td>Unit 3</td><td colspan="2">Types of vulnerabilities: OWASP Top 10 : cross-site scripting (XSS), cross site request forgery (CSRF/XSRF), SQL injection, input parameter, manipulation, broken authentication, sensitive information disclosure, XML, External Entities, Broken access control, Security Misconfiguration, using components with known vulnerabilities, Insufficient Logging and monitoring, OWASP Mobile Top10, CVE Database, ARP Poisoning, DoS attack, SQL injection attack.</td><td>15</td></tr>
<tr><td>Unit 4</td><td colspan="2">Vulnerability Assessment and Penetration Testing (VAPT) Process:
Introduction to VA and PT, Threat modelling, Categories of Penetration Test, Tools used like Web Inspect/Qualys, Nessus,
differences in VA and PT.</td><td>15</td></tr>
<tr><td></td><td colspan="3">Reference Books:
1. Hacking: The Art of Exploitation by Jon Erickson
2. The Basics of Hacking and Penetration Testing: Ethical Hacking and Penetration Testing Made Easy by Patrick Engebretson
3. Certified Ethical Hacker Study Guide v9, Sean-Philip Oriyano, Sybex; Study Guide Edition,2016
4. CEH official Certified Ethical Hacking Review Guide, Wiley India Edition, 2007</td></tr>
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<tr><td colspan="4">M.Com.(IT) Part-II Semester IV
Paper DSE4.2: Digital Forensics</td></tr>
<tr><td>Course Outcomes</td><td colspan="3">After completion of this course student should be able to-
1. Understand basic and advanced concepts of Forensic Science.
2. Analyze need of Evidence Collection in computer forensics.
3. Identify role of Computer forensic analysis and validation.
4. Evaluate different Computer Forensic Tools.</td></tr>
<tr><td>Marks:100</td><td>Total Hours of Teaching: 60</td><td>University Exam: 80</td><td>Internal:20</td></tr>
<tr><td>Unit No.</td><td colspan="2">Description</td><td>No. of Periods</td></tr>
<tr><td>Unit1:</td><td colspan="2">Introduction to Digital Forensic
Computer Forensics Fundamentals: Introduction, Use of Computer Forensics in Law Enforcement, Human Resources / Employment Proceedings, Computer Forensics Services, Benefits of professional Forensics Methodology, Steps taken by Computer Forensics Specialists.
Types of Computer Forensics Technology: - Types of Business, Military, Law Enforcement
Computer Forensics Evidence and capture: Data Recovery
Defined-Data Back-up and Recovery, The Role of Back -up in Data Recovery, The Data -Recovery Solution.</td><td>15 Periods</td></tr>
<tr><td>Unit2:</td><td colspan="2">Evidence Collection and Data Seizure:
Need of Evidence, Collection Options Obstacles, Types of Evidence, The Rules of Evidence, Volatile Evidence, General Procedure, Collection and Archiving, Methods of Collections, Art facts, Collection Steps, Controlling Contamination: The chain of custody.
Duplication and Preservation of Digital Evidence: Preserving the Digital Crime Scene-Computer Evidence processing steps-Legal
Aspects of collecting and Preserving Computer forensic Evidence.
Computer image Verification and Authentication: Special needs of Evidential Authentication, Practical Consideration, Practical Implementation.</td><td>15 Periods</td></tr>
<tr><td>Unit3:</td><td colspan="2">Digital Forensic Analysis and Validation:
Determining what data to collect and analyze, validating forensic data, addressing data-hiding techniques, performing remote acquisitions.
Network Forensics: Network forensic overview, performing live acquisitions, developing standard procedures for network forensics, extracting logs, cross log analysis with the help SIEM tools.(SPLUNK/SNORT)
Processing crime at incident scenes: Identifying digital evidence, collecting evidence in private-sector incident scenes, processing law enforcement crime scenes, preparing for a search, securing a computer incident or crime scene, seizing digital evidence at the scene, storing digital evidence, obtaining a digital hash, reviewing
a case.</td><td>15 Periods</td></tr>
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Unit4:	**Digital Forensic Tools:** Evaluating need of computer forensic tool, computer forensic software tools and computer forensic hardware tools. E-mail investigations: Exploring the role of email in investigations, exploring the role of client and server in email, investigating email crimes and violations, understanding email servers, using specialized email forensic tools. Cell phone and mobile device forensics: Understanding mobile device forensic, understanding acquisition procedures for cell phones and mobile devices.	15 Periods

Reference Books:

1. CyberEye:The Book For Digital Citizen Eye Opener Guide, by Tanmay S Dikshit (Author), Urjita V Gokhale (Author), Adv. D.S Rana (Foreword)
2. Cyber Case Studies: Better to Learn from Other's Mistakes Than to Commit the Same and Be Sorry Later Kindle Edition by S Khadsare (Author), Tanmay S Dikshit(Author)
3. Computer Forensics, Computer Crime Investigation by John R, Vacca, Firewall Media, New Delhi.
4. Computer Forensics and Investigations by Nelson, Phillips Enfinger, Steuart, CENGAGE Learning.
5. Real Digital Forensics by Keithj Jones, Richard Bejitlich, Curtis W.Rose, Addison Wesley Pearson Education
6. Forensic Compiling, A Tractitioneris Guide by Tony Sammes and Brain Jenkinson, Springer International edition.
7. Computer Evidence Collection & Presentation by Chrostopher L.T.Brown, Firewall Media.
8. Homeland Security, Techniques & Technologies by Jesus Mena, Firewall Media.
9. Software Forensics Collecting Evidence from the Scene of a Digital Crime by Robert M. Slade , TMH 2005
10. Windows Forensics by chadSteel, Wiley India Edition.

M.Com. (IT) Part-II Semester-IV Paper DSE4.3: Data Center Management			
Course Outcomes	After completion of this course student should be able to- 1. Understand core concepts of data center and its functionality. 2. Illustrate architecture and key elements incorporated in data center. 3. Analyze Risk management process of a data center environment. 4. Evaluate requirements and recommendations for security of data center.		
Marks:100	Total Hours of Teaching: 60	University Exam:80	Internal: 20

Unit No.	Description	No. of Periods
Unit 1:	**Introduction to Data Center** History of data centers, Definition of data centers ,Different types of data centers ,Data Centre Development Process ,Data Centre Facilities and their functions, Critical services in Data Centers, Hardware in Data Centre, Power supply: Standby/backup power, Renewable power, Power efficiency indicators, Physical security components and Environmental control components.	15 Periods
Unit 2:	**Data Centre Components and Architecture** Design and architecture of Data Centre, Data Centre standards, Structured cabling standards, Network Infrastructures: Network connectivity and cabling, Data Centre Cabling Topology, Routing, Switching and security. Cloud Infrastructure, Integration of cloud and on-premise services. Bandwidth requirements, Load balancer and Proxy servers. Server Architectures: Stand-alone, blades, stateless, clustering, scaling, optimization, virtualization, I/O connectivity, Storage Types and Media	15 Periods
Unit 3:	**Data Center Risk Management** Data Centre Risk Factors: Risk in facility, power, cooling, fire suppression, infrastructure, and IT services, Data Centre downtime: Impact of down time, Main causes of downtime, Cost factors in downtime, Risk management process: Identification, Analysis, Evaluation, Treatment, Communication and consultation, Monitoring and review, Business Continuity Management, Disaster Recovery Planning	15 Periods
Unit 4:	**Data Centre Security** Managing Safety and Statutory Requirements, Safety policies and regulations ,Reporting of safety issues, Security Controls& Management: Data Centre physical security, Data Centre Logical security, Security policies and procedures, Security standards and guidelines: Telecommunications Infrastructure Standard for Data Centres (TIA-942), ISO / IEC 27001:2005 and 27001:2013 Information Security Management System Standard , CERT-In Guidelines, Internal /external Safety and Security audits of data centers.	15 Periods

Reference Books:

1. Data Center Management: Your guide to efficient Data Center operation, Dr. Mohammad Nawaz, July 31, 2019
2. Data Center Handbook 1st Edition, Hwaiyu Geng,Wiley
3. Data Center for Beginners: A beginner's guide towards understanding Data Center Design (Data Center Design Guide), B.A. Ayomaya, Mar 31, 2020
4. Cloud Native Data Center Networking: Architecture, Protocols, and Tools, Dinesh G. Dutt , o'Reilly
5. Data Center Networks: Topologies, Architectures and Fault-Tolerance Characteristics 2013th Edition, Yang Liu, Jogesh K. Muppala, Springer
6. Enterprise Data Center Design and Methodology 1st Edition, Rob Snevely, Sun
7. Data Center Fundamentals (Cisco Press Fundamentals Series), Mauricio Arregoces (Author), Maurizio Portolani, 4 December 2003

Suggested Research Journals:

1. Optical fiber technology: Special Issue on Data Center Communications
2. Data Center Research Journal: https://www.datacenterresearch.com/research/cloud.html

Suggested Additional Reading:

1. Data Center Blog| New York & Jersey Infrastructure| Nyi
2. Enterprise Data Storage, Virtualization Management Solutions| Tegile
3. The Continuity Council-Data Center Blog
4. Tufin Security Policy Orchestration Blog
5. Impex Technologies Blog

M.Com. (IT) Part-II Semester-IV RP: Research Project			
Course Outcomes	**The student will be able to:** 1. Identify different functional areas in business organization for IT implementation. 2. Analyze the different operations in functional area for effective IT implementation. 3. Find the need of IT framework for implementation of Information System in business organization. 4. Prepare Project report suggesting Information System to be implemented in business organization including its need. 5. Design a prototype model for the proposed Information System to be implemented in business organization. 6. Specify the Hardware and Software requirements for the implementation of the Information System.		
Marks:150		External: 100	Internal: 50

Student has to prepare the project report under the guidance of allotted guide.

Student should prepare research project related to identifying the need and suggesting the IT implementation in various functional areas of management with respect to any organization. (Commercial Organisation/ NGO, Government or Semi-Government organisation, cooperative society, bank, local authority etc.)

Student should submit two typed copies to the college (One copy for the college and another copy for his/her personal record. Students may prepare additional copies for the guide etc.)

Project Report is to be evaluated for 100 marks by committee.

Committee will be appointed by the University for Project Evaluation and viva-voice.

A committee will consist of 3 members. (One expert is internal and two are external)

60 Marks for project work and 40 Marks for Viva-Voce.

A viva- voce examination will be conducted after the Semester IV examination.

Project Report is also to be evaluated internally by project guide for 50 marks.

30 Marks for project work and 20 Marks for Viva-Voce.

Institute should submit the internal marks to the University along with internal assessment marks of other courses.

Institute should decide the last date of submission of Research Project accordingly.

GUIDELINES FOR PROJECT WORK:

1. A student has to take project work at the Semester IV
2. Research project should be done individually.
2. Student should take guidance from allotted guide.
3. Two copies of “Project Work” should be submitted to the principal of the college in stipulated time.
4. The nature of project work should be such that it could be useful for organization/industry.
5. The project report shall be duly assessed by the external committee appointed by university.
6. Student should not use logos and name of company on the project report pages.
7. Header and Footer shall consist of University name and Institute name respectively.
   No other information should be included in the Header and Footer.
8. Use of colours in text matter should be avoided.

STRUCTURE OF PROJECT REPORT

Preface

a) Certificate of the college
b) Declaration by Guide
c) Declaration of Students
d) Acknowledgement
e) Contents/ index (Heading of the chapter, page numbers, sub headings of the chapter.)

Chapter I – Introduction to the study & Research Methodology

1.1 Introduction
1.2 Objective and importance of the study
1.3 Scope of the study
1.4 Research Methodology

Chapter II – Theoretical Background

Chapter III – Introduction to the Organisation

a. Name of the unit
b. Location or address of the unit
c. Brief history of the unit and present position
d. IT Infrastructure in organisation
e. Organization chart

Chapter IV – Analysis and Interpretation of Data

Chapter V – Findings, Suggestions and Conclusions

Chapter VI – Proposed System

a. Objectives
b. System Analysis and Design
- DFD
- ERD
- UML(if applicable)
- Database Design
- Input Design
- Output Design

c. Implementation
- Hardware Requirement
- Software Requirement

APPENDICES

The document charts, questionnaires, tables, schedules etc which are actually referred to in the body of the project report (Chapters I to VI) are to be included under appendix or appendices as follows:

a. Questionnaires used for collecting information.
b. Schedules used for collecting information.
c. Tables formed for presenting the data.
d. Documents/forms etc., referred to in the body of the project report.
e. Diagram, graphs etc. referred to in the body of the project report.
f. Guide student meeting record form.
g. Source Code

BIBLIOGRAPHY

Bibliography means list of books, journals, published work actually referred to or used in the writing of the project report.

The bibliography has to be written in a specific manner as follows.
The name of author (surname followed by initials), title of the book, year of publication, place of publication, number of the edition, name of the publisher, pages referred to.
Or bibliography should be written following international standards as APA or MLM system.

FORMAT OF PROJECT REPORT

a. Paper:
The Report shall be typed on white paper, A4 size, for the final submission.
The report to be submitted must be original and subsequent copies may be photocopied on any paper.

b. Typing:
The typing shall be of standard letter size, 1.5 spaced and on both side of the paper.
(Normal text should have Times New Roman, Font size 12. Headings can have bigger size)

c. Margins:
The typing must be done in the following margins:
Left -----1.5 inch, Right ------ 1 inch
Top ----- 1 inch, Bottom ----- 1 inch