CMS COLLEGE KOTTAYAM *(AUTONOMOUS)*

Affiliated to the Mahatma Gandhi University, Kottayam, Kerala

CURRICULUM FOR UNDER GRADUATE PROGRAMMES IN

Bachelor of Vocation

INFORMATION TECHNOLOGY

UNDER CHOICE BASED CREDIT SYSTEM 2018
(With effect from 2018)

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CONTENTS

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ACKNOWLEDGEMENTS

The Board of Studies in Computer Science, CMS Colleges Kottayam (Autonomous) takes this opportunity to express our deep appreciation to all academicians and representatives from the industry who participated in the meeting that were arranged during the year in connection with Curriculum design of Bachelor of Vocation (B.Voc) Information Technology Program, held at CMS College Kottayam (Autonomous). Our heartfelt gratitude to Dr. N. J. Rao, Former Professor, Indian Institute of Science for the 2 day workshop on curriculum designing and to Dr, T P Sasikumar, Former Professor ISRO for the 2 day curriculum workshop for presenting the Concept and Philosophy behind curriculum Revision. I am also thankful to Dr. C James, Scott Christian College for presenting the rationale of question bank design in a workshop. I express my sincere thanks to Prof. Shyamkumar K, Chairman, BOS of Computer Science, MG University and Mr. Vino Alex, Principal Consultant Analyst, RED HAT Asia Pacific for their suggestions and advices. I also thank the Expert Committee of various subjects for their valuable suggestions in finalizing the syllabus. I also place on record the work done by Prof. Mathew. C. Mathew, Head, Department of Computer Science, CMS College Kottayam (Autonomous) in coordinating the curriculum revision process.

Chairman

Board of Studies

PREFACE

Technology is defined as the applications of Basic Science. The past two revolutions, industrial and electronic, have transformed the society from agricultural to industrial and then to electronic. The electronically based technologies focused in information gathering, processing and distribution. The use of this technology in all sectors gave the birth to Computer Industry and its unprecedented growth launched another revolution in Communication.

Information, the basic raw material for the Decision Support System, can be derived from processing of huge database related with different sectors. Systematic storage and management with adequate security are essential for data retrieval and processing to generate information. The information technology plays an important role in all areas. But the main drawback is the technophobia of the people to adapt with the new technologies. This may be due to lack of awareness of the merits and advantages of new technologies. So our youths have to be equipped with all kinds of knowledge tools to work with computers comfortably which are basic requirements to provide human resource to the industry.

The radical changes in technologies, both hardware as well as software, and their ever increasing adaptation to newer areas of application, demand frequent updating of the academic curriculum so that the students can rise to the expectation of the Industry. The syllabus revision committee has considered all these factors thoroughly before venturing into the revision exercise.

The syllabus of B.Voc Information and TechnologyProgramme provides a strong foundation to pursue higher studies in computer science/applications. Special emphasis is given in such a way that students may also equip themselves as Application Developers to meet the industrial needs in Local, National and Global contexts.

GRADUATE PROGRAMME OUTCOMES (GPO)

Students of all Undergraduate Degree programmes at the time of graduation will be able to:

GPO No	Graduate Programme Outcomes
GPO-1	**Critical Thinking:** Take an informed and analytical approach to learning and demonstrate in-depth knowledge of the subject and give opinion(s) supported by logical reasoning that one have judged to be appropriate and understanding different approaches and using them
GPO-2	**Effective Communication:** Demonstrate proficiency in communicating competently in groups and organizations, competence in interpersonal communication; possess skills to effectively deliver formal and informal presentations to a variety of audiences in multiple contexts
GPO-3	**Social Interaction:** Foster social skills and peer interaction enabling them to make all people feel valued and respect their differences by being responsible citizens for creating a socially inclusive society
GPO-4	**Ethical Standards:** Recognize values such as justice, trust, equity, fairness, kindness and develop a commitment to meeting and upholding standards of ethical behavior in all walks of life and comprehending the moral dimensions of decisions and actions
GPO-5	**Environmental Consciousness:** Discern the issues of environmental contexts and engages in promoting values and attitudes that claim coexistence and sustainable living with reduced, minimal, or no harm upon ecosystems
GPO-6	**Lifelong Learning:** Acquire the skill to be an independent lifelong learner embracing real-time changes in the socio-technological context, promoting continuous development and improvement of the knowledge and skills needed for employment and personal fulfillment

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO No	Intended Programme Specific Outcomes Upon completion of Bachelor of Computer Applications Programme, the graduates will be able to:	GPO No.
PSO-1	Function effectively as an entrepreneur, a team member or team leader and commit to professional ethics.	3,4,6
PSO-2	Comprehend and write effective reports, presentations, design documentations and to give and receive clear instructions.	1,2
PSO-3	Apply the knowledge of Mathematics to identify, formulate and solve real life complex engineering and computing problems	1,2,3
PSO-4	Apply the knowledge of technology and management principles to design, develop and provide solutions to complex problems in IT filed using modern tools.	3,4,6
PSO-5	Understand how to identify, formulate and design solutions in the areas of Computer Science and Engineering	1
PSO-6	Develop skills in software development so as to enable the graduates to take up employment/self-employment in local, Indian & global software market	1
PSO-7	Adopt any modern engineering tool or software for analyzing and solving various computer engineering problems	1,2
PSO-8	Have the knowledge of contemporary issues and able to apply various software engineering approaches for project management	1,2,3
PSO-9	Communicate effectively on complex programming activities with the IT community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	1,3,5
PSO-10	Organize and deliver relevant applications of knowledge through effective written verbal, graphical/ virtual communication and interact productively with people from diverse background	3

PROGRAMME DESIGN

B.Voc Programme

The B.Voc UG programmein Information Technology includes General Education Component, Skill Component, project work, Viva Voce, Destination visit, Case Studies and Internships. For the successful completion of this UG programme, a student shall acquire minimum 180 credits. Provision has also been made for acquiring Extra credits through the Extra Credit Courses and Add on programmes. The course design is given below.

Sl.No	Course type	No. of courses	Total credits
1	General Education Component	18	72
2	Skill Component	31	108
Total		**49**	**120**

PROGRAMME STRUCTURE

Course Code	Subject	General/ Skill	Credit	Contact hrs/We	Total Hrs in the Sem	Marks ESE	Marks CE	Total Marks
SEMESTER – I								
EN1811503	Listening and Speaking skills in English	General	4	4	72	80	20	100
MT1811202	Discrete Mathematics I	General	4	4	72	80	20	100
IT1811201	Introduction to IT	General	4	4	72	80	20	100
CA1811103	Programming in C	Skill	4	4	72	80	20	100
CA1811104	Computer Architecture and Organization	Skill	4	4	72	80	20	100
IT1811101	Office Automation, Image Editing and Latex	Skill	3	3	54	80	20	100
IT1811601	Office Automation, Image Editing and Latex Lab	Skill	3	3	54	80	20	100
CA1811602	C Programming Lab	Skill	4	4	72	80	20	100
Total			**30**	**30**	**540**	**640**	**160**	**800**
SEMESTER – II								
EN1812505	Reading and Writing Skills	General	4	4	72	80	20	100
IT1812202	Environmental Studies	General	4	4	72	80	20	100
MT1812204	Discrete Mathematics-II	General	4	4	72	80	20	100
CA1812106	Data Structures and Algorithms	Skill	4	4	72	80	20	100
CA1812103	Data Base Management Systems	Skill	4	4	72	80	20	100
IT1812102	Digital Electronics	Skill	4	4	72	80	20	100
CA1812603	Data Base Management Systems Lab	Skill	3	3	54	80	20	100
CA1812604	Data Structure Lab	Skill	3	3	54	80	20	100
Total			**30**	**30**	**540**	**640**	**160**	**800**

Course Code	Subject	General/ Skill	Credit	Contact hrs/Week	Total Hrs in the Sem	Marks ESE	MarksCE	Total Marks
SEMESTER – III								
ST1813206	Statistical Methods And Probability	General	4	4	72	80	20	100
EN1813507	Social Skills	General	4	4	72	80	20	100
CM1813201	Business informatics and Principles of Accounting	General	4	4	72	80	20	100
CA1813110	Object Oriented Programming using Java	Skill	4	4	72	80	20	100
CA1813111	Software Engineering and Testing	Skill	4	4	72	80	20	100
CA1813107	Microprocessor and PC Hardware	Skill	4	4	72	80	20	100
CA1813605	Java Programming Lab	Skill	3	3	54	80	20	100
CM1813601	Business Accounting Lab	Skill	3	3	54	80	20	100
Total			**30**	**30**	**540**	**640**	**160**	**800**
SEMESTER – IV								
EN1814509	Corporate Skills	General	4	4	72	80	20	100
IT1814203	Management Information Systems	General	4	4	72	80	20	100
CM1814205	Principles of Management	General	4	4	72	80	20	100
CA1814114	Operating Systems	Skill	4	4	72	80	20	100
CA1814115	Computer Networks	Skill	4	4	72	80	20	100
IT1814103	Object Oriented Modeling And Design	Skill	3	4	72	80	20	100
CA1814606	Networks and Operating Systems Lab	Skill	3	3	54	80	20	100
CA1814607	Computer Animations Lab	Skill	3	3	54	80	20	100
IT1814801	Summer Internship	Skill	1			80	20	100
Total			**30**	**30**	**540**	**720**	**180**	**900**

Course Code	Subject	General/ Skill	Credit	Contact hrs/Week	Total Hrs in the Sem	Marks ESE	MarksCE	Total Marks
SEMESTER – V								
IT1815204	Information security	General	4	4	72	80	20	100
IT1815205	Aptitude And Logical Reasoning	General	4	4	72	80	20	100
CM1815202	Entrepreneurship Development	General	4	3	54	80	20	100
IT1815104	Web development	Skill	4	4	72	80	20	100
CA1815117	Mobile Application Development- Android	Skill	4	4	72	80	20	100
CA1815608	Android Lab	Skill	3	3	54	80	20	100
CA1815609	Web development Lab	Skill	3	4	72	80	20	100
CA1815802	Minor Projects	Skill	4	4	72	80	20	100
Total			**30**	**30**	**540**	**640**	**160**	**800**
SEMESTER – VI								
IT1816206	Digital Marketing	General	4	4	72	80	20	100
IT1816207	Informatics	General	4	4	72	80	20	100
IT1816208	IT And Society	General	4	4	72	80	20	100
IT1816105	Free and Open Source Software	Skill	4	4	72	80	20	100
IT1816106	Embedded Systems and Internet of Things	Skill	4	4	72	80	20	100
IT1816107	Virtual and Augmented Reality	Skill	3	3	54	80	20	100
IT1816602	Internet of Things Lab	Skill	3	3	54	80	20	100
IT1816803	Major Project	Skill	4	4	72	120	30	150
IT1816901	Viva Voce							50
Total			**30**	**30**	**540**	**640**	**160**	**900**

GENERAL EDUCATION COMPONENTS

Sl.No	Course Name	Credit	Hrs/W	Semester
1	Listening and Speaking skills in English	4	4	1
2	Discrete Mathematics I	4	4	1
3	Introduction to IT	4	4	1
4	Reading and Writing Skills	4	4	2
5	Environmental Studies	4	4	2
6	Discrete Mathematics-II	4	4	2
7	Statistical Methods And Probability	4	4	3
8	Social Skills	4	4	3
9	Business informatics and Principles of Accounting	4	4	3
10	Corporate Skills	4	4	4
11	Management Information Systems	4	4	4
12	Principles of Management	4	4	4
13	Information security	4	4	5
14	Aptitude And Logical Reasoning	4	4	5
15	Entrepreneurship Development	4	3	5
16	Digital Marketing	4	4	6
17	Informatics	4	4	6
18	IT And Society	4	4	6
Total		**72**		

SKILL EDUCATION COMPONENTS

Sl.No	Course Name	Credit	Hrs/W	Semester
1	Programming in C	4	4	1
2	Computer Architecture and Organization	4	4	1
3	Office Automation, Image Editing and Latex	3	3	1
4	Office Automation, Image Editing and Latex Lab	3	3	1
5	C Programming Lab	4	4	1
6	Data Structures and Algorithms	4	4	2
7	Data Base Management Systems	4	4	2
8	Digital Electronics	4	4	2
9	Data Base Management Systems Lab	3	3	2
10	Data Structure Lab	3	3	2
11	Object Oriented Programming using Java	4	4	3
12	Software Engineering and Testing	4	4	3
13	Microprocessor And PC Hardware	4	4	3
14	Java Programming Lab	3	3	3
15	Business Accounting Lab	3	3	3
16	Operating Systems	4	4	4
17	Computer Networks	4	4	4
18	Object Oriented Modeling and Design	3	4	4
19	Networks and Operating Systems Lab	3	3	4
20	Computer Animations Lab	3	3	4
21	Summer Internship	1	-	4

22	Web development	4	4	5
23	Mobile Application Development-Android	4	4	5
24	Android Lab	3	3	5
25	Web development Lab	3	4	5
26	Project Phase I	4	4	5
27	Free and Open Source Software	4	4	6
28	Embedded Systems and Internet of Things	4	4	6
29	Virtual and Augmented Reality	3	3	6
30	Internet of Things Lab	3	3	6
31	Project Phase II	4	4	6
Total		**108**		

ADD ON COURSES

Sl No	Code	Course Name	Semester
1	IT18A1001	INTERACTIVE FRONT END DEVELOPMENT	1
2	IT18A1002	IT SUPPORT PROFESSIONAL	2
3	IT18A1003	WEB DEVELOPMENT USING VISUAL STUDIO	3
4	IT18A1004	SOFTWARE TESING FOUNDATIONS	4
5	IT18A1005	WINDOWS AZURE	5
6	IT18A1006	CYBER SECURITY	6

DETAILED SYLLABUS

SEMESTER 1				
Course Code	**Courses**	**General/ Skill**	**Credit**	**Instructional Hours/Week**
EN1811503	Listening and Speaking Skills in English	General	4	4
MT1811202	Discrete Mathematics I	General	4	4
IT1811201	Introduction to IT	General	4	4
CA1811103	Programming in C	Skill	4	4
CA1811104	Computer Architecture and Organization	Skill	4	4
IT1811101	Office Automation, Image Editing and Latex	Skill	3	3
IT1811601	Office Automation, Image Editing and Latex Lab	Skill	3	3
CA1811602	C Programming Lab	Skill	4	4
Total			**30**	**30**

Course	Details				
Code	**EN1811503**				
Title	**LISTENING AND SPEAKING SKILLS IN ENGLISH**				
Degree	**B. Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**1/1**				
Type	**General Education**				
Credits	**4**	Hrs/Week	**4 hours**	Total Hours	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Listen to lectures, public announcements and news on TV and radio.	U
2	Engage in telephonic conversation.	C
3	Communicate effectively and accurately in English.	AP
4	Use spoken language for various purposes.	AP
5	Critically analyze a poem or a prose.	An

Module	Course Description	Hrs	CO.No.
1.0	**Pronunciation**	**25**	
1.1	Phonemic symbols	4	3,4
1.2	Consonants	4	3,4
1.3	Vowels	4	3,4
1.4	Syllables	4	3,4
1.5	Consonants and words that are commonly mispronounced	2	3,4
1.6	Influence of mother tongue	4	3,4
1.7	Practice sessions	3	3,4
2.0	**Listening Skills**	**18**	
2.1	Difference between listening and hearing	1	1,2
2.2	Active listening	1	1,2
2.3	Barriers to listening	1	1,2
2.4	Academic listening	1	1,2
2.5	Listening for details	2	1,2
2.6	Listening and note-taking	2	1,2
2.7	Listening for sound contents of videos	2	1,2
2.8	Listening to talks and descriptions	2	1,2
2.9	Listening for meaning	2	1,2
2.10	Listening to announcements	2	1,2
2.11	Listening to news programmers.	2	1,2
3.0	**Speaking Skills**	**14**	

3.1	Interactive nature of communication	1	2,3,4
3.2	Importance of context	1	2,3,4
3.3	Formal and informal	1	2,3,4
3.4	Set expressions in different situations	1	2,3,4
3.5	Greeting	1	2,3,4
3.6	Introducing	1	2,3,4
3.7	Making requests	1	2,3,4
3.8	Asking for / giving permission	1	2,3,4
3.9	Giving instructions and directions	1	2,3,4
3.10	Agreeing / disagreeing	1	2,3,4
3.11	Seeking and giving advice	1	2,3,4
3.12	Inviting and apologizing telephonic skills	1	2,3,4
3.13	Conversational etiquettes	1	2,3,4
4.0	**Dialogue Practice**	**7**	
4.1	Students should be given ample practice in dialogue, using core and supplementary materials	7	1,2,3,4
5	**Literature Review**	**8**	
5.1	Detailed Analysis – O. Henry: The Last Leaf (Short Story)	3	3,5
5.2	Detailed Analysis- Robert Frost: The Road not Taken	3	3,5
5.3	Literature Activity: Critical Activity	2	3,5

REFERENCES

1. English for Effective Communication, Oxford University Press, 2013.
2. Marks, Jonathan, English Pronunciation in Use, New Delhi: CUP, 2007.
3. Lynch, Tony, Study Listening, New Delhi: CUP, 2008.
4. Kenneth, Anderson, Tony Lynch, Joan MacLean, Study Speaking, New Delhi: CUP, 2008.
5. Jones, Daniel, English Pronouncing Dictionary, 17th Edition, New Delhi: CUP, 2009.

Course	Details				
Code	**MT1811202**				
Title	**DISCRETE MATHEMATICS -I**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**I/I**				
Type	**General Education**				
Credits	**4**	**Hours/week**	**4**	**Total hours**	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	To learn a mathematical topic, a person needs to actively construct mathematical arguments on this topic. A major goal of this course is to teach the students how to understand and construct correct mathematical arguments.	An
2	Identify sets, different properties of sets, set operations and set identities.	R
3	Explain the different methods for representing the relationship between sets.	U
4	The basic concepts involving functions needed in discrete mathematics.	R
5	Discuss how the equivalence classes of an equivalence relation partition a set into disjoint nonempty subsets.	U
6	Find a relation that is reflexive, anti- symmetric and transitive. These are the properties that characterize relations used to order the elements of sets.	R
7	Solve the problems using what they studied.	Ap
8	Define and interpret the concepts of divisibility, congruence, greatest common divisor, prime and prime factorization.	R, Ap

Module	Course Description	Hrs	CO.No.
1.0	**Logic**	**18**	**1**
1.1	Propositional Logic	5	1
1.2	Propositional Equivalence	5	1
1.3	Predicates and Quatifiers	4	1
1.4	Rules of Inference	4	1
2.0	**Basic Structures**	**19**	**2**
2.1	Sets	4	2
2.2	Set Operations	5	2,3

2.3	Functions	5	2,3
2.4	Sequences and Summations	5	2,3
3.0	**Number Theory and Cryptosystem**	**20**	**4,7**
3.1	The integer and Division	7	4,7
3.2	Primes and Greatest Common Divisors	7	4,7
3.3	Applications of Number Theory	6	7
4.0	**Relations**	**15**	**4,6,7**
4.1	Relations and Their Properties	4	4,7
4.2	Representing Relations	4	4,7
4.3	Equivalence Relations	3	4,5,6,7
4.4	Partial Ordering	4	4,6,7

Text Books

1. Kenneth H Rosen; Discrete Mathematics and its applications; 6th Edition; Tata McGraw-Hill Publishing Company Limited

Module 1: Logic (18 hrs)

Chapter 1 (Sections 1.1, 1.2, 1.3 and 1.5only)

Module II: Basic Structure (19 hrs)

Chapter 2 (Sections 2.1, 2.2, 2.3 and 2.4)

Module III: Number Theory and Cryptosystem (20 hrs)

Chapter 3 (Sections 3.4, 3.5 and 3.7 Only)

Module IV: Relations (15 hrs)

Chapter 7 (Sections 7.1, 7.3, 7.5 and 7.6)

Text Books for References

1. Clifford Stien, Robert L Drysdale, KennethBogart ; Discrete Mathematics for Computer Scientists; Pearson Education; Dorling Kindersley India Pvt. Ltd
2. Kenneth A Ross; Charles R.B. Wright ; Discrete Mathematics; Pearson Education; Dorling Kindersley India Pvt.Ltd
3. Ralph P. Grimaldi, B.V.Ramana; Discrete And Combinatorial Mathematics ; Pearson Education; Dorling Kindersley India Pvt. Ltd
4. Richard Johnsonbaugh; Discrete Mathematics; Pearson Education; Dorling Kindersley India Pvt.Ltd
5. Winfried Karl Grassman, Jean-Paul Tremblay; Logic And Discrete Mathematics A Computer Science Perspective ; Pearson Education; Dorling Kindersley India Pvt. Ltd

Course	Details				
Code	**IT1811201**				
Title	**INTRODUCTION TO IT**				
Degree	**B. Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**1/1**				
Type	**General Education**				
Credits	**4**	Hrs/Week	**4 hours**	Total Hours	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Understand the characteristics, evolution, generations and classification of computers.	U
2	Understand the organization of computers, types of memory and storage systems.	U
3	Understand the various input and output devices of a computer systems.	U
4	Understand the operating system, types of computer software and programming languages.	U

Module	Course Description	Hrs	CO.No.
1.0	**Introduction**	**18**	
1.1	Computer characteristics	2	1
1.2	Evolution of Computers	2	1
1.3	Generations of computers	2	1
1.4	Classification of computers	1	1
1.5	Computing concepts	2	2
1.6	The computer system	2	2
1.7	Applications of computers	2	2
1.8	Computer organization: Central processing unit	1	2
1.9	Internal communications, Machine cycle	2	2
1.10	The bus, Instruction set	2	2
2.0	**Hardware**	**18**	
2.1	Memory and Storage systems: Memory representation	1	2
2.2	Random Access Memory	2	2
2.3	Read only memory	2	2
2.4	Magnetic Storage systems	2	2
2.5	Optical Storage systems	1	2
2.6	Storage Evaluation Criteria	1	2
2.7	Input devices: Keyboard, Pointing devices	1	2
2.8	Scanning Devices, Optical recognition Devices	2	2

2.9	Media Input Devices	1	2
2.10	Output devices: Display Monitors, Printers	2	2
2.11	Impact and Non impact printers	1	2
2.12	Plotters	1	2
2.13	Voice output systems, Projectors , terminals	1	2
3.0	**Software**	**18**	
3.1	Computer software-Types of computer software	1	3
3.2	System Management Programs	1	3
3.3	Standard Application Programs	1	3
3.4	Unique Application Programs	1	3
3.5	Problem Solving, Structuring the logic	2	3
3.6	Operating Systems: Functions	2	3
3.7	Types of operating systems	2	3
3.8	Providing user interface	1	3
3.9	Popular operating systems	2	3
3.10	Programming languages: Characteristics	1	3
3.11	Categorisation	1	3
3.12	Popular high level languages	1	3
3.13	Factors affecting the choice of a language	1	3
3.14	Developing a progam	1	3
4.0	**Computer Networks**	**18**	
4.1	Data Communication using modem	1	4
4.2	Computer network	2	4
4.3	Network topologies	2	4
4.4	Network protocols and software	1	4
4.5	Applications of network	2	4
4.6	History of Internet	1	4
4.7	Internet Applications	1	4
4.8	Understanding the World Wide Web	2	4
4.9	Web browsers	2	4
4.10	Browsing the Internet	1	4
4.11	Using a search engine	1	4
4.12	Email service	1	4
4.13	Protocols used for the Internet	1	4

Text Books for Reference

1. E. Balaguruswamy, Fundamentals of Computers, McGraw hill, 2014
2. Dennis P. Curtain, Information Technology: The Breaking wave, McGrawHill, 2014
3. Peter Norton, Introduction to Computers, McGrawHill, Seventh edition

Course	Details				
Code	**CA1811103**				
Title	**PROGRAMMING IN C**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**1/1**				
Type	**Skill Education**				
Credits	**4**	Hrs/Week	**Hours 4**	Total Hours	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Understand the concepts of programming and methodologies essential for developing good C programs.	U
2	Understand the use of character set, data types, operators and input/output operations	U
3	Apply Flow control statements in problem solving	Ap
4	Enhance skill in developing programs using various constructs	Ap
5	Apply knowledge to construct programs using standard library functions in C language	Ap
6	Apply Complex data types arrays, structures, union and pointers in program development	Ap

Module	Course Description	Hrs	CO. No.
1.0	**Introduction to programming.**	**12**	
1.1	Software and Types of Software	2	1
1.2	Classification of computer languages	2	1
1.3	Algorithm	2	1
1.4	Flowchart	2	1
1.5	Pseudocode	2	1
1.6	Different approaches of Programming	2	1
2.0	**C Character Set, Data types and Operators**	**18**	
2.1	Character Set, C Tokens	1	2
2.2	Keywords and Identifiers	1	2
2.3	Constants, Variables	1	2
2.4	Data types, Declaration of variables, storage class	1	2
2.5	Assigning values to variables, symbolic constants, declaring as constant, volatile	2	2
2.6	Operators and Expressions- Introduction, Arithmetic operators, Relational operators.	2	2
2.7	Logical, assignment, increment and decrement operators, conditional operator	3	2

2.8	Bitwise, special operators. Arithmetic expressions, Evaluation of expressions	2	2
2.9	Precedence of arithmetic operators, Type conversions in expressions	2	2
2.10	Managing Input and Output operations- Reading and Writing aa character	1	2
2.11	Formatted Input	1	2
2.12	Formatted Output	1	2
3.0	**Control Structures**	**21**	
3.1	If statements	2	3,4
3.2	Switch statement, ?: operator, goto statement	1	3,4
3.3	While, do, for statement	1	3,4
3.4	Jumps in loops	1	3,4
3.5	Arrays: Introduction, one dimensional arrays- declaration, initialization	2	3,4
3.6	Two dimensional arrays: Initialization, Multi-dimensional arrays	1	3,4
3.7	Character arrays and Strings: Introduction, Declaring and initializing string variables	1	3,4
3.8	Reading strings, writing strings, arithmetic operations on strings,	3	3,4
3.9	String comparison, concatenation, string handling functions	2	3,4
3.10	User defined functions, declaration, definition, return values	1	3,4
3.11	Function calls, function declaration, category of functions, Recursion	3	3,4
3.12	Scope, visibility and lifetime of variables	2	3,4
3.13	Call by value, call by reference	1	3,4
4.0	**Advanced Features**	**21**	
4.1	Structures and Unions: Defining, declaring, accessing structure, structure initialization	3	5,6
4.2	Copying and comparing structure variables, operations on elements, arrays of structures, arrays within structures	3	5,6
4.3	Unions, size of structures	2	5,6
4.4	Pointers: Accessing address, declaring and initializing a pointer variable, accessing a variable using its pointer	2	5,6
4.5	Chain of pointers, pointer expressions, pointer increments, pointers and arrays, pointers and strings, array of pointers	3	5,6
4.6	File Management: Defining, opening and closing a file	2	5,6
4.7	Input/output operations on files	2	5,6
4.8	Error handling, random access to files	2	5,6
4.9	Dynamic memory allocation: malloc, calloc, free	2	5,6

Text Books for Reference

1. Ashok N. Kamthene, Programming in C, Pearson Education
2. E.Balaguruswamy, Programming in ANSI C, McGrawhill
3. P. K. Sinha&PritiSinha, Computer Fundamentals,BPB Publications

Course	Details				
Code	**CA1811104**				
Title	**COMPUTER ARCHITECTURE AND ORGANISATION**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**1/1**				
Type	**Skill Education**				
Credits	**4**	Hrs/Week	**4 Hours**	Total Hours	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Describe the fundamental organization of a computer system and addressing modes	**U**
2	Understand basic organization of memory and different types of memory	**U**
3	Explain organization and working of processing unit	**U**
4	Understanding organization of IO devices, interrupts and DMA	**U**

Module	Course Description	Hrs	CO.No.
1.0	**Basic Structure of computers**	**16**	
1.1	Functional units	2	1
1.2	Basic Operational concepts	2	1
1.3	Bus structures	2	1
1.4	Memory locations and addresses	2	1
1.5	Memory operations	2	1
1.6	Instructions and instruction sequencing	2	1
1.7	Addressing Modes	2	1
1.8	Basic I/O Operations	2	1
2.0	**Memory Organization**	**20**	
2.1	Memory system: basic concepts	1	2
2.2	Semiconductor RAM memories	2	2
2.3	Memory system considerations	1	2
2.4	Read only memories	2	2
2.5	Flash memory	1	2
2.6	Cache memory	2	2
2.7	Interleaving	2	2
2.8	Basic concepts of virtual memory	2	2
2.9	Associative memory	2	2
2.10	Secondary memory	1	2
2.11	Magnetic hard disk	2	2
2.12	Optical disk	2	2
3.0	**Processing unit**	**18**	
3.1	Fundamental concepts	2	3

3.2	Register Transfers	3	3
3.3	Performing An Arithmetic Or Logic Operations	2	3
3.4	Fetching A Word In Memory	2	3
3.5	Execution Of A Complete Instruction	2	3
3.6	Branch Instruction	2	3
3.7	Hardwired Control	1	3
3.8	A Complete Processor	1	3
3.9	Microprogrammed Control	3	3
4.0	**Input/Output Organization**	**18**	
4.1	Input/Output Organization: Accessing I/O Devices	2	4
4.2	Interrupts	3	4
4.3	Enabling And Disabling Interrupts	3	4
4.4	Handling Multiple Devices	2	4
4.5	Direct Memory Access	2	4
4.6	Bus Arbitration	2	4
4.7	Interface Circuits	2	4
4.8	Standard I/O Interfaces (PCI, SCSI, USB).	2	4

Text Books for Reference

1. HamacherVranesicZaky,ComputerOrganisation, McGraw Hill(Fifth edition)
2. M.Morris Mano-Computer Systems Architecture, Third Edition, Pearson Education

Text Books for Enrichment

3. Andrew S. Tannenbaum, Sructured Computer Organisation, Prentice Hall India Learning Private Limited
4. William Stallings , Computer Organisation and Architecture, PHI

Course	Details				
Code	**IT1811101**				
Title	**OFFICE AUTOMATION, IMAGE EDITING AND LATEX**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**1/1**				
Type	**Skill Education**				
Credits	**3**	Hrs/Week	**3 hours**	Total Hours	**54**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Create a spread sheet	C
2	Prepare a latex documents	C
3	Create animation using Flash	C
4	Modify images using Photoshop	AP

Module	Course Description	Hrs	CO.No.
1.0	**SPREADSHEETS**	13	
1.1	Introduction to Spread sheet	1	1
1.2	Creating Worksheets & feeding data	1	1
1.3	Using functions	1	1
1.4	Editing Cells and Using commands and functions	1	1
1.5	Moving and Copying	1	1
1.6	Inserting and Deleting Rows and Columns	1	1
1.7	Sorting, filtering	1	1
1.8	What If Analysis Tool- goal seek, scenario	1	1
1.9	Formatting a Worksheet	1	1
1.10	Working with Charts	1	1
1.11	Working with Macros	1	1
1.12	Pivot tables	1	1
1.13	Creation of Forms in Excel	1	1
2.0	**LATEX**	**13**	
2.1	Creating a Document in Latex	1	2
2.2	Latex Commands- Paragraph's and newlines, bold, italics and underlining, Lists	1	2
2.3	Errors	1	2
2.4	Mathematical expressions	1	2
2.5	Figures &Tables, Drawing diagram directly in Latex	1	2
2.6	Bibliography management	1	2
2.7	International language support	1	2
2.8	Document structure-section and chapters	1	2
2.9	Nomenclature	1	2

2.10	Indices	1	2
2.11	Table of Contents	1	2
2.12	Hyperlinks	1	2
2.13	Fonts & Formatting and presentations.	1	2
3.0	**FLASH**	**14**	
3.1	Introduction	1	3
3.2	Drawing,	1	3
3.3	Working with Colour	1	3
3.4	Using imported artwork	1	3
3.5	Adding sound	1	3
3.6	Working with Objects	1	3
3.7	Using layers	1	3
3.8	Using type	1	3
3.9	Using Symbols and Instances	1	3
3.10	Creating animation	1	3
3.11	Creating interactive movies	2	3
3.12	Creating Printable movies	1	3
3.13	Publishing and Exporting	1	3
4.0	**PHOTOSHOP**	**14**	
4.1	Getting image into Photoshop	1	4
4.2	Selecting	1	4
4.3	Transforming and Retouching	2	4
4.4	Drawing	1	4
4.5	Painting	1	4
4.6	Applying Filters for special effects	2	4
4.7	Designing Web pages	2	4
4.8	Creating Rollovers and Animations	2	4
4.9	Preparing Graphics for the Web	1	4
4.10	Saving and exporting images	1	4

Text Books for Reference

1 Todd Perkins, Adobe Flash CS3 Professional Hands-On Training, Peachpit Press

2 Adobe Flash CS3 Professional User Guide

3 Microsoft Office Excel –TorbenLageFrandsen

4 Latex Tutorials A primer TEX users Group

5 Adobe Photoshop CC help - Adobe

Internet Resources

- https://support.office.com/en-us/article/Excel-training
- https://www.sharelatex.com/learn
- https://helpx.adobe.com/photoshop/tutorials.html

Course	Details				
Code	**IT1811601**				
Title	**OFFICE AUTOMATION AND LATEX LAB**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**1/1**				
Type	**Skill Component**				
Credits	**3**	Hrs/Week	**3 hours**	Total Hours	**54**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Create a spread sheet	C
2	Construct worksheets in Excel and perform all basic computations	AP
3	Prepare a latex documents	C
4	Create animation using Flash	C
5	Perform professional image editing in Photoshop	AP
6	Design brochure, logo, certificates and visiting cards	C

Module	Course Description	Hrs	CO.No.
1.0	**MICROSOFT EXCEL**	13	
1.1	Charts and Pivot Tables: Activities to generate charts and pivot tables will help to visualize the information at hand. It will convey the appropriate message from the data.(2 Experiments)	6	1,2
1.2	Conditionals and Lookup Tables: Experiments that includes conditional checking, COUNTIF, AVERAGEIF etc.(2 Experiments)	7	1,2
2.0	**LATEX**	**13**	
2.1	Simple activities to generate articles	3	3
2.2	Reports	5	3
2.3	Presentations in latex	5	3
3.0	**FLASH**	**14**	
3.1	Creating Animation	5	4
3.2	Creating interactive movies	5	4
3.3	Creating Printable movies	4	4
4.0	**PHOTOSHOP**	**14**	
4.1	Add an object to an image.	1	5
4.2	Remove an object from an image.	1	5
4.3	Change the color of an object in an image	1	5
4.4	Create a pencil drawing of an image	1	5
4.5	Change the hair color of an object in an image	1	5
4.6	Design a brochure for an exhibition	2	5,6
4.7	Design a logo for your institution	2	5,6

4.8	Design a certificate of participation for a seminar	2	5,6
4.9	Design a visiting card with relevant details	1	5,6
4.10	Create a rollover button.	1	5,6
4.11	Design an attractive website	1	5,6

Text Books for Reference

1. Todd Perkins, Adobe Flash CS3 Professional Hands-On Training, Peachpit Press
2. Adobe Flash CS3 Professional User Guide
3. Microsoft Office Excel –TorbenLageFrandsen
4. Latex Tutorials A primer TEX users Group
5. Adobe Photoshop CC help - Adobe

Internet Resources

- https://support.office.com/en-us/article/Excel-training
- https://www.sharelatex.com/learn
- https://helpx.adobe.com/photoshop/tutorials.html

Course	Details				
Code	**CA1811602**				
Title	**C PROGRAMMING LAB**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**1/1**				
Type	**Skill Component**				
Credits	**4**	Hrs/Week	**Hours 4**	Total Hours	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Use the fundamentals ofC programming in trivial problem solving	U
2	Enhance skill on problem solving by constructing algorithms	U
3	Identify solution to a problem and apply control structures and user defined functions for solving the problem	Ap
4	Demonstrate the use of Strings and string handling functions	Ap
5	Apply skill of identifying appropriate programming constructs for problem solving	Ap

Module	Course Description	Hrs	CO. No.
1.0	**Testing out and interpreting a variety of simple programs**	**18**	
1.1	Demonstrate the use of the features of the language	2	1,2
1.2	Programs using basic data types	4	1,2
1.3	Programs using operators in C	4	1,2
1.4	Programs using control structures in C	8	1,2,3
2.0	Arrays, Strings and pointers	**18**	
2.1	Programs to declare, initialize, read, print and process 1-D arrays of various basic data types.	3	3,5
2.2	Processing to include, selection, sum, counting, selective sum, selective counting, reversing etc.	3	3,5
2.3	Programs to declare, initialize, read, print and process 2-D arrays of various basic data types.	2	3,5
2.4	Processing to include, selection, sum, counting, selective sum, selective counting, reversing etc. On 2-D Arrays	3	3,5
2.5	Programs involving all possible data types to familiarize the syntax of pointers in a variety of situations	2	3,5
2.6	Programs to demonstrate handling of 1-D and 2-D arrays using pointers	5	3,5
3.0	**Structures and Functions**	**18**	
3.1	Programs to declare, initialize, read, print and process structures made up of a variety of data types and structures	5	3

3.2	Programs to demonstrate declaration and processing of structure of arrays and array of structures	5	3
3.3	Programs to demonstrate use of pointers to structures	4	3
3.4	Simple Examples of declaring and using functions of the following categories (i) no argument, no return (ii) argument, no return (iii) no argument, return (iv) argument, return, all pass by value	4	3
4.0	**Files and Library functions**	**18**	
4.1	Simple Example involving use of multiple files: declaring, opening, closing, reading from and writing to text files	6	5
4.2	Example involving use of multiple files: declaring, opening, closing, reading from and writing to binary files	7	5
4.3	A variety of Examples demonstrating (i) string processing functions (ii) a variety of selected library functions	5	4

Text Books for Reference

1. Deitel&Deital, C: How to Program, Pearson Education
2. Alan R. Feuer, The C Puzzle Book, Pearson Education
3. YashvantKanetkar, Test Your C Skills, BPB Publications, 3rd Edition

SEMESTER 2				
Course Code	**Courses**	**General/ Skill**	**Credit**	**Instructional Hours/Week**
EN1812505	Reading and Writing Skills	General	4	4
IT1812202	Environmental Studies	General	4	4
MT1812204	Discrete Mathematics-II	General	4	4
CA1812106	Data Structures and Algorithms	Skill	4	4
CA1812103	Data Base Management Systems	Skill	4	4
IT1812102	Digital Electronics	Skill	4	4
CA1812603	Data Base Management Systems Lab	Skill	3	3
CA1812604	Data Structure Lab	Skill	3	3
Total			**30**	**30**

Course	Details				
Code	**EN1812505**				
Title	**READING AND WRITING SKILLS**				
Degree	**B. Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**1/2**				
Type	**General Education**				
Credits	**4**	Hrs/Week	**4 hours**	Total Hours	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Understand the mechanism of general and academic writing	U
2	Recognize the different modes of writing	U
3	To assist students to develop literal comprehension skills.	U
4	To assist students to develop increased reading efficiency.	C

Module	Course Description	Hrs	CO.No.
1.0	**Writing skill**	**36**	
1.1	Writing as a skill	3	1
1.2	Mechanism of writing	3	1
1.3	Words and sentences	3	1
1.4	Paragraph as a unit of structuring a whole text	2	1
1.5	Combining different sources	2	1
1.6	Functional use of writing- personal	2	1
1.7	Academic and business writing	3	1
1.8	Creative use of writing.	2	1
1.9	Writing process	3	2
1.10	Finding materials	2	2
1.11	Drafting	3	2
1.12	Revising	2	2
1.13	Editing	3	2
1.14	Finalizing the draft	3	2
2.0	**Reading Skills**	**36**	
2.1	What is Reading?	3	3,4
2.2	Different types of reading	6	3,4
2.3	Reading comprehension passages	5	3,4
2.4	Poem- *Don't go into the library* by Alberto Ríos	3	3,4
2.5	Poem- *Scholar* by Robert Southey	3	3,4
2.6	Essay- Francis Bacon on *Learning and How to Read Intelligently*	4	3,4
2.7	Improving vocabulary, spelling and punctuation usage	3	3,4
2.8	Subject-verb-agreement	3	3,4
2.9	*Story of an hour*- Kate Chopin	3	3,4

2.10	How to read a poem	1	3,4
2.11	How to read a story	1	3,4
2.12	How to read an essay	1	3,4

REFERENCES

1. English for Effective Communication, Oxford University Press, 2013.
2. Robert, Barraas, Students Must Write, London: Routledge, 2006.
3. Bailey, Stephen, Academic Writing, Routledge, 2006.
4. Hamp-Lyons, Liz, Ben Heasley, Study Writing, 2nd Edition. Cambridge University Press, 2008.
5. English for Effective Communication, Oxford University Press, 2013.
6. Robert, Barraas, Students Must Write, London: Routledge, 2006.
7. Bailey, Stephen, Academic Writing, Routledge, 2006.
8. Hamp-Lyons, Liz, Ben Heasley, Study Writing, 2nd Edition. Cambridge University Press, 2008.

Course	Details				
Code	**IT1812202**				
Title	**ENVIRONMENTAL STUDIES**				
Degree	**B. Voc**				
Branch(s)	**Information Technology**				
Year/Semester	½				
Type	**General Education**				
Credits	**4**	Hrs/Week	**4 hours**	Total Hours	**72**

CO No.	*Expected Course Outcomes* *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Have better awareness and concern Artificial Intelligence in Environmental Decision Support System	U
2	Understand Global Information System And Remote Sensing Application in Environment	U
3	Familiarize with role of ICT in Disaster Management	U
4	Familiarizedeveloping Green Computing Through Cloud Computing	U

Module	Course Description	Hrs	CO.No.
1.0	**AI and Environmental Decision Support System**	**18**	
1.1	Introduction	4	1
1.2	Artificial Intelligence and Environmental Issues	4	1
1.3	Environmental Decision support system	4	1
1.4	Data Interpretation And data Mining	3	1
1.5	Applications of Environmental Decision Support System	3	1
2.0	**GIS and Remote Sensing**	**18**	
2.0	Introduction	3	2
2.1	Mining Environment	2	2
2.2	Urban Environment Management	2	2
2.3	GIS Solutions for Environmental management	1	2
2.4	Enterprise GIS for Environmental management	2	2
2.5	GIS in the Field	2	2
2.6	GIS on the web	2	2
2.7	GIS for Environmental Data Management and Analysis	2	2
2.8	GIS tools for Environmental management	2	2
3.0	**ICT for Disaster Risk Management**	**18**	
3.1	Need for Information In Disaster Risk Management	3	3
3.2	ICT for Disaster Mitigation	3	3
3.3	ICT for Disaster Preparedness	3	3
3.4	ICT for Disaster response	3	3
3.5	ICT for Disaster Recovery and Reconstruction	3	3
3.6	Building Regional and International Networks	3	3

4.0	**Green Cloud Computing And Environmental Sustainability**	**18**	
4.1	Green Computing	1	4
4.2	Green Initiatives in Information Technology	2	4
4.3	Introduction to cloud computing	1	4
4.4	Cloud Computing Characteristics	2	4
4.4	Components of Cloud Computing	2	4
4.6	Cloud Computing Deployment Models	2	4
4.7	Cloud Computing And Energy usage Model	2	4
4.8	Features of cloud Enabling Green Computing	2	4
4.9	Towards Energy Efficiency of Cloud Computing	2	4
4.10	Green Cloud Architecture	2	4

Text Books for Reference

1. U Cortes, M Sanchez-Marre and L Ceccaroni "Artificial Intelligence and Environmental Decision Supprt System " Proceedings Applied Intelligence(Mod 1)
2. S SenthilKumar , S Arivazhagan, N Rangarajan –"Remote Sensing And GIS Applications in Environmental Sciences" Journal Environ. Nanotechnol volume2(Mod 2)
3. GIS Solutions for Environmental Management –Mapping Your Environmental Management Strategy by ESRI (Mod 2)
4. ICT for Disaster Risk Mangement – Asian Disaster Preparedness Center Academy of ICT Essentials for Government Leaders (Mod 3)
5. Sheikh jahanZaib, Raqeeb UI Hassan,OmarFarooq Khan "Green Computing and Initiatives for Environmental issues" IJCSMC (Mod 4)
6. Saurabh Kumar Garg And RajkumarBuyya-"Green Cloud Computing and environmental Sustainability" (Mod 4)

Course	Details				
Code	**MT1812204**				
Title	**DISCRETE MATHEMATICS -II**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	½				
Type	**General Component**				
Credits	**4**	Hours/week	**4**	Total hours	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Solve real world problems using graphs and trees, both quantitatively and qualitatively	Ap
2	Explain the combination of logic gates	U
3	To work with the basics of matrices and analysis its application in computer science.	Ap

Module	Course Description	Hrs	CO.No
1.0	**Graphs**	**18**	
1.1	Graphs and Graph models	3	1
1.2	Graph Terminology and Special type of Graphs	4	1
1.3	Representing Graphs and Graph Isomorphism	4	1
1.4	Connectivity	3	1
1.5	Euler and Hamilton Paths	4	1
2.0	**Trees**	**17**	
2.1	Introduction to Trees	4	1
2.2	Application of Trees	3	1
2.3	Tree Traversal	5	1
2.4	Spanning Trees	5	1
3.0	**Boolean Algebra**	**17**	
3.1	Boolean Function	7	2
3.2	Representing Boolean Functions	3	2
3.3	Logic Gates	6	2
4.0	**Matrices**	**20**	
4.1	Definition and types of Matrices	2	3
4.2	Operation of matrices	3	3
4.3	Adjoint, Inverse,Rank	4	3
4.4	Cramer's rule	2	3
4.5	Dependence of vectors	2	3
4.6	Eigenvectors of a matrix	2	3

4.7	Cayley- Hamilton theorem	2	3
4.8	Determinants- Definition, minor, cofactors, properties of determinants.	3	3

Text Books

1. Kenneth H Rosen; Discrete Mathematics and its applications; 6th Edition; Tata McGraw-Hill Publishing Company Limited
2. Frank Ayres Jr: Matrices, Schaum‟s Outline Series ,TMH Edition

Module I: Graphs (18 hrs)

Text 1 Chapter 8 (Sections 8.1, 8.2, 8.3, 8.4 and 8.5 only)

Module II: Trees (17 hrs)

Text 1 Chapter 9 (Sections 9.1, 9.2, 9.3 and 9.4 only)

Module III: Boolean Algebra (17 hrs)

Text 1 Chapter 10 (Sections 10.1, 10.2 and 10.3 only)

Module IV: Matrices (20 hrs)

Text 2. Relevant Sections of Chapters 2, 5 , 10 , 19 and 23 (Proofs of all Theorems in Module IV are Excluded)

Text Books for References

1. Clifford Stien, Robert L Drysdale, KennethBogart ; Discrete Mathematics for Computer Scientists; Pearson Education; Dorling Kindersley India Pvt. Ltd
2. Kenneth A Ross; Charles R.B. Wright ; Discrete Mathematics; Pearson Education; Dorling Kindersley India Pvt.Ltd
3. Ralph P. Grimaldi, B.V.Ramana; Discrete And Combinatorial MathematicsPearson Education; Dorling Kindersley India Pvt. Ltd
4. Richard Johnsonbaugh; Discrete Mathematics; Pearson Education; Dorling Kindersley India Pvt.Ltd
5. Winfried Karl Grassman, Jean-Paul Tremblay; Logic And Discrete Mathematics A Computer Science Perspective ; Pearson Education; Dorling Kindersley India Pvt. L

Course	Details				
Code	**CA1812106**				
Title	**DATA STRUCTURES AND ALGORITHMS**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	½				
Type	**Skill Component**				
Credits	**4**	Hrs/Week	**4 hours**	Total Hours	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Understand different programming methodologies& Complexity of algorithms	U
2	Design and implement Data structures such as linked list, stack, queue and tree by using C as the programming language and using static or dynamic implementations.	C
3	Demonstrate different sorting, searching techniques and understand various file organizations.	AP
4	Represent and manipulate data using non linear data structures like trees and graphs to design algorithms for various applications.	AP

Module	Course Description	Hrs	CO.No.
1.0	**Introduction to programming methodologies & Complexity of algorithms**	18	
1.1	Introduction to programming methodologies	1	1
1.2	Structured approach	1	1
1.3	Stepwise refinement techniques	1	1
1.4	Programming style, Documentation	2	1
1.5	Analysis of algorithms: frequency count	1	1
1.6	Definition of Big O notation	1	1
1.7	Asymptotic Analysis of simple algorithms	1	1
1.8	Recursive and iterative algorithms	2	1
1.9	Study of basic data structures: Vectors and Arrays	1	2
1.10	Linked lists: Singly linked list	1	2
1.11	Doubly linked list, Circular linked list	3	2
1.12	Operations on linked list	3	2
2.0	**Basic data structures**	**18**	
2.1	Stacks: Introduction, Definition	1	2
2.2	Representation of stack	1	2
2.3	Operations on Stacks	2	2
2.4	Applications of stack: Evaluation of Arithmetic expressions	2	2
2.5	Queues: Introduction, Definition	1	2

2.6	Representation of queues	2	2
2.7	Various Queue structures: Circular queue	2	2
2.8	Dequeue	2	2
2.9	Priority queue	2	2
2.10	Multiple stacks and queues, Applications	3	2
3.0	**Sorting & File Organization**	**18**	
3.1	Internal and external sorting techniques	1	3
3.2	Selectionsort	1	3
3.3	Bubble sort	1	3
3.4	Insertion sort	1	3
3.5	Merge sort	2	3
3.6	Quick sort	2	3
3.7	Heaps and Heap sort	2	3
3.8	Searching – linear and binary	2	3
3.9	File organizations	2	3
3.10	External sorting – sorting with disks, sorting with tapes	2	3
4.0	**Non linear data structures**		
4.1	Trees: - m-ary Tree	2	4
4.2	Binary Trees – level and height of the tree	2	4
4.3	Complete-binary tree representation using array	2	4
4.4	Tree traversals (Recursive and non-recursive)	2	4
4.5	Applications	2	4
4.6	Binary search tree – creation, insertion and deletion and search Operations	2	4
4.7	Applications	2	4
4.8	Graphs: Representation of graphs	2	4
4.9	BFS and DFS(Analysis not required)	2	4

Text Books for Reference

1. Tremblay and Sorenson, Introduction to data structures with applications, TMH.
2. Wirth N., Algorithms + Data Structures = Programs, Prentice Hall
3. Achuthsankar S. N. and Mahalakshmi T., Data Structures Using C, Prentice Hall India
4. Hugges J. K., & J. I. Michtm, A Structured Approach to Programming, Prentice Hall.
5. Thomas H. Corman, Charles E. Leiserson and Ronald L. Rivest., Introduction to Algorithms, Prentice Hall India
6. Samanta D, Classic Data Structures, Prentice Hall India, 2/e, 2009.

Course	Details				
Code	**CA1812103**				
Title	**DATA BASE MANAGEMENT SYSTEMS**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	½				
Type	**Skill Component**				
Credits	**4**	Hrs/Week	**4 hours**	Total Hours	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Characterize the data base approach	U
2	Discuss the relations, relationship models and relational database schemas in detail	U
3	Practice with the SQL queries	Ap
4	Understand the Normalization and Indexing Structures for Files	U
5	Discuss Transaction Processing and Database Security	U

Module	Course Description	Hrs	CO.No.
1.0	**Introduction**	**12**	
1.1	Characteristics of the Database Approach	1	1
1.2	Database users :DBA	1	1
1.3	Database users: Database Designers	1	1
1.4	Database users: End users	1	1
1.5	Advantages of using the DBMS Approach	1	1
1.6	Data models, Schemas , and Instances	2	1
1.7	Three-Schema Architecture and Data Independence	2	1
1.8	DBMS Languages: DDL, DML	1	1
1.9	The Database System Environment	1	1
1.10	DBMS Component Modules.	1	1
2.0	**Unit 2: Relational Model**	**16**	
2.1	Entity Relationship Modeling: Introduction	1	2
2.2	Entity Types , Entity Sets , Attributes and Keys	1	2
2.3	Relationship Types	1	2
2.4	Relationship Sets, Roles	1	2

2.5	Structural Constraints	1	2
2.6	Weak Entity Types	1	2
2.7	Notation for ER diagrams – Sample ER diagrams	1	2
2.8	Relational Model concepts	1	2
2.9	Domains ,Attributes, Tuples, and Relations	1	2
2.10	Characteristics of Relations	1	2
2.11	Relational Model Constraints	1	2
2.12	Relational Database Schemas	1	2
2.13	Domain Constraints, Key Constraints	1	2
2.14	Relational Database Schemas	1	2
2.15	Entity Integrity	1	2
2.16	Referential Integrity, and Foreign Keys .	1	2
3.0	**SQL**	**14**	
3.1	Data Types	1	3
3.2	Data Definition commands : CREATE , ALTER ,DROP	1	3
3.3	Adding constraints in SQL	1	3
3.4	Basic SQL Queries : INSERT ,SELECT, DELETE ,UPDATE	1	3
3.5	Substring comparison using LIKE operator,BETWEEN operator	1	3
3.6	Ordering of rows	1	3
3.7	SQL set operations UNION, EXCEPT, INTERSECT	1	3
3.8	Complex Queries	1	3
3.9	Comparison involving NULL and Three-valued logic	1	3
3.10	Nested queries	1	3
3.11	EXISTS and UNIQUE functions	1	3
3.12	Renaming of attributes	1	3
3.13	Joining of tables, Aggregate functions ,Grouping	1	3
3.14	Managing Views.	1	3
4.0	**Normalization and Indexing Structures for Files**	**15**	
4.1	Normalization	1	4
4.2	Informal Design Guidelines for Relational Schemas	2	4
4.3	Functional Dependencies	1	4
4.4	Normal forms : First Normal Form	1	4
4.5	Second Normal Form	1	4
4.6	Third Normal Form	1	4
4.7	BCNF.	2	4
4.8	Indexing Structures for files	1	4
4.9	Types of Single-Level Ordered Indexes	2	4
4.10	Primary Indexes	1	4
4.11	Clustering Indexes,	1	4
4.12	Secondary Indexes.	1	4
5.0	**Transaction Processing and Database Security**	**15**	
5.1	Transaction Processing -Introduction to Transaction Processing	2	5
5.2	Transaction and System Concepts	1	5
5.3	Desirable properties of Transactions	1	5

5.4	Database Security and Authorization	2	5
5.5	Types of Security	1	5
5.6	Control measures	1	5
5.7	Database Security and DBA	2	5
5.8	Access Control	1	5
5.9	User Accounts	1	5
5.10	Database Audits	1	5
5.11	Access Control based on Granting and Revoking Privileges	2	5

Text Books for Reference

1. RamezElmasri and ShamkantB.Navathe - DATABASE SYSTEMS , Sixth Edition, PearsonEducation.

Text Books for Enrichment

2. C.J Date- An Introduction to Database Systems, Eighth edition, Pearson Education,2003
3. ReghuRamakrishnan and Johannes Gehrke- Database Management Systems , Third edition,McGraw Hill International Edition.
4. DipinDesai , An Introduction to Database Systems , First Edition, Galgoria Publications .

Course	Details				
Code	**IT1812102**				
Title	**DIGITAL ELECTRONICS**				
Degree	**B. Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**1/2**				
Type	**Skill Component**				
Credits	**4**	Hrs/Week	**4 hours**	Total Hours	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Understand binary, hexadecimal and octal number systems and their arithmetic	U
2	Manipulate and design combinational logic circuits	Ap
3	Understand how logic circuits and Boolean algebra forms as the basics of digital computer	U
4	Demonstrate the building up of Sequential and combinational logic from basic gates.	Ap
5	Understand different types of memory organization.	U

Module	Course Description	Hrs	CO.No.
1.0	**Number Systems**	18	
1.1	Base of a number system, Positional number system	1	1
1.2	Popular number systems(Decimal, Binary, Octal and Hexadecimal)	2	1
1.3	Counting in binary number system	1	1
1.4	Conversion-Decimal to Binary, Binary to Decimal	2	1
1.5	Decimal to Octal, Octal to decimal and binary	2	1
1.6	Decimal to hexadecimal, Hexadecimal to decimal, Binary and octal	2	1
1.7	Concept of binary addition and subtraction	1	1
1.8	Complements in binary number systems,1s Complement, 2s Complement and their applications	2	1
1.9	Number representation in memory- bi-stable devices	1	1
1.10	Signed magnitude form	1	1
1.11	Representation of real numbers	1	1
1.12	BCD numbers- concept and addition	1	1
1.13	Concept of parity bit.	1	1
2.0	**Boolean Algebra and Gate Networks**	**18**	
2.1	Logic gates- AND, OR, NOT, NAND and NOR Truth tables and graphical representation	2	1,2,3
2.2	Logic gates- NAND and NOR Truth tables and graphical representation	2	1,2,3
2.3	Basic laws of Boolean Algebra	1	1,2,3
2.4	Simplification of Expressions, De Morgan’s theorems	2	1,2,3
2.5	Canonical expressions	1	1,2,3
2.6	Min terms and Max terms	1	1,2,3
2.7	SOP and POS expressions	1	1,2,3

2.8	Simplification of expression using K-MAP (up to 4 variables)	2	1,2,3
2.9	Representation of simplified expressions using NAND/NOR Gates	2	1,2,3
2.10	Don't care conditions	1	1,2,3
2.11	XOR and its applications	2	1,2,3
2.12	parity generator and checker	1	1,2,3
3.0	**Sequential and Combinational Logic**	**18**	
3.1	Flip flops- Latch, Clocked, RS, JK	2	4
3.2	Flip flops-T, D and Master slave	2	4
3.3	Triggering of flip flops	1	4
3.4	Counters- Synchronous and asynchronous	2	4
3.5	BCD, Ripple counters	2	4
3.6	Half adder, Full adder(need and circuit diagram)	2	4
3.7	Encoders, Decoders	2	4
3.8	Multiplexers and De-multiplexers(working of each with diagram)	2	4
3.9	Analog to digital and digital to analog converters (Diagram and working principle)	3	4
4.0	**The Memory Elements**	**18**	
4.1	Random Access Memories	2	5
4.2	Static Random Access Memories	2	5
4.3	Dynamic Random Access Memories	2	5
4.4	Read Only Memories	3	5
4.5	Magnetic Disk Memories	2	5
4.6	Magnetic Bubble and CCD Memories Concept of Registers	3	5
4.7	Types of Registers	2	5
4.8	Application of Shift Registers	2	5

Text Books for Reference

1. M.M.Mano-Digital Logic and Computer design
2. Thomas C Bartee- Digital computer Fundamentals
3. Floyd- Digital Electronics
4. Malvino& Leach- Digital Principles and Applications

Course	Details				
Code	**CA1812603**				
Title	**DATA BASE MANAGEMENT SYSTEMSLAB**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**1/2**				
Type	**Skill Component**				
Credits	**3**	Hrs/Week	**3 hours**	Total Hours	**54**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Apply DDL commands in SQL to create, modify, and remove database objects	U
2	Use Basic SQL queries INSERT, SELECT, DELETE, UPDATE to multiple tables	Ap
3	Showordering of rows using ORDER BY option	Ap
4	Manipulate tables using SET operations	Ap
5	Apply complex queries inSQL	Ap
6	Make views in SQL	Ap
7	Apply the concepts of object-oriented programming	Ap

Module	Course Description	Hrs	CO No
1.0	**SQL - Data definition commands**	30	
1.1	SQL statement for creating, listing, dropping, checking, updating tables	3	1
1.2	Record manipulation using – insert, delete, update	3	1
1.3	Experiments that clarify the importance of keys	3	1
1.4	Queries with an Expression and a column alias	3	1
1.5	A simple query that aggregates (groups) over a whole table	3	1
1.6	A query with a literal string in the SELECT list	3	1
1.7	Queries with sub string comparison and ordering	3	1
1.8	Query using the "IS NULL" syntax to list (compare '=NULL' instead of IS NULL")	3	2
1.9	Finding values within a certain range	3	4
1.10	Using the --"BETWEEN" keyword	3	4
2.0	**Complex Queries**	**25**	
2.1	A Join between two tables (foreign key)	5	5
2.2	Nested queries	5	5
2.3	The EXISTS and UNIQUE function in SQL	5	5
2.4	Renaming attributes and joined tables	5	5
2.5	Statements related with VIEWs	5	6

Text Books for Reference

1. Elmasri&Navathe , Fundamentals of Database Systems, Pearson Education.
   4.2 Additional References
2. Ramon A. Mata-toledo and Pauline K. Cushman, Fundamentals of Relational Data Bases, Schaum Outlines, Tata McGraw Hill
3. Abraham Silberschatz, Henry F. Korth, Database System Concepts, McGraw Hill

Course	Details				
Code	**CA1812604**				
Title	**DATA STRUCTURELAB**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**1/2**				
Type	**Skill Component**				
Credits	**3**	Hrs/Week	**3 hours**	Total Hours	**54**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Implement basic linear and non linear data structures and their major operations.	Ap
2	Implement representation of graphs	Ap
3	Implement algorithms for various sorting and searching techniques	Ap

Module	Course Description	Hrs	CO.No.
1.0	**Linear and Non linear data structures**	30	
1.1	Implementation of stack using array	3	1
1.2	Implementation of queue using array	3	1
1.3	Implementation of various linked list operations	6	1
1.4	Implementation of stack using linked list	3	1
1.5	Implementation of queue using linked list	3	1
1.6	Implementation of trees using linked list	6	1
1.7	Implementation of binary trees	6	1
2.0	**Graphs**	**6**	
2.1	Breadth First Search	3	2
2.2	Depth First Search	3	2
3.0	**Sorting and Searching Techniques**	**18**	
3.1	Selectionsort	3	3
3.2	Bubble sort	3	3
3.3	Insertion sort	3	3
3.4	Merge sort	3	3
3.5	Quick sort	3	3
3.6	Linear search and binary search	3	3

Text Books for Reference

1. Tremblay and Sorenson, Introduction to data structures with applications, TMH.
2. Wirth N., Algorithms + Data Structures = Programs, Prentice Hall
3. Achuthsankar S. N. and Mahalakshmi T., Data Structures Using C, Prentice Hall India
4. Hugges J. K., & J. I. Michtm, A Structured Approach to Programming, Prentice Hall.
5. Thomas H. Corman, Charles E. Leiserson and Ronald L. Rivest., Introduction to Algorithms, Prentice Hall India
6. Samanta D, Classic Data Structures, Prentice Hall India, 2/e, 2009.

SEMESTER 3				
Course Code	**Courses**	**General/ Skill**	**Credit**	**Instructional Hours/Week**
ST1813206	Statistical Methods And Probability	General	4	4
EN1813507	Social Skills	General	4	4
CM1813201	Business informatics and Principles of Accounting	General	4	4
CA1813110	Object Oriented Programming using Java	Skill	4	4
CA1813111	Software Engineering and Testing	Skill	4	4
CA1813107	Microprocessor And PC Hardware	Skill	4	4
CA1813605	Java Programming Lab	Skill	3	3
CM1813601	Business Accounting Lab	Skill	3	3
Total			**30**	**30**

Course	Details				
Code	**ST1813206**				
Title	**STATISTICAL METHODS AND PROBABILITY**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**2/3**				
Type	**General Component**				
Credits	**4**	Hrs/Week	**4hours**	Total Hours	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Define and use the basic terminology of statistics	R,AP
2	Analyse and compare different sets of data	An
3	Classify the data by means of diagrams and graph	Ap
4	Recall the meanings of statistical terms	R
5	Explain the statistical concepts of central tendency, dispersion skewness, Kurtosis & index numbers	U
6	Explain the concept of correlation and regression coefficient	Ap
7	Define the basic rules of probability	U
8	Solve the problems in probability	Ap
9	Explain the concepts of random variables	U
11	Differentiate the ideas between discrete and continuous random variables.	An
12	To develop the skill for applying appropriate statistical tools and techniques in different situations.	An, Ap

Module	Course Description	Hrs	CO.No.
1.0	**Different Aspects Of Data, And Its Collection**	**20**	
1.1	Introducing Statistics- meaning, definition	2	1
1.2	Primary and secondary data	2	1
1.3	Bar chart, pie diagram, histogram, frequency polygon, ogives,.	2	3
1.4	Measures of central tendency- Arithmetic Mean, Median, Mode,	2	5,6
1.5	Geometric Mean, Harmonic Mean and Weighted averages. Merits and demerits.	2	5,6
1.6	Measures of dispersion - Mean Deviation, Standard Deviation and standard deviation.	2	5,6
1.7	Coefficient of variation	2	5,6
2.0	**CORRELATION**	**18**	
2.1	Meaning and definition	2	6
2.2	Types of correlation	2	6
2.3	Methods of measuring correlation for ungrouped data	2	6
2.4	Karl Pearson’s co-efficient of correlation and its interpretation	3	6
2.5	Spearman’s rank correlation	2	6
2.6	Regression analysis-meaning and definition, types of regression,	3	6

	regression lines		
2.7	Properties of correlation and regression co efficient	2	
2.8	Comparison of correlation and regression	2	8
2.10	Box plot.	2	3
3.0	**TIME SERIOUS ANALYSIS**	**15**	
3.1	Meaning and definition	5	12
3.2	Measurement of long term trend- method of semi average, moving average method	5	12
3.3	Method of least square- fitting of a second degree trend	5	12
4.0	**PROBABILITY**	**19**	
4.1	Concept of probability- addition and multiplication theorem on probability	2	8
4.2	Conditional probability. Independence of events	3	9
4.3	Bayes' theorem	2	9
4.4	Concept of random variables. discrete and continuous random variables.	4	10
4.5	Mean, standard deviation, M.G.F,	4	10
4.6	Simple problems based on binomial, poisson and normal distributions	4	11

Text Books for Reference

1. Goon, A. M.,Gupta M. K. and Dasgupta,B(1986).Fundamentals of Statistics,Volume1, world press, Kolkota
2. Gupta, S. C. and Kapoor, V. K.(2002). Fundamentals of Mathematical Statistics, 11th edition, Sultan Chand and Sons.
3. Gupta, S. C. and Kapoor, V. K.(2007).Fundamentals of applied StatisticsSultanChandand Sons.
4. R.S.N. Pillai, Bagavathi(2010). STATISTICS- Theory and Practice, S.Chand publications.
5. Elhance D.L, Fundamentals of Statistics, KitabMahal, Allahabad

Course	Details				
Code	**EN1813507**				
Title	**SOCIAL SKILLS**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**2/3**				
Type	**General Component**				
Credits	**4**	Hrs/Week	**4 hours**	Total Hours	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Understand the concept of social skills by doing tasks	U
2	Develop life skills to cope with stress and do better time management	Ap
3	Enhance personality development and communication skills of a student	Ap
4	Prepare for interviews	Ap

Module	Course Description	Hrs	CO.No.
1.0	**Communication**	**36**	
1.1	Development of competency/proficiency in English and Communication	4	1
1.2	Oral/spoken communication skill	2	1
1.3	Testing – voice and accent	2	1
1.4	Voice clarity	2	1
1.5	Voice modulation & intonation	2	1
1.6	Word stress	2	1
1.7	Components of Effective Communication	4	1
1.8	KISS (keep it short & simple) in communication	4	1
1.9	Listening	2	1
1.10	Non-verbal communication	2	1
1.11	Enhance the writing skills in English	4	1
1.12	Enhance their grammar usage	4	1
1.13	TOCSE Process for presentation	2	1
2.0	**Life Skills**	**18**	
2.1	Life skills	1	2
2.2	Attitudes- types	1	2
2.3	Positive attitude	1	2
2.4	Emotional intelligence(ei)	1	2
2.5	Four branch model	1	2
2.6	Measuring emotional intelligence	1	2
2.7	Ways to improve ei	1	2
2.8	Time management	1	2
2.9	Major blocks to time management	1	2

2.10	Time management techniques for students	1	2
2.11	Stress management- causes	1	2
2.12	Techniques to overcome stress	1	2
2.13	Manage job issues	1	2
2.14	Principles of good time management	2	2
2.15	Stress management	1	2
2.16	Stress interview.	2	2
3.0	**Personality Development**	**18**	
3.1	Development- Introspection	2	3
3.2	Self assessment	2	3
3.3	Self appraisal	2	3
3.4	Self development	2	3
3.5	Self interrogation	1	3
3.6	Setting personal mission and preparing its statement	2	3
3.7	Need for setting a personal mission	2	3
3.8	Process for preparing a mission statement	2	3
3.9	Winning factors for a personal mission	1	3
3.10	Characteristics of a personal mission.	2	3

Text Books for Reference

1. R. M. Onkar, Personality development and Career Management- A Pragmatic perspective, S. Chand Publishers, 2009
2. S. I. Hariharan, N. Sundarajan, S. P. Shanmugapriya, Soft Skills, Mjp Publishers, 2011
3. M. S. Rao, Soft Skills - Enhancing Employability: Connecting Campus with Corporate, I. K. International Publishing House Pvt Ltd, 2010
4. Gopalaswamy Ramesh, Mahadevan Ramesh, The Ace of Soft Skills: Attitude, Communication and Etiquette for Success, Pearson Education, 2013
5. Philip Burnard, Interpersonal Skills Training, Kogan Page, 120 Pentonville Road, London N19JN.
6. Philip Burnard, Acquiring Interpersonal Skills – A handbook of experiential learning for health professionals, Second Edition, Springer-Science+Business Media, B. V.

Course	Details				
Code	**CM1813201**				
Title	**BUSINESS INFORMATICS AND PRINCIPLES OF ACCOUNTING**				
Degree	**B. Voc Information Technology**				
Branch(s)	**Computer Science**				
Year/Semester	**2/3**				
Type	**General Education**				
Credits	**4**	Hrs/Week	**4 hours**	Total Hours	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	**H**ave an awareness about the role of IT in business	U
2	**H**ave knowledge of basic Accounting Principles	Ap
3	**U**nderstand how to manage journal and ledgers	Ap
4	**H**ave knowledge of how to prepare Final Accounts	Ap
5	**H**ave basic knowledge of an Accounting Package	U

Module	Course Description	Hrs	CO.No.
1.0	**Business Informatics**	18	
1.1	History of e-commerce, definition	1	1
1.2	Classification- B2B, B2C, C2C, G2C, B2G	1	1
1.3	Electronic payment systems	1	1
1.4	Relevance of currencies,	1	1
1.5	Credit cards, debit cards, smart cards	1	1
1.6	E-credit accounts	1	1
1.7	E-money	1	1
1.8	Security concerns in e commerce,	1	1
1.9	Authenticity, privacy, integrity	1	1
1.10	Non-repudiation,	1	1
1.11	Encryption	1	1
1.12	Secret key	1	1
1.13	Cryptography, public key cryptography	1	1
1.14	Digital signatures	1	1
1.15	Firewalls	1	1
1.16	Mobile commerce,	1	1
1.17	Intellectual property law	1	1
1.18	Common law and EC legal issues.	1	1
2.0	**Accounting Concepts**	**18**	
2.1	Basic Accounting Principles and Conventions	7	2-4
2.1	Accounting standards	3	2-4
2.3	Accounting v/s Book Keeping Terms used in accounting	5	2-4

2.4	Users of accounting information	3	4
3.0	**Recording of transactions**	**18**	
3.1	Journals	3	2-4
3.2	Subsidiary Books	1	2-4
3.3	Ledger	3	2-4
3.4	Cash Book	2	2-4
3.5	Bank Reconciliation Statement	2	2-4
3.6	Trial Balance	2	2-4
3.7	Depreciation: Meaning	2	2-4
3.8	Need & importance of depreciation	1	2-4
3.9	Methods of charging depreciation.	2	2-4
4.0	**Preparation of final accounts**	**18**	
4.1	Preparation of Trading and Profit & Loss Account and Balance Sheet of sole proprietary business with adjustments.:	9	4
4.2	Computerized Accounting	2	5
4.3	Journalizing and preparing final accounts using TALLY	7	5

Text Books for Reference

1. Erfan Turban et.al.,Electronic Commerce–A Managerial Perspective, Pearson Education.
2. Anil Chowdhry, Fundamentals of Accounting & Financial Analysis, Pearson Education
3. R.Kalokota, Andrew V. Winston, Electronic Commerce – A Manger's guide, Pearson.
4. Jane Reimers, Financial accounting, Pearson Education
5. Rajesh Agarwal& R. Srinivasan , Accounting Made Easy, Tata McGraw –Hill
6. Dr. S. N. Maheshwari , Financial Accounting for Management, Vikas

Course	Details				
Code	**CA1813110**				
Title	**OBJECT ORIENTED PROGRAMMING USING JAVA**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**2/3**				
Type	**Skill Component**				
Credits	**4**	Hrs/Week	**4 hours**	Total Hours	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Understand platform independent pure object oriented programming paradigm through Java.	U
2	Write Java application programs using OOP principles and proper program structuring	C
3	Understand the concepts of inheritance, interface and packages in Java.	U
4	Write Java programs to implement error handling techniques using exception handling and creating applets	C
5	Use standard Java's API's and Java I/O classes when writing applications.	Ap
6	Apply GUI components in event handling for user friendly program interface	Ap
7	Apply the JDBC interface for connecting Java programs with SQL-based databases	Ap

Module	Course Description	Hrs	CO.No.
1.0	**Introduction & Class**	**20**	
1.1	Basic concepts of object oriented programming	1	1
1.2	Java history, features, java environment	1	1
1.3	Overview of Java language	2	1
1.4	Java Program Structure, Java tokens	1	1
1.5	Implementing a java program, Java virtual machine	1	1
1.6	Constants, Variables, Data types	1	1
1.7	Variable declaration, assignment statement	1	1
1.8	Scope of variables, symbolic constants, type casting, getting values of variables	2	1
1.9	Java Operators	2	1
1.10	Decision making and branching	2	1,2
1.11	Decision making and looping	2	1,2
1.12	Class, objects, constructors	2	1,2
1.13	Method Overloading, static members	2	1,2
2.0	**Inheritance , Interface and Package**	**16**	
2.1	Inheritance	2	3
2.2	Overriding methods, Final variables and methods, final classes	2	3

2.3	Abstract methods and classes	2	3
2.4	Visibility control	1	3
2.5	Interfaces	2	3
2.6	Packages	2	3
2.7	Multithreaded Programming: Creating threads, Extending thread class	2	3
2.8	Stopping and blocking thread, Lifecycle of a thread	2	3
2.9	Implementing Runnable interface	1	3
3.0	**Exception Handling and Applets**	**18**	
3.1	Types of errors, Exceptions	2	4
3.2	The Try-Catch Statement	2	4
3.3	Catching more than one Exception	2	4
3.4	The Finally Clause	2	4
3.5	Generating Exceptions	2	4
3.6	Applet Programming: Introduction, Applets and Applications	2	4
3.7	Developing applets, Applet life cycle	2	4
3.8	Creating an executable applet, Designing web page, Applet tag	2	4
3.9	Adding applet to HTML file, Running the applet	2	4
4.0	**Java IO**	**18**	
4.1	Managing Input/Output files in Java: Introduction, Concept of streams, stream classes	2	5
4.2	Byte Stream classes, Character Stream classes, Using streams	1	5
4.3	RandomAccessFile, StreamTokenizer, File Class	2	5
4.4	Input/Output Exceptions,Creation of files	2	5
4.5	Reading/Writing Characters	1	5
4.6	Reading/Writing bytes	1	6
4.7	Primitive data types	1	6
4.8	Concatenating and Buffering files	1	6
4.9	Random Access files	1	6
4.10	Interactive Input and Output: Simple Input and Output	1	6
4.11	Graphical Input and Output	3	6
4.12	JDBC	2	7

Text Books for Reference

1. E. Balagurusamy, Programming with Java, McGraw Hill Education
2. Deitel&Deitel, Java: How To Program, Pearson Education
3. Java2: The Complete Reference Seventh Edition: Herbert Schildt

Course	Details				
Code	**CA1813111**				
Title	**SOFTWARE ENGINEERING AND TESTING**				
Degree	**B.Voc Information Technology**				
Branch(s)	**Computer Science**				
Year/Semester	**2/3**				
Type	**Skill Component**				
Credits	**4**	Hrs/Week	**4 hours**	Total Hours	**72**

CO No.	*Expected Course Outcomes* *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Research the state-of-the-art, and application of Software Engineering in developing software.	U
2	Analyse different approaches to software developing and testing	An
3	Understand different aspect in software design and implementation	U
4	Familiarize software testing, different testing techniques and design test cases	U
5	Familiarize different types of tools in testing manual and automated testing	U

Module	Course Description	Hrs	CO.No.
1.0	**Introduction to Software Engineering**	**18**	
1.1	Professional Software development	2	1
1.2	Software Development Life Cycle SDLC	2	1
1.3	Software Process models	3	1,2
1.4	Agile software development	2	1,2
1.5	Functional And non functional Requirements	1	1,2
1.6	Requirement Specification	1	1,2
1.7	Requirement Engineering process	3	1,2
1.9	System context model	1	1,2
1.10	Interaction Model	1	1,2
1.11	Structural Model	1	1,2
1.12	Behavioral Model	1	1,2
2.0	**Software Design & Implementation**	**18**	
2.1	Architectural Design	3	3
2.2	Architectural Patterns	3	3
2.3	Application Architecture	3	3
2.4	Object Oriented Design using UML	3	3
2.5	Design Patterns	3	3
2.6	Implementation Issues	3	3
3.0	**Software Testing**	**18**	
3.1	Software testing fundamentals	2	4
3.2	Test Case Design	1	4

3.3	White box Testing	1	4
3.4	Basic Path Testing	1	4
3.5	Control Structure Testing	2	4
3.6	Black box Testing	3	4
3.7	Unit testing	2	4
3.8	Integration Testing	2	4
3.9	Validation Testing	2	4
3.10	System testing and User Acceptance Testing	2	4
4.0	**Tool support for testing**	**18**	
4.1	Tool support for testing Automated Testing	2	5
4.2	Types of Test tool- Test management tools	1	5
4.3	Requirements management tools,	2	5
4.4	Incident management tools	1	5
4.5	Configuration management tools	2	5
4.6	Dynamic analysis tools	1	5
4.7	Monitoring tools	2	5
4.8	Manual testing	1	5
4.9	Goals of manual testing	2	5
4.10	Comparison of Manual testing and Automated testing	2	5
4.11	Familiarization of a test tool (Selenium IDE)	2	5

REFERENCE:

1. Ian Sommervile, Software Engineering, Ninth Edition. (Module1,2)
2. Roger S Pressman, Software Engineering A Practitioners Approach, McGraw-Hill Series, fifth edition. (Module 3)
3. Dorothy Graham, Erik Van Veenendaal, Isabel Evans, Rex Black, Foundations of Software Testing, Gaynor Redvers-Mutton, Third Edition. (Module 4)

Course	Details				
Code	**CA1813107**				
Title	**MICROPROCESSOR AND PC HARDWARE**				
Degree	**B. Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**2/3**				
Type	**Skill Component**				
Credits	**4**	Hrs/Week	**4 hours**	Total Hours	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Explain the general architecture of 8085 microprocessor	U
2	Classify the instruction set of 8085 microprocessor and distinguish the use of different instructions	Ap
3	Identify different components and their functions on the motherboard	U
4	Understand the operation of hard disk	U
5	Identify the distinguishing features of physical memory, memory modules and memory areas.	U

Module	Course Description	Hrs	CO.No.
1.0	**Microprocessor8085**	**18**	
1.1	Introduction to microprocessors	2	1
1.2	The concept of 8085 - Intel 8085 introduction	3	1
1.3	Architecture	1	1
1.4	Pin diagram	2	1
1.5	Instruction cycle	3	1
1.6	Timing diagrams	3	1
1.7	Interrupts of Intel 8085	2	1
2.0	**Instruction Set of Intel 8085**	**18**	
2.1	Introduction	4	2
2.2	Instruction and data format	3	2
2.3	Addressing modes	3	2
2.4	Status flags	3	2
2.5	Intel 8085 instruction set.	5	2
3.0	**Motherboard**	**18**	
3.1	Components of motherboard	3	3
3.2	Expansion slots	2	3
3.3	Processor socket, coprocessor	2	3
3.4	memory modules	2	3

3.5	BIOS and CMOS	1	3
3.6	Chipset. Super I/O chip	2	3
3.7	ROM BIOS	1	3
3.8	System buses- Processor Buses,	1	3
3.9	Memory buses	1	3
3.10	I/O Bus(ISA,PCI Local Bus, AGP, USB),	2	3
3.11	Motherboard selection criteria.	1	3
4.0	**Hard disk**	**18**	
4.1	Hard Disk drive – Definitions	2	4
4.2	Hard Disk operations	3	4
4.3	Disk formatting	2	4
4.4	Basic hard disk drive components	3	4
4.5	Hard disk features	2	4
4.6	Hard disk drive installation procedure	1	4
4.7	FAT Disk, VFAT	2	4
4.8	FAT 32	2	4
4.9	NTFS	1	4
5.0	**Types of memory**	**18**	
5.1	Physical Memory	3	5
5.2	Memory modules:- SIMMs	2	5
5.3	DIMMs, RIMMs	2	5
5.4	Brief study of conventional base memory	3	5
5.5	Upper memory area	2	5
5.6	High memory area	2	5
5.7	Extended memory	2	5
5.8	Expanded memory.	2	5

Text Books for Reference

1. R S. Gaonkar- Micro processor Architecture, Programming and applications with 8085.
2. Lotia and Nair- Modern all about motherboard.
3. Lotia and Nair- Modern all about Hard Disk.
4. B RAM -Fundaments of microprocessors and micro computers
5. Venugopal and Ravikanth- Introduction to assembly language programming in 8086.
6. Scottmuller with Creigzacker- Upgrading and repairing PCs.

Course	Details				
Code	**CA1813605**				
Title	**JAVA PROGRAMMING LAB**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**2/3**				
Type	**Skill Component**				
Credits	**3**	Hrs/Week	**3 hours**	Total Hours	**54**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Write Java application programs using OOP principles and proper program structuring.	C
2	Develop Java program using packages, inheritance and interface.	C
3	Create Multithreaded programs.	C
4	Write Java programs to implement error handling techniques using exception handling and develop programs using class and inputs from keyboard.	C
5	Develop graphical User Interface using AWT.	C
6	Demonstrate event handling mechanism.	C

Module	Course Description	Hrs	CO.No.
1.0	**Class, Objects & Methods**	**13**	
1.1	Testing out and interpreting a variety of simple programs to demonstrate the syntax and use of the following features of the language: basic data types, operators and control structures.	3	1
1.2	Class definitions and usage involving variety of constructors and finalizers	3	1
1.3	Programs involving various kinds of inheritances,	3	1
1.4	Program involving Method Over-riding, Method Over-loading	2	1
1.5	Program involving Abstract Class and Methods	2	1
2.0	**Interface and Packages**	**13**	
2.1	Program involving Interface	6	2
2.2	Program to demonstrate creation and handling of packagestheir imports and Class Path.	7	2
3.0	**Exception Handling & threads**	**14**	
3.1	Programs involving a variety of Exception Handling situations	4	4
3.2	Program to define a class that generates Exceptions and using objects of the class.	5	4
3.3	Program involving creating and handling threads in applications and applets.	5	3
4.0	**I/O classes & AWT**	**14**	
4.1	Programs to demonstrate methods of various i/o classes	2	4

4.2	Programs to demonstrate methods of string class	2	4
4.3	Program to demonstrate AWT graphic methods	2	5
4.4	Program for Loading and Viewing Images, Loading and Playing Sound	2	5
4.5	Programs to demonstrate various Layouts	2	5
4.6	Programs to demonstrate event handling	2	6
4.7	Debugging programs involving syntactic and/or logical errors	2	4

Text Books for Reference

1. E. Balagurusamy, Programming with Java,McGraw Hill Education
2. Deitel&Deitel, Java: How To Program, Pearson Education
3. Java2: The Complete Reference Seventh Edition: Herbert Schildt

Course	Details				
Code	**CM1813601**				
Title	**BUSINESS ACCOUNTING LAB**				
Degree	**B. Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**2/3**				
Type	**Skill Component**				
Credits	**3**	Hrs/Week	**3 hours**	Total Hours	**54**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	**D**evelop accounting projects based on Tally	C
2	**D**evelop accounting projects based on Peach Tree	C
3	**D**evelop accounting projects based on Quick books	U

Module	Course Description	Hrs	CO.No.
1.0	**Basics of Accounting with Tally-ERP 9**	**20**	
1.1	Understand the basics of Manual Accounting	7	1
1.2	Familiriase with Tally ERP9 for computraised accounting	6	1
1.3	Sample projects on Tally ERP	7	2
2.0	**Peach Tree Accounting**	**16**	
2.1	Familiriase with installation Running and basics of Peach tree	8	2
2.2	Manage Accounts ,Payroll and inventory using Peach tree	8	2
3.0	**QuickBooks**	**18**	
3.1	Familiarization QuickBooks	9	3
3.2	Organise financial Data , create invoices and track sales and expenses using quick books	9	3

Text Books for Reference

1. CAS Tally Training Material
2. Peach Tree Complete Instruction pdf
3. Quick Books User guide- quickbooks_cuser_study_guide.pdf

SEMESTER 4				
Course Code	**Courses**	**General/ Skill**	**Credit**	**Instructional Hours/Week**
EN1814509	Corporate Skills	General	4	4
IT1814203	Management Information Systems	General	4	4
CM1814205	Principles of Management	General	4	4
CA1814114	Operating Systems	Skill	4	4
CA1814115	Computer Networks	Skill	4	4
IT1814103	Object Oriented Modeling and Design	Skill	3	4
CA1814606	Networks and Operating Systems Lab	Skill	3	3
CA1814607	Computer Animations Lab	Skill	3	3
IT1814801	Summer Internship	Skill	1	
Total			**30**	**30**

Course	Details				
Code	**EN1814509**				
Title	**CORPORATE SKILLS**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**2/4**				
Type	**General Education**				
Credits	**4**	Hrs/Week	**4 hours**	Total Hours	**72**

Theory- 60 marks **Practical- 20 marks** **Continuous assessment- 20**

CO No.	*Expected Course Outcomes* *Upon completion of this course, the students will be able to*:	Cognitive Level
1	**D**evelop ability to assimilate in work atmosphere	C
2	**H**ave a good understanding of workspace etiquette	U
3	**G**et an experience onworkspace environment	Ap
4	**K**now how to perform in an interview	U

Module	Course Description	Hrs	CO.No.
1	**Interview skills**	**18**	
1.1	Interview skills	2	4
1.2	Types of interviews	4	4
1.3	Preparing for a face – face interview	2	4
1.4	How to conduct a Mock Interview	2	4
1.5	Group Discussion as a selection process	4	4
1.6	Structure of GD	2	4
1.7	Preparation for GD	2	4
2	**Conversational Skills**	**14**	
2.1	Picking the right medium Context-Addressing superior officers, colleagues, subordinates	3	2
2.2	Clarity and Concision	3	2
2.3	Listening at workplace • Active listening • Reflective listening • Appreciative listening	3	2
2.4	Verbal Communication Skills	3	2
2.5	Giving and receiving feedback	2	2
3.0	**Work Culture**	**18**	
3.1	Work ethics and values	3	1,3
3.2	Fayol's principles of management	3	1,3
3.3	Workplace collaboration	3	1,3
3.4	Workplace Etiquette	3	1,3
3.5	Corporate Social Responsibility (CSR)	3	1,3
3.6	TedxTalks: OnkarKishanKullar: Redefining Social Entrepreneurship, Charity and CSR	3	1,3
4.0	**Practical Session**	**8**	

5.0	**Interview Skills** • Mock interview • Non-verbal cues Documentation **[Resume/Cover Letter]**	**10**	2,4
6.0	**Group Discussion** • Structure • Method • Mock GDs	**2**	2,4
7.0	**Mock online exams**	**2**	

References

1. McLean, S (2005), The basics of Interpersonal Communication. Boston, MA: Allyn and Bacon.
2. Vocate, D (ED). (1994) Intrapersonal Communication: Different Voices, Different Minds. Hillsdale, N J: Lawrence Erlbruw.
3. Brown, Michele and GylesBrandreth. How to interview and be interviewed. London: Sheldon Press, 1994
4. Prasadh, H M, How to prepare for Group discussion and Interview. New Delhi: Tata Mcgraw – Hill Publishing Company Ltd, 2001.

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Course	Details				
Code	**IT1814203**				
Title	**MANAGEMENT INFORMATION SYSTEMS**				
Degree	**B. Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**2/4**				
General Studies	**General Education**				
Credits	**4**	Hrs/Week	**4 hours**	Total Hours	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Reproduce a working knowledge of concepts and terminology related to information technology	Ap
2	Understand MIS framework and methodologies	U
3	Understand basic concepts of modern management and its functions	U
4	study the applications of information technology in management	U
5	Understand the importance of transaction processing in business	U
6	Interpret how to use information technology to solve business problems	Ap

Module	Course Description	Hrs	CO.No.
1.0	**Information systems**	**18**	
1.1	An introduction to information systems	2	1
1.2	Data and Information	1	1
1.3	Management and Decision Making	2	3
1.4	Classification of Information Systems	2	2
1.5	Impact of Business on Information Systems	3	4
1.6	Information for Functional Areas of Management	2	4
1.7	Computers and Information Systems	2	4
1.8	Importance of MIS	2	2
1.9	Evolution of MIS	2	2
2.0	**Transaction processing system**	**18**	
2.1	Transaction processing system	5	5
2.2	Hardware and software requirements	4	5
2.3	Tools used	4	5
2.4	Merits and demerits of transaction processing system.	5	5
3.0	**Managerial control**	**18**	
3.1	Information and tools required	1	3
3.2	Difference between transactional system and managerial system.	2	3
3.3	Frequency of taking outputs	1	3
3.4	Need for interconnected system	2	3
3.5	Common database	1	3
3.6	Redundancy control	1	3

3.7	Case studies	1	3
3.8	Decision support system	2	3
3.9	Concept and tools	2	3
3.10	Case studies	1	3
3.11	Virtual organizations	2	3
3.12	Strategic decisions -unstructured approach	1	3
3.13	Cost and values of unstructured information	1	3
4.0	**Optimization techniques**	**18**	
4.1	Difference between optimization tools and DSS tools	6	3
4.2	Expert system	4	6
4.3	Difference between expert system and management information system	6	3,6
4.4	Role of chief Information officer	2	6

Text Books for Reference

1. S. Sadagopan, Management Information Systems, Prentice-Hall of India
2. Uma G. Gupta, Management Information Systems, Galgotia Publications

Course	Details				
Code	**CM1814205**				
Title	**PRINCIPLES OF MANAGEMENT**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**2/4**				
Type	**General**				
Credits	**4**	Hrs/Week	**4**	Total Hrs	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Explain the Principles of Management	R
2	Compare contributions of Managerial Scientists	U
3	Describe the planning, coordination and decision making process	U
4	Explain the principles of organisation and staffing	U
5	Explain the components of direction- leadership, motivation and communication	U
6	Explain the process and techniques of control	U
7	Explain the modern management techniques	U

CO-Course Outcome; Cognitive Level: R-Remember; U-Understanding; Ap-Apply; An-Analyze; E-Evaluate; C-Create.

Module	Course Description	Hrs	CO.No
1.0	**Introduction to Management**	**14**	
1.1	Meaning , Nature, Scope of Management	1	1
1.2	Functional Areas of Management	2	1
1.3	Management as a Science	1	1
1.4	Management as an Art	1	1
1.5	Management as a Profession	1	1
1.6	Management & Administration	1	1

1.7	Principles of Management	1	1
1.8	Managerial roles: Mintzberg Model	2	2
1.9	Functions of Management	2	1
1.10	Contributions of F.W.Taylor and Henry Fayol	2	2
2.0	**Planning**	**14**	
2.1	Planning - Nature and Importance	1	3
2.2	Types of Plans	2	3
2.3	Planning Process	2	3
2.4	Barriers to Effective Planning	2	3
2.5	M.B.O - Features – Steps	1	3
2.6	Coordination - Meaning and Importance	2	3
2.7	Techniques for Effective Coordination	2	3
2.8	Decision making under certainty and uncertainty	2	3
3.0	**Organizing and Staffing**	**15**	
3.1	Meaning ,Nature – Importance of Organising	1	4
3.2	Principles of Organisation	2	4
3.3	Types of Organisation	2	4
3.4	Organisation Chart - Organisation Manual	1	4
3.5	Centralization – Decentralization	1	4
3.6	Authority and Delegation of Authority	2	4
3.7	Responsibility and Accountability	1	4
3.8	Staffing: Nature and importance of staffing	2	4
3.9	Process of selection - recruitment. – training	2	4
3.10	Staff Evaluation / Appraisal	1	4
4.0	**Direction and Control**	**14**	
4.1	Principles of direction	1	5
4.2	Leadership: Concept and Styles	2	5
4.3	Trait and Situational Theory of Leadership	2	5
4.4	Managerial Grid by Blake and Mouton	1	5
4.5	Likert's Four System Model	1	5
4.6	Motivation: Concept and Importance	1	5
4.7	Maslow's Need Hierarchy Theory	1	5
4.8	Herzberg's Two Factors Theory	1	5
4.9	Communication: Types	1	5
4.10	Control: Concept and Process	1	6
4.11	Control Techniques	2	6
5.0	**Management Techniques**	**15**	

5.1	Total Quality Management	2	7
5.2	Quality circle	2	7
5.3	Business Process Reengineering (BPR)	2	7
5.4	Six sigma	2	7
5.5	Kaizen	2	7
5.6	Management Information System	2	7
5.7	Knowledge Management	2	7
5.8	Importance of knowledge management in business	1	7

SUGGESTED READING

1. Koontz, O Donnell, Management, McGraw-Hill
2. Appaniah, Reddy, Essentials of Management, Himalaya Publishing House.
3. Prasad, L. M., Principles of management, Sultan Chand and Sons.
4. Srinivasan, Chunawalla, Management Principles and Practice, Himalaya Publishing House.
5. Tulsian, P.C., &Pandey, Vishal, Business Organization and Management, Pearson Education

Course	Details				
Code	**CA1814114**				
Title	**OPERATING SYSTEM**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**2/4**				
Type	**Skill Component**				
Credits	**4**	Hrs/Week	**Hours 4**	Total Hours	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	**F**amiliarize fundamental concepts, structure and design of OS	U
2	**I**mpart skill in identifying the type of operating systems used in various real time applications	U
3	**A**pply knowledge to describe different approaches to process management	Ap
4	**A**pply knowledge to describe different approaches to memory management	Ap
5	**A**pply knowledge to describe secondary storage management and disk scheduling	Ap

Module	Course Description	Hrs	CO.No
1.0	**Introduction**	**14**	
1.1	Operating System: Definition, Functions	1	1
1.2	Operating System Structure	1	1
1.3	Operating System Operations	2	1
1.4	Operating System Services	1	1
1.5	Process Management, Memory Management	2	1
1.6	Storage Management	2	1
1.7	User and Operating System Interface	2	1
1.8	System Calls	1	1
1.9	Types of System Calls	2	1,2
2.0	**Process**	**14**	
2.1	Process Concept	1	3
2.2	Process Scheduling	2	3
2.3	Operations on Processes	2	3
2.4	Inter process communication	2	3
2.5	CPU Scheduling Criteria	1	3
2.6	Scheduling Algorithms	4	3
2.7	Multiple Processor Scheduling	2	3
3.0	**Process Coordination**	**15**	
3.1	Process Synchronization	1	3
3.2	The Critical Section problem	1	3

3.3	Semaphores	1	3
3.4	Classic Problems of Synchronization	1	3
3.5	MonitorsF	1	3
3.6	Deadlocks: System Model	1	3
3.7	Deadlock Characterization	1	3
3.8	Methods for handling Deadlocks	1	3
3.9	Deadlock Prevention	1	3
3.10	Deadlock Avoidance	2	3
3.11	Deadlock Detection	2	3
3.12	Recovery from Deadlock	2	3
4.0	**Memory Management**	**15**	
4.1	Memory Management Strategies	2	4
4.2	Swapping	1	4
4.3	Contiguous memory allocation	2	4
4.4	Segmentation	2	4
4.5	Paging	2	4
4.6	Virtual Memory Management	2	4
4.7	Demand paging	2	4
4.8	Page Replacement	2	4
5.0	**Storage Management:**	**14**	
5.1	File System Interface: Concept	1	5
5.2	Access Methods	1	5
5.3	Directory and disk structure	2	5
5.4	File System Structure	2	5
5.5	File system Implementation	1	5
5.6	Allocation Methods	2	5
5.7	Free Space Management	2	5
5.8	Disk Scheduling	1	5

Text Books for Reference

1. Operating System Principles, Seventh Edition, Abraham Silberschatz, Peter Galvin and Greg Gagne, John Wiley
2. Operating Systems- By William Stallings
3. Operating Systems- By Milan Kovic (TMH)

Course	Details				
Code	**CA1814115**				
Title	**COMPUTER NETWORKS**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**2/4**				
Type	**Skill Component**				
Credits	**4**	Hrs/Week	**4 hours**	Total Hours	**72**

CO No.	*Expected Course Outcomes* *Upon completion of this course, the students will be able to*:	Cognitive Level
1	**U**nderstand the concepts of data communication and networks,TCP/IP and OSI reference models.	**U**
2	**D**iscuss the process of Multiplexing, switching and transmission media in networks.	**U**
3	**U**nderstand the services of data link layer and protocols	**U**
4	**U**nderstand multiple access protocols and Ethernet	**U**
5	**U**nderstand the services of network layer, transport layer and application layer.	**U**

Module	Course Description	Hrs	CO.No
1.0	**Introduction**	**14**	
1.1	Data Communication: Characteristics, Components, Data flow	1	1
1.2	Networks: Criteria, Types of connection, Topologies, LAN, MAN, WAN	2	1
1.3	Switched Network: Circuit switched, packet switched	1	1
1.4	The Internet: Accessing the Internet	1	1
1.5	TCP/IP Protocol Suite, OSI versus TCP/IP	3	1
1.6	Physical Layer: Data and Signals, Periodic Analog Signals	1	1
1.7	Digital Signals: Bit rate, Bit length, Transmission	2	1
1.8	Transmission Impairments- Attenuation, Distortion And Noise	2	1
1.9	Digital Transmission Modes: Parallel transmission, Serial transmission	1	1
2.0	**Multiplexing, Transmission Media and Switching**	**14**	
2.1	Bandwidth utilization Multiplexing: FDM	2	2
2.2	TDM	2	2
2.3	Spread spectrum.	1	2
2.4	Transmission Media- guided media	2	2
2.5	Unguided media.	2	2
2.6	Switching: Introduction, Circuit switched networks	2	2
2.7	Packet switching: datagram networks	1	2
2.8	virtual- circuit networks	2	2
3.0	**Data link layer:**	**14**	

3.1	Data link layer: Services	1	3
3.2	Error Detection and Correction: Introduction	1	3
3.3	Block coding	2	3
3.4	Cyclic Codes	2	3
3.5	Checksum	2	3
3.6	Data Link Control services: Framing	1	3
3.7	Flow and error control	1	3
3.8	Connectionless and Connection oriented	1	3
3.9	Data-link layer protocols: Simple protocol	1	3
3.10	Stop and Wait protocol, Piggy backing	2	3
4.0	**Multiple Access Protocols& Ethernet**	**14**	
4.1	Multiple Access Protocols : Random Access-Aloha	1	4
4.2	CSMA	1	4
4.3	CSMA/CD	1	4
4.4	CSMA/CA	1	4
4.5	Standard Ethernet	2	4
4.6	Satellite Networks -Geo, Meo	1	4
4.7	Satellite Networks –Leo	1	4
4.8	Network layer services	1	5
4.9	Packet switching	1	5
4.10	Internet Protocol(IP): Datagram format	1	5
4.11	Fragmentation	2	5
4.12	Security of IPv4	1	5
5.0	**Transport layer and application layer**	**16**	
5.1	Transport layer services	3	5
5.2	User Datagram Protocol (UDP)	2	5
5.3	Transmission Control Protocol (TCP): TCP services, TCP features, segment, TCP connection	2	5
5.4	Application layer: Client server programming- Application Programming Interface	1	5
5.5	World Wide Web (WWW)	1	5
5.6	HTTP	2	5
5.7	FTP	1	5
5.8	Electronic Mail	2	5
5.9	Domain Name System	2	5

Text Books for Reference

1. Data communication and Networking (fourth edition)-B. A. Forouzan

References:

1. Official Red Hat Linux Users guide by Redhat, Wiley Dreamtech India
2. Graham Glass & King Ables - UNIX for programmers and users, Third Edition, Pearson
   Education.
3. Neil Mathew & Richard Stones - Beginning Linux Programming, Fourth edition, Wiley
   Dreamtech India.

Course	Details				
Code	**IT1814103**				
Title	**OBJECT ORIENTED MODELING AND DESIGN**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**2/4**				
Type	**Skill Component**				
Credits	**3**	Hrs/Week	**Hours 4**	Total Hours	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Familiarize various modelling constructs used in software design phase	U
2	Enhance skill in preparing software documentation	Ap
3	Impart skill in Identifying requirements of a software for solving a particular problem	Ap
4	Apply knowledge in designing a software	Ap

Module	Course Description	Hrs	CO.No
1.0	**Object Oriented Programming and Design Principles**	**18**	
1.1	Object Oriented Concepts	2	1
1.2	Natureand purpose of models	3	1
1.3	Object Modeling	2	1
1.4	Dynamic Modeling	3	1
1.5	Functional Modeling	3	1
1.6	System Design	3	1
1.7	Object Design	2	1
2.0	**UML Structural Modeling**	**18**	
2.1	Basics of UML based object oriented analysis and design	2	1,2
2.2	Classes	2	1,2
2.3	Relationships	2	1,2
2.4	Interfaces	1	1,2
2.5	Roles	1	1.2
2.6	Class diagrams	2	1,2,3,4
2.7	Advanced classesand relationship	2	1,2
2.8	Packages	2	1,2
2.9	Instances	2	1,2
2.10	Object diagrams	2	1,2,3,4
3.0	**UML Behavioral Modeling**	**18**	
3.1	Interactions	1	1,2,3,4
3.2	Use cases	3	1,2,3,4
3.3	Interaction diagrams	1	1,2,3,4
3.4	Use casediagrams	3	1,2,3,4

3.5	Activity diagrams	1	1,2,3,4
3.6	Events	1	1,3
3.7	Signals	1	1,3
3.8	State Machines	3	1,3
3.9	Processes and Threads	1	1
3.10	State chart diagrams	3	1,2,3,4
4.0	**UML Architectural Modeling**	**18**	
4.1	Component diagrams	2	1,2,3,4
4.2	Deployment diagrams	3	1,2,3,4
4.3	Collaborations	3	1,2,3,4
4.4	Unified Processes	2	1,2,3
4.5	Introduction to Software Architecture	2	1,2,3
4.6	Design frameworks	2	1,2,3
4.7	Design pattern	2	1,2,3
4.8	Architecturedescription language (ADL)	2	1,2,3

Text Books for Reference

1. James Rambaughet. al., Object Modelling and Design –PHI
2. Grady Booch, James Rambaugh,Ivar Jacobson .A.WThe Unified Modeling Language User Guide
3. Ivan Jacobson, Grady Booch, James Rambaugh A.W The Unified Software Development Process
4. Bruegge. Object Oriented Software Engineering using UML patterns and Java,PearsonEducation ,2003
5. Rational Unified Process, Third Edition – Kruchten.

Course	Details				
Code	**CA1814606**				
Title	**NETWORKS AND OPERATING SYSTEM LAB**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**2/4**				
Type	**Skill Component**				
Credits	**3**	Hrs/Week	**Hours3**	Total Hours	**54**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Implement various communication protocols	Ap
2	Demonstrate communication between different processes	Ap
3	Demonstrate direct communication with the operating systems via system calls	Ap
4	Impart skill in using synchronisation tools for solving classic problems	Ap
5	Implement forking processes, waiting for them to terminate, and getting information about them	Ap

Module	Course Description	Hrs	CO.No
1.0	**System calls**	**12**	
1.1	Study of system level calls of a suitable multitasking operating system	6	3
1.2	Exercisesinvolving the system calls. (E.g. fork(), exec(), create(), etc. in UNIX.)	6	3,5
2.0	**Inter process communication**	**12**	
2.1	Implementation of Inter process communication	6	2
2.2	Implementation of Shared memory and messages	6	2
3.0	**Process synchronization**	**15**	
3.1	Implementation of Semaphores and monitors	7	4
3.2	Implementation of typical problems(E.g. Bounded buffer, DiningPhilosophers. etc.)	8	4
4.0	**Computer Networks**	**15**	
4.1	Implementation of communication protocols	3	1
4.2	Implementation of Client serverprogramming	3	1
4.3	Write a code simulating PING and TRACEROUTE commands	3	1
4.4	Create a socket for HTTP for web page upload and download	3	1
4.5	Study of Network Simulator	3	1

Text Books for Reference

1. Douglas E.Comer, Hands on Networking with Internet Technologies,
2. PearsonEducation Bach, M.J., “Design of UNIX Operating System”, Prentice Hall

Course	Details				
Code	**CA1814607**				
Title	**COMPUTER ANIMATIONS LAB**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**2/4**				
Type	**Skill Component**				
Credits	**3**	Hrs/Week	**Hours 3**	Total Hours	**54**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Familiarize standard primitive object creation and editing	U
2	Impart skill in object creation and animation	C
3	Apply skill effectively and creatively to solve a wide range of graphic design problems	C
4	Develop design drawings that demonstrate computer animation and design skills	C
5	To familiarize 2D to 3D conversion	C

Module	Course Description	Hrs	CO. No
1.0	**Primitive and Architectural objects**	**18**	
1.1	Creating & Editing Standard Primitive Objects	6	1
1.2	Creating & Editing Extended Primitive Objects	6	1
1.3	Working with Architectural objects	6	1
2.0	**2D to 3D conversion**	**18**	
2.1	Convert 2D to 3D object using extrude, loft, terrain etc	18	4,5
3.0	**Creating a Scene and Animation**	**18**	
3.1	Create a scene using lights, materials and maps	3	2,3,4
3.2	Creating & Appling materials	3	2,3,4
3.3	Creating wall lights	3	2,3,4
3.10	Set up physical camera settings	2	2,3,4
3.11	Animating with simple controllers	4	2,3,4
3.12	Using Morph compound object	3	2,3,4

Text Books for Reference

1. Prof. Sham Tickoo, Autodesk 3ds Max 2017: A Comprehensive Guide, BPB Publications
2. Kelly L. Murdock, 3ds Max 2014 Bible, John W

SEMESTER 5				
Course Code	**Courses**	**General/ Skill**	**Credit**	**Instructional Hours/Week**
IT1815204	Information security	General	4	4
IT1815205	Aptitude And Logical Reasoning	General	4	4
CM1815202	Entrepreneurship Development	General	4	3
IT1815104	Web development	Skill	4	4
CA1815117	Mobile Application Development- Android	Skill	4	4
CA1815608	Android Lab	Skill	3	3
CA1815609	Web development Lab	Skill	3	4
CA1815802	Minor Projects	Skill	4	4
Total			**30**	**30**

Course	Details				
Code	**IT1815204**				
Title	**INFORMATION SECURITY**				
Degree	**B. Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**3/5**				
Type	**General Education**				
Credits	**4**	Hrs/Week	**4 hours**	Total Hours	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	**F**amiliarize the students with the Information security, security issues, attacks, identification and authentication	U
2	**I**mparts essential knowledge of how to achieve security in real world information and operations	U
3	**I**mparts essential knowledge of how to achieve security in network and operating system	U
4	**H**ave a basic idea of Application security	U

Module	Course Description	Hrs	CO.No.
1.0	**Information Security**	18	
1.1	What is information security	1	1
1.2	Models for discussing security issues	1	1
1.3	Attacks, Types of attack	1	1
1.4	Threats Vulnerabilities and risk	1	1
1.5	Controls	1	1
1.6	Defense in depth	1	1
1.7	Identification	1	1
1.8	Authentication –factors, multifactor authentication	2	1
1.9	Mutual authentication, passwords	1	1
1.10	Biometrics ,hardware tokens	3	1
1.11	Authorization	1	1
1.12	Access Control	1	1
1.13	Access Control methodologies	3	1
2.0	**Cryptography And Operations Security**	**18**	
2.1	Accountability,security benefits	2	2
2.2	Auditing	2	2
2.3	Introduction to cryptography	1	2
2.4	Modern cryptographic tools	3	2
2.5	Protecting data	2	2

2.6	Operation Security Process	2	2
2.7	Laws of operations security	2	2
2.8	Physical security-protection of data	2	2
2.9	Protection of equipment	2	2
3.0	**Network And Operating System Security**	**18**	
3.1	Protecting network-security in network design	1	3
3.2	Firewall	2	3
3.3	Network Intrusion Detection	1	3
3.4	Protecting network traffic-Intercepting data, virtual private network	2	3
3.5	Wireless network security, secure protocol	2	3
3.6	Network Security tools- wireless, scanners	2	3
3.7	Packet sniffers , honey pots, firewall tools	2	3
3.8	Operating System Security – Operating System hardening	2	3
3.9	Protecting against malware	1	3
3.10	Software firewall and host intrusion detection	1	3
3.11	Operating system Security tools	2	3
4.0	**Application Security**	**18**	
4.1	Software development vulnerabilities Buffer overflows	1	4
4.2	Race conditions Input validation attacks	1	4
4.3	Authentication attacks , authorization attacks, cryptographic attacks	2	4
4.4	Web security- client side attack	2	4
4.5	Server- side attack	2	4
4.6	Database Security- Protocol issues	1	4
4.7	Unauthenticated access, arbitrary code execution	2	4
4.8	Privilege escalation	2	4
4.9	Application security tools- sniffers	2	4
4.10	Web application analysis tool	2	4
4.11	Fuzzers	1	4

Text Books for Reference

1. Jason Andress., The Basics of Information Security –Understanding fundamentals of Infosec in Theory and Practise.

Course	Details				
Code	**IT1815205**				
Title	**APTITUDE AND LOGICAL REASONING**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**3/5**				
Type	**Core**				
Credits	**4**	Hrs/Week	**Hours 3**	Total Hours	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Understand and practice quantitative aptitude	Ap
2	Understand and practice Logical reasoning	Ap
3	Understand and practice verbal reasoning	Ap
4	Understand different placement practice techniques	Ap

Module	Course Description	Hrs	CO. No.
1.0	**Quantitative Aptitude**	**20**	
1.1	Number System	1	1
1.2	Average	1	1
1.3	LCM and HCF	1	1
1.4	Interest and Discount	1	1
1.5	Time Distance Speed	1	1
1.6	Profit And Loss	1	1
1.7	Geometry and Menstruation	1	1
1.8	Percentage	1	1
1.9	Ratio and Proportion	1	1
1.10	Age Problems	1	1
1.11	Time and Work	1	1
1.12	Data-Interpretation	1	1
1.14	Practice papers	4	1
1.15	Practice papers	4	1
2.0	**Logical Reasoning**	**20**	
2.1	Coding – Decoing	1	2
2.2	Seating Arrangement	1	2
2.3	Calender	1	2
2.4	Direction Sense	1	2

2.5	Blood relation	1	2
2.6	Series	1	2
2.7	Symbol based operations	1	2
2.8	Statements and Arguments	1	2
2.9	Syllogism	1	2
2.10	Non verbal Reasoning	1	2
2.11	Analogy Classification	1	2
2.12	Alphabet Test	1	2
2.13	Practice papers	4	2
2.14	Practice papers	4	2
3.0	**Verbal Ability**	**12**	
3.1	One word substitutes	1	3
3.2	Antonyms	1	3
3.3	Synonyms	1	3
3.4	Spotting Errors	1	3
3.5	Verbal Analogies	1	3
3.6	Sentence Completion	1	3
3.7	Practice Papers	3	3
3.8	Practice Papers	3	3
4.0	**Placement Preparation**	**20**	
4.1	Group Discussion	2	4
4.2	Technical Interview	2	4
4.3	HR Interview	2	4
4.4	Resume Preparation	2	4
4.5	Placement Papers	4	4
4.6	Placement Papers	4	4
4.7	Placement Papers	4	4

Text Book for Reference

1. Complete Reference Campus Recruitment www.campusrecruitment.co.in

Course	Details				
Code	**CM1815202**				
Title	**ENTREPRENEURSHIP DEVELOPMENT**				
Degree	**B. Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**3/5**				
Type	**General Education**				
Credits	**4**	Hrs/Week	**3 Hours**	Total Hours	**54**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	**F**amiliarize the students with the latest programs of the government authorities in promoting small and medium industries.	U
2	**I**mparts essential knowledge of how to start one's own business venture and the various facts that influence successful setting up and operations.	U
3	**R**ealize skills and inspiration for developing an entrepreneurial mindset.	U
4	**H**ave a basic idea of the economics of Entrepreneurship	U

Module	Course Description	Hrs	CO.No.
1.0	**Concepts of entrepreneur**	18	
1.1	Characteristics of entrepreneur	2	2
1.2	Entrepreneurial traits	1	2
1.3	Role of entrepreneurs in the economic development	2	2,4
1.4	Factor effecting entrepreneurial growth	2	2,4
1.5	Entrepreneurship - Meaning- definition	1	2
1.6	Entrepreneur VsIntrapreneur	2	2
1.7	Women Entrepreneurs	1	2
1.8	Recent development-Problems	2	2
1.9	Entrepreneurial Development Programmes	2	1,2
1.10	Objectives of EDP	1	2
1.11	Methods of training	1	2
1.12	Phases of EDP.	1	2
2.0	**Institutional support and incentives to entrepreneurs**	**18**	
2.1	Functions of Department of Industries and Commerce (DIC)	2	1
2.2	Activities of Small Industrial Development Corporation (SIDCO)	2	1

2.3	Functions of National Small Industries Corporation(NSIC)	1	1
2.4	Functions of Small Industries Development Bank of India (SIDBI	1	1
2.5	Khadi Village Industry Commission (KVIC)-Small Industries Service Institute (SISI)-	1	1
2.6	Functions and services of Kerala Industrial Technical Consultancy Organisation (KITCO)-	2	1
2.7	Activities of Science and Technology Entrepreneurship Development Project (STEDP)-	2	1
2.8	Strategies of National entrepreneurship Development Board(NEDB)	1	1
2.9	Objectives of National Institute for entrepreneurship and small business development (NIESBUD)	1	1
2.10	Techno park-Functions of techno park Incentives-Importance	2	1
2.11	Classification of incentives	1	1
2.12	Subsidy- Types of Subsidy	2	1,3
3.0	**Micro Small and Medium Enterprises**	**18**	
3.1	Micro Small and Medium Enterprises	2	1
3.2	Features- Objectives- Importance-	2	1,4
3.3	Role of SME in the economic development	2	1
3.4	MSME Act 2006- Salient features-	1	1
3.5	Credit Guarantee Fund Trust Scheme for MSMEs	1	1
3.6	Industrial estates - Classification	1	1
3.7	Benefits-Green channel	1	1
3.8	Bridge capital	1	1
3.9	Seed capital assistance-	2	1
3.10	Margin money schemes	1	1
3.11	Single Window System	2	1
3.12	Sickness- Causes –Remedies-	1	1
3.13	Registration of SSI	1	1
4.0	**Setting up of Industrial unit**	**18**	
4.1	Setting up of Industrial unit-(Only Basic study)	1	1
4.2	Environment for Entrepreneurship	1	1
4.3	Criteria for selecting particular project	1	1
4.4	Generating project ideas	1	1
4.5	Market and demand analysis	1	1
4.6	Feasibility study- Scope of technical feasibility, Financial feasibility	1	1
4.7	Social cost benefit analysis-	1	1
4.8	Government regulations for project clearances	1	1
4.9	Import of capital goods, approval of foreign collaboration	1	1
4.10	Pollution control clearances	1	1
4.11	Setting up of micro small and medium enterprises	1	1
4.12	Location decision- Significance	1	1
4.13	Project Report – Meaning – Definition	1	1
4.14	Purpose of project reports	1	1

4.15	Requirements of good report	1	1
4.16	Methods of reporting	1	1
4.17	General principles of a good reporting system	1	1
4.18	Performa of a project report	1	1

Text Books for Reference

1. Shukla M. B., Entrepreneurship and Small Business Management, KitabMahal Allahabad.
2. SangramKeshariMohanty, Fundamentals of Entrepreneurship, PHI Learning Pvt. Ltd., New Delhi.
3. H. Nandan, Fundamentals of Entrepreneurship, PHI Learning Pvt. Ltd., New Delhi.
4. Dr. Vasant Desai, Small-Scale Industries and Entrepreneurship, Himalaya Publishing, Delhi.
5. C. N. Sontakki, Project Management, Kalyani Publishers, Ludhiana.
6. Peter F. Drucker, Innovation and Entrepreneurship, Routledge Taylor & Francis Group
7. Dr. Vasant Desai, Small Business Entrepreneurship, Himalaya Publications.
8. MSME Act 2006.

Course	Details				
Code	**IT1815104**				
Title	**WEB DEVELOPMENT**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**3/5**				
Type	**Skill Component**				
Credits	**4**	Hrs/Week	**4hours**	Total Hours	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Introduce the installation of PHP.	U
2	Understand basic program elements in PHP	U
3	Outline the principles behind using MySQL as a backend DBMS with PHP.	U
4	Illustrate the creation of session and cookies.	U
5	FamiliarizePHP validation	U

Module	Course Description	Hrs	CO.No.
1.0	**Introduction to PHP**	18	
1.1	Installing XAMPP on windows	1	1
1.2	Working Remotely	1	1
1.3	Using Program editor and IDE	2	1
1.4	Introduction to PHP : Variables, Operators Constants	2	2
1.5	Operators and multiline command	1	2
1.6	Expressions	1	2
1.7	Control flow	1	2
1.8	Functions , include and require files	1	2
1.9	PHP objects- constructors destructors scope	2	2
1.10	PHP Arrays- creating arrays(associative &multidimensional)	2	2
1.11	Accessing values from arrays; Array related functions	2	2
1.12	Array functions	2	2
2.0	**Accessing MySQL using PHP**	**18**	
2.1	MySQL Basics- Datyatypes Commands	2	3
2.2	Acessing MySQL using phpmyadmin	2	3
2.3	Accessing MySQL using PHP- Querying database with PHP –Creating login file	2	3
2.4	Connecting to mysql database	2	3
2.5	Building and executing query	2	3
2.6	Fetching result,Fetching row	2	3
2.7	Practical MySQL- creating table	1	3
2.8	Describing a table, Dropping table	1	3
2.9	Adding data, updating and deleting data	1	3

2.10	Using AUTO INCREMENTS	1	3
2.11	Preventing hacking Attempts	2	2
3.0	**Form Handling Cookies and Sessions**	**18**	
3.1	Building PHP Forms-retrieving submitted data	2	4
3.2	Embedding HTML in PHP	2	4
3.3	New features in HTML 5	2	4
3.4	Using cookies in PHP, setting a cookie	2	4
3.5	setting a cookie	2	4
3.6	Accessing a cookie, destroying a cookie	2	4
3.7	Using session-starting a session	2	4
3.8	Ending session, setting timeout	2	4
3.9	Session Security	2	4
4.0	**PHP Validation and Error Handling**	**18**	
4.1	HTTP Authentication	3	5
4.2	Storing usernames and passwords	2	5
4.3	Salting	2	5
4.4	Validating User input with java script	2	5
4.5	General Modifiers	2	5
4.6	Using Regular Expressions in JavaScript	3	5
4.7	Using Regular Expressions in PHP	2	5
4.8	Redisplaying a form after PHP validation	2	5

Text Books for Reference

1. Robin Nixon, PHP, MySQL & JavaScript with JQUERY,CSS & HTML5, O,Reilly

Course	Details				
Code	**CA1815117**				
Title	**MOBILE APPLICATION DEVELOPMENT – ANDROID**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**3/5**				
Type	**Skill Component**				
Credits	**4**	Hrs/Week	**Hours4**	Total Hours	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Familiarize about mobile computing	U
2	Explain the differences between Android, Windows and other mobile development environments	U
3	Install and configure Android application development tools	Ap
4	Impart skill in designing and developing user Interfaces for the Android platform	Ap
5	Familiarize Android SQLite database	U

Module	Course Description	Hrs	CO. No.
1.0	**Introduction to Mobile Computing**	**18**	
1.1	Mobile Connectivity	1	1
1.2	Cells	1	1
1.3	Framework	1	1
1.4	Wireless Delivery Technology and switching methods	2	1
1.5	Mobile Information Access Devices	1	1
1.6	Mobile Data Internetworking Standards	2	1
1.7	Cellular data communication Protocols	2	1
1.8	Mobile Computing Applications	2	1
1.9	Mobile Data Bases	2	1
1.10	Tools and Technology	2	1
1.11	M- Business	2	1
2.0	**Android Development Tools**	**18**	
2.1	Introduction to Android Studio	2	2,3
2.2	Android software development kit (SDK)	2	2,3
2.3	Application development tools (ADT) plugin	1	2,3
2.4	Emulators and Devices	2	2,3
2.5	Android virtual devices (AVDs)	2	2,3
2.6	Connecting Androids to the development platform	2	2,3
2.7	Android Platform Architecture	2	2,3
2.8	Android application Components	1	2,3
2.9	Android Development Lifecycle	2	2,3

2.10	"Hello World!", Running on the emulator	1	2,3
2.11	"Hello World!", Running on a device	1	2,3
3.0	**Android User Interface**	**18**	
3.1	XML Fundamentals: Trees, Elements, Attributes	1	4
3.2	Simple Interactive programs	1	4
3.3	Building a Dynamic UI with Fragments	2	4
3.4	Android Intents and Filters	1	4
3.5	Activity Lifecycles	2	4
3.6	Callbacks and activity pyramids	1	4
3.7	Launcher activity	2	4
3.8	Instantiation	2	4
3.9	Destroying activities	2	4
3.10	Pausing	1	4
3.11	Resuming	1	4
3.12	Starting and stopping activities	1	4
3.13	Saving and restoring activities	1	4
4.0	**Apps and SQLite**	**18**	
4.1	Android Notifications	3	5
4.2	Android SQLite Database	3	5
4.3	Interaction with Other Apps	3	5
4.4	Location-Aware Apps	3	5
4.5	Layout Hierarchies	3	5
4.6	Adding Audio, Photos and Videos to Apps	3	5

Text Books for Reference

1. Neil Smyth, Android Studio Development Essentials, eBookFrency
2. Beginning Android Programming with Android Studio J.F.DiMarzio

Course	Details				
Code	**CA1815608**				
Title	**ANDROID LAB**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**3/5**				
Type	**Skill Component**				
Credits	**3**	Hrs/Week	**Hours 3**	Total Hours	**54**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Setup and create Android Development Environment	Ap
2	Understand the limitations and features of developing for mobile devices	Un
3	Impart skill in explaining the entire lifecycle of an Android Application	Un
4	Enhance skill in developing simple and creative android applications with all basic features incorporated in them	C

Module	Course Description	Hrs	CO. No.
1.0	**Expanding the app capabilities with lifecycles and more UI options**	**18**	
1.1	Use the IDE to create an app that has an activity lifecycle including some of the following: pause, resume, start, stop, destroy and restore	5	1,2,3
1.2	Experiment with UI fragments, and flexible UIs	5	1,2,3
1.3	Use the emulator to test the app	3	1,2,3
1.4	Load the app onto an Android device and test it on actual hardware	5	1,2,3
2.0	**Building a program that demonstrates layout hierarchies**	**18**	
2.1	Use the IDE to create an app that has multiple layout hierarchies	5	4
2.2	Experiment with ListView,check boxes and ViewStubs in this project	5	4
2.3	Use the emulator to test the app	3	4
2.4	Load the app onto an Android device and test it on actual hardware	5	4
3.0	**Incorporating audio and/or video into app projects**	**18**	
3.1	Use the IDE to create an app that has either audio or video (or both) incorporated into its design	5	4
3.2	Experiment with volume, playback, photo-capture and/or video control	5	4
3.3	Use the emulator to test the app	4	4
3.4	Load the app onto an Android device and test it on actual hardware	4	4

Text Books for Reference

1. Neil Smyth, Android Studio Development Essentials, eBookFrency
2. Beginning Android Programming with Android Studio J.F.DiMarzio

Course	Details				
Code	**CA1815609**				
Title	**WEB DEVELOPMENT LAB**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**3/5**				
Type	**Skill Component**				
Credits	**3**	Hrs/Week	**4 hours**	Total Hours	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Installation of PHP and develop simple PHP programs.	AP
2	Integrate HTML forms to PHP scripts.	C
3	Build Dynamic web site using server side PHP Programming and Database connectivity.	C
4	Design a responsive web site.	C

Module	Course Description	Hrs	CO.No.
1.0	**PHP**	**30**	
1.1	PHP installation and Running XAMPP on Windows	3	1
1.2	Exercises covering basic introduction to PHP	6	1,2
1.3	Connecting HTML forms to PHP Scripts	7	1,2
1.4	Combining Cascading Style sheets with HTML and PHP	7	1,2
1.5	PHP – HTML forms & JavaScript	7	1,2
2.0	**PHP with MySQL**	**24**	
2.1	Interacting with MySQL using PHP	7	1,2,3
2.2	Development of a web site involving a variety of tools practiced above	17	1,2,3,4

Text Books for Reference

1. Robin Nixon, learning PHP ,MYSQL & JAVASCRIPT With JQuery CSS And HTML5, O;Reilly

Course	Details				
Code	**CA1815802**				
Title	**MINOR PROJECTS**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**3/5**				
Type	**Project Work**				
Credits	**4**	Hrs/Week	**4 hours**	Total Hours	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	**Cognitive Level**
1	Acquire practical knowledge within the chosen area of technology for project development	An
2	Understand the problems faced during project implementation.	U
3	Identify, analyze, formulate and handle programming projects with a comprehensive and systematic approach	An
4	Contribute as an individual or in a team in development of technical projects	C
5	Develop effective communication skills for presentation of project related activities	C
6	Enhance the problem solving ability by solving the real-time problems.	C

Module	Course Description	Hrs	CO.No.
1.0	**Main Project**	**72**	**1-6**
	The project topic shall be chosen from areas of current day interest using latest packages / languages running on appropriate platforms (Except the tools used in software development-I), so that the student can be trained to meet the requirements of the Industry. A project report should be submitted in hard bound complete in all aspects. For internal evaluation, the progress of the student shall be systematically assessed through various stages of evaluation at periodic intervals		

SEMESTER 6				
Course Code	**Courses**	**General/ Skill**	**Credit**	**Instructional Hours/Week**
IT1816206	Digital Marketing	General	4	4
IT1816207	Informatics	General	4	4
IT1816208	IT And Society	General	4	4
IT1816105	Free and Open Source Software	Skill	4	4
IT1816106	Embedded Systems and Internet of Things	Skill	4	4
IT1816107	Virtual and Augmented Reality	Skill	3	3
IT1816602	Internet of Things Lab	Skill	3	3
IT1816803	Project Phase II	Skill	4	4
IT1816901	Viva Voce			
Total			**30**	**30**

Course	Details				
Code	**IT1816206**				
Title	**DIGITAL MARKETING**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**3/6**				
Type	**General Education**				
Credits	**4**	Hrs/Week	**4 hours**	Total Hours	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Help students to understand digital marketing methods	U
2	Develop skills on engaging in marketing on the web using latest Search Engine Marketing	U
3	Familiarize E-mail marketing and Affiliate Marketing	U

Module	Course Description	Hrs	CO.No.
1.0	**Digital Marketing-Internet Marketing**	18	
1.1	Introduction to Digital Marketing	1	1
1.2	Crafting a digital marketing strategy	1	1
1.3	Concepts of market Research	1	1
1.4	Online research methodologies	1	1
1.5	Content marketing strategies	2	1
1.6	Types of online marketing	1	1
1.7	Online marketing trends	1	1
1.8	Web Analytics	1	1
1.9	Offisite Web Analytics	1	1
1.10	On-site Web Analytics	1	1
1.11	Reason for using web analytics	1	1
1.12	Methods of measuring web traffic- web metrices	1	1
1.13	Using log files	1	1
1.14	Page tagging	1	1
1.15	Determining geographical location	1	1
1.16	Click analytics	1	1
1.17	Google Analytics	1	1
2.0	**Search Engine Marketing**	**18**	
2.1	Introduction to SEM	1	2
2.2	Advantages of SEM	1	2
2.3	Internet marketing: search engine marketing	1	2
2.4	Paid methods-Pay-per-click advertising (PPC)	1	2
2.5	Cost-per-thousand impressions (CPM)	1	2
2.6	Ad formats	1	2
2.7	The bases of Search Engine Optimisation	1	2
2.8	Search engine optimization elements-On-page SEO	1	2

2.9	SEO content writing	1	2
2.10	Code optimization	2	2
2.11	Inbound links	1	2
2.12	Present-day algorithms: Non-disclosure	2	2
2.13	Three types of SEO	1	2
2.14	Tips and tricks of SEO	2	2
2.15	SEO Disclaimers Off-site SEO	1	2
3.0	**Email Marketing**	**18**	
3.1	What is email marketing?	1	3
3.2	Email marketing as a part of online marketing	1	3
3.3	How to start with email marketing?	1	3
3.4	Types of Email	3	3
3.5	Mailing list	2	3
3.6	How to grow mailing list	3	3
3.7	How to write a good email-Email design	1	3
3.8	Elements of a good email , how to write high performing email	1	3
3.9	What is E-mail deliverability	1	3
3.10	Spam- Spam filters	1	3
3.11	Email Marketing Matrices	1	3
3.12	Conversions in Email marketing	1	3
3.13	Tracking conversions	1	3
4.0	**Affiliate Marketing**	**18**	
4.1	What is Affiliate Marketing?	1	3
4.2	How to become a merchant?	2	3
4.3	How to become an affiliate?	2	3
4.4	Managing Affiliate Program	2	3
4.5	Affiliate programs	2	3
4.6	Affiliate Marketing Compensation Models	1	3
4.7	Affiliate Marketing Strategies for Merchants	2	3
4.8	Affiliate Marketing Strategies for Affiliates	2	3
4.9	Affiliate Networks	2	3
4.10	Affiliate Software	2	3

Text Books for Reference

1. Online Marketing Fundamentals – e-Marketing Institute - www.emarketinginstitute.org (Module 1,2)
2. E-mail Marketing Fundamentals – e-Marketing Institute - www.emarketinginstitute.org (Module 3)
3. Affiliate Marketing Fundamentals – e-Marketing Institute - www.emarketinginstitute.org (Module 4)
4. e-Marketing Essential Guide to marketing in a digital world 5th Edition By Rob Stokes and the Minds of Quirk (Module 1,2,3,4)

Course	Details				
Code	**IT1816207**				
Title	**INFORMATICS**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**3/6**				
Type	**General Education**				
Credits	**4**	Hrs/Week	**4 hours**	Total Hours	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	To understand cognitive informatics	**U**
2	To develop a strong base on bioinformatics, geo-informatics	**U**
3	To create awareness about social issues of informatics	**Ap**

Module	Course Description	Hrs	CO.No.
1.0	**Introduction**	**18**	
1.0	Cognitive informatics: fundamentals	3	1
1.1	Formal cognitive models	3	1
1.2	Cognitive resonance models	3	1
1.3	Semantic Analysis	3	1
1.4	Semantic Categorisation	3	1
1.5	Cognitive information systems	3	1
1.6	Cognitive System and Artificial brains	3	1
2.0	**Bio-informatics**	**18**	
2.1	Bio-informatics: introduction to bioinformatics	3	2
2.2	DNA Repair Data and Databases	3	2
2.3	Bioinformatics tools for Study of DNA Repair Protiens	3	2
2.4	Ten major Databases	3	2
2.5	Ten major Bio informatics Software Programs	3	2
2.6	Ten major resource locators	3	2
3.0	**Geo-Informatics**	**18**	
3.1	Geo-Informatics: Introduction	1	2
3.2	Objectives of GIS	1	2
3.3	Elements of GIS	1	2
3.4	Two approaches of data model	2	2
3.5	Need of GIS	2	2
3.6	Steps in GIS Analysis	2	2
3.7	Principles of Remote sensing	3	2
3.8	Global positioning system	3	2
3.9	Application of GIS	3	2
4.0	**Social Informatics**	**18**	
4.1	Introduction	2	3
4.2	Socio-technical principles	2	3
4.3	Socio-technical principles and social informatics	2	3

4.4	Socio-technical principles in theory	2	3
4.5	Socio-technical Interaction Network	2	3
4.6	Users as Social Actors	2	3
4.7	Empirical Work	2	3
4.8	ARJIS	2	3
4.9	Socio-technical principles and Social informatics reflected in practice	2	3

REFERENCES

1. Lidia Ogiela, Marek R. Ogiela, Advances in Cognitive Information Systems, Springer (Mod 1)
2. KajaMilanowska, KristianRother, and Janusz M Bujnicki "Database and Bioinformatics Tools for the study of DNA Repair"- Research Molecular Biology International. (Mod 2)
3. Jin Xiong Essential Bioinformatics-Cambridge University Press
4. Manakari MP ,Kodge B G, Kulkarni MJ, Nagargojeba U-"Fundamentals of geo-informatics and its applications in geography" –Geoscience Research (Mod 3)
5. Steve Sawyer, Michael Tyworth –"Social Informatics: Priciples, Theory and Practice" Proceedings of 7th International Conference Human Choice And Computers, IFIp-TC9 Springer London (Mod 4)

Course	Details				
Code	**IT1816208**				
Title	**IT AND SOCIETY**				
Degree	**B. Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**3/6**				
Type	**General Education**				
Credits	**4**	Hrs/Week	**4 hours**	Total Hours	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Have a clear view of what is role of ICT in e-governance	U
2	Understanding e-learning	U
3	Understanding e-commerce	U
4	Realize the pros and cons of Cyber law	U

Module	Course Description	Hrs	CO.No.
1.0	**ICT in e-governance**	**18**	
1.1	Introduction	3	1
1.2	Role of ICT in e-Governance	3	1
1.3	Back bone of e-Governance	3	1
1.4	e-governance maturity model	3	1
1.5	Infrastructure of e-Governance	3	1
1.6	Challenges of e-governance in India	3	1
2.0	**e-learning**	**18**	
2.1	What is e-learning?	2	2
2.2	Benefits and Drawback of online learning	2	2
2.3	Future of e-learning	3	2
2.4	Learning Management System –What is LMS?	2	2
2.5	Types of LMS	2	2
2.6	Content Authoring tool	2	2
2.7	SCROM and Tincan	2	2
2.8	E-learning Trends	3	2
3.0	**e-Commerce**	**18**	
3.1	e-Commerce Overview	2	3
3.2	Advantages	3	3
3.3	Disadvantages	3	3
3.4	Business Models	3	3
3.5	Payment Systems	2	3
3.6	Security Systems	3	3
3.7	B2B and B2C Model	2	3
4.0	**Cyber Law And IT**	**18**	
4.1	Introduction	2	4

4.2	Cyber Crime definition	2	4
4.3	Classification of cyber Crime	2	4
4.4	Other Cyber crimes	2	4
4.4	Cyber law and terrorism	2	4
4.4	Cyber offenders	2	4
4.6	Criminal law principles	2	4
4.7	Positive aspects of IT Act 2000	2	4
4.8	Grey Areas of IT Act 2000	2	4
4.9	Major laws on Privacy	2	4

Text Books for Reference

1. Theoretical Concepts of e-governance.
2. E-LEARNING concepts Trends and Applications Epignosis LLC
3. E-COMMERCE pdf tutorials point
4. R M Kamble – Cyber Law and Information Technology
5. Cyber Ethics pdf- Cyber Ethics and Issues in IT

Course	Details				
Code	**IT1816105**				
Title	**FREE AND OPEN SOURCE SOFTWARE**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**3/6**				
Type	**Skill Component**				
Credits	**4**	Hrs/Week	**4 hours**	Total Hours	**72**

CO No.	*Expected Course Outcomes* *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Understand the features of Python	**U**
2	Familiarization with Control Structure	**Ap**
3	Familiarization with Python Advanced Programme in Techniques	**An**
4	Create a software application using the Python programming language. And Understand Networking and Database programming	**C**

Module	Course Description	Hrs	CO.No.
1.0	**Introduction to Python Programming**	**18**	
1.1	Creating and Running Python Programs	1	1
1.2	Data types Identifiers and keywords	1	1
1.3	Integral Types	1	1
1.4	Floating point Types	1	1
1.5	Strings Comparing string, Slicing and Striding Strings	2	1
1.6	String operators and methods	2	1
1.7	String Formatting	1	1
1.8	Collection Data types-sequence types	2	1
1.9	Set types	2	1
1.10	Mapping types- Dictionaries	1	1
1.11	Default Dictionaries ,Ordered Dictionaries	2	1
1.12	Iterating collections	1	1
1.13	Copying collections	1	1
2.0	**Control Structure And Functions**	**18**	
2.1	Conditional branching	1	2
2.2	Looping	1	2
2.3	Exception Handling	2	2
2.4	Custom Functions	2	2
2.5	Modules and packages	1	2
2.6	Custom modules	1	2
2.7	Pythons standard library- String Handling	2	2
2.8	Command Line programming	1	2
2.9	Mathematics and Numbers	1	2
2.10	Times and Dates	1	2

2.11	File formats, Encodings and Data Persistence	1	2
2.12	File ,Directory, process handling	1	2
2.13	Networking and internet programming	1	2
2.14	XML	1	2
2.15	Other modules	1	2
3.0	**Advanced Programming Techniques**	**18**	
3.1	Custom classes	2	3
3.2	Custom collection classes	2	3
3.3	Local and recursive functions	2	3
3.4	Dynamic code execution and dynamic imports	2	3
3.5	Controlling Attribute Access	2	3
3.6	Multiple inheritance	2	3
3.7	Functional style Programming	2	3
3.8	Debugging	2	3
3.9	Unit testing	1	3
3.10	Profiling	1	3
4.0	**Advanced Topics**	**18**	
4.1	Networking- creating TCP client	2	4
4.2	Creating TCP server	2	4
4.3	Database programming-DBM databases	2	4
4.4	SQL databases	2	4
4.5	Regular Expression	2	4
4.6	Introduction GUI Programming	2	4
4.7	Dialog style Programs	2	4
4.8	Main window style programs Create main window	2	4
4.9	Creating a Custom Dialog	2	4

Reference

1) Mark Summerfield-Programming in Python3 A Complete Introduction to Python Language 2nd edition, Addison-Wesley

Course	Details				
Code	**IT1816106**				
Title	**EMBEDDED SYSTEMS AND INTERNET OF THINGS**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**3/6**				
Type	**Skill Component**				
Credits	**4**	Hrs/Week	**4hours**	Total Hours	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Understand fundamentals of embedded system.	U
2	Understand fundamentals of IoT	U
3	Familiarize and analyse IOT development methodologies	AN
4	Familiarize major applications of IOT.	U

Module	Course Description	Hrs	CO.No.
1.0	**Introduction To Embedded System**	18	
1.1	Embedded Systems: Definitions	1	1
1.2	Characteristics of Embedded System	1	1
1.3	Challenges in designing Embedded Sysytem	1	1
1.4	Categorization of Embedded System	1	1
1.5	Functional building blocks of Embedded System	1	1
1.6	Processor and controller	2	1
1.7	Memory ports and Communication devices	1	1
1.8	CISC Vs RISC processor	1	1
1.9	DMA	2	1
1.10	Cache memory and its types	1	1
1.11	Co design of hardware and software	2	1
1.12	System on Chip	1	1
1.13	Tools for Embedded System	2	1
2.0	**Internet of Things**	**14**	
2.1	Definition and characteristics of IOT	1	2
2.2	Physical Design of IOT	1	2
2.3	Things in IOT	1	2
2.4	IOT Protocols	1	2
2.5	Logical Design of IOT- IOT functional blocks	1	2
2.6	IOT communication model	2	2
2.7	IOT communication API	1	2

2.8	IOT Enabling Technologies Wireless Sensor Network	2	2
2.9	Cloud Computing	2	2
2.10	Big Data Analytics	2	2
2.11	Communication Protocols	2	2
2.12	Embedded Syystems	2	2
3.0	**Pillars Of Embedded IOT And Physical Devices**	**18**	
3.1	IOT Design Methodology	2	3
3.2	Python package for IOT JSON	2	3
3.3	XML	2	3
3.4	HTTPLib and URLLib	2	3
3.5	SMTPLib	2	3
3.6	IOT Device	2	3
3.7	Raspberry Pi	2	3
3.8	Raspberry Pi Interfaces	2	3
3.9	Programming Raspberry Pi with Python	2	3
4.0	**Domain Specific IOT**	**15**	
4.1	Home Automation	2	4
4.2	Smart Cities	2	4
4.3	Environment	2	4
4.4	Energy	2	4
4.5	Retail	2	4
4.6	Logistics	2	4
4.7	Agriculture	2	4
4.8	Industry	2	4
4.9	Health and Lifestyle	2	4

Text Books for Reference

1. DP Kothari- “Embedded Systems”
2. ArshdeepBahga, Vijay Madisetti, “Internet of Things – A hands-on approach”, Universities Press, ISBN: 0: 0996025510, 13: 978-0996025515

Course	Details				
Code	**IT1816107**				
Title	**VIRTUAL AND AUGMENTED REALITY**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**3/6**				
Type	**Skill Component**				
Credits	**3**	Hrs/Week	**3 hours**	Total Hours	**54**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Familiarize VR and AR in marketing	U
2	Understand concepts of VR	U
3	Understand concepts of AR	U
4	Understand the basic applications os AR and VR in different fiels	U

Module	Course Description	Hrs	CO.No.
1.0	**Overview**	**13**	
1.1	Introduction	1	1
1.2	The difference between VR and AR	2	1
1.3	Virtual Reality	2	1
1.4	VR Headsets	2	1
1.5	VR companies	1	1
1.6	Augmented Reality	2	1
1.7	AR Companies	1	1
1.8	Mixed reality	2	1
2.0	**Virtual Reality**	**16**	
2.1	Introduction	1	2
2.2	3 Is in VR	1	2
2.3	Commercial VR technology	1	2
2.4	Classic components of VR system	1	2
2.5	Input Devices	3	2
2.6	Output Devices	3	2
2.7	Modeling	3	2
2.8	Human Factors	3	2
3.0	**Augmented Reality**	**13**	
3.1	Introduction	1	3
3.2	Brief history	1	3
3.3	Examples of AR	1	3
3.4	Related Fields of AR	1	3
3.5	Adding sound	1	3
3.6	Multimodal display	1	3
3.7	Visual Perception	1	3

3.8	Spatial Display Model	1	3
3.9	Visual Display	1	3
3.10	Tracking of AR	1	3
3.11	Mobile AR	3	3
4.0	**Creation &Applications of AR and VR**	**12**	
4.1	SDK and Games Engine	2	4
4.2	Selecting	2	4
4.3	3D Modeling	2	4
4.4	AR Project Example	2	4
4.5	Extended Reality in Marketing	2	4
4.6	Application of AR and VR in different industries	2	4

Text Books for Reference

1. Laura Hakanson ,Virtual And Augmented Reality in Marketing
2. Georgy C Burdea&PhillippeCoiffet, John Weily Virtual Reality Technology 2nd Edition
3. Dieter,Tobias, Principles and practices Augmented Reality

Course	Details				
Code	**IT1816602**				
Title	**INTERNET OF THINGS LAB**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**3/6**				
Type	**Skill Component**				
Credits	**3**	Hrs/Week	**3 hours**	Total Hours	**54**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Understand functionalities of various single board embedded platforms fundamentals.	U
2	Use Raspberry-Pi program to create simple application.	C
3	Use Raspberry-Pi program to create network application.	C
4	Develop client server application and use cloud services.	C
5	Develop comprehensive approach towards building small low cost embedded IoT system.	C

Module	Course Description	Hrs	CO.No.
1.0	**GROUP A**	54	
1.1	IOT Real world application- The experiment topic shall be chosen from the areas of IOT real world applications. Topics of interest include, but are not limited to following- smart homes, vehicle simulation, health monitoring and management,, wifi based IOT projects, IOT chats, RFID based projects etc.	54	1-5

Text Books for Reference

1. ArshdeepBahga, Vijay Madisetti, “Internet of Things – A hands-on approach”, Universities Press, ISBN: 0: 0996025510, 13: 978-0996025515
2. Honbo Zhou, “The Internet of Things in the Cloud: A Middleware Perspective”, CRC Press, 2012. ISBN : 9781439892992
3. Dieter Uckelmann, Mark Harrison, Florian Michahelles, “Architecting the Internet of Things”, Springer, 2011. ISBN: 978-3-642-19156-5
4. Lyla B. Das, “Embedded Systems: An Integrated Approach” Pearson , ISBN: 9332511675, 9789332511675.

5. David Easley and Jon Kleinberg, “Networks, Crowds, and Markets: Reasoning About a Highly Connected World”, Cambridge University Press, 2010, ISBN:10: 0521195330
6. Olivier Hersent, Omar Elloumi and David Boswarthick, “The Internet of Things: Applications to the Smart Grid and Building Automation”, Wiley, 2012, 9781119958345
7. Olivier Hersent, David Boswarthick, Omar Elloumi , “The Internet of Things – Key applications and Protocols”, Wiley, 2012, ISBN:978-1-119-99435-0
8. Barrie Sosinsky, “Cloud Computing Bible”, Wiley-India, 2010.ISBN : 978-0-470-90356-8 5. Adrian McEwen, Hakim Cassimally, “Designing the Internet of Things”, Wiley, 2014, ISBN: 978-1-118-43063-7
9. Christopher Hallinan, “Embedded Linux Primer”, Prentice Hall, ISBN:13: 978-0-13-167984-9

Course	Details				
Code	**IT1816803**				
Title	**MAJOR PROJECT**				
Degree	**B.Voc**				
Branch(s)	**Information Technology**				
Year/Semester	**Sixth Semester**				
Type	**Project Work**				
Credits	**4**	Hrs/Week	**4 Hours**	Total Hours	**72**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level
1	Acquire practical knowledge within the chosen area of technology for project development	An
2	Understand the problems faced during project implementation.	U
3	Identify, analyze, formulate and handle programming projects with a comprehensive and systematic approach	An
4	Contribute as an individual or in a team in development of technical projects	C
5	Develop effective communication skills for presentation of project related activities	C
6	Enhance the problem solving ability by solving the real-time problems.	C

Module	Course Description	Hrs	CO.No.
1.0	**Main Project**	**72**	**1-6**
	The project topic shall be chosen from areas of current day interest using latest packages / languages running on appropriate platforms (Except the tools used in software development-I), so that the student can be trained to meet the requirements of the Industry. A project report should be submitted in hard bound complete in all aspects. For internal evaluation, the progress of the student shall be systematically assessed through various stages of evaluation at periodic intervals		

SYLLABUS OF ADD ON COURSES

Course	Details				
Code	**IT18A1001**				
Title	**INTERACTIVE FRONT END DEVELOPMENT**				
Degree	**B.VOC Information Technology**				
Branch(s)	**Computer Science**				
Year/Semester	**First semester**				
Type	**Add-on**				
Credits	**2**	Hrs/Week	**Hours 6**	Total Hours	**36**

CO No.	*Expected Course Outcomes* *Upon completion of this course, the students will be able to*:	Cognitive Level	PSO No.
1	Understand the basics of HTML 5, CSS and JavaScript and how they fit together on the web	U	1,2,3,4
2	Learn how to create interactive, engaging web contents using Java Script, CSS, HTML 5 and more.	C	1,2,3,4

Cognitive Level: R-Remember; U-Understanding; Ap-Apply; An-Analyze; E-Evaluate; C-Create

Module	Course Description	Hrs	CO. No.
1.0	**HTML**	**12**	
1.1	Structure	2	1,2
1.2	Text	2	1,2
1.3	List, Links	2	1,2
1.4	Images, Tables	2	1,2
1.5	Forms	2	1,2
1.6	Flash, Video & Audio	2	1,2
2.0	**CSS**	**12**	
2.1	Introduction	2	1,2
2.2	Color	2	1,2
2.3	Text, Boxes	2	1,2
2.4	List, Tables and forums	2	1,2
2.5	Layout,Images	2	1,2
2.6	HTML 5 Layout, Process and Design	2	1,2
3.0	**JavaScript &JQuery**	**12**	
3.1	Basic javascript instructions	1	1,2
3.2	Functions Methods and Object	1	1,2
3.3	Decision and loop	2	1,2
3.4	Events	2	1,2
3.5	JQuery	2	1,2
3.6	APIs	2	1,2
3.7	Form Enhancement and Validation	2	1,2

Text Books for Reference

1. HTML 5 And CSS Interactive Front end Development Jon Duckett
2. JavaScript and JQuery Interactive Front end Development Jon Duckett

Course	Details				
Code	**IT18A1002**				
Title	**IT SUPPORT PROFESSIONAL**				
Degree	**B.VOC Information Technology**				
Branch(s)	**Computer Science**				
Year/Semester	**Second semester**				
Type	**Add-on**				
Credits	**2**	Hrs/Week	**Hours 6**	Total Hours	**36**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level	PSO No.
1	Implement system installation, keeping system in running condition and troubleshooting if any problem arises.	Ap	1,2,3,4
2	Understand and create files in MS Office with different formatting features	C	1,2,3,4
Cognitive Level: R-Remember; U-Understanding; Ap-Apply; An-Analyze; E-Evaluate; C-Create			

Module	Course Description	Hrs	CO. No.
1.0	**Technical Support Fundamentals**	**18**	
1.1	Computer hardware-CPU RAM Motherboard Peripherals	2	1
1.2	Operating System –Components, Chrome OS	2	1
1.3	Process Management, Memory Management,IO Management	2	1
1.4	Logs, Boot Process	2	1
1.5	Installing Windows, Linux, Mac OS X	2	1
1.6	Networking basics, Networking hardware	2	1
1.7	IoT, Privacy and Security	2	1
1.8	Installing, Updating and Removing Software on Windows	2	1
1.9	Installing, Updating and Removing Software on Linux	2	1
2.0	**MS Office Fundamentals**	**18**	
2.1	MS Word- Basic menus, tools, Document creation	3	2
2.2	MS Excel- Basic menus, tools, functions, formatting	3	2
2.3	MS Access- Basic menus, tools	3	2
2.4	MS Power point- Basic formatting of slides, creating animations	3	2
2.5	MS Outlook	3	2
2.6	Basic functions of Windows and Internet Explorer	3	2

Text Books for Reference

1. Microsoft Office 2016 Step by Step: MS Office 2016- John Lambert, Curtis Frye
2. Lotia and Nair- Modern all about motherboard.
3. Operating System Principles, Seventh Edition, Abraham Silberschatz, Peter Galvin and Greg Gagne, John Wiley

Course	Details				
Code	**IT18A1003**				
Title	**WEB DEVELOPMENT USING VISUAL STUDIO**				
Degree	**B.VOC Information Technology**				
Branch(s)	**Computer Science**				
Year/Semester	**Third semester**				
Type	**Add-on**				
Credits	**2**	Hrs/Week	**Hours 6**	Total Hours	**36**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level	PSO No.
1	Understand the structure of web programs developed in VB and XML	U	1,2,3,4
2	Learn how to create interactive, engaging web contents using VB and XML	C	1,2,3,4
Cognitive Level: R-Remember; U-Understanding; Ap-Apply; An-Analyze; E-Evaluate; C-Create			

Module	Course Description	Hrs	CO. No.
1.0	**Web Development in .NET**	**18**	
1.1	Introduction to ASP.NET	2	1,2
1.2	Web Form Construction in VS.NET	2	1,2
1.3	Understanding Web Form Structure	2	1,2
1.4	A Brief Tour of An ASP.NET Application	2	1,2
1.5	Server Controls	2	1,2
1.6	User Controls	2	1,2
1.7	Debugging and Exception Handling	3	1,2
1.8	ASP.NET Authentication, Authorization and Security	3	1,2
2.0	**XML and Web Development**	**18**	1,2
2.1	Markup Languages	3	1,2
2.2	XML Data Exchange	3	1,2
2.3	XML Schema creation	3	1,2
2.4	XML Document Creation in VS.NET	3	1,2
2.5	Manipulation of XML in .NET	3	1,2
2.6	XML API Comparison	3	1,2

Text Books for Reference

1. Beginning Visual Web Programming in VB.NET from Novice to Professional – Chris Hart, James Greenwood, Daniel Cazzulino

Course	Details				
Code	**IT18A1004**				
Title	**SOFTWARE TESING FOUNDATIONS**				
Degree	**B.VOC Information Technology**				
Branch(s)	**Computer Science**				
Year/Semester	**Fourth semester**				
Type	**Add-on**				
Credits	**2**	Hrs/Week	**Hours 6**	Total Hours	**36**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level	PSO No.
1	Understand testing in Software development life cycle	U	1,2,3,4
2	Learn to prepare test plans manualy and automatically	Ap	1,2,3,4
Cognitive Level: R-Remember; U-Understanding; Ap-Apply; An-Analyze; E-Evaluate; C-Create			

Module	Course Description	Hrs	CO. No.
1.0	**Software Testing**	**18**	
1.1	Introduction to Software Testing	3	1
1.2	Testing throughout the software development life cycle	3	1
1.3	Testing Process	3	1
1.4	Testing Levels, Types	3	1
1.5	Test case Preperation	3	1
1.6	Manual Testing	3	1,2
2.0	**Automated Testing**	**18**	
2.1	Java Programming	5	2
2.2	Introduction to Selenium HQ	5	2
2.3	Test Scenario Description using Automated Testing	8	2

Text Books for Reference

1. Dorothy Graham, Erik Van Veenendaal, Isabel Evans, Rex Black, Foundations of Software Testing, Gaynor Redvers-Mutton, Third Edition. (Module 4)
2. Test Automation Using Selenium Web Driver - Adactin

Course	Details				
Code	**IT18A1005**				
Title	**WINDOWS AZURE**				
Degree	**B.VOC Information Technology**				
Branch(s)	**Computer Science**				
Year/Semester	**Fifth semester**				
Type	**Add-on**				
Credits	**2**	Hrs/Week	**Hours 6**	Total Hours	**36**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level	PSO No.
1	Understand the essentialities of Windows Azure	U	1,2,3,4
2	Learn the basics of creating virtual machines	Ap	1,2,3,4
Cognitive Level: R-Remember; U-Understanding; Ap-Apply; An-Analyze; E-Evaluate; C-Create			

Module	Course Description	Hrs	CO. No.
1.0	**Getting Started with Microsoft Azure**	**18**	
1.1	What is Azure?	3	1
1.2	Azure Resource Manager, Classic deployment model	3	1
1.3	Role based access controls	3	1
1.4	Azure App Service and Web Apps- App service plans	3	1
1.5	Creating and deploying Web Apps- Demo	3	1
1.6	Configuring Scaling and monitoring web Apps	3	1
2.0	**Azure Virtual Machine**	**18**	
2.1	Virtual machine models	3	2
2.2	Virtual machine components	3	2
2.3	Create configuring and connecting virtual machine	3	2
2.4	Azure Storage-storage services Security, creating and managing store	3	2
2.5	Databases-Azure SQL Database	3	2
2.6	Azure virtual networks	3	2

Text Books for Reference

1. Fundamentals of Azure 2nd edition Microsoft Azure Essentials Michael Colliner Robin Shahan

Course	Details				
Code	**IT18A1006**				
Title	**CYBER SECURITY**				
Degree	**B.VOC Information Technology**				
Branch(s)	**Computer Science**				
Year/Semester	**Sixth semester**				
Type	**Add-on**				
Credits	**2**	Hrs/Week	**Hours 6**	Total Hours	**36**

CO No.	***Expected Course Outcomes*** *Upon completion of this course, the students will be able to*:	Cognitive Level	PSO No.
1	Understand basic ethical hacking techniques and protection mechanism	Ap	1,2,3,4
Cognitive Level: R-Remember; U-Understanding; Ap-Apply; An-Analyze; E-Evaluate; C-Create			

Module	Course Description	Hrs	CO. No.
1.0	**Ethical Hacking**	**18**	
1.1	Introduction to hackers	4	1
1.2	Crackers	4	1
1.3	Creation of Virus in notepad	4	1
1.4	Password Cracking	4	1
1.5	Password Creating policies	4	1
1.6	Website, Wifi hacking, android lock screen cracking	4	1
1.7	Protect PDF Files from Copying	4	1
1.8	Hacking Android phone	4	1
1.9	Botnets	4	1

Text Books for Reference

1. Hack-X-Crypt- Straight forward guide towards ethical hacking and cyber security- UjjwalSahay

QUESTION PAPERS

B. Voc Information Technology Degree Examination

First Semester

LISTENING AND SPEAKING SKILLS IN ENGLISH

Model Question Paper

Time:3Hrs Max Marks:80 marks

PART A

Answer all questions.

1. Why English is called an unphonetic language?
2. What are suffixes?
3. How many syllables are there in the word 'examination'?
4. What is rising intonation?
5. Indentify the word |steias|
6. What is active learning?
7. Mark the intonation-We are buying the property, aren't we?
8. What is syllable?
9. What are short vowels?
10. What is a consonant cluster?

(10*1=10)

Part B

Answer any eight from the given twelve questions.

11. What is academic listening?
12. What are contracted forms?
13. Write a short note on intonation in commodes
14. Direct a person who seeks the way to railway station.
15. Write 2 expressions of the mild disagreement.
16. Write an email to your friend inviting him to your brother's marriage.
17. List formal greetings.
18. Write 2 expressions asking for permission.
19. What are telephonic skills?
20. What are conversational etiquettes?
21. List some of the words that are mispronounced
22. How far mother-tongue interference hinders your communication?

(8*2=16)

Part C

Answer any six from the given nine questions.

23. Write a short note on consonants in English
24. Write a short note on fluency and its importance in speech
25. Distinguish between formal and informal ways of speaking
26. Imagine you are the college chairman. Prepare an agenda of the meeting to be conducted in connection with college day.
27. Your college is organizing an inter-collegiate debate on Use of mobile phones in Campus. Prepare a notice on that as the secretary of debate Club.
28. Write a conversation between you and your friend whom you have seen after a long time in a mall.
29. Introduce yourself in an interview
30. What is note-taking in listening?
31. Write 4 expressions for making requests.

(6*4=24)

Part D

Answer any two from the given four questions.

32. What are the barriers to listening? Explain in detail
33. A) You are the Arts Club Secretary. Prepare a vote of thanks on the occasion of Arts Club Inauguration.

    B) Write a conversation between you and your principal on the Christmas Day Celebrations.
34. Construct an interview between you, a reporter of a leading newspaper and megastar Mohanlal.
35. Write a discussion with the

    A) Assistant Engineer of KSEB section of your area complaining about the poor supply of electricity.

    B) Write a welcome address to welcome the invitees on a formal occasion

(2*15=30)

B.VOC. MODEL QUESTION PAPER
First Semester
COMPLEMENTARY COURSE: DISCRETE MATHEMATICS I

Time: Three hours **Maximum Marks: 80**

Section A

Answer all questions. **(10 x 1 = 10 marks)**

(Each question carries 1 mark.)

1. Find the bitwise OR of the bitstrings 11111111 and 00000000.
2. Define a tautology.
3. What is the cartition product of A = {1} and B = {0, 1}?
4. Demonstrate A∩B in Venn Diagram.
5. Find the intersection of the sets {1, 2, 5} and {0, 1, 2, 6}.
6. What is the cardinality of the set A = $\{\emptyset, \{\emptyset, \{\emptyset\}\}, \{\emptyset\}\}$?
7. Find the lcm of $2^3 3^5 7^1$ and $2^1 3^4$.
8. Determine whether the integers 10, 17, and 21 are pairwise relatively prime.
9. Define a reflexive relation.
10. Give an example of partition of the set {1,2,3,4,5,6,7,8,9}

Section B

Answer any eight questions. **(8 × 2 = 16 marks)**

(Each question carries 2 marks.)

11. Construct the truth table for p↔q.
12. Show that (p∧q)→(p∨q) is a tautology.
13. What is the truth value of the statement "∃! x (x2 = x)" , if the domain consist of all integers?
14. What is the values of the sum, $\sum_{j \in S} j\ 2$ where S = {1, 3, 5, 7}
15. Let f and g be the functions from the set of integers to the set of integers defined by f(x) = 2x + 3 and g(x) = 3x + 2. Find g∘f?
16. Prove or disprove that ⌈x + y⌉ = ⌈x⌉+⌈y⌉ for all real numbers x and y.
17. Find the prime factorization of 10! .
18. What letter replaces the letter K when the function f(p) = (7p+3) mod 26 is used for encryption?
19. Let R = {(1, 1), (2, 1), (3, 2), (4, 3)}. Find R2.
20. Give an example of a digraph which is reflexive and but not symmetric.
21. Draw the Hasse diagram of the poset ({2,4,5,10,12,20,25}, |).
22. Prove or disprove "divides" relation is the set of positive integers is an equivalence relation.

Section C

Answer any six questions. (6 × 4 = 24 marks)

(Each question carries 4 marks.)

23. Show that the premises "Everyone in discrete mathematics class has taken a course in computer science" and "Marla is a student in this class" imply the conclusion "Marla has taken a course in computer science"
24. Prove that $(p \vee q) \wedge (\neg p \wedge \neg q)$ is a contradiction using truth table.
25. State and prove absorption laws of logical equivalence.
26. Find a) $\left|-(\frac{7}{8})\right|$ b) $\lfloor -1 \rfloor$ c) $\left|\frac{1}{2} + \lceil 3/2 \rceil\right|$
27. Let A = {0, 2, 4, 6, 8, 10}, B = {0, 1, 2, 3, 4, 5, 6}, and C = {4, 5, 6, 7, 8, 9, 10}. Find a) $A \cap B \cap C$ b) $A \cup B \cup C$ c) $(A \cup B) \cap C$ d) $(A \cap B) \cup C$
28. Encrypt the message DO NOT PASS GO, by applying the given encryption functionf (p) = (3p + 7) mod 26.
29. Write a short note on RSA cryptosystem.
30. Answer these questions for the poset ({3, 5, 9, 15,24, 45}, |).
    a) Find the maximal elements.
    b) Find the minimal elements.
    c) Find all upper bounds of {3, 5}.
    d) Find the least upper bound of {3, 5}, if it exists.
31. Give example of each of the following relation on {1, 2, 3, 4, 5 }:
    i) symmetric and transitive
    ii) symmetric and reflexive
    iii) transitive but not reflexive
    iv) neither symmetric nor transitive

Section D

Answer any two questions. (2 × 15 = 30marks)

(Each question carries 15 marks.)

32. a) State the converse, contrapositive, and inverse of the conditional statement, "If it snows today, I will ski tomorrow".

    b) Let p and q be the propositions "Swimming at the New Jersey shore is allowed" and "Sharks have been spotted near the shore," respectively. Express each of these compound propositions as an English sentence.

    i) $\neg q$

    ii) $p \wedge q$

    iii) $\neg p \vee q$

    iv) $p \rightarrow \neg q$

    v) $\neg q \rightarrow p$

c) Construct a truth table for each of these compound propositions.

i) $(p \vee q) \rightarrow (p \oplus q)$

ii) $(p \leftrightarrow q) \oplus (\neg p \leftrightarrow q)$

33. a) Show that $(p \wedge q) \rightarrow (p \vee q)$ is a tautology without using truth tables.

b) Show that $\neg(p \vee (\neg p \wedge q))$ and $\neg p \wedge \neg q$ are logically equivalent without using truth tables.

c) Show that $(p \rightarrow r) \vee (q \rightarrow r)$ and $(p \wedge q) \rightarrow r$ are logically equivalent.

d) Show that $(p \rightarrow q) \wedge (q \rightarrow r) \rightarrow (p \rightarrow r)$ is a tautology

34. a) Draw the Venn diagram of the following

i) $A \cap (B-C)$

ii) $(A \cap B^c) \cup (A \cap C^c)$.

b) Let $A_i=\{i, i+1, i+2,...\}$, then evaluate

i) $\bigcup_{i=1}^{n} A_i$

ii) $\bigcap_{i=1}^{n} A_i$

c)Show that if A and B are two sets

i) $A \oplus A = \emptyset$

ii) $A \oplus \emptyset = A$

d)Use set builder notation and logical equivalences to establish the first De Morgan law $(A \cap B)^c = A^c \cup B^c$.

35. a) Define a lattice and give example.

b) Determine whether the poset $(P(S), \subseteq)$ is a lattice where S is a set?

c) Find two incomparable elements in these posets.

i) $(P(\{0, 1, 2\}), \subseteq)$

ii)$(\{1, 2, 4, 6, 8\}, |)$

d)Draw the Hasse diagram for divisibility on the set{1, 2, 3,6, 12, 24, 36, 48}. Then find:

i) upper bounds of {3,6}

ii) maximal elements

iii)minimal elements

iv)greatest lower bound of {2,6,12}

v)least upper bound of {2,12}

vi) Is there a greatest element?

B.Voc Information Technology Degree Examination
First Semester
INTRODUCTION TO IT

MODEL QUESTION PAPER

Time 3 hrs Max 80 mark

Part A

Answer all questions

1. ASCII stands for ….?
2. ---- act as an interface between user and hardware.
3. EEPROM stands for ----
4. Expand POST
5. Software that converts high level language into machine language line by line ------
6. In the urlhttps://www.google.com where https:// is --------
7. What is full form of HTML?
8. What is diligence of computer?
9. Radix of hexadecimal number system is -----
10. ------ of CPU controls all the operations of a computer

(10*1=10)

Part B

Answer any eight from the given twelve questions

11. What are characteristics of computer?
12. Explain briefly about scanners.
13. Differentiate RAM and ROM
14. What is flash memory?
15. What is web browser? Give examples
16. What is URL? Explain its components
17. What is topology?
18. What is computer virus?
19. Why do we need network?
20. What is NIC?
21. Differentiate between bridge and router
22. What is utility software

(8*2=16)

Part C

Answer any six from given nine questions

23. What is e-mail? Explain its structure.
24. Explain System software.
25. Explain different types of printer.
26. Explain how search engine works.
27. Explain optical storage devices
28. Explain network terminal devices
29. What are common security issues over internet.
30. Explain IPV4 and IPV6
31. Explain the basic protocol for communication over network.

(6*4=24)

Part D

Answer any two from the given four questions

32. Explain briefly different types of software
33. Explain about storage devices in computer
34. Explain functional units of a computer
35. Explain different communicating devices.

(2*15=30)

B. Voc Information Technology Degree Examination

First Semester

PROGRAMMING IN C

Model Question Paper

Time 3 hrs Max 80 mark

Part A

Answer all questions.

1. A declaration float a, b occupies _____ bytes of memory.
2. _____ header file is essential for using strcmp() function.
3. Step by step instructions written to solve any problem is called _____
4. Recall the use of continue statement?
5. The output of the following code is

```
void main()
{       intz,a=5,b=3;
        z=a*2+26%3;
        printf("%d",z);
}
```

6. Recall the different modes of opening a file?
7. State the use of break statement?
8. What is a variable? How do you declare a variable?
9. A pointer variable contains as its value the _____ of another variable.
10. By default ____ is the return type of a C function.

(10*1=10)

Part B

Answer any eight from the given twelve questions.

11. Differentiate pass by value and pass by reference.
12. What is recursion?
13. Find the output of the following code.

```
int n=0, m;
for(m=1;m<=n+1;m++)
printf(m);
```

14. Write the two forms of #include directive.
15. Write the syntax of simple if statement with an example.
16. What is an array? How do declare a one dimensional array?
17. Write a C program to find the remainder when two numbers are given as input.
18. Distinguish between intmain() and void main().
19. Describe the purpose of the qualifiers const and volatile.

20. Differentiate global and local variables.
21. Identify the output:

```
main()
{
int x=100, y=200;
printf("%d", (x>y)?x:y);
}
```

22. Distinguish between & and * operator.

(8*2=16)

Part C

Answer any six from the given nine questions.

23. Describe the structure of a C program?
24. Write a program to find the area of a circle if the radius is given.
25. Write a program to find the average of five numbers.
26. Describe the syntax of a structure with an example.
27. Write a program to reverse the digits of an integer number.
28. Write a program to check whether the given string is palindrome or not.
29. Distinguish between while and do while loop.
30. Write a program to find the sum of odd numbers between 1 and 20.
31. Write a program to find the sum of the digits of a number.

(6*4=24)

Part D

Answer any two from the given four questions.

32. Describe the storage classes in C with suitable examples.
33. Explain the string handling functions in C with examples.
34. Write a C program using structure to find student grades in a class
    Maximum total marks is 500.

Student_percentage	Grades
>=80	A
>=60	B
>=50	C
>=40	D
<40	F

35. Write a program to get n elements and store it an array and sort the elements of an array in ascending order.

(2*15=30)

B.Voc Information Technology Degree Examination
First Semester
COMPUTER ARCHITECTUREANDORGANIZATION
MODEL QUESTION PAPER

Time 3 hrs Max 80 mark

Part A

Answer all questions

1. Name the basic functional units of computer
2. ALU stands for--------
3. Activity of a computer is governed by -------
4. MAR stands for -----
5. Group of lines that serves as connecting path for several devices is called ----
6. Two basic operations of memory are ------
7. USB stands for-----
8. ------ contains address of next instruction to be executed.
9. What is EEPROM?
10. What is seek time?

(10*1=10)

Part B

Answer any eight from the given twelve questions

11. What is register mode and absolute mode? Give examples
12. What is stack frame?
13. Briefly explain a single bus structure with a neat diagram.
14. How interrupts are enabled and disabled?
15. What are exceptions?
16. What is PCI bus?
17. Differentiate between subroutine and interrupt service routine
18. What is cache memory?
19. What is flash memory?
20. What is memory interleaving?
21. Explain briefly accumulator
22. Differentiate RAM and ROM

(8*2=16)

Part C

Answer any six from given nine questions

23. Explain functional unites of computer with neat diagram.
24. Differentiate between stack and queue
25. What are subroutines?
26. What are interrupts? Explain its classification.
27. What is bus? Explain its types.
28. Explain briefly about USB
29. Explain DMA
30. Explain different types of ROM
31. Explain briefly execution of branch instruction

(6*4=24)

Part D

Answer any two from the given four questions

32. Explain subroutines and how it is operated?
33. Explain standard IO interfaces
34. Explain how execution of a complete instruction take place
35. Explain about different addressing modes.

(2*15=30)

B.Voc Information Technology Degree Examination
First Semester
OFFICE AUTOMATION IMAGE EDITINGAND LATEX
MODEL QUESTION PAPER

Time 3 hrs Max 80 mark

Part A

Answer all questions

1. ----- in spread sheet display coordinates of active cell
2. MS Excel saves the worksheet with an extension ------
3. ------ in spread sheet used to analyze different things from different perspective quickly
4. ------ command creates title in latex
5. ------ latex produce numbered list
6. Equation/math mode in latex can be done with an opening and closing ------ sign
7. ----- in Photoshop used to select portion of an image based of shape and colour
8. ------ tool remove dust mark and scratches from photograph
9. In flash ----- let you view all layers of your animation in timeline in multiple layers for positioning.
10. File saved in flash with ----- extension

(10*1=10)

Part B

Answer any eight from the given twelve questions

11. Explain briefly flash timelines
12. What modifications can be performed on frame/ key frames in flash
13. What are steps to use templates in adobe flash?
14. How to capture image in Photoshop?
15. What is clone stamp?
16. How to remove red eye from and image?
17. What is cell referencing?
18. What is window freezing?
19. Explain COUNTA function.
20. How to select font sixe of entire document in latex in document class?
21. Briefly mention the commands used for dividing a document
22. What is bibliographic databases?

(8*2=16)

Part C

Answer any six from given nine questions

23. Explain cell referencing in spread sheet.
24. Explain Page orientation.
25. Explain arithmetic functions in spread sheet with example.
26. Explain page styling in latex.
27. Explain different parts of a document
28. Explain different features with graphic objects
29. Explain action scripts.
30. Explain different selecting tools available in Photoshop
31. Explain different ways of cropping an image in Photoshop

(6*4=24)

Part D

Answer any two from the given four questions

32. Explain different types of functions available in spread sheets with example.
33. Explain bibliography generation in latex
34. Explain filtering in Photoshop
35. Explain creating animations in adobe flash

(2*15=30)

B. Voc Information Technology Degree Examination

Second Semester

READING AND WRITING SKILLS

Model Question Paper

Time:3Hrs Max Marks:80 marks

PART A

Answer all questions.

1. Correct the sentence – He jumped on his horse and rode off.
2. What is editing?
3. Use correct verb forms
   I – (live) in Kottayam
4. One of my teachers – (Be) an Anglo Indian
5. What is writing skill?
6. Pick out the correct spelling – que , queue
7. What is proof reading?
8. What is drafting?
9. yes or no questions are normally spoken in _____tone
10. Differentiate interactional and transactional forms of communication.

(10*1=10)

Part B

Answer any eight from the given twelve questions.

11. Re arrange the sentences
    - Egyptians / the ancient/ securely/ inside pyramids/the mummies/buried
    - Dried out bodies / wrapped / in linen bandages/ were
12. Complete the following conversation
    Radha: Seetha, where have you been last week?
    Seetha: Radha, I have been to the new college in Delhi (four more sentences to be spoken by each)
13. What are the elements of business writing?
14. What are the main ideas proposed by Francis Bacon on learning?
15. Write a paragraph about your village?
16. What is the main theme of 'the story of an hour'.
17. Differentiate skimming and scanning with examples.
18. Suppose you are coach write a dialogue that took place among your team members before the match.
19. "My thoughts are with the dead, with them

I live in long past years" - Explain

20. Write an email to your friend inviting him on your brothers wedding.
21. You are the arts club secretary of your college . Prepare the minutes of last meeting conducted

22.Write a short conversation between a taxi driver and his passenger.

(8*2=16)

Part C

Answer any six from the given nine questions.

23. Differentiate extensive and intensive reading

24. Your College is organizing an inter college debate on ' abuse on environment) write a notice giving necessary details

25. Why does Mrs Mallard die at the end of 'the story of an hour'?

26. Write a letter to the `editor of a leading newspaper about the nuisance created by the stray dogs on the road during the busy hours of the day.

27. Punctuate the sentences.

- Mother had to go into hospital she had heart problem
- Did you understand why I was upset
- It is a fine idea let us hope that it is going to work
- We will be arriving on Monday morning at least I think so

28. Prepare a CV and cover letter for the post of Administrative officer in XYZ Company,Thrissur.

29. What is the irony in the title of the poem 'Don't Go into the Library'?

30 Edit the letter

- I hope that you study well for your examination. Here I give a few hints about how to preparing well for it . First of all get all the related material of your subjects. After read a few pages, close the book. Repeat the same at your mind. Divide that in points at mental level. This way you may not forget. Then read the questions of earlier years. Practice them a practice has made a man perfect.

31. What is the central idea of the poem 'scholar?'

(6*4=24)

Part D

Answer any two from the given four questions.

Write a speech on the topic modern gadgets have made us slaves to machines

33.While reading the newspaper, you came across the following news item

Travelling as part of Education

Travelling exercises broadening influence upon human intellect. It helps us form an impartial and detached view about ourselves. It encourages a sense of enterprise, action and adventure. It enables contact with nature which uplifts and purifies our mind.

Based on the information given use your own ideas and write an article on the topic

34. Write an Essay stating your views on what you think terrorism will do to the world

35. Read the following passage carefully and answer the question that follows each:

If ever there was a man who took a total view of life and who devoted himself to the service of mankind, it was certainly Gandhiji. If his pattern of thinking was *sustained* by faith and the *lofty* ideals of service, his actions and actual teachings were always influenced by considerations at once moral and *eminently* practical. Throughout his career as a public leader extending over nearly sixty long years, he never allowed *exigencies* to shape his views. In other words, he never allowed himself to use wrong means to attain the right ends. His *punctiliousness* in the choice of means was so great that even the achievement of the end was *subordinated* to the nature of the means used , because he believed that the right end could not be achieved by wrong means and what could be achieved by the use of wrong means would be only a *distortion* of the right end. His method constituted a soul stirring *assertion* of man's *abiding* trust in man, of the belief that the sense of morality is *inherent* in the spiritual equipment of human beings. The freedom of the concept cannot be attained through mere scientific and technological advancement and *decrees*, nor can it be had through mere scientific and technological advancement. A society, to be really free has to be organized for freedom and that organization has to be started with the individual himself. To the extent that the Indian national life remains inspired by and patterned after his ideas, it will continue to be a source of *inspiration.*

Questions

1. What is inspired by Gandhiji's ideas?
2. What for was Gandhiji's belief?
3. What faith did Gandhiji have about man?
4. How was freedom to be attained as per Gandhiji?
5. Find a word from the passage which means 'obtained'

.

(2*15=30)

B.Voc Information Technology Degree Examination
Second Semester
ENVIRONMENTAL STUDIES
MODEL QUESTION PAPER

Time 3 hrs Max 80 mark

Part A

Answer all questions

1. Expand EDSS
2. Performing an initial exploration with in the decision context is called ------
3. What is the full form of OASIS?
4. GIS stands for -----
5. ----- is a family of software comprising complete GIS
6. Analysis and practice of environmentally sustainable computing is called ----
7. Cloud is implemented using ------ architecture model
8. What is DDR?
9. ----- is the condition determined by physical, social ,economical and environmental factors.
10. ----- is effort to reduce the loss of life and property by lessening the impact of disaster.

(10*1=10)

Part B

Answer any eight from the given twelve questions

11. What is disaster risk?
12. Explain risk communication.
13. What is disaster mitigation?
14. Mention characteristics of data involved in environmental decision problem
15. What is FRAME?
16. Explain hyper spectral remote sensing?
17. Explain Geographic information System?
18. What is remote sensing?
19. What is cloud computing?
20. Mention major green initiatives in IT
21. Mentions major components of cloud computing
22. Explain OASIS.

(8*2=16)

Part C

Answer any six from given nine questions

23. Explain EDSS.
24. Explain Data interpretation and data mining.
25. Explain activities of environmental management process
26. Explain how GIS can be used for Environmental Data Management and Analysis.
27. Explain on GIS technologies in field
28. Explain uses of ICT in disaster management risk.
29. Compare DRM and DDR.
30. Explain cloud computing deployment models
31. Explain factors of cloud that enable green computing.

(6*4=24)

Part D

Answer any two from the given four questions

32. With the help of a neat diagram briefly explain Green Computing Architecture
33. Explain GIS tools Environmental Management
34. Discuss the role of ICT in disaster mitigation.
35. Explain applications of Environmental Decision Support System

(2*15=30)

B. Voc Information Technology Degree Examination

Second Semester

DISCRETE MATHEMATICS II

Model Question Paper

Part A

Answer all questions.

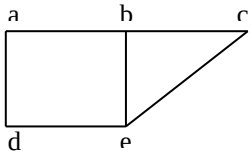
1. Define loops.
2. State the handshaking theorem.
3. Give one example of a connected graph.
4. Define a tree with an example.
5. Define spanning trees.
6. What are the Eigen values of $\begin{bmatrix}1 & 0\\0 & 1\end{bmatrix}$.
7. Determine whether $\begin{bmatrix}1 & -1\\1 & 2\end{bmatrix}$ is invertible.
8. Find $\begin{bmatrix}1 & 2\\3 & 4\end{bmatrix} + \begin{bmatrix}3 & 4\\5 & 6\end{bmatrix}$
9. Find the value of $1.0 + \overline{(0+1)}$.
10. Identify the dual of x (y + 0)

(10*1=10)

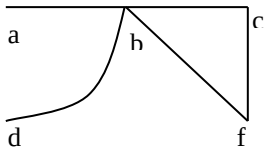
Part B

Answer any eight from the given twelve questions.

11. Draw the graph with the given adjacency matrix $\begin{bmatrix}0 & 1 & 0\\1 & 0 & 1\\0 & 1 & 0\end{bmatrix}$
12. Find the union of G1



G2



13. Draw C_5 and K_4.
14. Explain with example i) rooted tree ii) binary tree
15. Find the inverse of $\begin{bmatrix}3 & 1\\7 & 2\end{bmatrix}$
16. Determine the rank of $\begin{bmatrix}1 & 2 & 3\\1 & 4 & 6\\3 & 8 & 12\end{bmatrix}$

17. Prove the absorption law x (x + y) = x using other identities.
18. Show that ($\bar{1}$. $\bar{0}$) + (1 . $\bar{0}$) =1
19. What values of the Boolean variables x and y satisfy xy = x + y ?
20. If A = $\begin{bmatrix} i & 0 \\ 0 & -i \end{bmatrix}$ and B = $\begin{bmatrix} 0 & i \\ i & 0 \end{bmatrix}$. Find AB.
21. If $\begin{bmatrix} x+3 & 4 \\ y-4 & x+y \end{bmatrix}$ = $\begin{bmatrix} 5 & 4 \\ 3 & 9 \end{bmatrix}$. Find x and y ?
22. Give an example of a graph which is Hamiltonian but not Eulerian.

(8*2=16)

Part C

Answer any six from the given nine questions.

23. Define bipartate graph. Show that C_6 is bipartate.
24. Prove that" thereare almost n-ary tree of height h".
25. What is the value of the postfix expression 723 * - 4↑9 3 / + ?
26. Represent the compound proposition ¬ (p ∧ q) ↔ (¬ p ∨ ¬ q) and (¬ p ∧ (q ↔ ¬ p) λ using ordered rooted trees. Also write this expression in prefix notation.
27. Show that i) xy = (x | y) | (x | y)

    ii) x + y = (x | x) | (y | y)

28. Find the sum of products expansion for the function F (x, y, z) = (x + y) $\bar{z}$.
29. Find X and Y, if X + Y = $\begin{bmatrix} 5 & 2 \\ 0 & 9 \end{bmatrix}$ and X – Y = $\begin{bmatrix} 3 & 6 \\ 0 & -1 \end{bmatrix}$
30. Evaluate $\begin{vmatrix} 1 & a & bc \\ 1 & b & ca \\ 1 & c & ab \end{vmatrix}$
31. With suitable example prove that matrix multiplication is not commutative.

(6*4=24)

Part D

Answer any two from the given four questions.

32. a) if A = $\begin{bmatrix} 3 & -2 \\ 4 & -2 \end{bmatrix}$ and I = $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$. Find *k* so that $A^2 = k\,A - 2\,I$

    b) Solve the system of equation using Cramer's rule

    x + 2y + 3z = -5

    3x + y – 3z = 4

    -3x + 4y + 7z = -7

33. a) Define the following

i) isomorphic graph ii) cycles iii) isolated vertex iv) directed graph v) bipartite graph

b) Explain matrix representation of a graph with example.

c) Explain with example how a tree can be converted into a binary tree.

34. a) Find the values of the Boolean function represented by F(x,y,z) = x y + $\bar{z}$

b) Construct circuits that produce the following outputs

i) $\bar{x}\overline{(y + \bar{z})}$ ii) (x + y + z) ($\bar{x}\bar{y}\bar{z}$) iii) (x + y) $\bar{x}$

35. Let A = $\begin{bmatrix} 2 & -3 & 5 \\ 6 & 0 & 4 \\ 1 & 5 & -7 \end{bmatrix}$, B = $\begin{bmatrix} 1 & 0 & 2 \\ 0 & 3 & 1 \\ 1 & 1 & 2 \end{bmatrix}$.

Find i) A + B ii) |A| iii) AB iv) A^{-1}

(2*15=30)

B. Voc Information Technology Degree Examination

Second Semester

DATA STRUCTURES AND ALGORITHMS

Model Question Paper

Part A

Answer all questions.

1. List the operations on data structures.
2. Define data structure.
3. What is binary tree?
4. List the basic operations on a stack.
5. What is the minimum number of nodes that a binary tree can have?
6. List the steps to insert a new item at the head of a linked list
7. Identify the minimum number of queues needed to implement the priority queue.
8. In _____, search start at the beginning of the list and check every element in the list.
9. The complexity of binary search algorithm is_____
10. In binary trees nodes with no successors are called_____

(10*1=10)

Part B

Answer any eight from the given twelve questions.

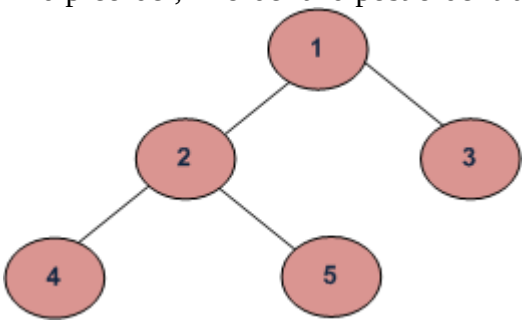
11. What are linear and non linear data structures?
12. What is a linked list?
13. What is a queue?
14. What is bubble sort and how it works?
15. What is binary search?
16. How quick sort works?
17. Arrange the given array using bubble sort.
    {12,4,5,10,1}
18. What is mean by a Dequeue?
19. How depth first search works?
20. Define abstract data type.
21. Define circular queue.
22. Which sorting technique is an example of divide and conquer.

(8*2=16)

Part C

Answer any six from the given nine questions.

23. What is a stack? When do we use a stack?
24. Recall the operations that can be performed on a queue.
25. What is tree traversal? List the different ways of tree traversal.
26. Give a basic algorithm for searching a binary search tree.
27. Explain the degree, height and depth of a tree.
28. Find preorder, in-order and post order traversal of the given tree.



29. Write an algorithm for searching a target value in a doubly linked list.
30. Write a short note on Big O notation.
31. Write an algorithm to remove a node from a linked list.

(6*4=24)

Part D

Answer any two from the given four questions.

32. Write a program to implement a queue using an array.
33. Define binary search tree. Write an algorithm to implement insertion and deletion operation.
34. Explain the graph traversal techniques with suitable examples.
35. Give an implementation of the stack using linked list.

(2*15=30)

B. Voc Information Technology Degree Examination

Second Semester

DATA BASE MANAGEMENT SYSTEMS

Model Question Paper

Part A

Answer all questions.

1. Define DBMS.
2. Differentiate database schema and database state.
3. List the data types allowed for SQL attributes.
4. Discuss when the concept of a weak entity is used in data modelling?
5. What is a functional dependency?
6. Define the terms-Candidate key, Primary key
7. Data about data is termed as _____
8. The set of all possible values of data items is _____
9. _____ command is used to remove a relation from an SQL database.
10. _____ symbol is used to represent a weak entity set in ER model.

(10*1=10)

Part B

Answer any eight from the given twelve questions.

11. List the four main types of actions involved in databases.
12. Differentiate database schema and database state.
13. Compare logical data independence and physical data independence.
14. Define foreign key. What is this concept used for?
15. Explain the entity integrity and referential integrity constraints.
16. Define normalization.
17. Recall aggregate functions. Give two examples.
18. What is commit point of a transaction?
19. State the conditions to check whether two operations are conflicting or not.
20. What is transitive dependency?
21. When is nested queries used? Give an example.
22. Describe the purpose of project operation in relational algebra with an example.

(8*2=16)

Part C

Answer any six from the given nine questions.

23. Discuss the responsibilities of DBA and database designers.
24. Describe the three schema architecture.

25. Consider the following relations for a database that keeps track of student enrolment in courses and the books adopted for each course:

    STUDENT(Ssn, Name, Major, Bdate)
    COURSE(Course#, Cname, Dept)
    ENROLL(Ssn, Course#, Quarter, Grade)
    BOOK_ADOPTION(Course#, Quarter, Book_isbn)
    TEXT(Book_isbn, Book_title, Publisher, Author)

    Specify the foreign keys for this schema.

26. Create a table student with the fields: (id,name,age) and do the following:
    a) Insert three records(101,Adam,15), (102,Alice,16),(103,'John',15) into the table.
    b) Update the age of the student, Adam to 17.
    c) Delete the details of the student, John from the table.
27. List the components of a trigger and its use.
28. Create Table department with the corresponding fields and constraints given below.

DEPARTMENT

DNO	Primary Key
DNAME	Not Null
CNT_EMP	Should not be greater than 15
DEPT_HOD	
DLOCATION	Should end with the letter D

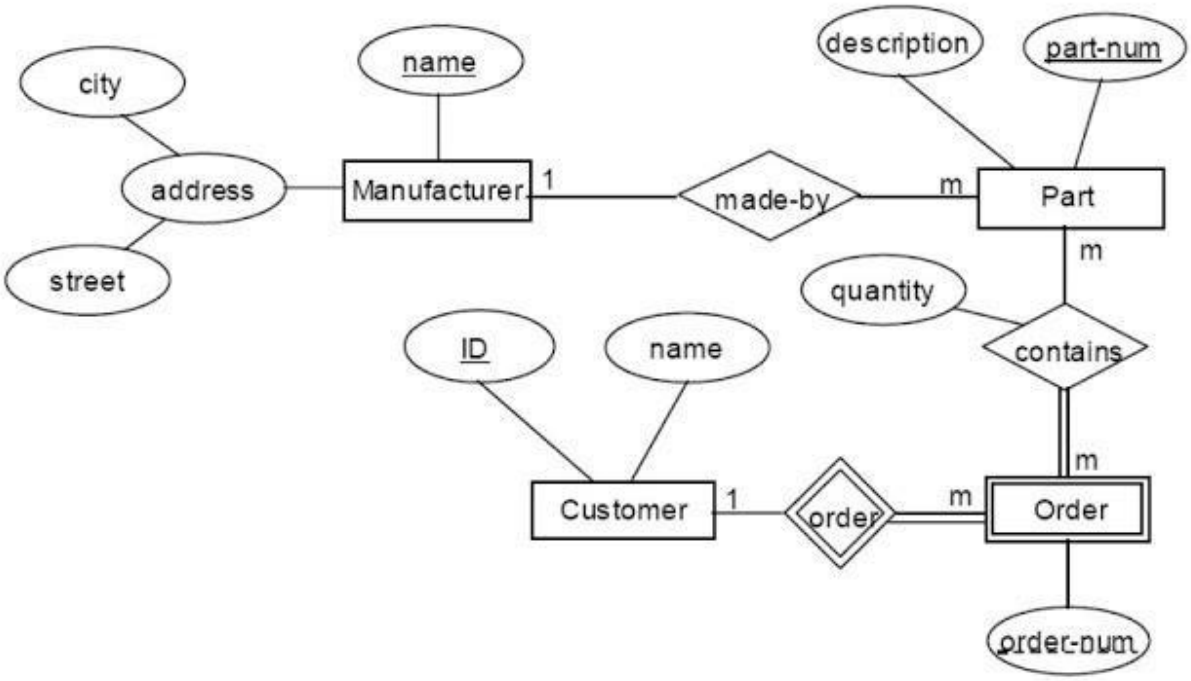
29. Define 1NF.Explain with an example.
30. Describe the desirable properties of transactions.
31. Discuss lost update problem with an example.

(6*4=24)

Part D

Answer any two from the given four questions.

32. Discuss the main characteristics of database approach and how it differs from traditional file systems.
33. Explain with a diagram the component modules of a DBMS and their interactions.
34. Convert the given ER diagram into relational schema.



35. Create a table employee with the following attributes (EmployeeID, FirstName, LastName, HireDate, City)and write the SQL queries for the following:

a) List the details of employees living in London.

b) List the details of employees who do not live in London.

c) Get a list of employees who were hired on or after 1-jan-2016.

d) List the details of employees who live in the cities: London, Redmond, Seattle or Paris.

e) Find all employees whose first name start with 'M' or 'A'.

f) Sort the details of employees in the order of city.

g) Find the number of employees living in each city.

h) List the details of employee hired during the period 1-jan2015 and 30-dec-2015.

(2*15=30)

B.Voc Information Technology Degree Examination

Second Semester

DIGITAL ELECTRONICS

MODEL QUESTION PAPER

Time 3 hrs Max 80 mark

Part A

Answer all questions

1. Base or radix of hexadecimal number system is ----
2. What is truth table?
3. What is SOP and POS ?
4. Which gates are known as universal gates?
5. Which gate the output is 1 if and only if at least one input is 1?
6. The time required for a gate or inverter to change its state is called -----
7. Device that route the data from single input to one of the many outputs is -----
8. ------ memory is volatile
9. T in T-flip flop stands for -----
10. What is modem?

(10*1=10)

Part B

Answer any eight from the given twelve questions

11. Convert hexadecimal 199.375 into binary and octal
12. Differentiate between combinational and sequential circuit
13. Explain in brief weighted and non weighted codes
14. What is modulus of acounter?
15. What is race around condition?
16. What are different types of ROM?
17. Differentiate between SRAM and DRAM
18. Draw circuit diagram of XOR gate and give its truth table
19. Convert binary data 1010 into 7 bit even parity hamming code
20. Find 2's complement of $(-195)_{10}$
21. Explain sign magnitude form of representation with example
22. Perform binary addition between 1011001 and 1100101

(8*2=16)

Part C

Answer any six from given nine questions

23. With circuit diagram explain half adder and full adder.
24. Convert JK flip flop into D flip flop
25. Explain operation of master slave SR flip flop with neat circuit diagram
26. Implement XOR gate using NAND gate.
27. Differentiate RAM and ROM
28. With neat diagram explain DAC and ADC?
29. Explain De-Morgan's theorem with truth table
30. Explain basic properties of Boolean algebra
31. Explain types of registers

(6*4=24)

Part D

Answer any two from the given four questions

32. Design basic gates using NAND and NOR gates
33. Simplify using K-Map and obtain minimum SOP F(A,B,C,D) = ∑m (1,3,4,6,9,11,12,14)
34. Explain the working of multiplexer and de-multiplexer with neat diagram
35. With neat circuit diagram explain design and function of different counters

(2*15=30)

B.Voc. Model Question paper

Third Semester

STATISTICAL METHODS AND PROBABILITY

Time: Three hours Maximum Marks: 80

Section A

Answer all questions. (10 x 1 = 10 marks)

(Each question carries 1 mark.)

1. Find mean of the following data:13,16,20,22.
2. Define mode.
3. A process by which we estimate the value of dependent variable on the basis of one or more independent variables is called-------
4. Draw the scatter diagram for the data

X	0	2	4	6	8	1 0	1 2
Y	5	2	1	20	6	7	1 0

5. The correlation coefficient named after the scientist-----
6. What is the probability of selecting a boy from a class containing 4 boys and 3 girls?
7. State Baye's theorem.
8. Give the sample space for the random experiment "tossing a coin, if the coin shows head toss it again but if it shows tail throw a die."
9. If X is A discrete random variable and f(x) is the probability of X, then the expected value of this random variable is equal to ----
10. If Var(X) =5 and Var(Y) = 10, then find Var(2X + Y).

Section B

Answer any eight questions. (8 × 2 = 16 marks)

(Each question carries 2 marks.)

11. The mean of 10 observations was found to be 28. Later, it was discovered that one observation 14 was misread as 24. Find the correct mean?
12. Define quartiles and deciles.
13. Find D3 of 28,30,13,15,14,34,50,90,15,21
14. Find range and coefficient of range of 25, 32, 85,10,36,40.
15. If P(A) = 6/ 11 , P(B) = 5 /11 and P(A ∪ B)= 7/ 11 , find P(A|B).
16. If P(A)= $\frac{1}{4}$, P(B) = $\frac{1}{3}$ and P(A∪B) = $\frac{1}{2}$. Find a) P(A∩B) b) P(Ac∩ Bc)
17. A die is thrown twice. What is the probability that atleast one of the two numbers is 4?
18. Find the probability of drawing an ace or a spade from a pack of cards.
19. State whether the following is a probability distributions of a random variable. Give reasons for your answer.

X	3	2	1	0	- 1
P(X)	0.3	0.2	0.4	0.1	0.05

20. Find E(X) for the following;

X	1	2	5
P(X)	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{6}$

21. A random variable X has the following probability distribution. Find k if P(x) = $\begin{cases} k, x = 1,2,3,4,5,6 \\ 0, \text{ otherwise} \end{cases}$

22. Explain curve fitting by the method of least squares.

Section C

Answer any six questions. (6 × 4 = 24 marks)

(Each question carries 4 marks.)

23. For the following data find standard deviation.

size	No of students
0 - 2	2
2 - 4	4
4 - 6	6
6 - 8	4
8 - 10	2
10 - 12	6

24. Compute Q_1, Q_3, D_6 of 28,30,13,15,14,34,50,90,15,21.

25. Find geometric mean from the following data.

Size : 5 8 10 12

Frequency: 2 3 4 1

26. Define random experiment, sample space, independent events and mutually exclusive events.

27. Bag I contains 3 red and 4 black balls while another Bag II contains 5 red and 6 black balls. One ball is drawn at random from one of the bags and it is found to be red. Find the probability that it was drawn from Bag II.

28. Find the 3rd and 4th moments about mean of a random variable X whose f(x)= 2(1-x), $0 \leq x \leq 1$

29. X is a random variable whose standard deviation σ. What will be the variance of:

i) 1

ii) 4x

iii) 6x+8

iv) 5x-3

30. A variable X has the probability density function f(x) = 6x(1-x), $0 \leq x \leq 1$. Find mean of X.

31. The table below shows the number of absences, x, in a Discrete Mathematics course and the final exam grade, y, for 7 students. Find the correlation coefficient .

x	1	0	2	6	4	3	3
y	95	90	90	55	70	80	85

Section D

Answer any two questions. (2 × 15 = 30marks)
(Each question carries 15 marks.)

32. Calculate standard deviation for the following two series and state which one is more variable.

marks	No. of students	
	section A	Section B
20-30	5	7
30-40	10	15
40-50	25	30
50-60	5	15
60-70	5	8

33. Find mode from the following data,

Size of the item	frequency
0 - 10	10
10 - 20	14
20 - 30	16
30 - 40	14
40 - 50	11
50 - 60	13
60 - 70	17
70 - 80	13

34. a) Define:
   i) Random experiment
   ii) Sample space
   iii) Event
   iv) mutually exclusive events
   v) independent events
   vi) dependent events
   vii) sure event
   viii) impossible event
   ix) complement of an event

x) union of two events

b) Write down the sample space in the following cases:

i) tossing three unbiased coins

ii) throwing a die

iii) selecting a number from the set of positive integers less than 10.

iv) selecting two from 3 men and 4 women.

35.

a) Find the probability distribution of number of tails in the simultaneous tosses of three coins.

b) Let X denote the sum of the numbers obtained when two fair dies are rolled. Find the mean variance and standard deviation of X

B. Voc Information Technology Degree Examination

Third Semester

SOCIAL SKILLS

Model Question Paper

Time:3Hrs Max Marks:80 marks

PART A

Answer all questions.

1. What are suffixes?
2. Explain KISS in communication
3. What are the conditions where the letter 'l' is silent?
4. What is emotional intelligence?
5. List the essential life skills
6. What are short vowels
7. State 2 components of effective communication
8. What is prefix?
9. Correct the sentence: I likes swimming
10. What is a constanant cluster?

(10*1=10)

Part B

Answer any eight from the given twelve questions.

11. Different types of attitudes?
12. What is self appraisal?
13. Explain voice modulation
14. List the major blocks to time management
15. What is academic listening?
16. Write a short note on the art of small talk
17. What are the roles and functions in a group discussion?
18. What are the expressions for mild disagreement?
19. What are the common informal greetings?
20. What is discussion etiquette?
21. What are the useful phrases for closing a conversation?

(8*2=16)

Part C

Answer any six from the given nine questions.

22. Write a short note on intonation in communication
23. Write a short note on fluency and its importance in speech
24. Write a short note on RD
25. What are the purposes of note making?
26. Write a short note on consonants in English
27. How do you manage a stress?
28. Give 4 sentences as examples of asking permission
29. Distinguish between formal and informal ways of speaking
30. Write a paragraph on favorite sports.
31. Construct a dialogue between you and your teacher explaining her on not bringing the assignment

(6*4=24)

Part D

Answer any two from the given four questions.

32. You and your family are planning a holiday in a city of your choice. Write a letter to the Information Office, Tourism Department in the state seeking information on:
    a) The particular places you want to visit
    b) Booking of accommodation
    c) Tariffs
    d) Convenient mode of travel, etc
33. Imagine that you are participating in a group discussion on 'water pollution' in which there are four participants. Write the discussion; evaluate the group discussion highlighting the strength and weakness of each participant.
34. Construct a a discourse along the following lines:
    a) A tourist guide is describing a tourist place to a tourist
    b) Suresh is describing to his friend Sangeeth, visit to a museum.
35. Construct a speech along the following lines:
    a) A lecture on rain water harvesting
    b) A vote of thanks to the invited at a function Describe the storage classes in C with suitable examples.

(2*15=30)

B. Voc Information Technology Degree Examination
Third Semester
BUSINESS INFORMATICS AND PRINCIPLES OF ACCOUNTING

Model Question Paper

PART A

Answer all questions.

1. What is Business Informatics?
2. What is a Bank Reconciliation Statement?
3. What is Digital Signatures?
4. What is Ledger?
5. What do you mean by B2G?
6. Give two examples of electronic payment systems?
7. What is a secret key?
8. Mention the use of Computerized Accounting
9. What is a Trial Balance?
10. State the methods of charging depreciation

(10*1=10)

Part B

Answer any eight from the given twelve questions.

11. What is authenticity, privacy and integrity?
12. What is Accounting Conventions?
13. What is an Accounting Cycle?
14. What is imprest System of Petty Cash Book?
15. What are the various types of Accounts? State examples.
16. What is Contra Entry? State an example?
17. What is Accounting Standards?
18. What is Source Document?
19. What is a suspense account?
20. What are the various subsidiary Books?
21. What is Intellectual property law?
22. Journalize
    1. Started Business with cash Rs 10000.
    2. Deposited into Bank 50000
    3. Purchase Goods costing Rs 20000 form Shyam
    4. Sold goods to Mohan Rs 25000

(8*2=16)

Part C

Answer any six from the given nine questions.

23. State the golden rules of Accounting? Explain with examples
24. Distinguish Between a Journal and Ledger.
25. Write the classification of assets.
26. Write a short Note on security Concerns in E-commerce.
27. Write a short Note on Relevance of Currencies.
28. What are the application of Business Informatics? State real life examples.
29. Distinguish between Book keeping and Accounting.

30. On 1st July, 2008 a company purchased a machine for Rs 3,90,000 and spent Rs 10,000 on its installation. It decided to provide depreciation @ 15% per annum, using written down value method. On 30th November, 2011 the machine was dismantled at a cost of Rs 5,000 and then sold for Rs 1,00,000.On 1st December, 2011 the company acquired and put into operation a new machine at a total cost of Rs 7,60,000. Depreciation was provided on the new machine on the same basis as had been used in the case of the earlier machine. The company closes its books of account every year on 31st March.Prepare Machinery Account and Depreciation Account for four accounting years ended 31st March. 2012

31. From the following particulars prepare a Bank Reconciliation Statement to find out the causes of difference in two balances as on August 31st, 2016 for Four Star (Pvt.) Ltd.
    (i) Bank Overdraft as per Bank Statement 17,000
    (ii) Check issued but not encashed during the August 2,200
    (iii) Dividends on shares collected by banker 2,300
    (iv) Interest charged by the bank recorded twice in the Cash Book 500
    (v) Check deposited as per Bank Statement not entered in Cash Book 3,400
    (vi) Credit side of the Bank column in Cash Book cast short 1,000
    (vii) Clubs dues paid by bank as per standing instruction not recorded in Cash Book 1,200
    (viii) Uncredited check due to outstation 3,900

(6*4=24)

Part D

Answer any two from the given four questions.

32. A)What are Accounting Principles? Explain with examples.
    B)State the difference between capital expenditure revenue expenditure and deferred revenue expenditure.
33. What is electronicpayment systems? Explain the types of electronic Payment Systems?
34. What is E-commerce Security? What are the different ways of ensuring E-commerce security?

35. The following trial balance have been taken out from the books of XYZ as on 31st December, 2018.

	Dr.	**Cr.**
Plant and Machinery	100,000	
Opening stock	60,000	
Purchases	160,000	
Building	170,000	
Carriage inward	3,400	
Carriage outward	5,000	
Wages	32,000	
Sundry debtors	100,000	
Salaries	24,000	
Furniture	36,000	
Trade expense	12,000	
Discount on sales	1,900	
Advertisement	5,000	
Bad debts	1,800	
Drawings	10,000	
Bills receivable	50,000	
Insurance	4,400	
Bank balances	20,000	
Sales		480,000
Interest received		2,000
Sundry creditors		40,000
Bank loan		100,000
Discount on purchases		2,000
Capital		171,500
	795,500	795,500

Closing stock is valued at Rs 90,000

Prepare the trading and profit and loss account of the business for the year ended 31.12.2018 and a balance sheet as at that date.

(2*15=30)

B. Voc Information Technology Degree Examination

Third Semester

OBJECT ORIENTED PROGRAMMING USING JAVA

Model Question Paper

Part A

Answer all questions.

1. Why is Java architectural neutral?
2. What is finalize() method?
3. Why do we need import statement in Java?
4. What is scope of a variable?
5. _____ is generated when the source code is successfully compiled.
6. The JDK command to compile a class in the file Test.java is _____
7. What is an applet?
8. Name the two byte stream classes.
9. State the use of StreamTokenizer class.
10. Name the two filter classes used for creating data streams for handling primitive data types.

(10*1=10)

Part B

Answer any eight from the given twelve questions.

11. What do you mean by constructor?
12. List three steps for creating an object for a class.
13. When throws keyword is used?
14. What is an exception?
15. Enumerate the rules for creating identifiers in Java.
16. Define packages in Java.
17. Differentiate overloading and overriding.
18. Does Java support multiple inheritance?
19. Compare local and remote applets.
20. Distinguish between init() and start() methods.
21. Distinguish between InputStream and Reader classes.
22. What is multithreading?

(8*2=16)

Part C

Answer any six from the given nine questions.

23. Explain different ways of creating a thread.
24. List the benefits of organizing classes into packages.
25. How applets differ from applications?
26. Describe the steps for creating our own package.
27. Compare classes with interfaces.
28. List the different levels of access protection available in Java.
29. What are objects? How are they created from a class?
30. Describe the steps involved in implementing a standalone program in Java with an example.
31. List the steps involved in developing and testing an applet.

(6*4=24)

Part D

Answer any two from the given four questions.

32. Describe the features of Java?
33. Explain in detail the life cycle of a thread?
34. Give an example where interface can be used to support multiple inheritance. Develop a standalone Java program for the example.
35. Develop an applet that receives three numeric values as input from the user and then displays the largest of the three on the screen. Write a HTML page and test the applet.

(2*15=30)

B.Voc Information Technology Degree Examination

Third Semester

SOFTWARE ENGINEERING AND TESTING

MODEL QUESTION PAPER

Time 3 hrs Max 80 mark

Part A

Answer all questions

1. SDLC stands for ….
2. What are fundamental software engineering activities?
3. In which requirement engineering activity the errors in requirements are inevitably discovered ?
4. Which software process model is known as risk driven model?
5. What is SRS?
6. Which agile project management method focus on iterative development of software rather than technical approaches?
7. What is cyclomatic complexity?
8. The data structure used in basic path testing is ….
9. Black box testing is also known as ……. testing
10. Name the advanced scripting techniques are used in test execution tools?

(10*1=10)

Part B

Answer any eight from the given twelve questions

11. What are advantages of incremental model?
12. Briefly discuss use cases.
13. How risk can be accessed and controlled ? Explain briefly
14. What is difference between generalization and aggregation?
15. What is Regression testing?
16. What is difference between functional and non functional requirements?
17. What are potential benefits from using tools in general to support testing?
18. Which tools help to support static testing?
19. Explain Spiral model.

20. What is integration Testing?
21. Mentions different stages in software development life cycle
22. Discuss requirement traceability matrix briefly.

(8*2=16)

Part C

Answer any six from given nine questions

23. Explain different attributes of a good software.
24. With the help of a neat diagram briefly explain Boehm's spiral model.
25. Explain behavioural models.
26. Explain briefly 4 types of Architectural patterns.
27. What do u mean by boundary value analysis .Give 2 examples of boundary value testing
28. What are the various types of coupling?
29. Explain the principles of testing.
30. Explain different levels of software testing
31. Compare manual testing with automated testing.

(6*4=24)

Part D

Answer any two from the given four questions

32. With the help of a neat diagram briefly explain different software process models.
33. Explain briefly Interaction models and Structural models
34. Discuss difference between White box testing and Black box testing
35. What are different types of tools in testing Explain briefly

(2*15=30)

B.Voc Information Technology Degree Examination

Third Semester

MICROPROCESSOR AND PC HARDWARE

MODEL QUESTION PAPER

Time 3 hrs Max 80 mark

Part A

Answer all questions

1. Why ALE signal in 8085 is made high?
2. ---- specifies address of next instruction to be executed
3. The cycle required to fetch and execute an instruction in a 8085 microprocessor is ---
4. The first machine cycle of 8085 A instruction is ----
5. Name of 16 bit register in 8085 is ----
6. ----- signal in 8085 is useful when CPU communicate with slow peripheral devices
7. Temporary registers in 8085 are ----
8. What is mother board?
9. Boards that used to connect additional devices to motherboard is known as -----
10. OS detect and installs appropriate device driver for ----- type of devices

(10*1=10)

Part B

Answer any eight from the given twelve questions

11. Mention hardware interrupts of 8085
12. Give functions of ALE and READY signal in 8085.
13. What is the function of HOLD signal?
14. What is EPROM?
15. What is Accumulator?
16. Mention the operation performed by PCHL and XTHL instruction
17. What is the function of auxiliary carry flag?
18. Give addressing mode of instruction MVI B,3FH and LDA 905FH
19. What are bus in 8085?
20. What constitute CPU?

21. How does RAL and RLC works?

22. Give the structure of program status word in 8085

(8*2=16)

Part C

Answer any six from given nine questions

23. Explain different addressing modes in 8085.

24. Mention different registers in 8085 along with its size

25. Explain memory types.

26. How data stored in hard disk?

27. Write 8085 assembly language program to add 2 numbers

28. Write short note on DMA data transfer?

29. Discuss the instruction format of 8085. Give examples for each

30. How address and data line multiplexed in 8085

31. List special function registers of 8085 and give special functions of each register.

(6*4=24)

Part D

Answer any two from the given four questions

32. Explain in detail Memory types.

33. Draw the 8085 architectural diagram and explain

34. Explain interrupt system of 8085

35. Discuss functions of various functional units of Intel 8085 microprocessor.

(2*15=30)

B. Voc Information Technology Degree Examination

Fourth Semester

CORPORATE SKILLS

Model Question Paper

PART A

Time:3Hrs Max Marks:60 marks

Answer all questions

1. What is CSR?
2. What do you refer to reflective thinking?
3. What is group discussion?
4. List the types of interview
5. What are the corporate skills?
6. What is interview?

(6*1=6)

Part B

Answer any sixfrom the given nine questions.

7. Giving and Receiving feedback is necessary in communication. Do you agree or not. Give reasons
8. Distinguish soft skills and hard skills
9. Explain significance of soft skills in professional life.
10. What is the structure of group discussion?
11. What is group cohesion?
12. What is team work?
13. Explain the 3 types of listening?
14. What are the work ethics and values to be followed in a workforce?
15. How far group discussion serves as an effective selection process?

(6*2=12)

Part C

Answer any three from the given five questions.

16. What are the dos and don’ts in a group discussion?
17. Explain Fayol’s principles of Management
18. Introduce yourself in an interview

19. You are attending an interview. The interviewer shouts at you without any reason. How would you react?
20. List the workplace etiquette to be followed?

(3*4=12)

Part D

Answer any two from the given four questions.

21. You are called for a GD at a bank as a part of your interview. You have to speak about your view point on 'Demonetization'. Present the views.
22. A) Write a conversation between you and the health inspector of your area on the health hazards of your village.
    B) Write a conversation with the principal complaining about the unruly behavior of your seniors.
23. A) Briefly elaborate on verbal and non-verbal communications
    B) In the airport a passenger who is going to board an aero plane for the first time is asking for help from a fellow passenger. Prepare a conversation between the two.
24. A) Imagine you are the chairman of your college Union. Make a presidential address on the occasion of the inauguration of the college day
    B) You have applied for a job as a receptionist of s reputed hotl. Write the interview that is conducted by the manger over telephone.

(2*15=30)

B. Voc Information Technology Degree Examination
Fourth Semester
MANAGEMENT INFORMATION SYSTEMS
Model Question Paper

PART A

Answer all questions.

1. What is Virtual organization
2. What is a DSS?
3. What is Digital Signatures?
4. What do you mean by data?
5. List the functions of MIS
6. State the hardware requirements
7. What is system stress?
8. Explain OAS
9. What is open system?
10. What is empirical system?

(10*1=10)

Part B

Answer any eight from the given twelve questions.

11. State an example denoting the importance of MIS
12. What is information and the various tools required?
13. Explain transaction processing system.
14. What is data dictionary?
15. Explain the need for interconnected system
16. What is structured and unstructured decisions?
17. What are objectives DBMS?
18. What is data independence?
19. What is structured system analysis?
20. Distinguish Between data and information.
21. What is expert system?
22. What is the importance of transaction processing in business

(8*2=16)

Part C

Answer any six from the given nine questions.

23. Write a short note on role of chief information officer.
24. What is the difference between transactional system and managerial system?
25. What are essentials of good information system
26. Distinguish between optimization tools and DSS tools.
27. What are merits and demerits if transaction processing system.
28. Write a short Note on Redundancy control
29. Distinguish between expert system and managerial information system
30. Write a note on the impact of Business on Information system.
31. What are the application of information technology in management

(6*4=24)

Part D

Answer any two from the given four questions.

32. Explain the levels of managerial decision making and how a MIS helps a Manager.
33. Define MIS what are the characteristics and functions of MIS? Support your Answer with real life examples
34. Transaction Processing Systemisthe work horse of the information system industry. Explain.

35. **Read the case summary given below and answer the following questions**

A waiter takes an order at a table, and then enters it online via one of the six terminals located in the restaurant dining room. The order is routed to a printer in the appropriate preparation area: the cold item printer if it is a *salad*, the hot-item printer if it is a hot *sandwich* or the bar printer if it is a *drink*. A customer's meal check-listing (bill) the items ordered and the respective prices are automatically generated. This ordering system eliminates the old three-carbon-copy guest check system as well as any problems caused by a waiter's handwriting. When the kitchen runs out of a food item, the cooks send out an 'out of stock' message, which will be displayed on the dining room terminals when waiters try to order that item. This gives the waiters faster feedback, enabling them to give better service to the customers. Other system features aid management in the planning and control of their restaurant business. The system provides up-to-the-minute information on the food items ordered and breaks out percentages showing sales of each item versus total sales. This helps management plan menus according to customers' tastes. The system also compares the weekly sales totals versus food costs, allowing planning for tighter cost controls. In addition, whenever an order is voided, the reasons for the void are keyed in. This may help later in management decisions, especially if the voids consistently related to food or service. Acceptance of the system by the users is exceptionally high since the waiters and waitresses were involved in the selection and design process. All potential users were asked to give their impressions and ideas about the various systems available before one was chosen.

a) In the light of the system, describe the decisions to be made in the area of strategic planning, managerial control and operational control? What information would you require to make such decisions?
b) What would make the system a more complete MIS rather than just doing transaction processing?
c) Explain the probable effects that making the system more formal would have on the customers and the management.

(2*15=30)

B. Voc Information Technology Degree Examination

Fourth Semester

PRINCIPLES OF MANAGEMENT

Model Question Paper

PART A

Answer all questions.

1. What is CPM?
2. What is a Benchmarking?
3. What is Recruitment?
4. Define HRM
5. What do you mean by Kaizen?
6. Name three elements of TQM
7. What is remedial training?
8. Define Motivation
9. State the types of market
10. Define management

(10*1=10)

Part B

Answer any eight from the given twelve questions.

11. What is product mix?
12. What isManagerialism?
13. What is BPR?
14. Explain the characteristics of a good recruitment policy
15. What do you mean by QC?
16. Explain recruitment and selection
17. What is in-basket exercise?
18. What is TQM?
19. Explain Marketing Mix
20. Explain ERG theory of Motivation
21. What do mean marketing management?
22. Explain Critical Path

(8*2=16)

Part C

Answer any six from the given nine questions.

23. Explain the Hygiene theory of Herzberg.
24. Discuss the functions of Top level Management

25. Explain the methodology followed for six sigma
26. Differentiate between coaching and mentoring.
27. What is meant by vestibule training? Explain the major advantages of vestibule training.
28. Section is a process of rejection. Explain
29. Explain PLC.
30. Management is a Profession. Discuss
31. Explain various sales promotion techniques

(6*4=24)

Part D

Answer any two from the given four questions.

32. Explain the various on-the-job and off-the-job methods used to train manpower in organizations.
33. Define Product quality. Why is quality improvement essential?
34. Define Motivation. Discuss clearly the "Hierarchy of Needs theory of Abraham Maslow".
35. What are the pricing methods of pricing?

(2*15=30)

B. Voc Information Technology Degree Examination

Fourth Semester

OPERATING SYSTEMS

Model Question Paper

Part A

Answer all questions.

1. Define an operating system.
2. What is a trap?
3. What is a system call?
4. Define a process.
5. Name the two general approaches to load balancing.
6. What is contiguous memory allocation?
7. Recall the technique copy-on-write.
8. Define seek time.
9. What is an executable file?
10. Name the two modes of operation in an operating system.

(10*1=10)

Part B

Answer any eight from the given twelve questions.

11. List the responsibilities of OS in connection with disk management.
12. Discuss the role of long term and short term scheduler.
13. Compare I/O bound process with a CPU bound process.
14. What is a context switch?
15. Discuss load balancing.
16. Describe a deadlock.
17. Differentiate logical address and physical address.
18. What is disk bandwidth?
19. Discuss the concept of SSTF algorithm
20. List the file attributes.
21. Name the basic file operations.
22. Compare job queue with ready queue.

(8*2=16)

Part C

Answer any six from the given nine questions.

23. Describe the concept of multiprogramming.
24. State the responsibilities of OS in connection with process management.
25. List the different types of system calls.
26. Illustrate the different states of a process.
27. What is swapping?
28. List the three requirements to solve critical section problem.
29. Discuss the twogeneral approaches are used to handle critical sections in operating systems.
30. List the criteria for comparing CPU-scheduling algorithms.
31. Describe the four conditions when hold simultaneously results in a deadlock situation.

(6*4=24)

Part D

Answer any two from the given four questions.

32. Explain briefly the operating system services.
33. Explain in detail the classic problems of synchronization.
34. Suppose that the following processes arrive for execution at the times indicated. Each process will run for the amount of time listed. In answering the questions, use nonpreemptive scheduling, and base all decisions on the information you have at the time the decision must be made.

Process	Arrival Time	Burst Time
P1	0.0	8
P2	0.4	4
P3	1.0	1

a. What is the average turnaround time for these processes with the FCFS scheduling algorithm?

b. What is the average turnaround time for these processes with the SJF scheduling algorithm?

35. Discuss briefly the concept of demand paging.

(2*15=30)

B. Voc Information Technology Degree Examination

Fourth Semester

COMPUTER NETWORKS

Model Question Paper

Part A

Answer all questions.

1. Name the four basic network topologies.
2. Define data communication.
3. Define the terms analog data and digital data.
4. Describe period and frequency of an analog signal?
5. What is a circuit switched network?
6. What is byte stuffing?
7. Specify the advantage of CSMA/CD over CSMA.
8. List the three categories of LEO satellites.
9. What is packet sniffing?
10. What is three way hand shaking?

(10*1=10)

Part B

Answer any eight from the given twelve questions.

11. What are the most common types of switched networks?
12. Describe the types of connections in a network.
13. List the most important criteria to be met by a network.
14. What are the different methods to access the Internet?
15. Compare periodic and nonperiodic signals.
16. Define bit rate and bit length of a digital signal.
17. Describe the two approaches for transmitting digital signals.
18. What does a socket address made up of?
19. Define a persistent connection.
20. Illustrate the basic model of FTP.
21. List the categories of documents in the world wide web.
22. Compare parallel transmission with serial tranmission

(8*2=16)

Part C

Answer any six from the given nine questions.

23. List the fundamental characteristics of a data communication system.
24. Illustrate the components of a data communication system.
25. Describe the different modes of data flow between two communication devices.
26. Describe the causes of transmission impairment.

27. List the advantages of optical fiber.
28. Describe the services of data link layer.
29. Discuss the concept of checksum.
30. Describe the behavior of the three persistence methods in CSMA.
31. Illustrate the Ethernet frame format.

(6*4=24)

Part D

Answer any two from the given four questions.

32. Describe briefly frequency division and time division multiplexing.
33. Explain in detail the layers of the TCP/IP protocol suite.
34. Describe briefly about virtual circuit networks.
35. Discuss briefly about data-link layer protocols.

(2*15=30)

B.Voc Information Technology Degree Examination
Fourth Semester
OBJECT ORIENTED MODELING AND DESIGN
MODEL QUESTION PAPER

Time 3 hrs Max 80 mark

Part A

Answer all questions

1. What is class?
2. Define instance.
3. UML stands for ----
4. What is ADL?
5. What are threads?
6. What is system Design?
7. What is a package?
8. Define role.
9. Program under execution is called ----
10. OOP stands for -----

(10*1=10)

Part B

Answer any eight from the given twelve questions

11. Differentiate class and object
12. What is inheritance? Give example.
13. Explain briefly Dynamic modeling
14. What are interfaces?
15. What is generalization and aggregation? How it differs each other?
16. What are use cases? Explain
17. Explain State machines
18. Define events and signals
19. Explain briefly class diagrams
20. Why do we need models?
21. Explain Interactions
22. Differentiate process and threads

(8*2=16)

Part C

Answer any six from given nine questions

23. Explain OOP concepts
24. Explain Functional modelling
25. Explain class and its properties
26. Explain object diagrams.
27. Differentiate RAM and ROM
28. Explain system design and object design
29. Explain design framework for software architecture
30. Explain collaboration
31. Explain activity diagrams

(6*4=24)

Part D

Answer any two from the given four questions

32. Explain Use case diagrams with example
33. Explain classes and its relationships
34. Explain Unified Programs
35. Explain component diagrams and deployment diagrams with examples

(2*15=30)

B.Voc Information Technology Degree Examination
Fifth Semester
INFORMATION SECURITY
MODEL QUESTION PAPER

Time 3 hrs Max 80 mark

Part A

Answer all questions

1. ------ refers to ability to prevent our data being changed in an unauthorized and undesirable manner.
2. -------- allows unauthorized users to access our data, applications and environment
3. -------- refers to authentication mechanism in which both parties authenticate each other
4. -------- gives history of activities that have taken place in the environmment
5. Symmetric key cryptography is also known as -------
6. A network of protocol analyzer is also known as -----
7. Expand HIDSec
8. ----- occurs when multiple process or multiple threads with in a process control or share access to particular resource.
9. Give an example for port scanners used for network security
10. Expand FTP

(10*1=10)

Part B

Answer any eight from the given twelve questions

11. What is security?
12. Briefly discuss CIA triad
13. Explain defense at each layer implemented
14. Explain authorisation
15. What is auditing?
16. Explain monitoring
17. Explain cryptography
18. Explain digital signature
19. Mention different types of physical security control
20. What is firewall?
21. Explain host intrusion detection
22. What is fuzzer?

(8*2=16)

Part C

Answer any six from given nine questions

23. Explain different types of attacks.
24. Explain bio-metric authentication.
25. Explain Access control methodologies.
26. How can we accomplish accountability?
27. Differentiate Symmetric and Asymmetric cryptography
28. Mention major laws of operation security
29. Explain network intrusion detection.
30. Explain packet sniffers
31. Explain different software development vulnerabilities.

(6*4=24)

Part D

Answer any two from the given four questions

32. Explain Modern cryptographic tools
33. Explain in detail firewall technology
34. Explain Network security tools
35. Explain web security

(2*15=30)

B.Voc Information Technology Degree Examination
Fifth Semester
APTITUDE AND LOGICAL REASONING
MODEL QUESTION PAPER

Time 3 hrs Max 80 mark

Part A

Answer all questions

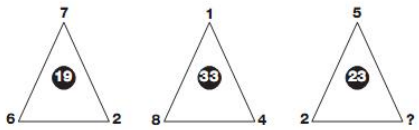
1. What is the average of first five multiples of 3?
   (a) 3 (b) 9 (c) 12 (d) 15
2. A man runs with 15 km/hr takes 15 minutes to cover a bridge. Then what is length of the bridge?
   (a) 1333.33 m (b) 1000 m (c) 7500 m (b) 1250 m
3. A and B together takes 35 days to do a job. A alone takes 60 days to complete the same job. Then how many days will B alone takes to complete the same job?
   (a) 42 (b) 72 (c) 84 (b) 96
4. If 77 ½ % of a number is 38 ¾. Then what is the number?
5. If x : y =5 : 2 , then find the value of (8x / 9y) : (8x / 2y)
6. If perimeter of a rectangular table is 4500 m sq and length of its side is 90 cm the find its width.
7. Post office : Envelope :: Bank : ----
   (a) Account (b) Money (c) Cheque (d) manager
8. DGJ : KMO :: MPS : ------
   (a) TVX (b) WUS (c) SVY (d) XVT
9. Find next number in the series …
   2 , 6 , 12 , 20 ,….
   (a) 30 (b) 32 (c) 38 (d) 40
10. Yen : Japan :: ? : Italy
    (a) Euro (b) Dinar (c) Cent (d) Piso

(10*1=10)

Part B

Answer any eight from the given twelve questions

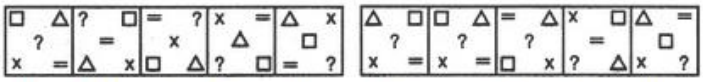
11. Which number replaces question mark?



12. Solve the following

Select a figure from amongst the Answer Figures which will continue the same series as established by the five Problem Figures.

Problem Figures: Answer Figures:



(A) (B) (C) (D) (E) (1) (2) (3) (4) (5)

13. If South-East becomes North, North-East becomes West and so on. What will West become?

(a) North – East (b) North – West (c) South – East (d) South – West

14. Rahul put his timepiece on the table in such a way that at 6 P.M. hour hand points to North. In which direction the minute hand will point at 9.15 P.M.?

(a) South (b) North (c) South – East (d) West

15. If A is the brother of B; B is the sister of C; and C is the father of D, how D is related to A?

16. Choose the one which can be substituted for the given word/sentence.

That which cannot be corrected

A. Unintelligible
B. Indelible
C. Illegible
D. Incorrigible

17. Choose the word which best expresses the meaning of the given word

AUGUST

A. Common
B. Ridiculous
C. Dignified
D. Petty

18. Choose the correct meaning of proverb/idiom, If there is no correct meaning given, E (i.e.) 'None of these' will be the answer.

To have an axe to grind

A. A private end to serve
B. To fail to arouse interest
C. To have no result
D. To work for both sides
E. None of these

19. From the given alternatives, choose the one which best expresses the given sentence in Passive/Active voice

I remember my sister taking me to the museum.

A. I remember I was taken to the museum by my sister.
B. I remember being taken to the museum by my sister.
C. I remember myself being taken to the museum by my sister.
D. I remember taken to the museum by my sister.

20. Select the pair which has the same relationship.

DIVA:OPERA

A. producer:theatre
B. director:drama
C. conductor:bus
D. thespian:play

21. Select the pair with same relation as follows

GRAIN:SALT

A. shard:pottery
B. shred:wood
C. blades:grass
D. chip:glass

22. Choose the word which is the exact OPPOSITE of the given words.

ENORMOUS

A. Soft
B. Average
C. Tiny
D. Weak

(8*2=16)

Part C

Answer any six from given nine questions

23. Look at the information and answer the questions

1. A cuboid shaped wooden block has 6 cm length, 4 cm breadth and 1 cm height.
2. Two faces measuring 4 cm x 1 cm are coloured in black.
3. Two faces measuring 6 cm x 1 cm are coloured in red.
4. Two faces measuring 6 cm x 4 cm are coloured in green.
5. The block is divided into 6 equal cubes of side 1 cm (from 6 cm side), 4 equal cubes of side 1 cm(from 4 cm side).

1. How many cubes having red, green and black colours on at least one side of the cube will be formed ?
   - **A.** 16
   - **B.** 12
   - **C.** 10
   - **D.** 4

2. How many small cubes will be formed ?
   - **A.** 6
   - **B.** 12
   - **C.** 16
   - **D.** 24

3. How many cubes will have 4 coloured sides and two non-coloured sides ?
   - **A.** 8
   - **B.** 4
   - **C.** 16
   - **D.** 10

24. Based on information Answer the questions

Each of the following questions is based on the following information:

1. A # B means B is at 1 metre to the right of A.
2. A $ B means B is at 1 metre to the North of A.
3. A * B means B is at 1 metre to the left of A.
4. A @ B means B is at 1 metre to the south of A.
5. In each question first person from the left is facing North.

1. According to X @ B * P, P is in which direction with respect to X?
   - **A.** North
   - **B.** South
   - **C.** North-East
   - **D.** South-West

2. According to M # N $ T, T is in which direction with respect to M?
   - **A.** North-West
   - **B.** North-East
   - **C.** South-West
   - **D.** South-East

3. According to P # R $ A * U, in which direction is U with respect to P?
   - **A.** East
   - **B.** West
   - **C.** North
   - **D.** South

25. Read both the statements and decide which of the following answer choice correctly depicts the relationship between these two statements.

Statements:

I. Standard of living among the middle class society is constantly going up since part of few years.

II. Indian Economy is observing remarkable growth.

- **A.** Statement I is the cause and statement II is its effect.
- **B.** Statement II is the cause and statement I is its effect.
- **C.** Both the statements I and II are independent causes.
- **D.** Both the statements I and II are effects of independent causes.
- **E.** Both the statements I and II are effects of some common cause.

26. Answer the question based on information

1. M % N means M is the son of N.
2. M @ N means M is the sister of N.
3. M $ N means M is the father of N.

Which of the following shows the relation that C is the granddaughter of E?

- **A.** C % B $ F $ E
- **B.** B $ F $ E % C
- **C.** C @ B % F % E
- **D.** E % B $ F $ C

27. Answer the question based on artificial language.

gorblflur means fan belt
pixngorbl means ceiling fan
arthtusl means tile roof
Which word could mean "ceiling tile"?

A. gorbltusl

B. flurgorbl

C. arthflur

D. pixnarth

28. Answer the question based on artificial language

hapllesh means cloudburst
srenchoch means pinball
resbosrench means ninepin
Which word could mean "cloud nine"?

A. leshsrench

B. ochhapl

C. haploch

D. haplresbo

29. Answer based on information

Tanya is older than Eric.
Cliff is older than Tanya.
Eric is older than Cliff.
If the first two statements are true, the third statement is

A. true

B. false

C. uncertain

30. Answer based on information

Blueberries cost more than strawberries.
Blueberries cost less than raspberries.
Raspberries cost more than strawberries and blueberries.
If the first two statements are true, the third statement is

A. true

B. false

C. uncertain

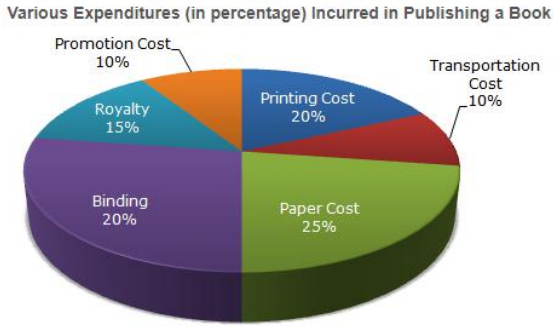
31. Complete the pattern

(6*4=24)

Part D

Answer any two from the given four questions

32. Study the pie chart and answer the questions



1. If for a certain quantity of books, the publisher has to pay Rs. 30,600 as printing cost, then what will be amount of royalty to be paid for these books?
   - **A.** Rs. 19,450
   - **B.** Rs. 21,200
   - **C.** Rs. 22,950
   - **D.** Rs. 26,150

2. What is the central angle of the sector corresponding to the expenditure incurred on Royalty?
   - **A.** 15°
   - **B.** 24°
   - **C.** 54°
   - **D.** 48°

3. The price of the book is marked 20% above the C.P. If the marked price of the book is Rs. 180, then what is the cost of the paper used in a single copy of the book?
   - **A.** Rs. 36
   - **B.** Rs. 37.50
   - **C.** Rs. 42
   - **D.** Rs. 44.25

4. If 5500 copies are published and the transportation cost on them amounts to Rs. 82500, then what should be the selling price of the book so that the publisher can earn a profit of 25%?
   - **A.** Rs. 187.50
   - **B.** Rs. 191.50
   - **C.** Rs. 175
   - **D.** Rs. 180

5. Royalty on the book is less than the printing cost by:

   A. 5%

   B. $33\frac{1}{5}\%$

   C. 20%

   D. 25%

33. Rearrange the following sentences to make a meaning full paragraph and anwer the questions according to it.

    1. After Examining him, the doctor smiled at him mischievously and took out a syringe.
    2. Thinking that he was really sick, his father summoned the family doctor.
    3. That day, Mintu wanted to take a day off from school
    4. Immediately, Mintu jumped up from his bed and swore the he was fine
    5. Therefor; he pretended to be sick and remained in bed.

    Which sentence should come **third** in the paragraph?

    A. 1

    B. 2

    C. 3

    D. 4

    E. 5

    Which sentence should come **last** in the paragraph?

    A. 1

    B. 2

    C. 3

    D. 4

    E. 5

    Which sentence should come **fourth** in the paragraph?

    A. 1

    B. 2

    C. 3

    D. 4

    E. 5

    Which sentence should come **second** in the paragraph?

    A. 1

    B. 2

    C. 3

    D. 4

    E. 5

Which sentence should come **first** in the paragraph?

A. 1

B. 2

C. 3

D. 4

E. 5

34. Replace the bold word to make grammatically correct

1. The small child does whatever his father **was done**.

   A. has done

   B. did

   C. does

   D. had done

   E. No correction required

2. **You need not come unless you want to**.

   A. You don't need to come unless you want to

   B. You come only when you want to

   C. You come unless you don't want to

   D. You needn't come until you don't want to

   E. No correction required

3. There are not many men who are so famous that they are frequently referred to by their **short names** only

   A. initials

   B. signatures

   C. pictures

   D. middle names

   E. No correction required

35. Read paragraph and answer questions

1. The attainment of individual and organisational goals is mutually interdependent and linked by a common denominator - employee work motivation. Organisational members are motivated to satisfy their personal goals, and they contribute their efforts to the attainment of organisational objectives as means of achieving these personal goals.

   The passage best supports the statement that motivation -

   A. encourages an individual to give priority to personal goals over organisational goals.

   B. is crucial for the survival of an individual and organisation.

   C. is the product of an individual's physical and mental energy.

   D. is the external force which induces an individual to contribute his efforts.

   E. makes organisation and society inseparable.

2. Due to enormous profits involved in smuggling, hundreds of persons have been attracted towards this anti-national activity. Some of them became millionaires overnight. India has a vast coastline both on the Eastern and Western Coast. It has been a heaven for smugglers who have been carrying on their activities with great impunity. There is no doubt, that from time to time certain seizures were made by the enforcement authorities, during raids and ambush but even allowing these losses the smugglers made huge profits.

   The passage best supports the statement that

   A. smuggling hampers the economic development of a nation.

   B. smuggling ought to be curbed.

   C. authorities are taking strict measures to curb smuggling.

   D. smuggling is fast increasing in our country owing to the quick profit it entails.

3. Though the waste of time or the expenditure on fashions is very large, yet fashions have come to stay. They will not go, come what may. However, what is now required is that strong efforts should be made to displace the excessive craze for fashion from the minds of these youngsters.

   The passage best supports the statement that:

   A. fashion is the need of the day.

   B. the excessive craze for fashion is detrimental to one's personality.

   C. the hoard for fashion should be done away with so as not to let down the constructive development.

   D. work and other activities should be valued more than the outward appearance.

(2*15=30)

B. Voc Information Technology Degree Examination
Fifth Semester

ENTREPRENEURSHIP DEVELOPMENT

Model Question Paper

PART A

Answer all questions.

1. Define Entrepreneur
2. What are tiny enterprises?
3. What is innovation?
4. What is intrapreneurship?
5. What are solo operators?
6. What is plan document?
7. What do you mean by Desk Research?
8. Define micro enterprises
9. Expand NIESBUD
10. What is IPR?

(10*1=10)

Part B

Answer any eight from the given twelve questions.

11. What are causes of sickness in SSI units?
12. State entrepreneur and innovation
13. Describe briefly the contents of EDP training.
14. What are the general principles of a good reporting system?
15. What is Project Report?
16. What are the different types of project?
17. What is Bridge Capita?
18. What is meant by project implementation?
19. Mention the objects of NREGA.
20. Define SSI
21. What is Drone entrepreneur?
22. What do you mean by risk-bearing?

(8*2=16)

Part C

Answer any six from the given nine questions.

23. Define Entrepreneurship. What are the characteristics of Entrepreneur

24. State the problems of SSIs in India.
25. What are the functions of DIC?
26. Explain the role of EDII in promoting entrepreneurs
27. What is an incentive? Explain the objective of providing incentives
28. What is MSME Act 2006? State the salient features.
29. Write a short note on Margin money schemes
30. What is location decision? State its significance
31. Write a short note STEDP

(6*4=24)

Part D

Answer any two from the given four questions.

32. Explain the formalities of setting up small industries.
33. What do you mean by EDP? Explain different methods and phases of training.
34. Explain the role of entrepreneur in the economic development of a nation.
35. State the problems faced by women entrepreneurs and suggest the solutions.

(2*15=30)

B.Voc Information Technology Degree Examination
Fifth Semester
WEB DEVELOPMENT
MODEL QUESTION PAPER

Time 3 hrs Max 80 mark

Part A

Answer all questions

1. PHP stands for ….?
2. PHP files have default file extension of ------
3. PHP script should start with ----- and end with ------
4. Which symbol is used for newline character ------?
5. Which are the 2 predefined variables used to retrieve information from forms?
6. MySQL syntax for creating a table is-----
7. Method responsible for sending query to the database is -----
8. Write a PHP statement that stores 111 in variable num.
9. Write output of following code

```
<?php
$foo = 'Bob';
$bar  =&$foo;
$bar = "My name is $bar";
echo $bar;
echo $foo;
?>
```

10. If $a =12 what will be returned when ($a = = 12)?5:1 is executed?

(10*1=10)

Part B

Answer any eight from the given twelve questions

11. Differentiate static and dynamic webpage
12. What is session ? How session is created and destroyed?
13. What are different types of error is PHP?
14. What is query string? Give example
15. What is web server?
16. What is difference between local and remote server?
17. Define constants in PHP
18. What are implicit casting and explicit casting?
19. Explain cookies.
20. What is scope of a variable?
21. Mentions different 3 conditional statements in PHP
22. How can we get properties of an image using PHP image function

(8*2=16)

Part C

Answer any six from given nine questions

23. What is PHP? Explain data types and variables in PHP.
24. List and explain all scopes of a variable and super global variable in PHP with examples
25. Write a PHP script to create multidimensional array.
26. Explain briefly 4 types of Architectural patterns.
27. Explain the following array functions
    a. assort
    b. explode
    c. compact
    d. reset
    e. is_array
28. What is MySQL? What are the different data types in MySQL?
29. Differentiate passing by value and passing by reference with examples.
30. Write PHP Script to upload a file?
31. Write down steps of XAMPP installation

(6*4=24)

Part D

Answer any two from the given four questions

32. Write a PHP code to design registration form according to given fields: name, email, phone no, comment. Apply form validation on name , email and phone number , also create a button to send data.
33. Write connecting and selecting database statement which is used to connect PHP with MySQL
34. Write PHP code to create database ‘course’ and create a table ‘student’ within the database with fields student id, student name, student age. Insert records and display them in table format
35. How user inputs are validated using JAVASCRIPT?

(2*15=30)

B.Voc Information Technology Degree Examination
Fifth Semester
MOBILE APPLICATION DEVELOPMENT- ANDROID
MODEL QUESTION PAPER

Time 3 hrs Max 80 mark

Part A

Answer all questions

1. An activity can be shut down by calling its ---- method
2. Android is licensed under which open source liscense?
3. The company that develop android is-----
4. When developing for android OS, Java byte code is compiled into-----
5. ---- makes a specific set of application data available to other applications
6. The request from content provider is handled by the method -----
7. What does src folder contains?
8. What is a loader?
9. The configuration file holds the permission to use the internet is ----
10. What does the line of code means:

    Intent intent = new intent(First Activity.this, Second Activity.this);

(10*1=10)

Part B

Answer any eight from the given twelve questions

11. What are steps to install SDK?
12. What is the function of tool Android monitor?
13. How can we change android studio theme?
14. How to configure finger print emulator?
15. Explain views and view groups.
16. How to debug application on android emulator
17. Explain about the view progress bar
18. What is geocoding?
19. Give the syntax for displaying google map
20. How zooming control works in android maps

21. What is JDK?

22. Mention features of main window.

(8*2=16)

Part C

Answer any six from given nine questions

23. What are the components of tools window.

24. What is an AVD? How can we create a new AVD?

25. Explain how to create AVD directly from command line?

26. Explain briefly control options in emulator.

27. What are components of android screen?

28. How to adapt screen display orientation?

29. Explain using the picker view

30. Explain content providers

31. How to debug and run android activity using emulator?

(6*4=24)

Part D

Answer any two from the given four questions

32. Explains the steps to run 'Hello world 'on android device

33. Explain different layouts available in android

34. Discuss difference basic views in android

35. What are CRUD operations in database? Explain.

(2*15=30)

B.Voc Information Technology Degree Examination
Sixth Semester
DIGITAL MARKETING
MODEL QUESTION PAPER

Time 3 hrs Max 80 mark

Part A

Answer all questions

1. ----- refers to promotion of goods over internet
2. What is content palnning?
3. ATOS stands for ----
4. SEM stands for ------
5. What is cost per thousand impressions?
6. Name the types of SEO
7. What is spam?
8. What is email deliverability?
9. What is affiliate marketing?
10. How to become an affiliate?

(10*1=10)

Part B

Answer any eight from the given twelve questions

11. What is web analytics?
12. What is page tagging?
13. Mention different types of online marketing
14. What are advantages of SEM?
15. What is SEO content writing?
16. What are Ad-formats?
17. What is e-mail marketing?
18. Which are types of e-mail?
19. What is tracking conversion?
20. Explain affiliate programs
21. How to manage affiliate programs?
22. Explain affiliate marketing strategies for affiliates.

(8*2=16)

Part C

Answer any six from given nine questions

23. Explain methods of measuring web traffic.
24. Explain different types of web analytics.
25. Explain 3 types of SEO.
26. Explain code optimization.
27. Explain e-mail marketing matrices
28. Explain conversions in e-mail marketing
29. Explain affiliate networks.
30. Explain affiliate marketing compensation models
31. Explain affiliate software.

(6*4=24)

Part D

Answer any two from the given four questions

32. Explain the features of online marketing.
33. Explain the features of e-mail marketing
34. Explain the features of Affiliate marketing
35. Explain Search engine marketing

(2*15=30)

B.Voc Information Technology Degree Examination
Sixth Semester
INFORMATICS
MODEL QUESTION PAPER

Time 3 hrs Max 80 mark

Part A

Answer all questions

1. Expand IME model.
2. Interdisciplinary research area at the interface between computer science and biological science is -----
3. Give an example for biological database
4. What is SRS in bioinformatics?
5. What is DRG?
6. Ability of a system to render the information at smallest discretely separable quantity is --
7. What is TIGER in geo informatics?
8. Expand GPS.
9. What is ARJIS?
10. Social informatics is ---- oriented

(10*1=10)

Part B

Answer any eight from the given twelve questions

11. What is bio-informatics? What are its applications?
12. What are biological databases?
13. Describe shortly Genbank.
14. Justify social informatics is problem oriented
15. What is seamless web?
16. Mention 4 dimensions of social actor
17. Explain shortly cognitive information system
18. Explain briefly CMM model
19. Draw a neat diagram of system learning process and label it.
20. Explain river morphology
21. Mention major steps in GIS analysis
22. Discuss stages in remote sensing.

(8*2=16)

Part C

Answer any six from given nine questions

23. Explain elements of GIS.
24. Explain significance of GPS.
25. Mention major objectives of GIS.
26. Explain briefly Semantic Analysis.
27. Explain general classification of cognitive information system
28. Explain briefly ARJIS
29. Explain socio-technical interaction network
30. Explain briefly principles of remote sensing
31. Mention any 4 major bioinformatics software program with its significance

(6*4=24)

Part D

Answer any two from the given four questions

32. Explain briefly about information retrieval from biological database
33. Explain empirical work in social informatics
34. Explain on cognitive resonance models
35. Explain applications of GIS

(2*15=30)

B.Voc Information Technology Degree Examination
Sixth Semester
IT AND SOCIETY
MODEL QUESTION PAPER

Time 3 hrs Max 80 mark

Part A

Answer all questions

1. Expand SDC.
2. Give example for CSC working in Kerala.
3. Different districts under the state are connected using ----
4. LMS stands for -----
5. ----- means the use of game thinking and game mechanics for non game context
6. GUI stands for -----
7. Expand EFT
8. B2G business model means ----
9. ----- is a global community of people using computer in a network
10. ---- law restrict federal agency data sharing

(10*1=10)

Part B

Answer any eight from the given twelve questions

11. What is cyber crime?
12. Briefly discuss general principles of criminal law.
13. How cyber crime can be classified?
14. What is content authoring tool?
15. What is asynchronous learning?
16. What is SCROM?
17. Compare traditional Vs e-commerce?
18. Explain the features of ecommerce?
19. Explain B2C model.
20. Differentiate G2G and G2C?
21. What is state data center?
22. What is NSDG?

(8*2=16)

Part C

Answer any six from given nine questions

23. Explain infrastructure of e-governance.
24. Explain about NeGP.
25. Explain advantages and disadvantages of e-commerce.
26. Explain e-governance maturity model.
27. Explain breiefly LMS
28. Explain micro learning?
29. Explain gamification.
30. Who all are cyber offenders?
31. Explain major cyber laws

(6*4=24)

Part D

Answer any two from the given four questions

32. Explain Electronic payment System in e-commerce
33. Explain positive and grey aspects of IT Act 2000.
34. Discuss major trends in e-learning.
35. Explain the back bone of e-governance. Also explain major challenges faced by e-governance.

(2*15=30)

B.Voc Information Technology Degree Examination
Sixth Semester
FREE AND OPEN SOURCE SOFTWARE
MODEL QUESTION PAPER

Time 3 hrs Max 80 mark

Part A

Answer all questions

1. Python is ----- programming language
2. Command used to add new element to a list is -----
3. What is the data type of object L= [1,23,'hello',1]
4. What is the output of given line of code? >>>"a"+"bc"
5. What is average value of the code

```
>>> grade1=80
>>>garde2=90
>>>average=(grade1+grade2)/2
```

6. What is comment in python programming?
7. What is significance of ** operator?
8. What is the use of del statement?
9. Write 2 methods of dictionary datatype.
10. Which core data type is used to store values in terms of key and value?

(10*1=10)

Part B

Answer any eight from the given twelve questions

11. What are advantages of python dictionary type?
12. Define encapsulation with example.
13. Rectify the error(if any) in given statements

```
>>>str = "Hello Python";
>>>str[6] = 'S';
```

14. What is use of raise statement? Mention its syntax
15. What is a string? How to create string in python
16. Write a line of code in python to execute infinite loop?
17. Write a small line line of code to illustrate try and exception in python?
18. Write 2 features of dictionary

19. How to perform user input in python?
20. Explain tuple with example
21. Mentions the role of indentation in python
22. Explain interpreter.

(8*2=16)

Part C

Answer any six from given nine questions

23. What are arithmetic operators in python? Explain with examples.
24. Write a python program to swap 2 numbers without using temporary variables.
25. Explain break and continue statements. When do we use it?.
26. What is user defined function? How can we pass arguments to user defined functions.
27. Illustrate the use of range() in python with example
28. Write a python program to calculate area of rectangle (input be length and breadth)
29. What is nested loop? Explain with example.
30. Explain map() with example
31. How does function return value? Give example.

(6*4=24)

Part D

Answer any two from the given four questions

32. Write a python program to create user defined function to calculate square of a number and square root of a number. Input number from the user
33. Write a python program to take string from user and find no of vowels in it
34. Write a python program to check whether the input string is palindrome or not
35. Write a python program that computes real roots of the input quadratic equation

(2*15=30)

B.Voc Information Technology Degree Examination
Sixth Semester
EMBEDDED SYSTEMS AND INTERNET OF THINGS
MODEL QUESTION PAPER

Time 3 hrs Max 80 mark

Part A

Answer all questions

1. Give an example of IoT system in which information and knowledge inferred from data
2. The term Internet of Things invented by ------
3. What is the size of IPv6 addressing?
4. MQTT stands for ----
5. What is java extension file of IoT?
6. IaaS stands for ------
7. ------ is the minimum value which an application shall exceed to be offloaded
8. ------ is defined as delay between offloading and final result.
9. QoE stands for -----
10. OAD stands for -----

(10*1=10)

Part B

Answer any eight from the given twelve questions

11. Why do IoT systems have to be self adapting and self configuring?
12. What is the role of things and internet in IoT
13. Discuss various components of RFID system
14. Explain SaaS
15. Explain PaaS
16. Explain mobile cloud computing.
17. What issues that affect implementation of IoT?
18. Explain SOA
19. Explain physical IoT
20. Mention IoT protocols

21. Explain IoT-A reference models

22. Briefly explain IoT communication models.

(8*2=16)

Part C

Answer any six from given nine questions

23. What are architectural constraints of REST

24. Explain application of IoT in home

25. What are challenges and issue in RFID system

26. Explain EPC global architecture frame work.

27. Write in detail business model scenario for IoT

28. Write application of IoT for e-health body area network

29. Explain access control and message integrity of IoT

30. Explain threat analysis in IoT

31. Explain clustering principles of IoT

(6*4=24)

Part D

Answer any two from the given four questions

32. Explain in detail IoT application.

33. Explain in detail IoT Architecture with neat diagram

34. Explain data synchronization techniques in IoT

35. Explain identity management technique in IoT

(2*15=30)

B.Voc Information Technology Degree Examination

Sixth Semester

VIRTUAL AND AUGMENTED REALITY

MODEL QUESTION PAPER

Time 3 hrs Max 80 mark

Part A

Answer all questions

1. HMD stands for ….
2. ----- keep track of positions.
3. ----- is a term for illusion of immersion by projecting stereo image on the walls and floor of room.
4. ------ refers to simulated motion pictures showing movement of drawn objects
5. Environment in which 3D scene is considered as a part of physical environment is ----
6. What is AR?
7. Give an example for AR?
8. Mention the name of any 2 companies incorporated with AR.
9. Name 3 Is in VR.
10. How VR and AR extends markets?

(10*1=10)

Part B

Answer any eight from the given twelve questions

11. What is Virtual Reality?
12. Explain Augmented Reality.
13. What is mixed reality?
14. Explain classic components of VR
15. Explain 3 Is in VR.
16. Explain commercial VR technology
17. Give examples of AR
18. Explain visual display in AR
19. Explain mobile AR
20. Explain 3D modeling

21. Explain Game Engine

22. Explain how to add sound in animation.

(8*2=16)

Part C

Answer any six from given nine questions

23. Explain difference between AR and VR.

24. Explain human factors in VR.

25. Explain modeling in VR.

26. Mention some fields related to AR.

27. Explain multimodal dispaly

28. Explain visual perception

29. Suggest an AR project example.

30. Explain tracking of AR

31. What is SDK? What SDK are associated with AR and VR creation?

(6*4=24)

Part D

Answer any two from the given four questions

32. Explain application of AR and VR in different industries.

33. Explain input and output devices in VR

34. Discuss spatial display and multimodal display in AR

35. Explain how AR and VR is created

(2*15=30)