MODIFIED CBCS CURRICULUM OF

B.Sc. in

INFORMATION TECHNOLOGY

HONOURS PROGRAMME

FOR UNDER GRADUATE COURSES UNDER RADHA GOVIND UNIVERSITY

Implemented from
Academic Session 2019-2022

Members of Board of Studies of CBCS Under-Graduate Syllabus as per Guidelines of the Radha Govind University, Ramgarh

Contents

SEMESTER V

SEMESTER VI

ANNEXURE

MARKS DISTRIBUTION FOR EXAMINATIONS
AND
FORMAT OF QUESTION PAPERS

COURSE STUCTURE FOR UNDERGRADUATE **'HONOURS'** PROGRAMME

Table AI-1: Distribution of 164 Credits [*wherever there is a Practical there will be no tutorial and vice –versa.]

Course Theory + Practical	**Papers**	**Credits** Theory + Tutorial	**Credits**
I. **Core Course**	**(CC 1 to 14)**		
Theory	14 Papers	14X4=56	14X5=70
Practical/Tutorial*	14 Papers	14X2=28	14X1=14
II. **Elective Course (EC)**			
A. Discipline Specific Elective	**(DSE1to4)**		
Theory	4 Papers	4X4=16	4X5=20
Practical/ Tutorial*	4 Papers	4X2=8	4X1=4
B. Generic Elective/ Interdisciplinary	**(GE1to4)**		
Theory	4 Papers	4X4=16	4X5=20
Practical/ Tutorial*	4 papers	4X2=8	4X1=4
III. **Ability Enhancement Compulsory Courses (AECC)**			
1. English/ Hindi Communication 1X2=2	1 Paper	1X2=2	
2. Environmental Science 1x2=2	1 Paper	1x2=2	
3. Skill Enhancement Course of the Core Course opted	**(SEC 1& 2)** 2 Papers	2X2=4	2X2=4
		Total Credit = 140 + 24 =164	**140 + 24 = 164**

Note: In the Academic Council Meeting of Radha Govind University, Ramgarh, held on 27.02.2019, it is resolved that Students will be offered **Two Generic Elective Subjects**(GE-A & GE-B) in C.B.C.S. U.G. Honours Courses of all streams, so that their 'Eligibility for Admission' in P.G., Vocational & Technical Courses in various Institutions is not hampered.

Semester	**Honours (Core Courses) 14 Papers**	**Allied (Elective Courses) 8 Papers**	**Ability Enhancement (Compulsory Courses) 4 Papers**	**Total Credits**
Sem-I	C-1, C-2 (6+6=12 Credits)	GE-1A, GE-1B (6+6=12 Credits)	English Comm./Hindi Comm. (02 Credits)	**26 Credits**
Sem-II	C-3, C-4 (6+6=12 Credits)	GE-2A, GE-2B (06 Credits)	EVS (02 Credits)	**26 Credits**
Sem-III	C-5, C-6, C-7 (6+6+6=18 Credits)	GE-3A, GE-3B (06 Credits)	SEC-1 (02 Credits)	**32 Credits**
Sem-IV	C-8, C-9, C-10 (6+6+6=18 Credits)	GE-4A, GE-4B (06 Credits)	SEC-2 (02 Credits)	**32 Credits**
Sem-V	C-11, C-12 (6+6=12 Credits)	DSE-1, DSE-2 (6+6=12 Credits)		**24 Credits**
Sem-VI	C-13, C-14 (6+6=12 Credits)	DSE-3, DSE-4 (6+6=12 Credits)		**24Credits**

Table AI-1.1: Course structure for B.Sc./ B.A./ B.Com./B.Voc. (Hons. Programme)

Total = 164 Credits

COURSES OF STUDY FOR UNDERGRADUATE **'I.T. Hons'** PROGRAMME

Table AI-2 Subject Combinations allowed for I.T. Hons. Programme (164 Credits)

Honours/Core Subject **CC 14 Papers**	Discipline Specific Elective Subject **DSES 4 Papers**	Skill Enhancement Course **SEC 2 Papers**	Compulsory Course **AECC 1+1=2 Papers**
IT	IT Specific	SEC in IT	Language Communication + EVS

Table AI-2.1 Semester wise Examination Structure for Mid Sem & End Sem Examinations:

Sem	Core Honours, Allied DSE, Compulsory AECC Courses		Examination Structure		
	Code	**Papers**	**Mid Semester Theory (F.M.)**	**End Semester Theory (F.M.)**	**End Semester Practical/ Viva (F.M.)**
I	C1	Programming Fundamental using C/C++ +Lab	15	60	50
	C2	Computer System Architecture +Lab	15	60	
	GE1A	Refer Table AI-2.3 of the Syllabus of Subject opted	---	100/ (75)	0/ (25)
	GE1B	Refer Table AI-2.3 of the Syllabus of Subject opted	---	100/ (75)	0/ (25)
	AECC	Language Communication	---	100	---
II	C3	Data Structures with C +Lab	15	60	50
	C4	Discrete Structures. + Lab	15	60	
	GE2A	Refer Table AI-2.3 of the Syllabus of Subject opted	---	100/ (75)	0/ (25)
	GE2B	Refer Table AI-2.3 of the Syllabus of Subject opted	---	100/ (75)	0/ (25)
	AECC	EVS	---	100	---
III	C5	Programming in JAVA +Lab	15	60	75
	C6	Operating Systems. +Lab	15	60	
	C7	Computer Networks +Lab	15	60	
	GE3A	Refer Table AI-2.3 of the Syllabus of Subject opted	---	100/ (75)	0/ (25)
	GE3B	Refer Table AI-2.3 of the Syllabus of Subject opted	---	100/ (75)	0/ (25)
	SEC 1	Elementary Computer Application Software +Lab	---	100	---
IV	C8	Theory of Computation + Lab	15	60	75
	C9	Visual Basis .NET +Lab	15	60	
	C10	Database Management Systems +Lab	15	60	
	GE4A	Refer Table AI-2.3 of the Syllabus of Subject opted	---	100/ (75)	0/ (25)
	GE4B	Refer Table AI-2.3 of the Syllabus of Subject opted	---	100/ (75)	0/ (25)
	SEC 2	MATLAB Programming +Lab	---	75	25
V	C11	Internet Technologies +Lab	15	60	50

	C12	Software Engineering +Lab	15	60	
	DSE 1	Information Security & Cyber Law +Lab	15	60	50
	DSE 2	Programming in Python +Lab	15	60	
VI	C13	Artificial Intelligence and Android Programming +Lab	15	60	50
	C14	Computer Graphics with Flash +Lab	15	60	
	DSE 3	Cloud computing +Lab	15	60	25
	DSE 4	Project Work/ Dissertation	---	---	100

GE1 & GE2; Two Generic Electives with Mathematics as one paper allowed for UG Information Technology (Hons) Course may be opted from the List given below:

Table AI-2.3: For Student from SCIENCE background All Four Papers of Two Subjects to be opted:

Generic Elective Subject **GE 4 Papers**	Generic Elective Courses for Science Stream (GE will be other than Core Subject opted)			
	Semester I **GE1**	Semester II **GE2**	Semester III **GE3**	Semester IV **GE4**
G.E. Paper-1				
Mathematics	Differential Calculus And Coordinate Geometry 2D **+T**	Integral Calculus, Vector Calculus & Trigonometry **+T**	Real Analysis-I, Group Theory & Differential Equations **+T**	Real Anaysis-II, Complex Variable, Set Theory & Matrices **+T**
G.E. Paper-2				
Physics	Mechanics **+Lab**	Electricity and Magnetism **+Lab**	Thermal & Statistical Physics **+Lab**	Waves and Optics **+Lab**
Chemistry	Atomic Structure, Bonding, General Org Chem & Aliphatic Hydrocarbons **+Lab**	Chemical Energetics, Equilibria & Functional Gp Org Chemistry-I **+Lab**	Chem. of s- and p-block elements, States of matter and Chem. Kinetics **+Lab**	Chem. of d-block elements, Molecules of Life **+Lab**
Zoology	Animal Diversity **+Lab**	Human Physiology **+Lab**	Food, Nutrition & Health **+Lab**	Environment & Public Health **+Lab**
Botany	Biodiversity**+Lab**	Plant Ecology & Taxonomy**+Lab**	Plant Anatomy & Embryology**+Lab**	Plant Physiology & Metabolism**+Lab**
Geology	Essentials of Geology **+Lab**	Rocks & Minerals **+Lab**	Fossils & their Applications **+Lab**	Earth Resources **+Lab**

SEMESTER I 5 Papers

Total 100 x 5 = 500 Marks

I. ABILITY ENHANCEMENT COMPULSORY COURSE (AECC)

(Credits: Theory-02)

योग्यता संवर्धन अनिवार्य पाठ्यक्रम : (क्रेडिट: सैद्धान्तिक -02)

ENGLISH COMMUNICATION

Theory: 30 Lectures

Marks : 100 (ESE 3Hrs) =100	**Pass Marks Th ESE = 40**

Instruction to Question Setter for
End Semester Examination (ESE):

There will be ***two*** group of questions. ***Group A is compulsory*** and will contain three ***questions. Question No.1 will be very short answer type*** consisting of ten questions of 1 mark each***. Question No.2 & 3 will be short answer type*** of 5 marks. ***Group B will contain descriptive type*** six questions of 20 marks each, out of which any four are to answer.

Note: *There may be subdivisions in each question asked in Theory Examinations*.

OBJECTIVE: To equip students effectively to acquire skills in reading, writing, comprehension, and communication, as also to use electronic media for English Communication.

Unit I: Communication – Definition, stages, barriers, types: verbal and non-verbal, Listening- Meaning, Nature and importance, Principles of Good Listening.

Unit II: Class-presentation (Oral for five minutes) on any of the above-mentioned topics: Descriptive writing, expansion of an idea.

Unit III: Writing skills –, notice writing, advertisement writing, précis writing, essay writing, letter writing (applications), Business letter formats (letters of enquiry, replies and complaints), resume writing, covering letter

Unit IV: Vocabulary building: One word substitution, synonyms and antonyms, idioms and phrases

Suggested Reading:

- *Technical Communication, M.H. Rizvi, Tata McGrawhill*
- *Effective Business Communication, Asha Kaul*
- *Developing Communication Skills, Krishnamohan*
- *Functional Grammar and Spoken and Written Communication in English, Bikram K. Das, Orient Blackswan*
- *Precis, Paraphrase and Summary,P.N. Gopalkrishnan, Authors Press Communication Skills, Sanjay Kumar and Pushplata, Oxford Publication Note: Latest edition of text books may be used.*

Note: Latest edition of text books may be used.

OR
HINDI COMMUNICATION

Theory: 30 Lectures

Marks : 100 (ESE 3Hrs) =100	**Pass Marks Th ESE = 40**

प्रश्न पत्र के लिए निर्देश :

छमाही परीक्षा :

प्रश्नां`के दो समूह हांगे। खण्ड '**A**'अनिवार्य है जिसमें तीन प्रश्न होंग) प्रश्न संख्या 1 में दस अत्यंत लघु उत्तरीय 1 अंक के प्रश्न हांगे। प्रश्न संख्या 2 व 3 लघु उत्तरीय 5 अंक का प्रश्न हागो। खण्ड '**B**' में छः में से किन्ही चार 20 अंका के` विषयनिष्ठ/ वर्णनात्मक प्रश्नों के उत्तर देने होंगे। नोट : थ्योरी परीक्षा म`पूछे गए प्रत्येक प्रश्न में उप–विभाजन हा`सकते हैं।

हिन्दी व्याकरण एवं संप्रेषण

सैद्धान्तिक: 30 व्याख्यान

इकाई–1 हिन्दी व्याकरण और रचना,

संज्ञा, सर्वनाम, विशेषण, क्रिया, अव्यय, कारक, वचन, संधि,उपसर्ग, प्रत्यय तथा समास, लिंग निर्णय, पर्यायवाची शब्द, विलोम शब्द, अनेक शब्दों के लिए एक शब्द, शब्द शुद्धि, वाक्य शुद्धि, मुहावरे और लोकोक्तियां, पल्लवन एवं संक्षेपण।

इकाई–2 निबंध कला तथा समसामयिक एवं राष्ट्रीय विषयों पर निबंध लेखन

इकाई–3 संप्रेषण (संचार)

–संप्रेषण की अवधारण और महत्व, संप्रेषण के लिए आवश्यक शर्तें, संप्रेषण के प्रकार, संप्रेषण का माध्यम, संप्रेषण कला, संप्रेषण की तकनीक, वाचन कला, समाचार वाचन, साक्षात्कार कला,रचनात्मक लेखन का लक्ष्य, रचनात्मक लेखन का आधार, भाव और विचारों की प्रस्तुति, वाक् कला की उपयोगिता।

अनुशंसित पुस्तकें :–

- वृहत व्याकरण भास्कर : डॉ0 वचनदेव कुमार
- वृहत निबधं भास्कर : डॉ0 वचनदवे कुमार
- आधुनिक हिन्दी व्याकरण और रचना : डॉ0 वासुदेव नन्दन प्रसाद
- रचना मानस : प्रो0 रामेश्वर नाथ तिवारी
- व्यवहारिक हिन्दी : डॉ0 जंग बहादुर पाण्डेय
- रचनात्मक लेखन : डॉ0 रमशे ा गौतम
- राजहंस हिन्दी निबंध : प्रो0 आर0 एन0 गौड़
- सफल हिन्दी निबंध : रत्नेश्वर
- निबंध सहचर : डॉ0 लक्ष्मण प्रसाद
- उपकार महु ावर` और लाके ोक्तियाँ चतवु ेदी : प्रो0 राजशे वर प्रसाद
- कहानियों कहावतां` की : प्रताप अनम
- सम्प्रेषणपरक हिन्दी भाषा शिक्षण : डॉ0 वैश्ना नारंग
- शैली विज्ञान : डॉ0 सुरेश कुमार
- शैली विज्ञान प्रतिमान और विश्लेषण : डॉ0 पाडं ये शशिभूषण 'शीताशुं' शैली विज्ञान का इतिहास : डॉ0 पाडं ये शशिभूषण 'शीताशुं'

II. GENERIC ELECTIVE (GE 1A): (Credits: 06)

All Four Papers (Refer Table AI 2.2) of any One Subject to be opted other than the Honours Subject. Refer Table AI 2.4 for name of papers and for Content in detail refer the Syllabus of Opted Generic Elective Subject.

III. GENERIC ELECTIVE (GE 1B): (Credits: 06)

All Four Papers (Refer Table AI 2.2) of any One Subject to be opted other than the GE1 & Honours Subject. Refer Table AI 2.4 and for Content in detail refer the Syllabus of Opted Generic Elective Subject.

IV. CORE COURSE –C 1: (Credits: Theory-04, Practicals-02)

Marks : 15 (MSE: 1Hr) + 60 (ESE: 3Hrs) =75	**Pass Marks: Th (MSE +ESE) = 30**

Instruction to Question Setter for

Mid Semester Examination (MSE):

*There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** three questions of five marks each, out of which any two are to answer.*

End Semester Examination (ESE):

*There will be **two** group of questions. **Group A is compulsory** and will contain two questions. **Question No.1 will be very short answer type** consisting of ten questions of 1 mark each. Question No.2 will be short answer type of 5 marks. **Group B will contain descriptive type** five questions of fifteen marks each, out of which any three are to answer.*

Note: There may be subdivisions in each question asked in Theory Examinations.

PROGRAMMING FUNDAMENTALS USING C/C++ Theory: 60 Lectures

1. **Introduction to C and C++** **(3 Lectures)**

History of C and C++, Overview of Procedural Programming and Object-Orientation Programming, Using main() function, Compiling and Executing Simple Programs in C++.

2. **Data Types, Variables, Constants, Operators and Basic I/O** **(5 Lectures)**

Declaring, Defining and Initializing Variables, Scope of Variables, Using Named Constants, Keywords, Data Types, Casting of Data Types, Operators (Arithmetic, Logical and Bitwise), Using Comments in programs, Character I/O (getc, getchar, putc, putcharetc), Formatted and Console I/O (printf(), scanf(), cin, cout), Using Basic Header Files (stdio.h, iostream.h, conio.hetc).

3. **Expressions, Conditional Statements and Iterative Statements** **(5 Lectures)**

Simple Expressions in C++ (including Unary Operator Expressions, Binary Operator Expressions), Understanding Operators Precedence in Expressions, Conditional Statements (if construct, switchcase construct), Understanding syntax and utility of Iterative Statements (while, do-while, and for loops), Use of break and continue in Loops, Using Nested Statements (Conditional as well as Iterative)

4. **Functions and Arrays** **(10 Lectures)**

Utility of functions, Call by Value, Call by Reference, Functions returning value, Void functions, Inline Functions, Return data type of functions, Functions parameters, Differentiating between Declaration and Definition of Functions, Command Line Arguments/Parameters in Functions, Functions with variable number of Arguments.

Creating and Using One Dimensional Arrays (Declaring and Defining an Array, Initializing an
Array, Accessing individual elements in an Array, Manipulating array elements using loops), Use
Various types of arrays (integer, float and character arrays / Strings) Two-dimensional Arrays (Declaring, Defining and Initializing Two Dimensional Array, Working with Rows and Columns), Introduction to Multi-dimensional arrays

5. **Derived Data Types (Structures and Unions)** **(3 Lectures)**

Understanding utility of structures and unions, Declaring, initializing and using simple structures and unions, Manipulating individual members of structures and unions, Array of Structures, Individual data members as structures, Passing and returning structures from functions, Structure with union as members, Union with structures as members.

6. **Pointers and References in C++** **(7 Lectures)**

Understanding a Pointer Variable, Simple use of Pointers (Declaring and Dereferencing Pointers to simple variables), Pointers to Pointers, Pointers to structures, Problems with Pointers, Passing pointers as function arguments, Returning a pointer from a function, using arrays as pointers, Passing arrays to functions. Pointers vs. References, Declaring and initializing references, Using references as function arguments and function return values

7. **Memory Allocation in C++** **(3 Lectures)**

Differentiating between static and dynamic memory allocation, use of malloc, calloc and free functions, use of new and delete operators, storage of variables in static and dynamic memory allocation

8. **File I/O, Preprocessor Directives** **(4 Lectures)**

Opening and closing a file (use of fstream header file, ifstream, ofstream and fstream classes), Reading and writing Text Files, Using put(), get(), read() and write() functions, Random access in files, Understanding the Preprocessor Directives (#include, #define, #error, #if, #else, #elif, #endif, #ifdef, #ifndef and #undef), Macros

9. **Using Classes in C++** **(7 Lectures)**

Principles of Object-Oriented Programming, Defining & Using Classes, Class Constructors, Constructor Overloading, Function overloading in classes, Class Variables &Functions, Objects as parameters, Specifying the Protected and Private Access, Copy Constructors, Overview of Template classes and their use.

10. **Overview of Function Overloading and Operator Overloading (5 Lectures)**

Need of Overloading functions and operators, Overloading functions by number and type of arguments, Looking at an operator as a function call, Overloading Operators (including assignment operators, unary operators)

11. **Inheritance, Polymorphism and Exception Handling (8 Lectures)**

Introduction to Inheritance (Multi-Level Inheritance, Multiple Inheritance), Polymorphism (Virtual Functions, Pure Virtual Functions), Basics Exceptional Handling (using catch and throw, multiple catch statements), Catching all exceptions, Restricting exceptions, Rethrowing exceptions.

Reference Books:

- Herbtz Schildt, "C++: The Complete Reference", Fourth Edition, McGraw Hill.2003
- Bjarne Stroustrup, "The C++ Programming Language", 4th Edition, Addison-Wesley, 2013.
- Bjarne Stroustroup, "Programming -- Principles and Practice using C++", 2nd Edition, Addison-Wesley 2014.
- E Balaguruswamy, "Object Oriented Programming with C++" Tata McGraw-Hill Education, 2008.
- Paul Deitel, Harvey Deitel, "C++ How to Program", 8th Edition, Prentice Hall, 2011.

V. CORE COURSE- C 2: (Credits: Theory-04, Practicals-02)

Marks : 15 (MSE: 1Hr) + 60 (ESE: 3Hrs) =75	Pass Marks: Th (MSE +ESE) = 30

Instruction to Question Setter for

Mid Semester Examination (MSE):

*There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** three questions of five marks each, out of which any two are to answer.*

End Semester Examination (ESE):

*There will be two group of questions. **Group A is compulsory** and will contain two questions. **Question No.1 will be very short answer type** consisting of ten questions of 1 mark each. **Question No.2 will be short answer type** of 5 marks. **Group B will contain descriptive type** five questions of fifteen marks each, out of which any three are to answer.*

Note: There may be subdivisions in each question asked in Theory Examinations.

COMPUTER SYSTEM ARCHITECTURE Theory: 60 Lectures

1. **Modern computer system (10 Lectures)**
   Von- Newman Architecture of the computer.
   Input Devices: Key Board, Light Pen, OMR etc.
   Output Devices: Impact/non-impact printers, display devices, LCD projector etc.
   Primary Memory: RAM, ROM and their types, Cache Memory.
   Secondary Memory: HDD, CTD, Pen drive, tape device etc. Concept and need for Memory Hierarchy Virtual memory, Pipelining.
   Concept of System Software, Application Software & Utility Software. Flynn's classification

2. **Introduction to Number Systems (14 Lectures)**
   Decimal, Binary, Octal & Hexadecimal Base Conversion.
   Representation of binary numbers in Sign magnitude & 2's complement form.
   Internal Representation of Floating Point numbers using IEEE-754 standard.
   Representation of Characters in memory using ASCII, EBCDIC & UNICODE.
   Concept of GRAY code, Gray to binary and Binary to Gray conversion.

3. **Digital Logic (08 Lectures)**
   Boolean Algebra (Axioms/Rules),
   Canonical Expression, SOP & POS.
   Logic Gates & Truth Table,
   K- Maps (2, 3, and 4-variables).

4. **Combinational Circuits** **(07 Lectures)**
   Half adder, Full adder.
   Serial and parallel Adder
   Multiplexer, De-multiplexer Decoder, encoder.

5. **Sequential Circuits** **(08 Lectures)**
   SR- Latch using NOR/NAND gate, RS-flip flop,
   D-flip flop, JK Flip flop, T- flip flop, Master Slave flip flop,
   Registers, Counters (Synchronous/ Asynchronous).

6. **INTEL-8086 architecture** **(06 Lectures)**
   14–general purpose registers in intel 8086 machine along with their use,
   Instruction set, type of instructions, mode of addressing etc.

7. **Assembly Language programming** **(07 Lectures)**
   Assembler (TASM/MASM) overview, Assembly instructions for Comparing & Branching, Numeric I/O, Macros, Bit Operations,

Text Book:

- M. Morris Mano, C. R. Kime: Logic and Computer Design Fundamentals, Pearson Education.
  Fundamentals of Computers; Pearson Publication

Reference Book:

- T.C. Bartee: Digital Computer Fundamentals, McGraw Hill, 2001.
- T.L. Floyd: Digital Fundamentals, Pearson Education, 2011.

INFORMATION TECHNOLOGY PRACTICAL- C 1 & C2 LAB

Marks : Pr (ESE: 3Hrs)=50	**Pass Marks: Pr (ESE) = 20**

Instruction to Question Setter for
Practical Examination (ESE)

*There will be **two** group of questions in Practical Examination of 3Hrs.. **Group A having questions from CORE PAPER 1(CC1)** will contain four questions, out of which any two are to be answered **Group B having questions from CORE PAPER 2(CC2)** will contain two questions, out of which any one is to be answered.*

***Lab:** Student have to Answer the given questions on Answer booklet and execute the answered programs/steps in computer with standard output.*

***Assignment:** The Assignment should be hand written in A4 size paper. First three pages (i.e. front page + acknowledgment + index) & Bibliography may be printout.*

Marks Distribution:

LAB(Experiment + Answer script)	*= 30 marks*
Assignment	*=10 marks*
Viva-voce	*=10 marks*

PROGRAMMING FUNDAMENTALS USING C/C++- C 1 LAB 60 Lectures

1. Execution of a simple sequential program in C.
2. Using simple C++ formatted and unformatted I/O facilities
3. Execution of a simple program based using if-else, nested if and switch-case
4. Application of goto, break, continue, return etc.
5. Application of iterative constructs
6. Programs using Arrays (1-D & 2-D)
7. Programs using Structures,
8. Using simple and nested control structures.
9. Using User Defined Functions (Interactive & Recursive) Function overloading etc.
10. Using Classes and Objects, friend function.
11. Using Constructors copy constructors and destructors.
12. Using Unary and binary operator overloading.
13. Using single, multilevel, multiple, hierarchical, hybrid and multipath inheritance.
14. Using virtual base classes and abstract classes.
15. Using wild pointers, void pointer, pointer to class, pointer to object, this pointer.
16. Using pointer to derived and base class, pointer to members.
17. Using arrays and arrays of classes.
18. Manipulating string objects.
19. File handling and command line arguments.

PRACTICAL-C 2 LAB **60 Lectures**

1. Create a machine based on the following architecture:

Register Set

IR	DR	AC	AR	PC	FGI	FGO	S	I	E
0 15	0 15	0 15	011	011	1 Bit	1 Bit	1 Bit	1 bit	1 Bit

Memory	Instruction format
4096 words 16 bits per word	0 3 4 15 Opcode | Address

Basic Computer Instructions

Memory Reference			Register Reference		Input-Output	
Symbol	Hex		Symbol	Hex	Symbol	Hex
AND	0xxx		CLA	E800	INP	F80 0
ADD	2xxx		CLE	E400	OUT	F40 0
LDA	4xxx	Direct	CMA	E200	SKI	F20 0
STA	6xxx	Addressing	CME	E100	SKO	F10 0
BUN	8xxx		CIR	E080	ION	F08 0
BSA	Axxx		CIL	E040	IOF	F04 0
ISZ	Cxxx		INC	E020		
AND_I	1xxx		SPA	E010		
ADD_I	3xxx	Indirect	SNA	E008		
LDA_I	5xxx		SZA	E004		
STA_I	7xxx	Addressing	SZE	E002		
BUN_I	9xxx		HLT	E001		
BSA_I	Bxxx					
ISZ_I	Dxxx					

Refer to Chapter-5 of Morris Mano for description of instructions.

2. Create the micro operations and associate with instructions as given in the chapter (except interrupts). Design the register set, memory and the instruction set. Use this machine for the assignments of this section.

3. Create a Fetch routine of the instruction cycle.

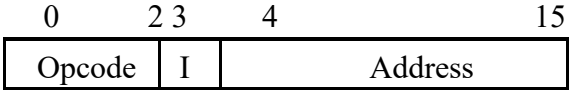
4. Simulate the machine to determine the contents of AC, E, PC, AR and IR registers in hexadecimal after the execution of each of following register reference instructions:
   a. CLA e. CIR i. SNA
   b. CLE f. CIL j. SZA
   c. CMA g. INC k. SZE
   d. CME h. SPA l. HLT
   Initialize the contents of AC to (A937)16, that of PC to (022)16 and E to 1.

5. Simulate the machine for the following memory-reference instructions with I= 0 and address part = 082. The instruction to be stored at address 022 in RAM. Initialize the memory word at address 082 with the operand B8F2 and AC with A937. Determine the contents of AC, DR, PC, AR and IR in hexadecimal after the execution.
   a. ADD
   b. AND
   c. LDA
   d. STA
   e. BUN

6. Simulate the machine for the memory-reference instructions referred in above question with I= 1 and address part = 082. The instruction to be stored at address 026 in RAM. Initialize the memory word at address 082 with the value 298. Initialize the memory word at address 298 with operand B8F2 and AC with A937. Determine the contents of AC, DR, PC, AR and IR in hexadecimal after the execution.

7. Modify the machine created in Practical 1 according to the following instruction format:

Instruction format



   a. The instruction format contains a 3-bit opcode, a 1-bit addressing mode and a 12-bit address. There are only two addressing modes, I = 0 (direct addressing) and I = 1 (indirect addressing).

   b. Create a new register I of 1 bit.

   c. Create two new microinstructions as follows :

      i. Check the opcode of instruction to determine type of instruction (Memory Reference/Register Reference/Input-Output) and then jump accordingly.

      ii. Check the I bit to determine the addressing mode and then jump accordingly.

SEMESTER II 5 Papers

Total 100 x 5 = 500 Marks

I. ABILITY ENHANCEMENT COMPULSORY COURSE (AECC)

(Credits: Theory-02)

Marks : 100 (ESE: 3Hrs) =100	**Pass Marks Th ESE = 40**

Instruction to Question Setter for
End Semester Examination (ESE):

There will ***be objective type test*** consisting of hundred questions of 1 mark each. Examinees are required to mark their answer on ***OMR Sheet*** provided by the University.

AECC – ENVIRONMENT STUDIES **Theory: 30 Lectures**

Unit 1 : Introduction to environmental studies

Multidisciplinary nature of environmental studies;

Scope and importance; Concept of sustainability and sustainable development.

(2 lectures)

Unit 2 : Ecosystems

What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chains, food webs and ecological succession. Case studies of the following ecosystems :

Forest ecosystem
Grassland ecosystem
Desert ecosystem
Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

(2 lectures)

Unit 3 : Natural Resources : Renewable and Non--renewable Resources

Land resources and landuse change; Land degradation, soil erosion and desertification. Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.

Water : Use and over--exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter--state).

Energy resources : Renewable and non renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

(5 lectures)

Unit 4 : Biodiversity and Conservation

Levels of biological diversity : genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots

India as a mega--biodiversity nation; Endangered and endemic species of India

Threats to biodiversity : Habitat loss, poaching of wildlife, man--wildlife conflicts, biological invasions; Conservation of biodiversity : In--situ and Ex--situ conservation of biodiversity.

Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.

(5 lectures)

Unit 5 : Environmental Pollution

Environmental pollution : types, causes, effects and controls; Air, water, soil and noise pollution

Nuclear hazards and human health risks

Solid waste management : Control measures of urban and industrial waste.

Pollution case studies.

(5 lectures)

Unit 6 : Environmental Policies & Practices

Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture

Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution)

Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD).

Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian context.

(4 lectures)

Unit 7 : Human Communities and the Environment

Human population growth: Impacts on environment, human health and welfare.

Resettlement and rehabilitation of project affected persons; case studies.

Disaster management : floods, earthquake, cyclones and landslides.

Environmental movements : Chipko, Silent valley, Bishnois of Rajasthan.

Environmental ethics: Role of Indian and other religions and cultures in environmental conservation.

Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi).

(3 lectures)

Unit 8 : Field work

Visit to an area to document environmental assets: river/ forest/ flora/fauna, etc.

Visit to a local polluted site--Urban/Rural/Industrial/Agricultural.

Study of common plants, insects, birds and basic principles of identification.

Study of simple ecosystems--pond, river, Delhi Ridge, etc.

(Equal to 4 lectures)

Suggested Readings:

1. Raziuddin, M.., Mishra P.K. 2014, A Handbook of Environmental Studies, Akanaksha Publications, Ranchi.
2. Mukherjee, B. 2011: Fundamentals of Environmental Biology. Silverline Publications, Allahabad.
3. Carson, R. 2002. Silent Spring. Houghton Mifflin Harcourt.
4. Gadgil, M., & Guha, R.1993. This Fissured Land: An Ecological History of India. Univ. of California Press.
5. Gleeson, B. and Low, N. (eds.) 1999.Global Ethics and Environment, London, Routledge.
6. Gleick, P. H. 1993. Water in Crisis. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.
7. Groom, Martha J., Gary K. Meffe, and Carl Ronald Carroll.Principles of Conservation Biology. Sunderland: Sinauer Associates, 2006.
8. Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalaya dams. Science, 339: 36---37.
9. McCully, P. 1996. Rivers no more: the environmental effects of dams(pp. 29---64). Zed Books.
10. McNeill, John R. 2000. Something New Under the Sun: An Environmental History of the Twentieth Century.
11. Odum, E.P., Odum, H.T. & Andrews, J. 1971.Fundamentals of Ecology. Philadelphia: Saunders.
12. Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011. Environmental and Pollution Science. Academic Press.
13. Rao, M.N. & Datta, A.K. 1987. Waste Water Treatment. Oxford and IBH Publishing Co. Pvt. Ltd.
14. Raven, P.H., Hassenzahl, D.M. & Berg, L.R. 2012.Environment. 8th edition. John Wiley & Sons.
15. Rosencranz, A., Divan, S., & Noble, M. L. 2001. Environmental law and policy in India. Tripathi 1992.
16. Sengupta, R. 2003. Ecology and economics: An approach to sustainable development. OUP.
17. Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. Ecology, Environmental Science and Conservation. S. Chand Publishing, New Delhi.
18. Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). 2013. Conservation Biology: Voices from the Tropics. John Wiley & Sons.
19. Thapar, V. 1998. Land of the Tiger: A Natural History of the Indian Subcontinent.
20. Warren, C. E. 1971. Biology and Water Pollution Control. WB Saunders.
21. Wilson, E. O. 2006.The Creation: An appeal to save life on earth. New York: Norton.
22. World Commission on Environment and Development. 1987. Our Common Future. Oxford University

---

II. GENERIC ELECTIVE (GE 2A): (Credits: 06)

GE2A paper of First subject selected in Sem-I to be studied. Refer Table AI 2.4 for name of papers and for Content in detail refer the Syllabus of Opted Generic Elective Subject.

III. GENERIC ELECTIVE (GE 2B): (Credits: 06)

GE2B paper of Second subject selected in Sem-I to be studied. Refer Table AI 2.4 for name of papers and for Content in detail refer the Syllabus of Opted Generic Elective Subject.

IV. CORE COURSE -C 3: (Credits: Theory-04, Practicals-02)

Marks : 15 (MSE: 1Hr) + 60 (ESE: 3Hrs) =75	Pass Marks: Th (MSE +ESE) = 30

Instruction to Question Setter for
Mid Semester Examination (MSE):

*There will be **two** group of questions. **Group A is compulsory** and will contain five questions of very short answer type consisting of 1 mark each. **Group B will contain descriptive type** three questions of five marks each, out of which any two are to answer.*

End Semester Examination (ESE):

*there will be **two** group of questions. **Group A is compulsory** and will contain two questions. **Question No.1 will be very short answer type** consisting of ten questions of 1 mark each. Question No.2 will be short answer type of 5 marks. Group B will contain descriptive type five questions of fifteen marks each, out of which any three are to answer.*

***Note:** There may be subdivisions in each question asked in Theory Examinations.*

DATA STRUCTURES WITH C Theory: 60 Lectures

1. **Introduction to Data Structures (04 Lectures)**
   Primitive/non-primitive data structures and their importance.
   Linear/non-linear data structure and their storage structure.
   Static/Dynamic data structures.
2. **Algorithms (04Lectures)**
   Use of asymptotic notations for analysis of complexity of an algorithm.
3. **Arrays: C Implementation (08 Lectures)**
   Traversal, Insertion, Deletion in Arrays.
   2-D arrays and their row major/column major storage
   Implementation of Matrices in 2-D Arrays.
   Concept of dynamic array in C language.
   Sparse matrices and their 3-Tuple representation.
4. **Sorting And Searching (06 Lectures)**
   Analysis of complexity of Sequential search and Binary search
   Analysis of simple sorting algorithms: Bubble Sort, Selection Sort, Insertion Sort, Merge Sort, and Quick Sort
5. **Stacks (06 Lectures)**
   Push And Pop Operations
   Application of Stacks:-prefix, postfix, and infix
6. **Queue (08Lectures)**
   Insertion and Deletion Operations
   Circular Queue
   Deque:-Input restricted and Output restricted
7. **Linked Lists: C Implementation (08 Lectures)**
   Concept of self-referential data structure and runtime allocation/de-allocation of memory in C. Manipulation (insertion, deletion, and traversal) of:
   Singly linked list.
   Doubly linked list.
   Circular linked list.
   Implementation of Stack, Queue using linked list

8. **Trees: Algorithm Only**
   (06Lectures)
   Trees, Some Properties of Trees,
   Binary trees, Binary search trees
9. **Graphs: Algorithm Only**
   (10Lectures)
   Graphs, Sub graphs, Walks paths and circuits.
   Connected Graphs, Representation of graph in computers Memory.
   Computation of Transitive closure of an adjacency matrix.
   Breadth First Search, Depth First Search,
   Spanning Trees, Finding all Spanning Trees of a Graph.
   Spanning Trees in a Weighted Graph,
   Kruskal's algorithm & Prim's algorithm for finding MST. Floyd Warshall Algorithm, Dijkstra's algorithm.

Text Book:

- Data Structure- Lipschutz.

References Book:

- Graph Theory-Nur Singh Dev.
- C and Data Structures, Mukul Priyadarshi.
- Data Structures through 'C', Y.P. Kanetkar, BPB Pub.
- Introduction to algorithms, T.H. Coremen, C.E. Leiserson, R.L. Rivest and C. Stein: PHI.

V. CORE COURSE -C 4: (Credits: Theory-05, Tutorial-01)

Marks : 15 (MSE: 1Hr) + 60 (ESE: 3Hrs) =75 **Pass Marks: Th (MSE +ESE) = 30**

Instruction to Question Setter for
Mid Semester Examination (MSE):

*There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** three questions of five marks each, out of which any two are to answer.*

End Semester Examination (ESE):

*There will be **two** group of questions. **Group A is compulsory** and will contain two questions. **Question No.1 will be very short answer type** consisting of ten questions of 1 mark each. **Question No.2 will be short answer type** of 5 marks. **Group B will contain descriptive type** five questions of fifteen marks each, out of which any three are to answer.*

***Note:** There may be subdivisions in each question asked in Theory Examinations.*

DISCRETE STRUCTURES 60 Lectures

1. **Introduction:** **(15 Lectures)**
Sets - finite and Infinite sets, Uncountable Infinite Sets; functions, relations, Properties of Binary Relations, Closure, Partial Ordering Relations; counting - Pigeonhole Principle, Permutation and Combination; Mathematical Induction, Principle of Inclusion and Exclusion.
2. **Growth of Functions:** **(8 Lectures)**
Asymptotic Notations, Summation formulas and properties, Bounding Summations, approximation by Integrals
3. **Recurrences:** **(10 Lectures)**
Recurrence Relations, generating functions, Linear Recurrence Relations with constant coefficients and their solution, Substitution Method, Recurrence Trees, Master Theorem
4. **Graph Theory:** **(15 Lectures)**
Basic Terminology, Models and Types, multigraphs and weighted graphs, Graph Representaion,
Graph Isomorphism, Connectivity, Euler and Hamiltonian Paths and Circuits, Planar Graphs, Graph
Coloring, Trees, Basic Terminology and properties of Trees, Introduction to Spanning Trees
5. **Prepositional Logic:** **(12 Lectures)**
Logical Connectives, Well-formed Formulas, Tautologies, Equivalences, Inference Theory

Reference **Books:**

- C.L. Liu , D.P. Mahopatra, Elements of Discrete mathematics, 2nd Edition , Tata McGraw Hill, 1985,
- Kenneth Rosen, Discrete Mathematics and Its Applications, Sixth Edition ,McGraw Hill 2006
- T.H. Coremen, C.E. Leiserson, R. L. Rivest, Introduction to algorithms, 3rd edition Prentice Hall on India, 2009
- M. O. Albertson and J. P. Hutchinson, Discrete Mathematics with Algorithms , John wiley Publication, 1988
- J. L. Hein, Discrete Structures, Logic, and Computability, 3rd Edition, Jones and Bartlett Publishers, 2009

INFORMATION TECHNOLOGY PRACTICAL- C 3 & C4 LAB

60 Lectures

Marks : Pr (ESE: 3Hrs)=50	**Pass Marks: Pr (ESE) = 20**

Instruction to Question Setter for

Practical Examination (ESE)

*There will be **two** group of questions in Practical Examination of 3Hrs.. **Group A having questions from CORE PAPER 3***

***(CC3)** will contain four questions, out of which any two are to be answered **Group B having questions from CORE PAPER 4 (CC4)** will contain two questions, out of which any one is to be answered.*

***Lab:** Student have to Answer the given questions on Answer booklet and execute the answered programs/steps in computer with standard output.*

***Assignment**: The Assignment should be hand written in A4 size paper. First three pages (i.e. front page + acknowledgment + index) & Bibliography may be printout.*

Marks Distribution:

LAB(Experiment + Answer script)	*= 30 marks*
Assignment	*=10 marks*
Viva-voce	*=10 marks*

DATA STRUCTURES WITH C

1. Using static/dynamic array sort in ascending and descending order:
2. (Apply bubble sort, selection sort, insertion sort & quick sort algorithms).
3. Searching for an element in an array using linear search and binary search.
4. Input sparse matrix and store in 3- tuple scheme.
5. Input 3-tuple data and convert it to standard matrix.
6. Compute transitive closure of an adjacency matrix.
7. Implement singly, doubly and circularly linked list using recursive functions. 8. Implement STACK, QUEUE and DEQUEUE using a vector (1-D array)
9. Implement STACK & QUEUE using Linked List.
10. Searching for an element in a singly, doubly and circularly linked list.
11. Write 'C' code to implement and manipulate a Binary Search Tree.

DISCRETR STRUCTURES LAB **60 Lectures**

1. Let **p** stand for the proposition "I bought a lottery ticket" and q for "I won the jackpot". Express the following as natural English sentences:

   (a) **¬p**

   (b) **p ∨ q**

   (c) **p ∧ q**

   (d) **p ⇒ q**

   (e) **¬p⇒ ¬q**

   (f) **) ¬p∨ (p∧q)**

2. Formalise the following in terms of atomic propositions **R, B**, and **W,** first making clear how they correspond to the English text.
   (a) Berries are ripe along the path, but rabbits have not been seen in the area.
   (b) Rabbits have not been seen in the area, and walking on the path is safe, but berries are ripe along the path.
   (c) If berries are ripe along the path, then walking is safe if and only if rabbits have not been seen in the area.
   (d) It is not safe to walk along the path, but rabbits have not been seen in the area and the berries along the path are ripe.
   (e) For walking on the path to be safe, it is necessary but not sufficient that berries not be ripe along the path and for rabbits not to have been seen in the area.
   (f)) Walking is not safe on the path whenever rabbits have been seen in the area and berries are ripe along the path.

3. Formalise these statements and determine (with truth tables or otherwise) whether they are consistent (i.e. if there are some assumptions on the atomic propositions that make it true): "The system is in a multiuser state if and only if it is operating normally. If the system is operating normally, the kernel is functioning. Either the kernel is not functioning or the system is in interrupt mode. If the system is not in multiuser state, then it is in interrupt mode. The system is not in interrupt mode."

4. When is a propositional formula **Pvalid** ? When is **Psatisfiable**?

5. For each of the following propositions, construct a truth table and state whether the proposition is valid or satisfiable. (For brevity, you can just write one truth table with many columns.)

   (a) **p ∧¬p**

   (b) **p ∨¬p**

   (c) **(p∨ ¬q) ⇒q**

   (d) **(p∨q) ⇒ (p∧q)**

   (e) **(p⇒q) ⇔ (¬q⇒ ¬p)**

   (f) **) (p⇒q) ⇒ (q⇒p)**

SEMESTER III 6 Papers

Total 100 x 6 = 600 Marks

I. SKILL ENHANCEMENT COURSE SEC 1: (Credits: Theory-02)

Marks : 100 (ESE: 3Hrs) =100	**Pass Marks Th ESE = 40**

Instruction to Question Setter for

End Semester Examination (ESE):

*There will be **objective type test** consisting of hundred questions of 1 mark each. Students are required to mark their answer on **OMR Sheet** provided by the University.*

ELEMENTARY COMPUTER APPLICATION SOFTWARES:

A Common Syllabus Prescribed by Radha Govind University **Theory: 30 Lectures**

Objective of the Course

The objective of the course is to generate qualified manpower in the area of Information Technology (IT) and Graphic designing which will enable such person to work seamlessly at any Offices, whether Govt. or Private or for future entrepreneurs in the field of IT.

A. INTRODUCTION TO COMPUTER SYSTEM

Basic Computer Concept

Computer Appreciation - Characteristics of Computers, Input, Output, Storage units, CPU, Computer System. **(1 Lecture)**

Input and Output Devices

Input Devices - Keyboard, Mouse, joystick, Scanner, web cam,

Output Devices- Soft copy devices, monitors, projectors, speakers, Hard copy devices, Printers – Dot matrix, inkjet, laser, Plotters.

(4 lectures)

Computer Memory and Processors

Memory hierarchy, Processor registers, Cache memory, Primary memory- RAM, ROM, Secondary storage devices, Magnetic tapes, Floppy disks, hard disks, Optical Drives- CD-ROM, DVD-ROM, CDR, CD-RW, USB Flash drive, Mass storage devices: USB thumb drive. Managing disk Partitions, File System. Basic Processor Architecture, Processor speed, Types of processor.

(5 lectures)

Numbers Systems and Logic Gates

Decimal number system, Binary number system, Octal number system, Hexadecimal number system, Inter-conversion between the number systems. Basic Logic gates-AND, OR, NOT, Universal logic gates- NAND, NOR

(3 lectures)

Computer Software

Computer Software- Relationship between Hardware and Software, System Software, Application Software, Compiler, Names of some high level languages, Free domain software.

(2 lectures)

Internet & its uses

History of Internet, WWW and Web Browsers: Web Browsing software, Surfing the Internet, Chatting on Internet, Basic of electronic mail, Using Emails, Document handling, Network definition, Common terminologies: LAN, WAN, MAN, Node, Host, Workstation, Bandwidth, Network Components: Severs, Clients, Communication Media. Wireless network

(3 lectures)

Operating system-Windows

Operating system and basics of Windows, The User Interface, Using Mouse, and Moving Icons on the screen, The My Computer Icon, The Recycle Bin, Status Bar, Start and Menu & Menu-selection, Running an Application, Windows Explorer Viewing of File, Folders and Directories, Creating and

Renaming of files and folders, Opening, and closing of different Windows, Windows Setting, Control

Panels, Wall paper and Screen Savers, Setting the date and Sound, Concept of menu Using Help,

Advanced Windows, Using right Button of the Mouse, Creating Short cuts, Basics of Window

Setup, Notepad, Window Accessories

(2 Lectures)

B. MICROSOFT OFFICE 2007 AND LATEST VERSIONS

Word Processing

Word processing concepts: saving, closing, opening an existing document, selecting text, Editing text, Finding and replacing text, printing documents, Creating and Printing Merged Documents, Character and Paragraph Formatting, Page Design and Layout. Editing and Checking. Correcting spellings. Handling Graphics, Creating Tables and Charts, Document Templates and Wizards, Mail merge and Macros.

(3 Lectures)

Microsoft Excel (Spreadsheet)

Spreadsheet Concepts, Creating, Saving and Editing a Workbook, Inserting, Deleting Work Sheets, entering data in a cell / formula Copying and Moving from selected cells, handling operators in Formulae, Functions: Mathematical, Logical, statistical, text, financial, Date and Time functions, Using Function Wizard. Formatting a Worksheet: Formatting Cells changing data alignment, changing date, number, character or currency format, changing font, adding borders and colors, Printing worksheets, Charts and Graphs – Creating, Previewing, Modifying Charts. Integrating word processor, spread sheets,

web pages. Pivot table, goal seek, Data filter and scenario manager

(4 Lectures)

Microsoft Power Point (Presentation Package)

Creating, Opening and Saving Presentations, Creating the Look of Your Presentation, Working in Different Views, Working with Slides, Adding and Formatting Text, Formatting Paragraphs, Drawing and Working with Objects, Adding Clip Art and other pictures, Designing Slide Shows, Running and Controlling a Slide Show, Printing Presentations. Creating photo album, Rehearse timing and record

narration. Master slides. **(3 Lectures)**

Reference Books

- Nishit Mathur, Fundamentals of Computer , Aph publishing corporation(2010)
- Misty E. Vermaat,.Microsoft word 2013 1st Edition (2013).
- Satish Jain, M.Geeta, MS- Office 2010 Training Guide, BPB publication (2010)
- Joan Preppernau, Microsoft PowerPoint 2016 step by step, Microsoft press(2015)
- Douglas E Corner, The Internet Book 4th Edition, prentice –Hall(2009)
- Faithe wempen, word 2016 in depth 1st edition, que publishing(2015)
- Steven welkler, Office 2016 for beginners, Create Space Independent publishing Plateform (2016)

SKILL ENHANCEMENT LAB- SEC 1 LAB 30 Lectures

A. MS-WORD LAB ASSIGNMENT

1. Write down the following Paragraph OR any one provided by your teacher;

Without a doubt, the Internet is one of the most important inventions of modern times. The Internet is a global interconnected computer networks which allow each connected computer to share and exchange information with each other. The origins of the Internet can be traced to the creation of Advanced Research Projects Agency Network (ARPANET) as a network of computers under the auspices of the U.S. Department of Defense in 1969.

Apply following effects on The paragraph:

i. Paragraph **font-size** and **font-type** must be 12 Verdana.
ii. Paragraph **alignment** must be justified and double line spacing.
iii. **Highlight** the "(ARPANET)" with green color.
iv. Make the "Internet" keywords **Bold and Italic.**
v. Insert any "**WordArt**" and a **symbol** to your document.
vi. Insert a **clipart** to your document.
vii. Add following lines to your document:

Internet, Intranet, Extranet, URL, WWW, Networking, Protocols, HTTP, TCP/IP

2. Create a Table of following fields:

Name, Surname, Age, Gender, Job and apply the following effects

i. Insert 10 records
ii. Font size should be 12
iii. Title size should be 14
iv. Font type should be Times new Roman
v. Title color should be blue
vi. Text color should be black
vii. Table border should be 2

3. Write a letter on 'Road Safety' and send to 'Multiple Recipients' using mail merge.

4. Type the paragraph given below:

Today, the Internet is a public, cooperative and self-sustaining facility accessible to hundreds of millions of people worldwide. Physically, the Internet uses a portion of the total resources of the currently existing public telecommunication networks. Technically, what distinguishes the Internet is its use of a set of protocols called TCP/IP (for Transmission Control Protocol/Internet Protocol). Two recent adaptations of Internet technology, the intranet and the extranet, also make use of the TCP/IP protocol. Today, the Internet is a public, cooperative and self-sustaining facility accessible to hundreds of millions of people worldwide. Physically, the Internet uses a portion of the total resources of the currently existing public telecommunication networks. Technically, what distinguishes the Internet is its use of a set of protocols called TCP/IP (for Transmission Control Protocol/ Internet Protocol). Two recent adaptations of Internet technology, the intranet and the extranet, also make use of the TCP/IP protocol.

Apply the following:

i. Change Internet into Internets at a time
ii. Heilight TCP/IP in red color
iii. Replace protocol into protocols
iv. Find the word "Public"

B. MICROSOFT EXCEL LAB ASSİGNMENT

Basic Formatting and Spreadsheet Manipulation

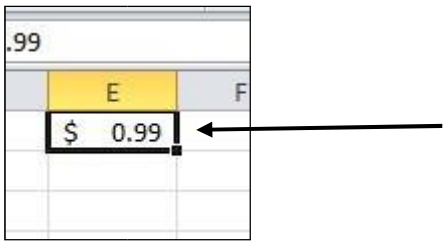
1. Add rows and columns to an existing spreadsheet
2. Reformat data (center, comma and currency styles, bold, text color)
3. Work with a simple formula (product) and function (sum)

Assignment

1. Create a workbook as shown below.
2. To enter new rows or columns, simply click on the row or column header to select the whole row or column. Then right click with the mouse and choose insert.
3. Add the new row for S Spade with the data that's shown below (between the original rows 7 and 8).
4. Add a column for gender and the data as shown below (between the original columns A and B). Enter the appropriate gender for yourself in the last row.

	A	B	C	D
	Name	**Male/Female**	**Genre**	**Number of Songs**
	J Smith	F	Blues	50
	B Doe	M	Country	110
	S Spade	F	Country	200
	F Zappa	M	Blues	1400
	F Zappa	M	Alternative	2300
	J Smith	F	Alternative	150
	S Spade	F	Blues	1000
	B Doe	M	Blues	75
	yourname	M	Blues	800

5. Center the data in columns B and C. Do this by selecting the whole column and click the center icon on the ribbon.
6. Bold the data in row 1, the column headings (ensure that the data all remains visible within the column boundaries).
7. Change the font color for row 1 to Blue.
8. Change the format of the data in column D to comma style (no decimal places showing).There is an icon on the home tab that sets it to comma style easily.
9. Add two new column labels to the right of the current columns; **Unit Price** and **Total Cost**. (They will be in columns E and F.) These two columns of data should be currency type so that the dollar sign is shown. There is an icon to quickly format the selected column as currency type.
10. All tunes are $.99, so enter that value for all rows in Column E. You can copy quickly by using the
    Auto Fill handle and drag that amount down. When you over your mouse over the tiny square in
    the bottom right hand corner of the active cell, your mouse shape will become a skinny plus sign, and you can click and drag that cell to make a copy.



11. Calculate Total Cost (column F) as column D times Column E. You will type in a formula like this into cell F2: **=D2*E2** (Be sure to begin the formula with an equal sign)
12. Use the AutoFill (skinny plus sign) again to copy the formula down column F; down to F10. Double check the picture below to make sure yours has the correct values
13. Add a border to all of the cells (A1-f10) using the Borders tool in the Fonts group on the Home Tab.
14. Change the page layout to landscape. Do this by clicking the Page Layout tab on the ribbon and then to Orientation to Landscape.
15. Save the file.
16. Click in cell F11 and Use the sum function or the shortcut icon that looks like ∑ to get the total of the Total Cost column.
17. Ensure that the data is all visible within the column boundaries. Make the columns wider if needed.
18. Save the workbook. Your final spreadsheet should look like the following when printed.

Name	Male/Female	Genre	Number of Songs	Unit Price	Total Cost
J Smith	F	Blues	50	$ 0.99	$ 49.50
B Doe	M	Country	110	$ 0.99	$ 108.90

S Spade	F	Country	200	$ 0.99	$ 198.00
F Zappa	M	Blues	1,400	$ 0.99	$ 1,386.00
F Zappa	M	Alternative	2,300	$ 0.99	$ 2,277.00
S Spade	F	Blues	1,000	$ 0.99	$ 990.00
J Smith	F	Alternative	150	$ 0.99	$ 148.50
B Doe	M	Blues	75	$ 0.99	$ 74.25
yourname	M	Blues	800	$ 0.99	$ 792.00
					$ 6,024.15

Create a sample table given below in Excel

- Using formula find Total
- Find the maximum value using MAX function from the **Units** column
- Find minimum value from **Total** column

Order Date	Region	Rep	Item	Units	Unit Cost	Total
1/6/2016	East	Jones	Pencil	95	1.99	189.05
1/23/2016	Central	Kivell	Binder	50	19.99	999.50
2/9/2016	Central	Jardine	Pencil	36	4.99	179.64
2/26/2016	Central	Gill	Pen	27	19.99	539.73
3/15/2016	West	Sorvino	Pencil	56	2.99	167.44
4/1/2016	East	Jones	Binder	60	4.99	299.40
4/18/2016	Central	Andrews	Pencil	75	1.99	149.25
5/5/2016	Central	Jardine	Pencil	90	4.99	449.10
5/22/2016	West	Thompson	Pencil	32	1.99	63.68
6/8/2016	East	Jones	Binder	60	8.99	539.40
6/25/2016	Central	Morgan	Pencil	90	4.99	449.10
7/12/2016	East	Howard	Binder	29	1.99	57.71
7/29/2016	East	Parent	Binder	81	19.99	1,619.19
8/15/2016	East	Jones	Pencil	35	4.99	174.65
9/1/2016	Central	Smith	Desk	2	125.00	250.00
9/18/2016	East	Jones	Pen Set	16	15.99	255.84
10/5/2016	Central	Morgan	Binder	28	8.99	251.72
10/22/2016	East	Jones	Pen	64	8.99	575.36
11/8/2016	East	Parent	Pen	15	19.99	299.85
11/25/2016	Central	Kivell	Pen Set	96	4.99	479.04
12/12/2016	Central	Smith	Pencil	67	1.29	86.43
12/29/2016	East	Parent	Pen Set	74	15.99	1,183.26

C. MS-POWERPOINT LAB ASSIGNMENT

Activity 1 : Using Text & Background/Themes

i. Create one new slide and insert any text.
ii. To make your slide more attractive, use the themes or background.
iii. iii. Make sure it applies for every slide not only one slide.

Activity 2 : Apply Custom Animation On Text

i. Use the custom animation to add effects on your text. Set the text move after you click the mouse.
ii. If you have more than one text, add effects for each of text.

Activity 3 : Insert Image & WordArt

i. Insert one new blank slide.
ii. Choose one pictures or clip art from any source and insert in your new slide.
iii. Using the WordArt, make a note or title on your picture.
iv. iv. Use the custom animation again to add effects on your picture and WordArt.

Activity 4 : Insert Text Box

i. Insert one new blank slide.
ii. Use the text box to insert one paragraph of text and adjust your text.

Activity 5 : Insert Smart Art

i. Insert one new blank slide.
ii. Insert the Smart Art and put your text on the Smart Art

Activity 6 : Insert Audio

i. Back to your first slide and insert one audio on that slide. The audio must play automatically when you show your slide.
ii. Make sure the speaker also not appear when you show your slide. (the icon).
iii. The audio must play when you show alls your slide, not only one slide.

Activity 7 : inserting Video

i. Insert one new slide and insert one short video

Activity 8 : Save File

i. Save your file

Activity 9 : Create Photo Album & Hyperlink

i. Insert one new slide and put a text ex: “My Photo Album”
ii. Create one photo album and adjust your text and your photos
iii. Save your photo album with a new file iv. Make a hyperlink to your photo using the text “My Photo Album”

Reference Books:

- Faithe wempen, word 2016 in depth 1st edition, que publishing(2015)
- steven welkler, Office 2016 for bignners, Create Space Independent publishing plateform(2016)
- Elaine Marmel, office 2016 simplified, 1st Edition, John wiley and sons Inc(2016)
- Patrice-Anne Rutledge, Easy office 2016 1st edition, Que publishing(2016)

II. GENERIC ELECTIVE (GE 3A): (Credits: 06)

GE3A paper of First subject selected in Sem-I to be studied. Refer Table AI 2.4 for name of papers and for Content in detail refer the Syllabus of Opted Generic Elective Subject.

III. GENERIC ELECTIVE (GE 3B): (Credits: 06)

GE3B paper of Second subject selected in Sem-I to be studied. Refer Table AI 2.4 for name of papers and for Content in detail refer the Syllabus of Opted Generic Elective Subject.

IV. CORE COURSE -C 5: (Credits: Theory-04, Practicals-02)

Marks : 15 (MSE: 1Hr) + 60 (ESE: 3Hrs) =75	Pass Marks: Th (MSE +ESE) = 30

Instruction to Question Setter for

Mid Semester Examination (MSE):

*There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** three questions of five marks each, out of which any two are to answer.*

End Semester Examination (ESE):
*There will be **two** group of questions. **Group A is compulsory** and will contain two questions. **Question No.1 will be very short answer type** consisting of ten questions of 1 mark each**. Question No.2 will be short answer type** of 5 marks. **Group B will contain descriptive type** five questions of fifteen marks each, out of which any three are to answer. Note: There may be subdivisions in each question asked in Theory Examinations.*

PROGRAMMING IN JAVA Theory: 60 Lectures

Object Oriented Concepts: (07 Lectures)
Recapitulate concepts of Object Oriented Programming, Object, Class, Method, Abstraction, Encapsulation, Polymorphism, Inheritance, Dynamic Binding and Message Passing.

Introduction to Java: (03 Lectures)
History of JAVA, features of JAVA, types of JAVA programs.

JDK tools: (08 Lectures)
Java compiler, Java Interpreter, applet viewer, Jot tool, Javap disassemble, Javadoc Tool, Javah tool, java Keywords, data types in java, variable naming conventions, Initializing variables, literals, operators, type conversion, looping construct, Arrays.

Classes and objects: (07 Lectures)
Declaring classes, creating objects, declaring objects, declaring methods, passing arguments to methods, constructors, access specifiers, modifiers, the main() method, Overloading, Relationship between classes.

Inheritance and interfaces: **(05 Lectures)**

Types of inheritance, Single inheritance, Multi level inheritance, interface implementation,

Packages: **(05 Lectures)**

Java packages, using a package, the Lang package, the util package, the collection class, creating a package.

Introduction to threads: **(07 Lectures)**

Threads, single treaded and multithreaded applications, life cycle of a thread, the current thread, the thread class, problems in multithreading, synchronization.

Exceptions Handling: **(08 Lectures)**

Types of Errors, Exceptions, Syntax of Exception Handling Code, Multiple Catch Statements, Finally Statements,

Throwing out Own exception, Debugging.

Applet & applications: **(10 Lectures)**

Applet class, Applet & HTML, Life cycle of an Applet, Graphic class, Font class, passing parameters to applets, creating an application, converting applets to applications.

Books Recommended:

- Herbert Schildt- Java: The Complete Reference, Seventh Edition, McGrawHill, 2006
- Cay S. Horstmannand, Gary Cornell – Core java, volume1 and 2, 8th-edition, Pearson Education.

V. CORE COURSE -C 6: (Credits: Theory-04, Practicals-02)

Marks : 15 (MSE: 1Hr) + 60 (ESE: 3Hrs) =75	Pass Marks: Th (MSE +ESE) = 30

Instruction to Question Setter for

Mid Semester Examination (MSE):

There will be two group of questions. ***Group A is compulsory*** *and will contain five questions of* ***very short answer type*** *consisting of 1 mark each.* ***Group B will contain descriptive type*** *three questions of five marks each, out of which any two are to answer.*

End Semester Examination (ESE):

There will be two group of questions. ***Group A is compulsory*** *and will contain two questions.* ***Question No.1 will be very short answer type*** *consisting of ten questions of 1 mark each.* ***Question No.2 will be short answer type*** *of 5 marks.* ***Group B will contain descriptive type*** *five questions of fifteen marks each, out of which any three are to answer.*

Note: *There may be subdivisions in each question asked in Theory Examinations.*

OPERATING SYSTEMS Theory: 60 Lectures

Introduction to Operating System **(05 Lectures)**

Definition and type of Operating Systems, role of Operating System as memory manager, I/o manager, process manager and file manager.

Computer system structure **(05 Lectures)**

Computer System Operation, I/O structure, Hardware protection.

Operating System Structure **(04 Lectures)**

System Components, System Services, System Calls.

Process Concepts **(04 Lectures)**

Process state, process control blocks (PCB), process scheduling, schedulers & threading.

CPU Scheduling **(06 Lectures)**

CPU and I/O burst cycle, Scheduling criteria/algorithms (FCFS, SRTN,RR etc.).

Memory Management **(07 Lectures)**

Memory hierarchy, properties

Contiguous & Static/Dynamic Partitioned allocation, paging, swapping, segmentation.

Virtual memory **(06 Lectures)**

Demand paging, page replacement policies/algorithms (FIFO, LRU, Optimum), thrashing.

File System Structure **(03 Lectures)**

File allocation (Contiguous, linked, indexed) Free space management (bit vector, linked list etc.).

I/O systems **(03 Lectures)**

I/O Hardware, Polling, Interrupts, DMA, Spooling, buffering.

Disk structure **(03 Lectures)**

Disk scheduling (FCFS, SSTF, Scan), Disk management, formatting, boot block, bad block & swap space management.

Security **(04 Lectures)**

The problem, Authentication, program threats, encryption

UNIX/LINUX **(10 Lectures)**

- Process scheduling, memory management, file system, file structure, inodes,
- Linux shell Commands : ls, cat, wc, grep, chmod, directory related commands, date, man, cp, mv

Text Books:

- Modern Operating Systems – A. S. Tanenbaum; Pearson Education Asia.
- Operating System Concepts – Silberschatz/Galvin/Gagne; John Wiley & Sons (Asia).

Reference Books:

- Operating System : Naresh Chouhan; Oxford University Press.
- Linux a Practical Approach -- B. Mohamed Ibrahim
- Operating Systems : Er. Rajiv Chopra ; S. Chand Publications.

VI. CORE COURSE -C 7: (Credits: Theory-04, Practicals-01)

Marks : 15 (MSE: 1Hr) + 60 (ESE: 3Hrs) =75	Pass Marks: Th (MSE +ESE) = 30

Instruction to Question Setter for

Mid Semester Examination (MSE):

*There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** three questions of five marks each, out of which any two are to answer.*

End Semester Examination (ESE):

*There will be **two** group of questions. **Group A is compulsory** and will contain two questions. **Question No.1 will be very short answer type** consisting of ten questions of 1 mark each. **Question No.2 will be short answer type** of 5 marks. **Group B will contain descriptive type** five questions of fifteen marks each, out of which any three are to answer.*

***Note:** There may be subdivisions in each question asked in Theory Examinations.*

COMPUTER NETWORKS Theory: 60 Lectures

Basics of Data Communication (07 Lectures)

Communication system, Analog and Digital Communication, Data communication modes, Synchronous and Asynchronous Transmission, Simplex, Half-duplex and Full duplex communication, Networking Protocols and Standards.

OSI and TCP/IP Reference Models (10 Lectures.)

OSI Model, Need, Basic functions of each layer, TCP/IP, Comparisons with TCP/IP layers.

Modulation, Encoding and Multiplexing (10 Lectures)

Analog Modulation: AM, FM, PM.

Data Encoding: Digital Data Digital Signals: NRZ-L, NRZ-I, Manchester, Differential Manchester. Digital Data Analog Signals: ASKFSK, PSK .

Analog Data Digital Signals: PCM, DM.

Introduction to FDM, TDM, SDM.

Communication Mediums (07 Lectures)

Digital data transmission, Serial and Parallel Transmission, Guided and Unguided mediums, Wireless Communication, Coaxial Cables, Twisted Pair Cables, Fiber Optic Cables, Connectors

Network Classification **(05 Lectures)**

Classification of Networks based on Technology, Scale, Topology and Ownership, LAN overview, LAN Topologies, LAN access methods.

Physical and Data link Layer **(05 Lectures)**

ARQ, CRC, Framing, Retransmission strategies, Random access (CSMA, CSMA/CD, CSMA/CA).

Internetworking Devices & Network layer **(04 Lectures)**

Network Interface Cards, Modems, Repeaters, Hubs, Bridges, Switchs and gateways; Circuit, Message and Packet Switching; Routing, Congestion control.

Transport layer and Application Layer **(06 Lectures)**

Addressing, Multiplexing, Flow control, Port numbers, DNS, Remote Logging, FTP, Network Management, Client-Server Applications, WWW, E-mail.

Network Security **(06 Lectures)**

Introduction to computer security, Authentication and Privacy, Public and Private key Cryptography, Digital Signature.

Text Books:

- Willam Stallings-Data and Computer communications, Pearson Education.

Reference Books:

- Tannenbaum - Data Communication and Networking.
- B.A. Forouzan: Data Communications and Networking. Tata McGraw Hill, 3rd Edition, 2004.

INFORMATION TECHNOLOGY PRACTICAL- C5, C6 & C7 LAB

Marks : Pr (ESE: 3Hrs)=75	**Pass Marks: Pr (ESE) = 30**

Instruction to Question Setter for

Practical Examination (ESE Pr)

*There will be **three** group of questions in Practical Examination of 3Hrs **Group A having questions from CORE PAPER 5(CC5)** will contain four questions, out of which any two are to be answered **Group B having questions from CORE PAPER 6(CC6)** will contain four questions, out of which any two are to be answered **Group C having questions from CORE PAPER 7(CC7)** will contain two questions, out of which any one is to be answered.*

***Lab:** Student have to Answer the given questions on Answer booklet and execute the answered programs/steps in computer with standard output.*

***Assignment**: The Assignment should be hand written in A4 size paper. First three pages (i.e. front page + acknowledgment + index) & Bibliography may be printout.*

Marks Distribution:

LAB (Experiment + Answer script)	*= 45 marks*
Assignment	*=15 marks*
Viva-voce	*=15 marks*

I.T. PRACTICAL- C 5 LAB **60 Lectures**

PROGRAMMING IN JAVA

1. Programming using Java.
2. Applet creation and execution.
3. Creating programs based on multithreading.

I.T. PRACTICAL- C 6 LAB **60 Lectures**

1. Write a program (*using fork()* and/or *exec()* commands) where parent and child execute:
    a. same program, same code.
    b. same program, different code.-
    c. before terminating, the parent waits for the child to finish its task.
2. Write a program to report behaviour of Linux kernel including kernel version, CPU type and model. (CPU information)
3. Write a program to report behaviour of Linux kernel including information on configured memory, amount of free and used memory. (memory information)
4. Write a program to print file details including owner access permissions, file access time, where file name is given as argument.
5. Write a program to copy files using system calls.
6. Write program to implement FCFS scheduling algorithm.
7. Write program to implement Round Robin scheduling algorithm.
8. Write program to implement SJF scheduling algorithm.
9. Write program to implement non-preemptive priority based scheduling algorithm.
10. Write program to implement preemptive priority based scheduling algorithm.
11. Write program to implement SRJF scheduling algorithm.
12. Write program to calculate sum of n numbers using *thread* library.
13. Write a program to implement first-fit, best-fit and worst-fit allocation strategies.

COMPUTER PRACTICAL-C 7 LAB **60 Lectures**

1. Simulate Cyclic Redundancy Check (CRC) error detection algorithm for noisy channel.
2. Simulate and implement stop and wait protocol for noisy channel.
3. Simulate and implement go back n sliding window protocol.
4. Simulate and implement selective repeat sliding window protocol.
5. Simulate and implement distance vector routing algorithm
6. Simulate and implement Dijkstra algorithm for shortest path routing.

SEMESTER IV 5 Papers

Total 100 x 5 = 500 Marks

I. SKILL ENHANCEMENT COURSE SEC 2: (Credits: Theory-02)

Marks : 75 (ESE: 3Hrs) + 25 (Pr 3Hrs) =100	**Pass Marks ESE = 40**

Guidelines to Examiners for

End Semester Theory Examination (ESE): F.M.=75

*There will be **two** group of questions. **Group A is compulsory** and will contain two questions. **Question No.1 will be very short answer type** consisting of ten questions of 1 mark each. **Question No.2 will be short answer type** of 5 marks. **Group B will contain descriptive type** six questions of fifteen marks each, out of which any four are to answer.*

***Note**: There may be subdivisions in each question asked in Theory Examinations.*

End Semester Practical Examination (ESE Pr): Viva-voce /Assignment/Lab work, F.M.=25

MATLAB PROGRAMMING **Theory: 15 Lectures**

Unit I- Introduction to Programming: Components of a computer, working with numbers, Machine code, Software hierarchy

Unit II- Programming Environment: MATLAB Windows, A First Program, Expressions, Constants, Variables and assignment statement, Arrays.

Unit III- Graph Plots: Basic plotting, Built in functions, Generating waveforms, Sound replay, load and save.

Unit IV- Procedures and Functions: Arguments and return values, M-files, Formatted console inputoutput, String handling.

Unit V-Control Statements: Conditional statements: If, Else, Else-if, Repetition statements: While, for loop.

Unit VI- Manipulating Text: Writing to a text file, Reading from a text file, Randomising and sorting a list, searching a list.

Unit VI- Manipulating Text: Writing to a text file, Reading from a text file, Randomising and sorting a list, searching a list.

Reference Books:

- MATLAB: An Introduction with Applications, by Amos Gilat, 2nd edition, Wiley, 2004,
- C.B. Moler, Numerical Computing with MATLAB, SIAM, 2004.

SKILL ENHANCEMENT LAB- SEC 2 LAB 15 Lectures

Marks : Pr (ESE: 3Hrs)=25	Pass Marks: Pr (ESE) = 10

Instruction to Question Setter for

Practical Examination (ESE)

*There will be **four** questions in Practical Examination of **3Hrs**. from skill enhancement paper 1 (**SEC1**) out of which **any two** are to be answered.*

***Lab:** Student have to Answer the given questions on Answer booklet and execute the answered programs/steps in computer with standard output.*

***Assignment:** The Assignment should be hand written in A4 size paper. First three pages (i.e. front page + acknowledgment + index) & Bibliography may be printout.*

Marks Distribution:

LAB (Experiment + Answer script)	*= 15 marks*
Assignment	*=05 marks*
Viva-voce	*=05 marks*

MATLAB PROGRAMMING

1. Calculate 10 approximate points from the function y=2x by using the formulae:
   a. xn = n
   b. yn = 2n + rand - 0.5
2. Fit a line of best fit to these points using the function polyfit() with degree=1, and generate coordinates from the line of best fit using polyval(). Use the on-line help to find out how to use these functions. Plot the raw data and the line of best fit.
3. Calculate and replay 1 second of a sinewave at 500Hz with a sampling rate of 11025Hz. Save the sound to a file called "ex35.wav". Plot the first 100 samples.
4. Calculate and replay a 2 second chirp. That is, a sinusoid that steadily increases in frequency with time, from say 250Hz at the start to 1000Hz at the end.
5. 4 Build a square wave by adding together 10 odd harmonics: 1f, 3f, 5f, etc. The amplitude of the nth harmonic should be 1/n. Display a graph of one cycle of the result superimposed on the individual harmonics.
6. Write a function called FtoC (ftoc.m) to convert Fahrenheit temperatures into Celsius. Make sure the program has a title comment and a help page. Test from the command window with:
   a. FtoC(96)
   b. lookfor Fahrenheit
   c. help FtoC
7. Write a program to input 2 strings from the user and to print out (i) the concatenation of the two strings with a space between them, (ii) a line of asterisks the same length as the concatenated strings, and (iii) the reversed concatenation. For example:
   i. Enter string 1: Mark
   ii. Enter string 2: Huckvale
   iii. Mark Huckvale
   iv. **********
   v. elavkcuH kraM

II. GENERIC ELECTIVE (GE 4A): (Credits: 06)

GE4A paper of First subject selected in Sem-I to be studied. Refer Table AI 2.4 for name of papers and for Content in detail refer the Syllabus of Opted Generic Elective Subject.

III. GENERIC ELECTIVE (GE 4B): (Credits: 06)

GE4B paper of Second subject selected in Sem-I to be studied. Refer Table AI 2.4 for name of papers and for Content in detail refer the Syllabus of Opted Generic Elective Subject.

VI. CORE COURSE -C 8: (Credits: Theory-04, Practicals-02)

Marks : 15 (MSE: 1Hr) + 60 (ESE: 3Hrs) =75	Pass Marks: Th (MSE +ESE) = 30

Instruction to Question Setter for

Mid Semester Examination (MSE):

*There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** three questions of five marks each, out of which any two are to answer.*

End Semester Examination (ESE):

*There will be **two** group of questions. **Group A is compulsory** and will contain two questions. **Question No.1 will be very short answer type** consisting of ten questions of 1 mark each. **Question No.2 will be short answer type** of 5 marks. **Group B will contain descriptive type** five questions of fifteen marks each, out of which any three are to answer.*

Note: There may be subdivisions in each question asked in Theory Examinations.

THEORY OF COMPUTATION Lectures: 60; Tutorials: 10

1. Mathematical Preliminaries: - Sets Relations, Functions, Graph and Trees, Strings and their properties, Principles of Induction. **(08 Lectures)**
2. Propositions and Predicates: - Proposition (0or statements), Propositional connectives, Wellformed formulae, tautology, Predicates, Universal and Existential qualifiers. **(07 Lectures)**
3. Theory of Automata: - Definition, Description of finite Automata, Transition System, Properties of transition system. Acceptability of a string by finite automata, Non-deterministic finite state machine. **(09 Lectures)**
4. Formal Languages:-Basic Definition and examples, Chomsky classification of languages, languages and their relations, operations on languages, languages and automata.(08 Lectures)
5. Regular Set and Regular Grammar :- Regular Expressions, Finite automata and Regular Expressions, Pumping Lemma for regular Sets, closure properties of regular set, Regular set and Regular Grammar. **(07 Lectures)**
6. Context – free languages: - Basic definition, Context-free languages and derivation trees, Normal forms of context free grammar. **(07 Lectures)**
7. Pushdown Automata:- Basic definition, Acceptance by pda, pushdown Automata and context-free languages, parsing and pushdown Automata. (07 Lectures)
8. Turing Machine and Linear bounded Automata:- Turing Machine Model, Representation of Turing machines, language acceptability by Turing machines, design of Turing Machines. **(07 Lectures)**

Text Books:

- M. Sipser - Introduction to the theory of computation, Thomson Learning, 2001.

Reference Books:

- J. Martin - Introduction to languages and the Theory of computation, 3rd edition, McGraw Hill, 2002.
- K.L.P. Mishra- Theory of Computer Science, PHI Publication.
- J. E. Hopcroft, R. Motwani and J.D. Ullman - Introduction to Automata Theory, Languages and Computation, 2nd Edition, Pearson Education, 2001.

IV. CORE COURSE -C 9: (Credits: Theory-04, Practicals-02)

Marks : 15 (MSE: 1Hr) + 60 (ESE: 3Hrs) =75 **Pass Marks: Th (MSE +ESE) = 30**

Instruction to Question Setter for

Mid Semester Examination (MSE):

*There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** three questions of five marks each, out of which any two are to answer.*

End Semester Examination (ESE):

*There will be **two** group of questions. **Group A is compulsory** and will contain two questions. **Question No.1 will be very short answer type** consisting of ten questions of 1 mark each. **Question No.2 will be short answer type** of 5 marks. **Group B will contain descriptive type** five questions of fifteen marks each, out of which any three are to answer.*

***Note:** There may be subdivisions in each question asked in Theory Examinations.*

VISUAL BASICS .NET Lectures: 60

1. **Introduction to VB.NET (08 Lectures)**
   Event Driven Programming, NET as better Programming Platform, NET Framework, NET Architecture, The Just-In-Time Compiler, NET Framework class library introduction.
2. **Elements of User Interface (08 Lectures)**
   Windows Forms, Text Boxes, Buttons, Labels, Check Boxes, and Radio Buttons, List Boxes, Combo Boxes. Picture Boxes, Scrollbars, Splitters, Timer, Menus, Built-in Dialogs, Image List, Tree Views, List Views, Toolbars, Status Bar and Progress bars.
3. **Mastering VB Language (10 Lectures)**
   Data, Operators, Conditionals and Loops, Procedures, Error Handling, Classes and Objects.
4. **Object Oriented Programming in VB .NET (10 Lectures)**
   Class and Object, Properties, methods and events, Constructors and Destructors Method overloading, Inheritance, Access modifiers: Public, Private, Protected, Friend, Overloading and Overriding, Interfaces, Polymorphism.
5. **Exception Handling (08 Lectures)**
   Introduction.
   Handling different types of exceptions.
6. **Name Spaces (08 Lectures)**
   Common Name spaces.
7. **Databases in VB .NET 08 Lectures)**
   Database: Connections, Connection to database with server explorer Multiple Table Connection with Data grid.

Text Books:

- Programming Microsoft Visual Basic.NET – Francesco Balena
- The Complete Reference -Visual Basic .NET – Jefrey R. Shapiro
- VB.NET database programming with ADO.NET -Anne Prince and Doug Lowe.

Reference Books:

- The Visual Basic.NET COACH Visual Basic .NET 2003 in 21 Days. – Steven Holzner, SAMS Publications. Mastering Crystal Report - BPB Publication
- Crystal Report – The Complete Reference :- Tata McGraw Hill
- VB. Net-Halls, Macarthy, L.Hotka
- Programming in Vb.Net – V Christy, University Science Press

V. CORE COURSE -C 10: (Credits: Theory-04, Practicals-02)

Marks : 15 (MSE: 1Hr) + 60 (ESE: 3Hrs) =75 **Pass Marks: Th (MSE +ESE) = 30**

Instruction to Question Setter for

Mid Semester Examination (MSE):

*There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** three questions of five marks each, out of which any two are to answer.*

End Semester Examination (ESE):
*There will be **two** group of questions. **Group A is compulsory** and will contain two questions. **Question No.1 will be very short answer type** consisting of ten questions of 1 mark each. **Question No.2 will be short answer type** of 5 marks. **Group B will contain descriptive type** five questions of fifteen marks each, out of which any three are to answer.*

Note: There may be subdivisions in each question asked in Theory Examinations.

DATABASE MANAGEMENT SYSTEMS Theory: 60 Lectures

1. **DBMS basics** **07 Lectures)**
   Data, Data Bank, Database, DBMS, Types of DBMS, Advantages/Disadvantages in comparison with conventional file system, 3-Level Abstraction of DBMS and Database Life Cycle.

2. **RDBMS basics** **07 Lectures)**
   Relation, Codd's Rules, RDBMS, Super Key, Candidate Key, Primary Key, Alternate Key, Secondary Key, Foreign Key, Discriminator and Surrogate Key.

3. **ER Model** **(10 Lectures)**
   Entity, Entity Set, Weak Entity Type, Relationship, Attributes, Domain, Degree of Relationship, Connectivity & Cardinality of Relationship, Existence of Relationship, Attributes of a relationship, Generalization, Specialization, Aggregation.

4. **Normalization** **(10 Lectures)**
   Normalization, desirable properties, insert, update, Delete anomalies & reduction in redundancy, FD, 1NF, 2NF, 3NF, BC/NF, MVD 4NF, JD, 5NF or PJ/NF, DK/NF and De-normalization.

5. **Transaction Concept** **(05 Lectures)**
   Transaction, ACID properties, Transaction States, Concurrent Executions, Serializability, conflict& view serializability,
   Deadlock: When occur, Detection, Prevention and Avoidance.

6. **Relationship algebra & Calculus** **(06 Lectures)**
   Project, Select, Compose, Rename, Cartesian Product, Join (equi, natura, □& Outer join), Union, Intersection, Difference, Division operations, Tuple Relational Calculus, Domain Relational Calculus.

7. **Oracle SQL** **(15 Lectures)**

SQL *Plus: Buffer Commands, Environment variables and Data Types.

Basic parts of speech in SQL: select, from, where, order by, having, group by.

Arithmetic Operators: Unary (+, □), Binary (*, /,+, □); Comparison Operator: =, !=, <>, >, <, >=, <=, IN, NOT IN, IS NULL, IS NOT NULL, LIKE, % or _, ALL, ANY, SOME, EXISTS, BETWEEN; Logical Operators: AND, OR, NOT, Set Operators: UNION, UNION ALL, INTERSECT, MINUS.

DQL: Data Query Language – SELECT.

DML: Data Manipulation Language(INSERT, UPDATE, DELETE).

DDL: Data Definition Language (CREATE, ALTER, DROP, RENAME).

TCL: Transaction Control Language (COMMIT, ROLLBACK, SAVEPOINT).

DCL: Data Control Language (GRANT, REVOKE).

Handling Database Objects like Table, View,

Concept of simple query, nested sub-query, self-join, equi-join,

PL/SQL: Introduction, Simple Procedure, Function.

Text Books:

- Silberschatz, Korth, Sudarshan – Database System Concepts, McGraw Hill.
- Ivan Byross - PL/SQL Programming.

Reference Books:

- Toby Teory et al., Database Modelling and Design, Morgan Kaufman Publishers.
- C. J. Date - Database management System.
- Alexis Leon, Mathews Leon – SQL A Complete Reference, TMH.
- V.P. Desai - Database management System.
- Sharad Maheswari and Ruchin jain–SQL and PL/SQL Programming's.

INFORMATION TECHNOLOGY PRACTICAL- C8, C9 & C10 LAB

60 Lectures

Marks : Pr (ESE: 3Hrs) =75	**Pass Marks: Pr (ESE) = 30**

Instruction to Question Setter for
Practical Examination (ESE)
*There will be **two** group of questions in Practical Examination of 3Hrs.. **Group A having questions from CORE PAPER 9 (CC9)** will contain four questions, out of which any two are to be answered **Group B having questions from CORE PAPER 10 (CC10)** will contain four questions, out of which any two is to be answered.*

***Lab:** Student have to Answer the given questions on Answer booklet and execute the answered programs/steps in computer with standard output.*
***Assignment**: The Assignment should be hand written in A4 size paper. First three pages (i.e. front page + acknowledgment + index) & Bibliography may be printout.*
Marks Distribution:

LAB(Experiment + Answer script)	*= 45 marks*
Assignment	*=15 marks*
Viva-voce	*=15 marks*

VISUAL BASIC. NET

1. Console Based Programming
2. Window Based Programming
3. Application Development using Database connectivity

DATABASE MANAGEMENT SYSTEMS

SQL * plus and SQL Commands:

1. Use of SQL *Plus Buffer Commands, Environment variables and Data Types.
2. Use of select, from, where, order by, having, group by.
3. Use of IN, NOT IN, IS NULL, IS NOT NULL, LIKE, % or _, ALL, ANY, SOME, EXISTS, BETWEEN.
4. Use of AND, OR, NOT, UNION, UNION ALL, INTERSECT, MINUS in SQL.
5. Using DDL and DML with database objects like Table, View, Sequence, Synonym and Index.
6. Use of COMMIT, ROLLBACK, SAVEPOINT.
7. GRANT & REVOKE privileges on database objects.
8. Use of sub-query, correlated sub-query, self-join, equi-join,
9. Displaying data from multiple tables.
10. Producing Readable output using SQL * plus.

SEMESTER V 4 Papers

Total 100 x 4 = 400 Marks

I. I.T. SPECIFIC (DSE 1): (Credits: Theory-04, Practicals-02)

Marks : 15 (MSE: 1Hr) + 60 (ESE: 3Hrs) =75	Pass Marks: Th (MSE +ESE) = 30

Instruction to Question Setter for
Mid Semester Examination (MSE):
*There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** three questions of five marks each, out of which any two are to answer.*

End Semester Examination (ESE):
*There will be **two** group of questions. **Group A is compulsory** and will contain two questions. **Question No.1 will be very short answer type** consisting of ten questions of 1 mark each. **Question No.2 will be short answer type** of 5 marks. **Group B will contain descriptive type** five questions of fifteen marks each, out of which any three are to answer.*

***Note:** There may be subdivisions in each question asked in Theory Examinations.*

INFORMATION SECURITY & CYBER LAW Theory: 60 Lectures

1. **Introduction** **(06 Lectures)**
   Security, Attacks, Computer Criminals, Security Services, Security Mechanisms.

2. **Cryptography** **(07 Lectures)**
   Substitution ciphers, Transpositions Cipher, Confusion, diffusion, Symmetric, Asymmetric Encryption. DES Modes of DES, Uses of Encryption, Hash function, key exchange, Digital Signatures, Digital Certificates.

3. **Program Security** **(05 Lectures)**
   Secure programs, Non malicious Program errors, Malicious codes virus, Trap doors, Salami attacks, Covert channels, Control against program

4. **Threats** **(05 Lectures)**
   Protection in OS: Memory and Address Protection, Access control, File Protection, User Authentication.

5. **Database Security** **(06 Lectures)**
   Requirements, Reliability, Integrity, Sensitive data, Inference, Multilevel Security.

6. **Security in Networks** **(05 Lectures)**
   Threats in Networks, Security Controls, firewalls, Intrusion detection systems, Secure e-mails

7. **Administrating Security** **(06 Lectures)**
Security Planning, Risk Analysis, Organizational Security Policy, Physical Security. Ethical issues in Security: Protecting Programs and data. Information and law.

8. **IT Act 2000** **(04 Lectures)**
Scope of the IT Act, Legal recognition of Electronic records and Digital Signature, use of electronic records and digital signature in government and its agencies.

9. **Certifying Authorities** **(04 Lectures)**
Need and Power of certifying Authority, Appointment, Function of Controller, who can be a certifying Authority? Digital signature certifications, Generation, Suspension and Revocation of Digital signature certificate.

10. **Domain name Disputes and Trademark Law** **(04 Lectures)**
Concept of Domain names, New concepts in trademark Jurisprudence, Cyber-squatting, Reverse Hijacking, Jurisdiction in Trademark dispute.

11. **Cyber regulations Appellate Tribunal** **(05 Lectures)**
Establishment and Composition of Appellate tribunal, Powers of Adjudicating officer to Award Compensation, Powers of Adjudicating officer to Impose Penalty.

12. **The Cyber Crimes(S-65 to S-74)** **(03 Lectures)**
Tampering with computer source document(S-65), Hacking with Computer system(S-66), Publishing of information which is Obscene in Electronic forms(S-67), Offences-Breach of
Confidentiality and Privacy(S-72), Offences- Related to Digital signature certificate(S-73 and S74)

Reference Books:

- C. P. Pfleeger, S. L. Pfleeger; Security in Computing, Prentice Hall of India, 2006
- W. Stallings; Network Security Essentials: Applications and Standards, 4/E, 2010

II. I.T. SPECIFIC (DSE 2): (Credits: Theory-04, Practicals-02)

Marks : 15 (MSE: 1Hr) + 60 (ESE: 3Hrs) =75 **Pass Marks: Th (MSE +ESE) = 30**

Instruction to Question Setter for
Mid Semester Examination (MSE):

*There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** three questions of five marks each, out of which any two are to answer.*

End Semester Examination (ESE):

*There will be **two** group of questions. **Group A is compulsory** and will contain two questions. **Question No.1 will be very short answer type** consisting of ten questions of 1 mark each. **Question No.2 will be short answer type** of 5 marks. Group B will contain descriptive type five questions of fifteen marks each, out of which any three are to answer.*

***Note:** There may be subdivisions in each question asked in Theory Examinations.*

PROGRAMMING IN PYTHON Theory: 60 Lectures; Tutorial: 10

1. **Planning the Computer Program: 10 Lectures)**
   Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation

2. **Techniques of Problem Solving: (10 Lectures)**
   Flowcharting, decision table, algorithms, Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming.

3. **Overview of Programming: (10 Lectures)**
   Structure of a Python Program, Elements of Python

4. **Introduction to Python: (15 Lectures)**
   Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators(Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator)

5. **Creating Python Programs: (15 Lectures)**
   Input and Output Statements, Control statements (Branching, Looping, Conditional Statement, Exit function, Difference between break, continue and pass.),
   Defining Functions, default arguments

Reference Books

- T. Budd, Exploring Python, TMH, 1st Ed, 2011
- Python Tutorial/Documentation www.python.or 2015
- Allen Downey, Jeffrey Elkner, Chris Meyers , How to think like a computer scientist : learning with Python , Freely available online.2012
- http://docs.python.org/3/tutorial/index.html
- http://interactivepython.org/courselib/static/pythonds

DISCIPLINE SPECFIC ELECTIVE LAB- DSE 1 & DSE 2 LAB

Marks : Pr (ESE: 3Hrs)=50	**Pass Marks: Pr (ESE) = 20**

Instruction to Question Setter for
Practical Examination (ESE)

*There will be **two** group of questions in Practical Examination of 3Hrs.. **Group A having questions from DISCIPLINE SPECFIC ELECTIVE PAPER 1(DSE1)** will contain four questions, out of which any two are to be answered **Group B having questions from DISCIPLINE SPECFIC ELECTIVE PAPER 2 (DSE2)** will contain four questions, out of which any two is to be answered.*

***Lab:** Student have to Answer the given questions on Answer booklet and execute the answered programs/steps in computer with standard output.*

***Assignment:** The Assignment should be hand written in A4 size paper. First three pages (i.e. front page + acknowledgment + index) & Bibliography may be printout.*

Marks Distribution:

LAB(Experiment + Answer script)	*= 30 marks*
Assignment	*=10 marks*
Viva-voce	*=10 marks*

GROUP-A INFORMATION SECURITY & CYBER LAW 60 Lectures

1. Demonstrate the use of Network tools: ping, ipconfig, ifconfig, tracert, arp, netstat, whois
2. Use of Password cracking tools : John the Ripper, Ophcrack. Verify the strength of passwords using these tools.
3. Perform encryption and decryption of Caesar cipher. Write a script for performing these operations.
4. Perform encryption and decryption of a Rail fence cipher. Write a script for performing these operations
5. Use nmap/zenmap to analyse a remote machine.
6. Use Burp proxy to capture and modify the message.
7. Demonstrate sending of a protected word document.
8. Demonstrate sending of a digitally signed document.
9. Demonstrate sending of a protected worksheet.
10. Demonstrate use of steganography tools.
11. Demonstrate use of gpg utility for signing and encrypting purposes.

GROUP-B PROGRAMMING IN PYTHON 60 Lectures

SECTION-I (SIMPLE PROGRAMS)

1. Write a menu driven program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon users' choice.
2. WAP to calculate total marks, percentage, and grade of a student. Marks obtained in each of the three subjects are to be input by the user. Assign grades according to the following criteria :
    a. Grade A: Percentage >=80
    b. Grade B: Percentage>=70 and
    c. <80 Grade C: Percentage>=60
    d. and <70 Grade D:
    e. Percentage>=40 and <60 Grade
    f. Percentage<40
3. Write a menu-driven program, using user-defined functions to find the area of rectangle, square, circle and triangle by accepting suitable input parameter's from user.
4. WAP to display the first n terms of Fibonacci series.
5. WAP to find factorial of the given number.
6. WAP to find sum of the following series for n terms: 1 – 2/2! + 3/3! - - - - - n/n!
7. WAP to calculate the sum and product of two compatible matrices.

SECTION-II (VISUAL PYTHON)

All the programs should be written using user defined functions, wherever possible.

1. Write a menu-driven program to create mathematical 3D objects
    i. curve
    ii. sphere
    iii. cone
    iv. arrow
    v. ring
    vi. cylinder
2. WAP to read n integers and display them as a histogram.
3. WAP to display sine, cosine, polynomial and exponential curves.
4. WAP to plot a graph of people with pulse rate p vs. height h. The values of p and h are to be entered by the user.
5. WAP to calculate the mass m in a chemical reaction. The mass m (in gms) disintegrates according to the formula m=60/(t+2), where t is the time in hours. Sketch a graph for t vs. m, where t>=0.
6. A population of 1000 bacteria is introduced into a nutrient medium. The population p grows as follows:
    i. P(t) = (15000(1+t))/(15+ e)
    where the time t is measured in hours. WAP to determine the size of the population at given time t and plot a graph for P vs t for the specified time interval.
7. Input initial velocity and acceleration, and plot the following graphs depicting equations of motion:
    i. velocity wrt time (v=u+at)
    ii. distance wrt time (s=u*t+0.5*a*t*t)
    iii. distance wrt velocity (s=(v*v-u*u)/2*a)
8. WAP to show a ball bouncing between 2 walls. (Optional)

III. CORE COURSE -C 11: (Credits: Theory-04, Practicals-02)

Marks : 15 (MSE: 1Hr) + 60 (ESE: 3Hrs) =75	Pass Marks: Th (MSE +ESE) = 30

Instruction to Question Setter for
Mid Semester Examination (MSE):
*There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** three questions of five marks each, out of which any two are to answer.*

End Semester Examination (ESE):
*There will be **two** group of questions. **Group A is compulsory** and will contain two questions. **Question No.1 will be very short answer type** consisting of ten questions of 1 mark each. **Question No.2 will be short answer type** of 5 marks. **Group B will contain descriptive type** five questions of fifteen marks each, out of which any three are to answer.*

***Note:** There may be subdivisions in each question asked in Theory Examinations.*

INTERNET TECHNOLOGIES Theory: 60 Lectures

1. **Introduction to HTML, DHTML, XML, CSS (05 lectures)**

2. **JavaScript (15 lectures)**
   Data types, operators, functions, control structures, events and event handling.

3. **JDBC (10 lectures)**
   JDBC Fundamentals, Establishing Connectivity and working with connection interface, Working with statements, Creating and Executing SQL Statements, Working with Result Set Objects.

4. **JSP (20 lectures)**
   Introduction to Java Server Pages, HTTP and Servlet Basics, The Problem with Servlets, The Anatomy of a JSP Page, JSP Processing, JSP Application Design with MVC, Setting Up the JSP Environment, Implicit JSP Objects, Conditional Processing, Displaying Values, Using an expression to Set an Attribute, Declaring Variables and Methods, Error Handling and Debugging, Sharing Data Between JSP Pages, Requests, and Users, Database Access.

5. **Java Beans (10 lectures)**
   Java Beans Fundamentals, JAR files, Introspection, Developing a simple Bean, Connecting to DB

Reference Books:

- Ivan Bayross, Web Enabled Commercial Application Development Using Html, Dhtml,javascript, Perl Cgi , BPB Publications, 2009.
- Cay Horstmann, BIG Java, Wiley Publication , 3rd Edition., 2009 Herbert Schildt , Java 7, The Complete Reference, , 8th Edition, 2009.
- Jim Keogh ,The Complete Reference J2EE, TMH, , 2002.
- O'Reilly , Java Server Pages, Hans Bergsten, Third Edition, 2003.

IV. CORE COURSE -C 12: (Credits: Theory-04, Practicals-02)

Marks : 15 (MSE: 1Hr) + 60 (ESE: 3Hrs) =75 **Pass Marks: Th (MSE +ESE) = 30**

Instruction to Question Setter for
Mid Semester Examination (MSE):
*There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** three questions of five marks each, out of which any two are to answer.*

End Semester Examination (ESE):
*There will be **two** group of questions. **Group A is compulsory** and will contain two questions. **Question No.1 will be very short answer type** consisting of ten questions of 1 mark each. **Question No.2 will be short answer type** of 5 marks. **Group B will contain descriptive type** five questions of fifteen marks each, out of which any three are to answer.*

***Note:** There may be subdivisions in each question asked in Theory Examinations.*

SOFTWARE ENGINEERING Theory: 60 Lectures

1. **PRODUCT and PROCESS (10 Lectures)**
   Software Characteristics, S/w Applications and S/w Crisis, Process, Methods, and Tools and Generic View of S/w Engineering, S/w Process Models, Linear Sequential Model, Prototyping Model, RAD Model, Evolutionary/Incremental Model, Spiral Model and Agile Model.

2. **PROJECT MANAGEMENT CONCEPTS (10 Lectures)**
   People (Player, Leader & Team), Product (S/w scope & Problem decomposition), Process (Melding Product/Process & Process Decomposition) and Project (W5HH Principle and Critical Practices).

3. **SOFTWARE PROJECT PLANNING (10 Lectures)**
   SRS, Analysis, Control flow model (Data dictionary, DFDs), Data Modeling (ERDs), Estimating, Planning, S/w Scope (Information for Scope/Feasibility), Resources (Human Resources, Reusable S/w and Environmental Resources), S/w Project Estimation and Decomposition Techniques (S/w Sizing, Problem-Based, LOC-Based, FP-Based and Process-Based Estimation) COCOMO II model.

4. **PROJECT SCHEDULING AND TRACKING (09 Lectures)**
   Basic Concepts & Principles, Relationship Between People and Effort, Defining a Task Network (PERT, CPM), Scheduling (Timeline Charts and Tracking the Schedule).

5. **DESIGN CONCEPTS AND PRINCIPLES (06 Lectures)**
   S/w Design Engineering, Design Process, Design Principles, Design Concepts (Abstraction, Refinement, Modularity, S/w Architecture, Information Hiding), Effective Modular Design (Functional Independence, Cohesion, Coupling)

6. **SOFTWARE TESTING TECHNIQUES and STRATEGIES (09 Lectures)**
   Objectives, Principles & Testability, Test Case Design, White-Box, Basis Path, Control Structure Testing (Condition, Data Flow & Loop Testing), Black-Box, Boundary Value Analysis, Architectures, and Applications, A Strategic Approach to S/w Testing, Verification and Validation, Organizing for S/w Testing, S/w Testing Strategy, Unit Testing, Integration Testing (Top-down, Bottom-up, Regression, Smoke) and System Testing.

7. **Quality and Metrics** **(06 Lectures)**
Quality concepts(what is quality, ISO 9126 quality factors), Factors That Affect Quality, Metrics for Software Quality (Measuring Quality and Defect Removal Efficiency), Process metrics, Project metrics SQA (Six sigma for software engineering).

Text Books:

- Roger S. Pressman - Software Engineering A Practitioner's Approach, Mc Graw Hill.

Reference Books:

- Ali Behforoz and F. J. Hudson - Software Engineering Fundamentals, Oxford University Press.
- Alan Dennis and B. H. Wixom – Systems Analysis and Design An Applied Approach, John Wiley.
- Carlo Ghezzi, M. Jazayeri and D. Mandrioli - Fundamentals of Software Engineering, PHI.

INFORMATION TECHNOLOGY PRACTICAL- C 11 & C12 LAB

Marks : Pr (ESE: 3Hrs)=50	**Pass Marks: Pr (ESE) = 20**

Instruction to Question Setter for
Practical Examination (ESE)
*There will be **two** group of questions in Practical Examination of 3Hrs.. **Group A having questions from CORE PAPER 11 (CC11)** will contain four questions, out of which any two are to be answered **Group B having questions from CORE PAPER 12 (CC12)** will contain four questions, out of which any two is to be answered.*

***Lab:** Student have to Answer the given questions on Answer booklet and execute the answered programs/steps in computer with standard output.*
***Assignment:** The Assignment should be hand written in A4 size paper. First three pages (i.e. front page + acknowledgment + index) & Bibliography may be printout.*
Marks Distribution:
LAB(Experiment + Answer script) = 30 marks
Assignment =10 marks
Viva-voce =10 marks

GROUP-A INTERNET TECHNOLOGIES 60 Lectures

- Web page creation with HTML tags, CSS and XML
- Adding lists, tables, pictures etc to web pages
- Event driven programming using JS
-

GROUP-B I.T. PRACTICAL- C 12 LAB 60 Lectures

S.No.	Practical Title
1	Problem Statement: Process Model
2	Requirement Analysis: Creating a Data Flow, Data Dictionary, , Use Cases
3	Project Management: Computing FP, Effort, Schedule, Risk Table, Timeline chart
4	Design Engineering: Architectural Design, Data Design, Component Level Design
5	Testing: Basis Path Testing

Sample Projects:

1. **Criminal Record Management**: Implement a criminal record management system for jailers, police officers and CBI officers
2. **DTC Route Information:** Online information about the bus routes and their frequency and fares
3. **Car Pooling**: To maintain a web-based intranet application that enables the corporate employees within an organization to avail the facility of carpooling effectively.
4. Patient Appointment and Prescription Management System
5. Organized Retail Shopping Management Software

SEMESTER VI 4 Papers

Total 100 x 4 = 400 Marks

I. I.T. SPECIFIC (DSE 3): (Credits: Theory-04, Practicals-02)

Marks : 15 (MSE: 1Hr) + 60 (ESE: 3Hrs) + 25 (Pr 3Hrs)=100	Pass Marks: Th (MSE +ESE) = 30 + Pr ESE =10

Instruction to Question Setter for
Mid Semester Examination (MSE):

*There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** three questions of five marks each, out of which any two are to answer.*

End Semester Examination (ESE):

*There will be **two** group of questions. **Group A is compulsory** and will contain two questions. **Question No.1 will be very short answer type** consisting of ten questions of 1 mark each. **Question No.2 will be short answer type** of 5 marks. **Group B will contain descriptive type** five questions of fifteen marks each, out of which any three are to answer.*

***Note:** There may be subdivisions in each question asked in Theory Examinations.*

CLOUD COMPUTING Theory: 60 Lectures

1. **Overview of Computing Paradigm (08 lectures)**
   Recent trends in Computing: Grid Computing, Cluster Computing, Distributed Computing, Utility Computing, Cloud Computing,

2. **Introduction to Cloud Computing (07 lectures)**
   Introduction to Cloud Computing, History of Cloud Computing, Cloud service providers, Benefits, and limitations of Cloud Computing,

3. **Cloud Computing Architecture (20 lectures)**
   Comparison with traditional computing architecture (client/server), Services provided at various levels, Service Models- Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service(SaaS), How Cloud Computing Works, Deployment Models- Public cloud, Private cloud, Hybrid cloud, Community cloud, Case study of NIST architecture.

4. **Case Studies** **(13 lectures)**
   Case study of Service model using Google App Engine, Microsoft Azure, Amazon EC2 , Eucalyptus.

5. **Service Management in Cloud Computing** **(07 lectures)**
   Service Level Agreements (SLAs), Billing & Accounting, Comparing Scaling Hardware: Traditional vs. Cloud, Economics of scaling.

6. **Cloud Security** **(5 lectures)**
   Infrastructure Security- Network level security, Host level security, Application-level security, Data security and Storage- Data privacy and security Issues, Jurisdictional issues raised by Data location, Authentication in cloud computing.

Reference Books

- Cloud Computing Bible, Barrie Sosinsky, Wiley-India, 2010
- Cloud Computing: Principles and Paradigms, Editors: Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Wile, 2011
- Cloud Computing: Principles, Systems and Applications, Editors: Nikos Antonopoulos, Lee Gillam, Springer, 2012
- Cloud Security: A Comprehensive Guide to Secure Cloud Computing, Ronald L. Krutz, Russell Dean Vines, Wiley-India, 2010
- Gautam Shroff, Enterprise Cloud Computing Technology Architecture Applications , Adobe Reader ebooks available from eBooks.com,2010
- Toby Velte, Anthony Velte, Robert Elsenpeter, Cloud Computing, A Practical Approach, McGraw Hills, 2010.
- Dimitris N. Chorafas, Cloud Computing Strategies ,CRC Press, 2010

INFORMATION TECHNOLOGY PRACTICAL- DSE 3 LAB 60 Lectures

Marks : Pr (ESE: 3Hrs)=25	**Pass Marks: Pr (ESE) = 10**

Instruction to Question Setter for
Practical Examination (ESE)

*There will be **four** questions in Practical Examination of 3Hrs. from **CORE PAPER 11(CC11)** out of which any two are to be answered.*

***Lab:** Student have to Answer the given questions on Answer booklet and execute the answered programs/steps in computer with standard output.*

***Assignment:** The Assignment should be hand written in A4 size paper. First three pages (i.e. front page + acknowledgment + index) & Bibliography may be printout.*

Marks Distribution:

LAB (Experiment + Answer script)	*= 15 marks*
Assignment	*=05 marks*
Viva-voce	*=05 marks*

CLOUD COMPUTING

1. Create virtual machines that access different programs on same platform.
2. Create virtual machines that access different programs on different platforms.
3. Working on tools used in cloud computing online- a) Storage b) Sharing of data c) manage your calendar, to-do lists, d) a document editing tool
4. Exploring Google cloud
5. Exploring microsoft cloud
6. Exploring amazon cloud

II. I.T. SPECIFIC (DSE 4): (Credits: Theory-06)

Marks : 50 (Project) + 50 (Viva) =100	Pass Marks ESE = 40

Guidelines to Examiners for
End Semester Examination (ESE):

Evaluation of project dissertation work may be as per the following guidelines:

Project model (if any) and the Project record notebook = 50 marks

Project presentation and viva-voce =50 marks

Overall project dissertation may be evaluated under the following heads:

- *Motivation for the choice of topic*
- *Project dissertation design*
- *Methodology and Content depth*
- *Results and Discussion*
- *Future Scope & References*
- *Presentation style*
- *Viva-voce*

PROJECT WORK/ DISSERTATION

Student alone or in a group of not more than five, shall undertake one Project Dissertation approved by the Subject Teacher/H.O.D. of the Department/College concerned. The progress of the Project Dissertation shall be monitored by the faculty members at regular intervals.

1. The students will be allowed to work on any project based on the concepts studied in core / elective or skill based elective courses.
2. Student have to do a complete project, the technologies (front end + back end) should be chosen among the syllabus, where the front end will be designing & coding portion and back end will be database portion.
3. Student have to run the code as a live project and submit CD containing supporting software, frontend and backend coding in proper format.

III. CORE COURSE -C 13: (Credits: Theory-04, Practicals-02)

Marks : 15 (MSE: 1Hr) + 60 (ESE: 3Hrs) =75 **Pass Marks: Th (MSE +ESE) = 30**

Instruction to Question Setter for
Mid Semester Examination (MSE):
*There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. G**roup B will contain descriptive type** three questions of five marks each, out of which any two are to answer.*

End Semester Examination (ESE):
*There will be **two** group of questions. **Group A is compulsory** and will contain two questions. **Question No.1 will be very short answer type** consisting of ten questions of 1 mark each. **Question No.2 will be short answer type** of 5 marks. **Group B will contain descriptive type** five questions of fifteen marks each, out of which any three are to answer.*

***Note:** There may be subdivisions in each question asked in Theory Examinations.*

ARTIFICIAL INTELLIGENCE & ANDROID PROGRAMMING

Theory: 60 Lectures

ARTIFICIAL INTELLIGENCE

1. **Introduction to AI** **(08 Lectures)**
   AI technique, importance, Task domains of Artificial intelligence, Intelligent System.
2. **State Space Search** **(10 Lectures)**
   Defining the problem as a State Space search, Strategies for State Space Search, Implementation for Graph Search, Production System-Characteristics, Components, Advantages, Applicability, Learning - Definition and classification.
3. **Knowledge Representation** **(10 Lectures.)**
   Representation and mappings, approaches to knowledge representation, Knowledge representation using Predicate logic, Representing simple facts in logic, Representing instance and ISA relationships, Knowledge Representation using Rules- Procedural Versus Declarative Knowledge and knowledge Acquisition.
4. **Heuristic Search** **(07 Lectures)**
   Generate and Test, Heuristic Search Techniques (Hill-climbing Heuristic, Best-first Search), Admissibility, Monotonicity, and Informedness and Heuristic Classification.
5. **Expert Systems** **(05 Lectures)**
   Introduction, Features, characteristics, Architecture, goals, advantages, Difference between Expert system and conventional method, Stages in the Development of an Expert System.
6. **Fuzzy Systems** **(05 Lectures)**
   Introduction, Crisp Sets, Fuzzy sets, Basic terms and operation, Fuzzy Relations, Arithmetic Operations of Fuzzy Numbers, Linguistic Descriptions, Fuzzification.
7. **Artificial Neural Networks** **05 Lectures)**
   Introduction Artificial Neural Networks Architecture, Features of Artificial Neural Networks, Back propagation Training Algorithms.
8. **R-Programming** **(10 Lectures)**
   Introduction: Overview and History of R, Getting Help, Data Types, Subsetting, Vectorized Operations, Reading and Writing Data. Control Structures, Functions.

ANDROID PROGRAMMING

1. **Introduction:** History of Android, Introduction to Android Operating Systems, Android Development Tools, Android Architecture.

(2Lectures)

2. **Overview of object oriented programming using Java:** OOPs Concepts: Inheritance, Polymorphism, Interfaces, Abstract class, Threads, Overloading and Overriding, Java Virtual Machine.

(3Lectures)

3. **Development Tools:** Installing and using Eclipse with ADT plug-in, Installing Virtual machine for Android sandwich/Jelly bean (Emulator), configuring the installed tools, creating a android project
   – Hello Word, run on emulator, Deploy it on USB-connected Android device.

(4Lectures)

4. **User Interface Architecture:** Application context, intents, Activity life cycle, multiple screen sizes.

(2Lectures)

5. **User Interface Design:** Form widgets, Text Fields, Layouts, Button control, toggle buttons, Spinners (Combo boxes), Images, Menu, Dialog.

(2Lectures)

6. **Database:** Understanding of SQLite database, connecting with the database.

(2Lectures)

Book Recommended:

- N. P. Padhy – Artificial Intelligence and Intelligent Systems, Oxford University Press.
- Patterson, Dan W. – Introduction to Artificial Intelligence and Expert Systems, PHI.
- W. N. Venables, D. M. Smith, An Introduction to R, R-core team,2015
- Android application development for java programmers. By James C. Sheusi. Publisher: Cengage Learning, 2013.

ONLINE READING / SUPPORTING MATERIAL:

- http://www.developer.android.com
- http://developer.android.com/about/versions/index.html
- http://developer.android.com/training/basics/firstapp/index.html
- http://docs.oracle.com/javase/tutorial/index.htm (Available in the form of free downloadable ebooks also).
- http://developer.android.com/guide/components/activities.html
- http://developer.android.com/guide/components/fundamentals.html
- http://developer.android.com/guide/components/intents-filters.html.
- http://developer.android.com/training/multiscreen/screensizes.html
- http://developer.android.com/guide/topics/ui/controls.html
- http://developer.android.com/guide/topics/ui/declaring-layout.html
- http://developer.android.com/training/basics/data-storage/databases.html

---

IV. CORE COURSE -C 14: (Credits: Theory-04, Practicals-02)

Marks : 15 (MSE: 1Hr) + 60 (ESE: 3Hrs) =75 **Pass Marks: Th (MSE +ESE) = 30**

Instruction to Question Setter for
Mid Semester Examination (MSE):

*There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive** type three questions of five marks each, out of which any two are to answer.*

End Semester Examination (ESE):

*There will be **two** group of questions. **Group A is compulsory** and will contain two questions. **Question No.1 will be very short answer type** consisting of ten questions of 1 mark each. **Question No.2 will be short answer type** of 5 marks. Group B will contain descriptive type five questions of fifteen marks each, out of which any three are to answer.*

***Note:** There may be subdivisions in each question asked in Theory Examinations.*

COMPUTER GRAPHICS WITH FLASH **Theory: 60 Lectures**

1. **Introduction to Computer Graphics and its Applications (03 Lectures)**

2. **Overview of Graphics Systems (08 Lectures)**
   CRT:- Refresh CRT, Raster Scan Display, Color CRT
   Flat Panel Displays:- Plasma Panel, LED, LCD,
   Input devices:- Mouse, Track ball & space ball, joysticks, Data gloves, digitizers, image Scanners, touch panels, light pens, voice systems.
   Hard copy Devices

3. **Graphics Software (02 Lectures)**
   Classification of Graphics Software
   Coordinate representations And Homogeneous Coordinates
   Software standards.

4. **Output Primitives (08 Lectures)**
   Points and Lines.
   Line drawing algorithms: DDA Algorithms, Bresenham's Algorithm
   Circle generation algorithm
   Curves: Conic Section, Polynomial and spline curves

5. **Filled Area Primitives 04 Lectures)**
   Scan-line polygon fill algorithm,
   Flood fill algorithm.

6. **Two-Dimensional Geometric Transformations (06 Lectures)**
   Translation, Rotation, Scaling, Composite Transformation, Reflection & Shear.

7. **Two-Dimensional Viewing** **(06 Lectures)**
   Viewing Coordinates & window coordinates
   Line Clipping: Cohen-Sutherland line clipping algorithm.

8. **Three-Dimensional Geometric Transformations** **(07 Lectures)**
   Translation, Rotation, Scaling, Composite Transformation,

9. **Visible Surface Detection methods** **(06 Lectures)**
   Classification of methods.
   Backface Detection: - Depth Buffer methods, Scan-line method.
   Visible face detection
   Curve Surfaces: Surface Contour Plots.

10. **Introduction to Computer Animation** **(10 Lectures)**
    Tweeing, Interpolation
    Morphing, Warping, Color Dissolving.
    Multimedia : Introduction.

Text Book:

- Donald Hearn, M. Pauline Baker – Computer Graphics, PHI

Reference Book:

- D.P. Mukherjee – Fundamentals of Computer Graphics and Multimedia, PHI.

INFORMATION TECHNOLOGY PRACTICAL- C 13 & C 14 LAB

Marks : Pr (ESE: 3Hrs)=50	**Pass Marks: Pr (ESE) = 20**

Instruction to Question Setter for

Practical Examination (ESE)

*There will be **two** group of questions in Practical Examination of 3Hrs.. **Group A having questions from CORE PAPER 13 (CC13)** will contain four questions, out of which any two are to be answered **Group B having questions from CORE PAPER 14 (CC14)** will contain two questions, out of which any one is to be answered.*

***Lab:** Student have to Answer the given questions on Answer booklet and execute the answered programs/steps in computer with standard output.*

***Assignment:** The Assignment should be hand written in A4 size paper. First three pages (i.e. front page + acknowledgment + index) & Bibliography may be printout.*

Marks Distribution:

LAB(Experiment + Answer script)	*= 30 marks*
Assignment	*=10 marks*
Viva-voce	*=10 marks*

GROUP-A 60 Lectures

ARTIFICIAL INTELLIGENCE

1. Write a prolog program to calculate the sum of two numbers.
2. Write a prolog program to find the maximum of two numbers.
3. Write a prolog program to find the n^{th} Fibonacci series.
4. Write a prolog program to find the factorial of a number.
5. Write a prolog program to implement GCD of 2 numbers.
6. Write a prolog program to implement palindrome.
7. Write a prolog program to implement reverse (list, reversed list) that reverses list.
8. Write a prolog program to implement append for two list.
9. Write a Prolog program to implement palindrome (List).

SOFTWARE LAB BASED ON ANDROID:

1. Create ―Hello World application. That will display ―Hello World in the middle of the screen in the emulator. Also display ―Hello World in the middle of the screen in the Android Phone.
2. Create an application with login module. (Check username and password).
3. Create spinner with strings taken from resource folder (res >> value folder) and on changing the spinner value, Image will change.
4. Create a menu with 5 options and and selected option should appear in text box.
5. Create a list of all courses in your college and on selecting a particular course teacher-in-charge of that course should appear at the bottom of the screen.
6. Create an application with three option buttons, on selecting a button colour of the screen will change.
7. Create and Login application as above. On successful login, pop up the message.
8. Create an application to Create, Insert, update, Delete and retrieve operation on the database.

GROUP-B 60 Lectures

1. Write a program to implement Bresenham‘s line drawing algorithm.
2. Write a program to implement mid-point circle drawing algorithm.
3. Write a program to clip a line using Cohen and Sutherland line clipping algorithm.
4. Write a program to clip a polygon using Sutherland Hodgeman algorithm.
5. Write a program to apply various 2D transformations on a 2D object (use homogenous coordinates).
6. Write a program to apply various 3D transformations on a 3D object and then apply parallel and perspective projection on it.
7. Write a program to draw Hermite/Bezier curve.

SAMPLE CALCULATION FOR SGPA & CGPA FOR UNDERGRADUATE
'B.Sc./B.A./B.Com/B.Voc. Honours' PROGRAMME

Distribution of Credits Semester wise for Undergraduate Honours Courses

Table B-1: UG (B.A./ B.Sc./B.Com. /B.Voc Hons. Programme)

Semester wise distribution of 164 Credits

	CC	AECC	GE-A	GE-B	SEC	DSE	Total credits
Semester I	12	02	06	06			20
Semester II	12	02	06	06			20
Semester III	18		06	06	02		26
Semester IV	18		06	06	02		26
Semester V	12					12	24
Semester VI	12					12	24
	84	**04**	**24**	**24**	**04**	**24**	**140 + 24 = 164**

CC=Core Course; AECC=Ability Enhancement Compulsory Course; GE=Generic Elective; SEC=Skill Enhancement Course;
DSE=Discipline Specific Elective

Table B-2: Sample calculation for SGPA for B.Sc./B.A./B.Com/B.Voc. Honours Programme

Course	Credit	Grade Letter	Grade Point	Credit Point (Credit X Grade)	SGPA (Credit Point/Credit)
Semester I					
C-1	06	A	8	48	
C-2	06	B+	7	42	
AECC-1	02	B	6	12	
GE-1A	06	B	6	36	
GE-1B	06	B+	7	42	
Total	26			180	**6.92 (180 / 26)**
Semester II					
C-3	06	B	6	36	
C-4	06	C	5	30	
AECC-2	02	B+	7	14	
GE-2A	06	A+	9	54	
GE-2B	06	B+	7	42	
Total	**26**			**176**	**6.76 (176 / 26)**
Semester III					
C-5	06	A+	9	54	
C-6	06	0	10	60	
C-7	06	A	8	48	
SEC-1	02	A	8	16	
GE-3A	06	0	10	60	
GE-3B	06	B+	7	42	
Total	**32**			**280**	**8.75 (280 / 32)**
Semester IV					
C-8	06	B	6	36	
C-9	06	A+	9	54	
C-10	06	B	6	36	
SEC-2	02	A+	9	18	
GE-4A	06	A	8	48	
GE-4B	06	B+	7	42	
Total	**32**			**234**	**7.31 (234 / 32)**
Semester V					
C-11	06	B	6	36	
C-12	06	B+	7	42	
DSE-1	06	0	10	60	
DSE-2	06	A	8	48	
Total	**24**			**186**	**7.75 (186 / 24)**
Semester VI					
C-13	06	A+	9	54	
C-14	06	A	8	48	
DSE-3	06	B+	7	42	
DSE-4	06	A	8	48	

Total	**24**			**192**	**8.0 (192 / 24)**
CGPA					
Grand Total	**140+24=164**			**1248**	**7.61 (1248 / 164)**

Table B-3: Sample calculation for CGPA for B.Sc./B.A./B.Com/B.Voc. Honours Programme

Semester I	Semester II	Semester III	Semester IV	Semester V	Semester VI
Credit:26; SGPA:6.92	Credit:26; SGPA: 6.76	Credit:32; SGPA: 8.75	Credit:32; SGPA: 7.31	Credit:24; SGPA: 7.75	Credit:24; SGPA: 8.0

Thus CGPA= (26x6.92+26x6.76+32x8.75+32x7.31+24x7.75+24x8.0)/164=7.61

MARKS DISTRIBUTION FOR EXAMINATIONS AND FORMAT OF QUESTION PAPERS

Marks Distribution of Mid Semester Theory Examinations:

Table No. C1: Marks distribution of Theory Examinations of Mid Semester

Topic	Code	Full Marks	Pass Marks	Time	Group-A (Very short answer type Compulsory Questions) No. of Questions x Marks = F.M.	Group-B (Descriptive Questions with Choices) No. of Questions x Marks = F.M.	Total No. of Questions to Set	
							Group A	Group B
Mid Sem*	T15	15	---	1 Hr	5 x1 =5	2 (out of 3) x5 =10	5	3
	T25	25	---	1 Hr	5 x1 =5	4 (out of 6) x5 =20	5	6

Marks Distribution of End Semester Theory Examinations:

Table No. C2: Marks distribution of Theory Examinations of End Semester

Topic	Code	Full Marks	Pass Marks including Mid Sem	Time	Group-A# (Very short answer type Compulsory Questions) No. of Questions x Marks = F.M.	Group-B (Descriptive Questions with Choices) No. of Questions x Marks = F.M.	Total No. of Questions to Set	
							Group A#	Group B
End Sem	T60	60	30	3 Hrs	Q.No.1 (10x1) + 1x5 =15	3 (out of 5) x15 =45	2	5
	T75	75	40	3 Hrs	Q.No.1 (10x1) + 1x5 =15	4 (out of 6) x15 =60	2	6
	T100	100	40	3 Hrs	Q.No.1 (10x1) + 2x5 =20	4 (out of 6) x20 =80	3	6
	T50 +T50	50X2=100	20	3 Hrs	2 x5 =10	2 (out of 3) x20 =40	2	3

 # Question No.1 in Group-A carries 10 very short answer type 1 Mark Questions.

Marks Distribution of Mid/End Semester Practical Examinations:

Table No. C3: Marks distribution of Practical Examinations of End Semester

Topic	Code	Full Marks	Pass Marks	Time	Distribution of Marks			Total No. of Questions to Set
					Experiment	Record	Viva	
End Sem	P25	25	10	3 Hrs	15	5	5	
	P50	50	20	3 Hrs	30	10	10	Pr. with components of both papers
	P75	75	30	3 Hrs	45	15	15	Pr. with components of all three papers
	P100	100	40	3 Hrs	60	20	20	Pr. with components of all four papers

Abbreviations : T= Theory Examination, **P=** Practical Examination.

Mid Sem* : There will be 15 Marks Theory Examination in Practical Subjects and 25 Marks Theory Examination in Non-Practical Subjects/ Papers. 25 Marks Theory Examination may include 10 Marks questions from Assignment/ Project/ Tutorial where ever applicable.

Note : There may be subdivisions in each question asked in Theory Examinations.

FORMAT OF QUESTION PAPER FOR MID SEM EXAMINATION

OF

SUBJECTS WITH PRACTICAL

Radha Govind University, Ramgarh

Mid Sem No. Exam Year

Subject/ Code

F.M. =15 Time=1Hr.

General Instructions:
समान्य निर्देश :

i. **Group A** carries very short answer type compulsory questions.
(खंड 'A' में अत्यतं लघु उत्तरीय अनिवार्य प्रश्न हैं।)
ii. **Answer 2 out of 3** subjective/ descriptive questions given in Group B.
(खंड 'B' के तीन में से किन्हीं दो विषयनिष्ठ/ वर्णनात्मक प्रश्नों के उत्तर दें।)
iii. Answer in your own words as far as practicable.
(यथासंभव अपने शब्दों में उत्तर दें।)
iv. Answer all sub parts of a question at one place.
(एक प्रश्न के सभी भागों के उत्तर एक साथ लिखें।)
v. Numbers in right indicate full marks of the question.
(पूणांर्क दायीं आरे लिखे गये हैं।)

Group A

1. ..... **[5x1=5]**
2. .....
3. .....
4. .....
5. .....

Group B

6. ..... **[5]**
7. ..... **[5]**
8. ..... **[5]**

Note: There may be subdivisions in each question asked in Theory Examination.

FORMAT OF QUESTION PAPER FOR MID SEM EXAMINATION

OF

SUBJECTS WITHOUT PRACTICAL

Radha Govind University, Ramgarh

Mid Sem No. Exam Year

Subject/ Code

F.M. =25 Time=1Hr.

General Instructions:
समान्य निर्देश :

i. **Group A** carries very short answer type compulsory questions.
(खंड ' **A** ' में अत्यतं लघु उत्तरीय अनिवार्य प्रश्न हैं।)
ii. **Answer 4 out of 6** subjective/ descriptive questions given in **Group B**.
(खंड 'B' के छः में से किन्ही चार विषयनिष्ठ/ वर्णनात्मक प्रश्नों के उत्तर दें।)
iii. Answer in your own words as far as practicable.
(यथासंभव अपने शब्दों में उत्तर दें।)
iv. Answer all sub parts of a question at one place.
(एक प्रश्न के सभी भागों के उत्तर एक साथ लिखें।)
v. Numbers in right indicate full marks of the question.
(पूणांर्क दायीं आरे लिखे गये हैं।)

Group A

1. ..... [5x1=5]
2. .....
3. .....
4. .....
5. .....

Group B

6. ..... [5]
7. ..... [5]
8. ..... [5]
9. ..... [5]
10. ..... [5]
11. ..... [5]

Note: There may be subdivisions in each question asked in Theory Examination.

FORMAT OF QUESTION PAPER FOR END SEM EXAMINATION
OF
SUBJECTS WITH PRACTICAL

Radha Govind University, Ramgarh

End Sem No. Exam Year

Subject/ Code

F.M. =60 **P.M.**=30 (Including Mid Sem) **Time**=3Hrs.

General Instructions:
i. **Group A** carries very short answer type **compulsory** questions.
ii. **Answer 3 out of 5** subjective/ descriptive questions given in **Group B**.
(खडं 'B' के पाँच में से किन्हीं तीन विषयनिष्ठ/ वर्णनात्मक प्रश्नों के उत्तर दंो।)
iii. Answer in your own words as far as practicable.
(यथासंभव अपने शब्दों में उत्तर दंो।)
iv. Answer all sub parts of a question at one place.
(एक प्रश्न के सभी भागों के उत्तर एक साथ लिखें।)
v. Numbers in right indicate full marks of the question.
(पूणांर्क दायीं आरे लिखे गये हैं।)

Group A

1. [10x1=10]
   i. .....
   ii. .....
   iii. .....
   iv. .....
   v. .....
   vi. .....
   vii. .....
   viii. .....
   ix. .....
   x. .....
2. ..... [5]

Group B

3. ..... [15]
4. ..... [15]
5. ..... [15]
6. ..... [15]
7. ..... [15]

Note: There may be subdivisions in each question asked in Theory Examination.

FORMAT OF QUESTION PAPER FOR END SEM EXAMINATION
OF
SUBJECTS WITHOUT PRACTICAL

Radha Govind University, Ramgarh

End Sem No. Exam Year

Subject/ Code

F.M. =75 **P.M.**=40 (Including Mid Sem) **Time**=3Hrs.

General Instructions:

i. **Group A** carries very short answer type **compulsory** questions.
ii. **Answer 4 out of 6** subjective/ descriptive questions given in **Group B**.
(खडं 'B' के पाँच में से किन्हीं तीन विषयनिष्ठ/ वर्णनात्मक प्रश्नों के उत्तर दंो।)
iii. Answer in your own words as far as practicable.
(यथासंभव अपने शब्दों में उत्तर दंो।)
iv. Answer all sub parts of a question at one place.
(एक प्रश्न के सभी भागों के उत्तर एक साथ लिखें।)
v. Numbers in right indicate full marks of the question.
(पूणांर्क दायीं आरे लिखे गये हैं।)

Group A

1. [10x1=10]
   i. .....
   ii. .....
   iii. .....
   iv. .....
   v. .....
   vi. .....
   vii. .....
   viii. .....
   ix. .....
   x. .....
2. ..... [5]

Group B

3. ..... [15]
4. ..... [15]
5. ..... [15]
6. ..... [15]
7. ..... [15]
8. …… [15]

Note: There may be subdivisions in each question asked in Theory Examination.

FORMAT OF QUESTION PAPER FOR END SEM EXAMINATION
OF
GE, SEC, GENERAL & AECC HINDI/ ENGLISH COMMUNICATION

Radha Govind University, Ramgarh

End Sem No. Exam Year

Subject/ Code

F.M. =100 **P.M.**=40 **Time**=3Hrs.

General Instructions:

i. **Group A** carries very short answer type **compulsory** questions.
ii. **Answer 4 out of 6** subjective/ descriptive questions given in **Group B**.
(खडं 'B' के पाँच में से किन्हीं तीन विषयनिष्ठ/ वर्णनात्मक प्रश्नों के उत्तर दं।)
iii. Answer in your own words as far as practicable.
(यथासंभव अपने शब्दों में उत्तर दं।)
iv. Answer all sub parts of a question at one place.
(एक प्रश्न के सभी भागों के उत्तर एक साथ लिखें।)
v. Numbers in right indicate full marks of the question.
(पूणांर्क दायीं आरे लिखे गये हैं।)

Group A

1. [10x1=10]
   i. .....
   ii. .....
   iii. .....
   iv. .....
   v. .....
   vi. .....
   vii. .....
   viii. .....
   ix. .....
   x. .....
2. ..... [5]
3. …….. [5]

Group B

3. ..... [20]
4. ..... [20]
5. ..... [20]
6. ..... [20]
7. ..... [20]
8. …… [20]
9. …… [20]

Note: There may be subdivisions in each question asked in Theory Examination.