K. C. E. Society's
Moolji Jaitha College
An 'Autonomous College' Affiliated to
K.B.C. North Maharashtra University, Jalgaon.
NAAC Reaccredited Grade - A (CGPA : 3.15 - 3rd Cycle)
UGC honoured "College of Excellence" (2014-2019)
DST(FIST) Assisted College

KNOWLEDGE IS POWER
ESTD. 1945

के. सी. ई. सोसायटीचे
मूळजी जेठा महाविद्यालय
क.ब.चौ. उत्तर महाराष्ट्र विद्यापीठ, जळगाव संलग्नित
'स्वायत्त महाविद्यालय'
नॅकद्वारा पुनर्मानांकित श्रेणी – 'ए' (सी.जी.पी.ए. : ३.१५ – तिसरी फेरी)
विद्यापीठ अनुदान आयोगाद्वारा घोषित 'कॉलेज ऑफ एक्सलन्स' (२०१४-२०१९)
डी.एस.टी. (फीस्ट) अंतर्गत अर्थसहाय्य प्राप्त

Date :- 01/08/2023

NOTIFICATION

Sub :- CBCS Syllabi of B. Sc. in Comp. Scie (Sem. I & II)

Ref. :- Decision of the Academic Council at its meeting held on 26/07/2023.

The Syllabi of B. Sc. in Comp. Scie (First and Second Semesters) as per **NATIONAL EDUCATION POLICY - 2020** and approved by the Academic Council as referred above are hereby notified for implementation with effect from the academic year 2023-24.

Copy of the Syllabi Shall be downloaded from the College Website (www.kcesmjcollege.in)

Sd/-
Chairman,
Board of Studies

To :

1) The Head of the Dept., M. J. College, Jalgaon.
2) The office of the COE, M. J. College, Jalgaon.
3) The office of the Registrar, M. J. College, Jalgaon.

Near Samarth Colony, Jalgaon - 425 002. (Maharashtra, India) | Ph. : +91 257 - 2237363, 2234281 | e-mail : mjcollege@kces.in | Website : mjcollege.kces.in
समर्थ कॉलनी जवळ, जळगांव – ४२५ ००२. (महाराष्ट्र, भारत) । दूरध्वनी क्र. : +९१ २५७–२२३७३६३, २२३४२८१ । ई–मेलः mjcollege@kces.in । वेबसाईटः mjcollege.kces.in

Khandesh College Education Society's

Moolji Jaitha College, Jalgaon

An "Autonomous College"

Affiliated to

Kavayitri Bahinabai Chaudhari
North Maharashtra University, Jalgaon-425001

STRUCTURE AND SYLLABUS

B.Sc. Honours / Honours with Research (F.Y.B.Sc. Computer Science)

Under Choice Based Credit System (CBCS)
and
as per NEP-2020 Guidelines

[w.e.f. Academic Year: 2023-24]

Preface

The main aim of this course is to develop the technical skills of the candidate and make them experts in the process of using computers and other computer-related technologies. The course initially educates the candidates about all the basic fundamentals of the computer to strengthen their core so that they will find it easy to understand other complicated subjects that are there in the course.

Candidates with a graduate degree in computer science are getting a lot of job opportunities from different sectors. Businesses are using new advanced technologies for the smooth running of different operations, but with more advanced technology, different functions are becoming more sophisticated and complicated, this is when organizations need a computer science graduate to make this upgrading procedure simple and easy ensuring the smooth running of the business.Companies are hiring more computer science graduates in recent years to deal with the complex and complicated evolving of different technologies. A computer science graduate makes sure that all the computer facilities of the business are properly managed and handled by the workforce.

This course creates IT professionals who have done expertise in dealing with different technical problems. This course develops and upgrades the candidate's skills in different IT areas with term exams, practical learning, arranging summer internships for giving an IT workforce experience, and also organizing seminars with IT professionals so that the candidates can interact with the experts and clarify their doubts.

Programme Outcomes (PO) for B.Sc. Computer Science honours/ Honours with Research

Upon successful completion of the B.Sc. program, student will be able to:

PO No.	PO
1	Understand the basic concepts and fundamental principles related to various science branches
2	Aquaint the skills in handling scientific instruments and performing in laboratory experiments
3	Relate various scientific phenomena and their relevancies in the day-to-day life.
4	Analyse experimental data critically and systematically to draw the objective conclusions.
5	Develop various skills such as communication, leadership, teamwork, social, research etc., which will help in expressing ideas and views clearly
6	Develop interdisciplinary approach for providing better solutions and sustainable developments.

Programme Specific Outcome (PSO) for B.Sc. Computer Science Honours/Honours with Research:

After completion of this course, students are expected to:

PSO No.	PSO
1	Database Management System and store the data in adequate form.
2	Object oriented programming languages such as C++ , Java Programming.
3	Various web technologies used for website development.
4	Core concepts in computer science
5	Different front end framework tools
6	Latest technologies such as Node js, PowerBI etc.

Credit distribution structure for Three/ Four year Honors/ Honors with Research Degree Programme with Multiple Entry and Exit

Level	Sem	Major (Core) Subjects		Minor Subjects (MIN)	GE/ OE	VSC, SEC (VESC)	AEC, VEC, IKS	CC, FP, CEP, OJT/Int, RP	Cumulative Credits/Sem	Degree/ Cumulative Cr.
		Mandatory (DSC)	Elective (DSE)							
4.5	I	DSC-1 (2T) DSC-2 (2T) DSC-3 (2P)	—	MIN-1 (2T) MIN-2 (2P)	OE-1 (2T)	SEC-1 (2T) SEC-2 (1P)	AEC-1 (2T) (ENG) VEC-1 (2T) (ES) IKS (1T)	CC-1 (2)	22	UG Certificate 44
	II	DSC-4 (2T) DSC-5 (2T) (IKS) DSC-6 (2P)	...	MIN-3 (2T) MIN-4 (2P)	OE-2 (2T)	SEC-3 (2T) SEC-4 (1P)	AEC-2 (2T) (ENG) VEC-2 (2T) (CI) IKS (1T)	CC-2 (2)	22	
	Cum. Cr	12	...	8	4	6	4+4+2	4	44	
Exit option: Award of UG Certificate in Major with 44 credits and an additional 4 credits core NSQF course/ Internship OR Continue with Major and Minor.										
5.0	III	DSC-7 (2T) DSC-8 (2T) DSC-9 (2P) DSC-10 (2P)	...	MIN-5 (2T) MIN-6 (2P)	OE-3 (2T) OE-4 (2P)		AEC-3 (2T) (MIL)	CC-3 (2) CEP (2)	22	UG Diploma 88
	IV	DSC-11 (2T) DSC-12 (2T) DSC-13 (2P) DSC-14 (2P)	...	MIN-7 (2T) MIN-8 (2P)	OE- 5 (2T) OE-6 (2P)		AEC-4 (2T) (MIL)	CC-4 (2) FP (2)	22	
	Cum. Cr	28	...	16	10	6	8+4+2	8+2+2	88	
Exit option: Award of UG Diploma in Major and Minor with 88 credits and an additional 4 credits core NSQF course/ Internship OR Continue with Major and Minor.										
5.5	V	DSC-15 (2T) DSC-16 (2T) DSC-17 (2T) DSC-18 (2P) DSC-19 (2P)	DSE-1 (2T) A/B DSE-2 (2P) A/B	MIN-9 (2T/P)	...	VSC-1 (2T) VSC-2 (2P)	...	OJT/Int(2)	22	UG Degree 132
	VI	DSC-20 (2T) DSC-21 (2T) DSC-22 (2T) DSC-23 (2P) DSC-24 (2P)	DSE-3 (2T) A/B DSE-4 (2P) A/B	MIN-10(2T/P)	—	VSC-3 (2T) VSC-4 (2P)	...	OJT/Int(2)	22	
	Cum. Cr.	48	08	20	10	8+6	8+4+2	8+2+2+4	132	
Exit option: Award of UG Degree in Major with 132 credits OR Continue with Major and Minor										
6.0	VII	DSC-25 (4T) DSC-26 (4T) DSC-28 (4T) DSC-27 (2P)	DSE-5 (2T) A/B DSE-6(2P) A/B	RM (2T)	—	...	...	OJT/Int (2)	22	UG Honors Degree 176
	VIII	DSC-29 (4T) DSC-30 (4T) DSC-32 (4T) DSC-31 (2P)	DSE-7 (2T) A/B DSE-8(2P) A/B	RM (2T)	—	...	...	OJT/Int (2)	22	
	Cum. Cr.	76	16	20+4	10	8+6	8+4+2	8+2+2+8	176	
Four Year UG Honors Degree in Major and Minor with 176 credits										
6.0	VII	DSC-25 (4T) DSC-26 (4T) DSC-27 (2P)	DSE-5 (2T) A/B DSE-6 (2P) A/B	RM (2T)	...	...	...	RP (6)	22	UG Honors with Research Degree 176
	VIII	DSC-29 (4T) DSC-30 (4T) DSC-31 (2P)	DSE-7 (2T) A/B DSE-8 (2P) A/B	RM (2T)	...	...	...	RP (6)	22	
	Cum. Cr.	68	16	20+4	10	8+6	8+4+2	8+2+2+8+12	176	
Four Year UG Honours with Research Degree in Major and Minor with 176 credits										

Sem- Semester, **DSC**- Department Specific Course, **DSE**- Department Specific Elective, **T**- Theory, **P**- Practical, CC-Cocurricular **RM**- Research Methodology, **OJT**- On Job Training, **FP**- Field Project, **Int**- Internship, **RP**- Research Project,

Multiple Entry and Multiple Exit options:

The multiple entry and exit options with the award of UG certificate/ UG diploma/ or three-year degree depending upon the number of credits secured;

Levels	Qualification Title	Credit Requirements		Semester	Year
		Minimum	Maximum		
4.5	UG Certificate	40	44	2	1
5.0	UG Diploma	80	88	4	2
5.5	Three Year Bachelor's Degree	120	132	6	3
6.0	Bachelor's Degree- Honours **Or** Bachelor's Degree- Honours with Research	160	176	8	4

F. Y. B. Sc. Computer Science Structure and Syllabus

Semester	Course Module	Credit	Hours/ week	TH/ PR	Code	Title
I	DSC	2	2	TH	COS-DSC-111	Database Managemet System - I
	DSC	2	2	TH	COS-DSC-112	Object Oriented Programming Using C++ - I
	DSC	2	**4**	**PR**	COS-DSC-113	Practical course based on DBMS-I and C++ -I
	MIN	2	2	TH	COS-MIN-111	Basics of Internet
	MIN	2	**4**	**PR**	COS-MIN-112	Practical course based on Basics of Internet
	OE/GE	2	2	TH	COS-GE-111	Word Processing Tools
	SEC	2	2	TH	COS-SEC-111	Office Automation-I
	SEC	1	**2**	**PR**	COS-SEC-112	Practical course based on Office Automation-I
	AEC	2	**2**	**TH**	ENGS-AEC-111	English
	VEC	2	**2**	**TH**	ES -VEC-111	Environmental Studies
	IKS	1	**1**	**TH**	IKS-111	Indian Knowledge System
	CC	2	**2**	**CC**	NCC-CC-111 NSS-CC-111 SPT-CC-111 CUL-CC-111	NCC NSS Sports Cultural
II	DSC	2	2	TH	COS-DSC-121	Database Managemet System - II
	DSC	2	2	TH	COS-DSC-122	Object Oriented Programming Using C++ - II
	DSC	2	**4**	**PR**	COS-DSC-123	Practical course based on DBMS-II and C++-II
	MIN	2	2	TH	COS-MIN-121	Basics of Web Design
	MIN	2	**4**	**PR**	COS-MIN-122	Practical course based on Basics of Web Design
	OE/GE	2	2	TH	COS-GOE-121	Data Vsualization and Analysis Tools
	SEC	2	2	TH	COS-SEC-121	Office Automation-II
	SEC	1	**2**	**PR**	COS-SEC-122	Practical course based on Office Automation-II
	AEC	2	**2**	**TH**	ENGS-AEC-121	English
	VEC	2	**2**	**TH**	CI-VEC-121	Constitution of India
	IKS	1	**1**	**TH**	IKS-121	Indian Knowledge System
	CC	2	**2**	**CC**	NCC-CC-121 NSS-CC-121 SPT-CC-121 CUL-CC-121	NCC NSS Sports Cultural

DSC	**:**	Department-Specific Core course	**ENG**	**:**	English
DSE	**:**	Department-Specific elective	**ES**	**:**	Environmental studies
GE/OE	**:**	Generic/ Open elective	**CI**	**:**	Constitution of India
SEC	**:**	Skill Enhancement Course	**IKS**	**:**	Indian Knowledge System
MIN	**:**	Minor course	**CC**	**:**	Co-curricular course
AEC	**:**	Ability Enhancement Course	**TH**	**:**	Theory
VEC	**:**	Value Education Courses	**PR**	**:**	Practical

Exam Pattern

- Each theory and practical course will be of 50 marks comprising of 10 marks internal and 40 marks external examination.

External Theory Examination (40 marks)

- External examination will be of two hours duration for each theory course. There shall be 4 questions each carrying equal marks (10 marks each) while the tentative pattern of question papers shall be as follows;
- Q1 (A), Q2 (A) and Q3 (A), each will be of 6 marks (attempt any 2 out of 3 sub-questions).
- Q1 (B), Q2 (B) and Q3 (B), each will be of 4 marks (attempt any 1 out of 2 sub-questions).
- Q4 will be of 10 marks (attempt any 2 out of 3 sub-questions).

External Practical Examination (40 marks):

- Practical examination shall be conducted by the respective department at the end of the semester. Practical examination will be of minimum 3 hours duration and shall be conducted as per schedule. There shall be 05 marks for journal, 10 marks for *viva-voce*. Certified journal is compulsory to appear for practical examination.

Internal Theory/ Practical Examination (10 marks):

- Internal theory assessment of the student by respective teacher will be comprehensive and continuous, based on written test/ assignment. The written test may comprise of both objective and subjective type questions.
- Internal practical examination should be conducted by respective department as per schedule given. For internal practical examination student should perform at least one major and one minor experiment and should have completed journal.

SEMESTER -I

F.Y. B.Sc.
SEMESTER-I
COS-DSC-111: Database Managemet System - I

Total Hours: 30 **Credits: 2**

Course objectives	• To understand the basic concepts and the applications of database systems. • To understand the relational database design principles. • To learn relational data model and relation algebra. • Master the basics of SQL and construct queries using SQL.	
Course outcomes	After successful completion of this course, students are expected to: • Aware about basic concepts of DBMS. • design the database using relational model. • normalize the data in required form. • Design SQL quires to access the required data from the database.	
Unit	**Content**	**Hours**
Unit I	**Introduction to DBMS and Database Design** o Overview, Definition, characteristics of data in database o DBMS Models o Comparison of DBMS Models o Queries in DBMS with examples (SQL : DDL, DML, DCL, TCL) o Phases of Database Design	**7**
Unit II	**Entity Relationship Models and Data Normalization** • **Entity Relationship Models** o ER-Model and its components o ER Diagram Symbols and conventions o ER-Diagrams • **Data Normalization** o Keys and relationship o Normal Forms (1NF, 2NF, 3NF,BCNF,4NF and 5 NF) o De-normalization	**8**
Unit III	**Relational data model and Relational Algebra** o Relations (concepts, definition) o Conversion of ER to Relational model o Integrity Constraints (Base Table Constraints, Domain Constraints, Referential Integrity) o Relational algebra (selection, projection, set operations, renaming, joins, Cartesian Product, division)	**7**
Unit IV	**Relational Data Modeling using SQL** o Introduction o Data types in SQL o Types of SQL Commands o Database Operations (Create, Drop) o Table Operations (Create, Alter, Truncate, Drop) o Basic SQL Statements (Select, Insert, Delete, Update)	**8**

Study Resources	• Korth H, Silberschatz A., and Sudarshan S., (2011). Database System Concepts, 6th Ed., Tata McGraw-Hill Education • Elmasri R. and Navathe S., (2004). Fundamentals of Database Systems, 4th Ed. Pearson Education, Inc. • Singh S., (2011). Database Management System : Concepts, design & applications, 2nd Ed, Pearson publication • Leon A. and Leon M., (2002), Database Management Systems, Leon Vikas • Douglas K., Souglas S., (2005), PostgreSQL, 2nd Ed, Sams Publishing • Stones R. and Matthew M., (2011), Beginning Databases with PostgreSQL, 2nd Ed., Apress	

F.Y. B.Sc.
SEMESTER-I
COS-DSC-112: Object oriented Programming using C++ Programming – I

Total Hours: 30 **Credits: 2**

Course objectives	• To understand the basic object oriented concepts. • To make the student aware of control structures in programming language. • To acquaint concepts of classes and objects. • To understand the polymorphism concept in C++.	
Course outcomes	After successful completion of this course, students are expected to: • Apply object oriented concepts for problem solving. • Solve real life prpblems using programming languages. • Use different functions for solving large problems. • Assign additional meaning to existing operators.	
Unit	**Content**	**Hours**
Unit I	**Introduction to OOPs and Basics of C++ Programming** • **Object Oriented Programming** o Overview of Procedure Oriented Programming and Object Oriented Programming o Basic Concepts of OOPS , o Benefits and Application of OOPS • **Basics of C++ Programming** o Overview of C++ o Structure of C++ program o Simple Program (Preprocessor Directives, Header Files, input output statements) o Data types, Tokens, keywords and variables in C++ o Operators and manipulators in C++	**7**
Unit II	**Control Structures and Functions** o Conditional statements (if, if-else, Nested if, switch) o Control Structures (while, Do-while, for) o Function and its needs, Function Prototype, Call by value and Call by reference o Types of functions (Inline Function, Friend functions, Recursive functions)	**8**
Unit III	**Classes and Objects** o Simple classes and object creation (Class specification, class members accessing) o Defining member functions (inside, outside) o Passing object as an argument, Returning object from functions, o Array of object, Pointer to object, Array of pointer to object, this pointer o Constructors and Destructors	**7**
Unit IV	**Polymorphism – Overloading** o Function overloading	**8**

	○ Rules for overloading Operators ○ Overloading Unary Operator ○ Overloading Binary Operator ○ Overloading Binary Operator using Friends	
Study Resources	• Balagurusamy E. (2017), Object-oriented programming C++, 3rd Ed., Tata McGraw-Hill • Rumbaugh J., Blaha M., Premerlani W., Eddy F., and Sorensen, W., Object-Oriented Modeling and Design, 3rd Ed, Prentice Hall of India • Stevens A., (2003), C++ Programming, 7th Ed., Wiley India Pvt Ltd	

F.Y. B.Sc.
SEMESTER-I
COS-DSC-113: Practical Course Based on DBMS-I and C++-I

Total Hours: 30 **Credits: 2**

Course objectives	• To get practical knowledge the relational database design principles. • To get hands on practical knowledge for relational data model and relation algebra. • To get basic practical knowledge about the basic object oriented concepts. • To acquaint concepts of classes and objects.	
Course Outcomes	After successful completion of this course, students are expected to: • aware about basic concepts of DBMS. • normalize the data in required form. • design SQL quires to access the required data from the database. • apply object oriented concepts for problem solving.	
Sr. No.	**Content**	**Hours**
1	Demonstration of database : Create, Alter and Delete	**4**
2	Demonstration of creating table and use of DDL statements : Create, Alter and Drop Table	**4**
3	Demonstration of use of DML statements: Select, Insert, Update and Delete	**4**
4	Write a program to demonstrate dynamic memory allocation operators.	**4**
5	Write a C++ program to demonstrate the concept of defining member function (inside, outside) i) Student Information ii) Employee Information	**4**
6	Write a C++ program to demonstrate Conditional Statements	**4**
7	Write a C++ program to demonstrate Control Structures	**4**
8	Write a C++ program to demonstrate the array of objects.	**4**
9	Write a C++ program that demonstrates the use of function with default argument	**4**
10	Write a C++ program to demonstrate inline function	**4**
11	Write a C++ program to demonstrate friend function	**4**
12	Write a C++ program to demonstrate following constructors and destructor i)Default constructor ii)Parameterized constructor iii)Copy Constructor	**4**
13	Write an object-oriented program to demonstrate constructor and destructor	**4**
14	Write a C++ program to demonstrate function overloading.	**4**
15	Write a C++ program to demonstrate operator overloading (Unary,Binary).	**4**
Study Resources	• Korth H, Silberschatz A., and Sudarshan S., (2011). Database System Concepts, 6th Ed., Tata McGraw-Hill Education • Elmasri R. and Navathe S., (2004). Fundamentals of Database	

	Systems, 4th Ed. Pearson Education, Inc. • Singh S., (2011). Database Management System : Concepts, design & applications, 2nd Ed, Pearson publication • Leon A. and Leon M., (2002), Database Management Systems, Leon Vikas • Douglas K., Souglas S., (2005), PostgreSQL, 2nd Ed, Sams Publishing • Stones R. and Matthew M., (2011), Beginning Databases with PostgreSQL, 2nd Ed., Apress • Balagurusamy E. (2017), Object-oriented programming C++, 3rd Ed., Tata McGraw-Hill • Rumbaugh J., Blaha M., Premerlani W., Eddy F., and Sorensen, W., Object-Oriented Modeling and Design, 3rd Ed, Prentice Hall of India • Stevens A., (2003), C++ Programming, 7th Ed., Wiley India Pvt Ltd	

Note: At least 12 experiments should be performed.

F.Y. B.Sc.
SEMESTER-I
COS-MIN-111: Basics of Internet

Total Hours: 30 **Credits: 2**

Course objectives	• To understand the concept of computer network. • To make the student aware of types of websites. • To understand the web design process • To understand the various web page types and its navigation.	
Course outcomes	After successful completion of this course, students are expected to: • Aware of computer networks and internet concepts. • Differtiate between various site types and their organizational models. • Understand the web design process can use the approcach for website development. • Understand the various page types.	
Unit	**Content**	**Hours**
Unit I	**Programming Concepts of network** o What is Computer Network? o Types of Networks (with Features and Application): LAN, WAN, MAN Wired Network, Wireless Network, MANET, Internet o Study of Web Browsers o Google services o Search Engines o Computer Virus o Computer Ethics	**7**
Unit II	**Introduction to Website** o Site Types o Site Structure o Site Organization Model o Site Planning and Testing	**8**
Unit III	**Web Design Process** o What is Web Design? o Web Design Pyramid o Web Process Model ▪ Modified Waterfall Model ▪ Joint Application Development Model	**7**
Unit IV	**Page Types and Navigation Theory** o Page Types o Page Size and Margins o Web Page Categorization: Splash Page, Entrance Page, Home Page, Sub Home Page, Content Page, Exit Page. o What is Navigation and types of Navigation?	**8**
Study Resources	• Powell T. (2003), The Complete reference –Web Design, 2nd Ed. McGraw-Hill Education, • Corner D., (2006), The Internet Book: Everything You Need to Know about	

	Computer Networking and How the Internet Works, 4th Ed. Pearson • Web reference: www.w3schools.com	

F.Y. B.Sc.
SEMESTER-I
COS-MIN-112: Practical course based on Basics of Internet

Total Hours: 60 **Credits: 2**

Course objectives	• To understand the concept of computer network. • To make the student aware of types of websites. • To understand the web design process • To understand the various web page types and its navigation.	
Course Outcomes	After successful completion of this course, students are expected to gain the practical knowledge of : • Various browsers and their advanced security settings • How to search the contents on web • Creating own e-mail account and its accessibilities • Creating forms which will help in conducting surveys	
Sr. No.	**Content**	**Hours**
1	Overview of Browsers.	**4**
2	Advanced security settings of web browsers.	**4**
3	Demonstration of web searching.	**4**
4	Creating of E-mail accounts.	**4**
5	Sending & Receiving mail.	**4**
6	Sending & receiving mail using CC option.	**4**
7	Sending & receiving mail using BCC option	**4**
8	Sending and receiving mail with Attachment.	**4**
9	Junk mails, changing password, maintaining folders.	**4**
10	Chatting : Messenger Services.	**4**
11	Creating and analysing survey form using google forms services.	**4**
12	Sending automated certificates using google services.	**4**
13	Demonstration of Navigation and types of Navigation.	**4**
14	Create a report on information about the postgraduate colleges for respective faculties by searching on internet.	**4**
15	Search the information on a _____topic and create report of the same.	**4**
Study Resources	• Powell T. (2003), The Complete reference –Web Design, 2nd Ed. McGraw-Hill Education, • Corner D., (2006), The Internet Book: Everything You Need to Know about Computer Networking and How the Internet Works, 4th Ed. Pearson • Web reference: www.w3schools.com	

Note: At least 12 experiments should be performed.

F.Y. B.Sc.
SEMESTER-I
COS-GE-111 :Word Processing Tools

Total Hours: 30 **Credits: 2**

Course objectives	• To create new document and save the data • To format the text in the document using different formatting tools • To arrange the text into columns and insert different objects into the text document. • To use mail merge on common document.	
Course outcomes	After successful completion of this course, students are expected to: • Aware different word processing tools and have hands on one of them. • Learn different formatting options for text and document. • Embed the object into text document • Create document with effective graphics and formatting	
Unit	**Content**	**Hours**
Unit I	**Launch any Word processing tool and navigate the editing screen.** o Launch Word. o Identify the components of the Word window. o Edit a document. o Save a document. o Preview and print a document. o Close a document. o Locate and open an existing document. o Create a new document. o Close the Word application. o Use Print Preview. o Print a document	**7**
Unit II	**Create, edit a Text document and Apply formatting** o Create a letter. o Select text. o Cut, copy, and paste text. o Find and replace text. o Change fonts and font sizes. o Apply font styles, character styles, and special character effects. o Change the case of text. o Highlight text in a document. o Insert symbols and special characters. o Add bullets, numbering, borders, and shading. o Set line and paragraph spacing. o Align and indent paragraphs. o Insert page breaks. o Create and modify headers and footers. o Apply paragraph styles. o Create outlines.	**8**

Unit III	**Work with columns, pictures, diagrams, and charts and tables.** o Create and use newspaper columns. o Insert pictures. o Create diagrams. o Create and modify a data chart o Create basic tables. o Create and format tables. o Modify tables. o Customize tables. o Use special table features. o Use table styles. o Use tab stops in a table. o Convert text to a table. o Merge and split table cells.	**8**
Unit IV	**Use the mail merge wizard, Work with drawing objects and graphics** o Explain the steps of the mail merge process. o Define the main document. Select the data source. Merge the main o document and data source. o Create drawing objects. o Add decorative page borders. o Use WordArt special text effects. o Insert, position, and delete pictures. o Insert and edit text boxes. o Create and edit an organization chart. o Create an equation.	**8**
Study Resources	• Frandsen T., (2010), Microsoft Office Word 2007, BookBoon • Curtis F.(2007), Microsoft Office Word 2007 Step by Step • https://testbook.com/computer-awareness/microsoft-office • https://documentation.libreoffice.org/assets/Uploads/Documentation/en/GS5.0/PDF/GS5001-IntroducingLibreOffice.pdf • https://www.teachmint.com/tfile/studymaterial/b-com/ccc/libreofficecalcpdf/e66b485b-3992-44c9-8972-209158129d10	

F.Y. B.Sc.
SEMESTER-I
COS-SEC-111 : Office Automation-I

Total Hours: 30 **Credits: 2**

Course objectives	• To create new document and save the data • To format the text in the document using different formatting tools • To arrange the text into columns and insert different objects into the text document. • To use mail merge on common document.	
Course outcomes	After successful completion of this course, students are expected to: • Aware different word processing tools and have hands on one of them. • Learn different formatting options for text and document. • Embed the object into text document • Understand the rules applied for microbial taxonomy	
Unit	**Content**	**Hours**
Unit I	**Launch any Word processing tool and navigate the editing screen.** o Launch Word. o Identify the components of the Word window. o Edit a document. o Save a document. o Preview and print a document. o Close a document. o Locate and open an existing document. o Create a new document. o Close the Word application. o Use Print Preview. Print a document	**7**
Unit II	**Create, edit a Text document and Apply formatting** o Create a letter. o Select text. o Cut, copy, and paste text. o Find and replace text. o Change fonts and font sizes. o Apply font styles, character styles, and special character effects. o Change the case of text. o Highlight text in a document. o Insert symbols and special characters. o Add bullets, numbering, borders, and shading. o Set line and paragraph spacing. o Align and indent paragraphs. o Insert page breaks. o Create and modify headers and footers. o Apply paragraph styles. o Create outlines.	**8**
Unit III	**Work with columns, pictures, diagrams, and charts and tables.** o Create and use newspaper columns.	**8**

	○ Insert pictures. ○ Create diagrams. ○ Create and modify a data chart ○ Create basic tables. ○ Create and format tables. ○ Modify tables. ○ Customize tables. ○ Use special table features. ○ Use table styles. ○ Use tab stops in a table. ○ Convert text to a table. ○ Merge and split table cells.	
Unit IV	**Use the mail merge wizard, Work with drawing objects and graphics** ○ Explain the steps of the mail merge process. ○ Define the main document. Select the data source. Merge the main ○ document and data source. ○ Create drawing objects. ○ Add decorative page borders. ○ Use WordArt special text effects. ○ Insert, position, and delete pictures. ○ Insert and edit text boxes. ○ Create and edit an organization chart. ○ Create an equation.	**8**
Study Resources	• Frandsen T., (2010), Microsoft Office Word 2007, BookBoon • Curtis F.(2007), Microsoft Office Word 2007 Step by Step • https://testbook.com/computer-awareness/microsoft-office • https://documentation.libreoffice.org/assets/Uploads/Documentation/en/GS5.0/PDF/GS5001-IntroducingLibreOffice.pdf • https://www.teachmint.com/tfile/studymaterial/b-com/ccc/libreofficecalcpdf/e66b485b-3992-44c9-8972-209158129d10	

F.Y. B.Sc.
SEMESTER-I
COS-SEC-112 : Practical Course Based on Office Automation-I

Total Hours: 30 **Credits: 1**

Course objectives	• To aquent document creation and storing information in proper form. • To study various text formatting options • To learn changing orientation and setting page margins according to the need. • To learn how to print or email multiple recipient form letters.
Course Outcomes	After successful completion of this course, students are expected to: • Apply different text formatting options and create effective documents. • Study the page types and its orientation and apply the same wherever required. • Insert header footer as well as apply different styles to the page • Create letters, labels, envelopes, and emails all with personalized data
Sr. No.	**Content**
1	Introduction to word processing tool environment.
2	Create document, insert and edit the text (Copy, Paste, format painter etc). Demonstrate paragraph formatting.
3	Create document and Apply different text formatting options, insert header, footer, page numbers etc.
4	Create document, set margin, orientation, size, watermark, page color and page border.
5	Create document and covert the text into column format. Change different column options.
6	Prepare mark sheet of your class subjects using table option
7	Insert chart of marks of students and apply different chart option on it.
8	Create an invitation letter with proper formatting and prepare it for different addresses using mail merge
Study Resources	• Frandsen T., (2010), Microsoft Office Word 2007, BookBoon • Curtis F.(2007), Microsoft Office Word 2007 Step by Step • https://testbook.com/computer-awareness/microsoft-office • https://documentation.libreoffice.org/assets/Uploads/Documentation/en/GS5.0/PDF/GS5001-IntroducingLibreOffice.pdf • https://www.teachmint.com/tfile/studymaterial/b-com/ccc/libreofficecalcpdf/e66b485b-3992-44c9-8972-209158129d10

Note: At least 06 experiments should be performed.

SEMESTER-II

F.Y.B.Sc.
SEMESTER-II
COS-DSC-121 : Database Managemet System – II

Total Hours: 30 **Credits: 2**

Course objectives	• Develop skills in constructing and executing database queries using Structured Query Language (SQL) • Develop skills in constructing and executing database queries using Structured Query Language (SQL) • Acquire knowledge of conceptual, logical, and physical database design techniques. • Understand how to analyze requirements, create entity-relationship (ER) diagrams, and transform them into relational schemas	
Course outcomes	After successful completion of this course, students are expected to: • Develop skills in constructing complex SQL queries. • Gain knowledge and skills in database administration tasks • Design entity-relationship diagrams and transform them into relational schemas • Deal with data integrity constraints	
Unit	**Content**	**Hours**
Unit I	**SQL Statements, Operators** o Operators (Arithmetic, Logical, Comparative, Assignments, Relational) o Clauses in SQL (group by, having, where) o Aggregate functions o Nested Sub queries o SQL mechanisms for joining relations (inner joins, outer joins and their types)	**7**
Unit II	**Relational Database Design** o PL/PgSqL: Datatypes, Language structure o Controlling the program flow, conditional statements, loops o Views o Stored Functions, Stored Procedures o Handling errors and exceptions o Cursors o Concepts of Triggers	**8**
Unit III	**Database Implementations** o Database security o Database integrity o Transaction Concept, Transaction State o Transaction Properties (ACID)	**7**
Unit IV	**Crash Recovery** o Failure classification o Recovery concepts o Log base recovery o Checkpoints o Recovery with concurrent transactions (Rollback, checkpoints, commit) o Database backup and recovery from catastrophic failure.	**8**

Study Resources	• Korth H, Silberschatz A., and Sudarshan S., (2011). Database System Concepts, 6th Ed., Tata McGraw-Hill Education • Elmasri R. and Navathe S., (2004). Fundamentals of Database Systems, 4th Ed. Pearson Education, Inc. • Singh S., (2011). Database Management System : Concepts, design & applications, 2nd Ed, Pearson publication • Leon A. and Leon M., (2002), Database Management Systems, Leon Vikas • Douglas K., Souglas S., (2005), PostgreSQL, 2nd Ed, Sams Publishing • Stones R. and Matthew M., (2011), Beginning Databases with PostgreSQL, 2nd Ed., Apress	

F.Y.B.Sc.
SEMESTER-II
COS-DSC-122 : Object Oriented Programming Using C++ - II

Total Hours: 30 **Credits: 2**

Course objectives	• To understand reusability concept in OOPS • To study concept of virtual function • To handle runtime errors. • To apply generic programming concepts	
Course outcomes	After successful completion of this course, students are expected to: • Apply reusability concepts in OOPS • Use virtual functions wherever required • deal with different runtime errors • create generic programs for various applications	
Unit	**Content**	**Hours**
Unit I	**Inheritance** o Overview o Defining Derived Class o Types of Inheritance o Constructors in Derived Classes	**7**
Unit II	**Virtual function** o Need of Virtual function o Virtual function o Rules for defining and declaring virtual function o Pure Virtual Functions	**8**
Unit III	**Exception Handling** o Basics of Exception Handling o Exception handling mechanism o Throwing mechanism of exception o Catching mechanism of exception o Re-throwing exception o Specifying exception	**7**
Unit IV	**Templates** o Class Template o Class template with multiple parameters o Function Template o Function template with multiple parameters o Overloading of template functions	**8**
Study Resources	• Balagurusamy E. (2017), Object-oriented programming C++, 3rd Ed., Tata McGraw-Hill • Rumbaugh J., Blaha M., Premerlani W., Eddy F., and Sorensen, W., Object-Oriented Modeling and Design, 3rd Ed, Prentice Hall of India • Stevens A., (2003), C++ Programming, 7th Ed., Wiley India Pvt Ltd	

F.Y.B.Sc.
SEMESTER-II
COS-DSC-123 : Practical Course Based on DBMS-II and C++-II

Total Hours: 60 **Credits: 2**

Course objectives	• To get practical knowledge retrieving data using defferent clauses in nSQL. • To get hands on practical knowledge for different aggregate functions • Master the basics of SQL and construct queries using SQL. • To create procedures for retrieving the data from database. • To acquaint concepts of generic programming. • To apply reusability concepts in OOPS.	
Course Outcomes	After successful completion of this course, students are expected to: • Access the data usning different SQL statements. • Perform various operations on the data stored in database. • Apply reusability concept in solving real life problem using OOPS • Apply generic programming concepts and increase the effeiciency of program.	
Sr. No.	**Content**	**Hours**
1	Practical for Retrieving Data Using following clauses. • Simple select clause • Accessing specific data with Where • Ordered By • Distinct • Group By	**4**
2	Practical Based on Aggregate Functions. • AVG • COUNT • MAX • MIN • SUM • CUBE	**4**
3	Practical Based on implementing use of UNION, INTERSECTION, SET, DIFFERENCE	**4**
4	Implement Nested Queries & JOIN operation	**4**
5	Practical Based on performing different operations on a view.	**4**
6	Practical Based on implementing use of Procedures	**4**
7	Practical Based on implementing use of Triggers	**4**
8	Practical Based on implementing Cursor	**4**
9	Write a C++ program to demonstrate simple inheritance	**4**
10	Write a C++ program to demonstrate Multilevel inheritance	**4**
11	Write a C++ program to demonstrate multiple inheritance	**4**
12	Write a C++ to demonstrate the concept of virtual function.	**4**
13	Write a C++ to demonstrate all types of Inheritances.	**4**
14	Write a C++ to demonstrate the concept of function template.	**4**
15	Write a C++ to demonstrate the concept of class template.	**4**

Study Resources	• Korth H, Silberschatz A., and Sudarshan S., (2011). Database System Concepts, 6th Ed., Tata McGraw-Hill Education • Elmasri R. and Navathe S., (2004). Fundamentals of Database Systems, 4th Ed. Pearson Education, Inc. • Singh S., (2011). Database Management System : Concepts, design & applications, 2nd Ed, Pearson publication • Leon A. and Leon M., (2002), Database Management Systems, Leon Vikas • Douglas K., Souglas S., (2005), PostgreSQL, 2nd Ed, Sams Publishing • Stones R. and Matthew M., (2011), Beginning Databases with PostgreSQL, 2nd Ed., Apress • Balagurusamy E. (2017), Object-oriented programming C++, 3rd Ed., Tata McGraw-Hill • Rumbaugh J., Blaha M., Premerlani W., Eddy F., and Sorensen, W., Object-Oriented Modeling and Design, 3rd Ed, Prentice Hall of India • Stevens A., (2003), C++ Programming, 7th Ed., Wiley India Pvt Ltd	

F.Y.B.Sc.
SEMESTER-II
COS-MIN-121 : Basics of Web Design

Total Hours: 30 **Credits: 2**

Course objectives	• Understand Web Design Principles • Gain proficiency in HTML (Hypertext Markup Language), the standard markup language used to structure content on the web. • Learn Cascading Style Sheets (CSS) to control the visual presentation of web pages • Learn how to optimize and integrate graphics, images, and icons into web pages	
Course outcomes	After successful completion of this course, students are expected to: • Learn the basic principles of web design • Gain proficiency in HTML (Hypertext Markup Language) • to control the visual presentation of web pages after studying CSS • design web form	
Unit	**Content**	**Hours**
Unit I	**Design Introduction to HTML Programming** o Structure of HTML Document o Text Formatting Tags, emojis and Character Entity Study Resources o List Tags o Image and Anchor Tag o Table Tags	**7**
Unit II	**HTML Graphics and Media Entity Relationship Models** o HTML Canvas o HTML SVG o HTML Media o HTML Video o HTML Audio o HTML YouTube	**8**
Unit III	**Introduction to CSS** o What is CSS o Types of Style sheet (Internal, External, and Inline) o Syntax of CSS with Example o Selectors (class,ID,Group,Element) o **Advanced CSS :** o CSS Rounded Corners, Border Images, Backgrounds, Colors, o Color Keywords, Gradients, Shadows, CSS Web Fonts, o Text Effects, CSS 2D and 3D Transforms, Transitions and Animations o CSS Style Images, Image Reflection, Masking, CSS Pagination o CSS Multiple Columns	**7**
Unit IV	**HTML Forms** o Frame and Form Tag o Form Elements <input>, <label>, <select>, <textarea>, <button>, <fieldset>, <legend>, <datalist>, <output>, <option>, <optgroup>, o Script Tags o HTML Favicon	**8**

Study Resources	• Powell T. (2003), The Complete reference –Web Design, 2nd Ed. McGraw-Hill Education, • Corner D., (2006), The Internet Book: Everything You Need to Know about Computer Networking and How the Internet Works, 4th Ed. Pearson • Holzner S., (2000),HTML Black Book: The Programmer's Complete, Dreamtech Press. • Web Study Resources: www.w3schools.com	

F.Y.B.Sc.
SEMESTER-II

COS-MIN-122 Practical course Based on Basics of Web Design

Total Hours: 60 **Credits: 2**

Course objectives	• To deal with images while creating web pages. • To study different controls useful for creating dynamic web pages. • To learn embedding audio and video tag in web page. • To create own styles for designing web page using CSS	
Course Outcomes	After successful completion of this course, students are expected to: • Deal with different image formats in designing web pages. • Create dynamic web pages for different applications. • Deal with multimedia options while creating web pages. • Create animated web pages.	
Sr. No.	**Content**	**Hours**
1	Create a HTML page for Demonstration of Linking using Image map	**4**
2	Create a HTML page to Create Calendar of Current month using table tag	**4**
3	Create a HTML page for creation of Admission form using tags. (cover all form elements)	**4**
4	Create a HTML page for Demonstration of Text Formatting Tags, emojis and Character Entity Study Resources	**4**
5	Create a HTML page for Demonstration of all types of List Tags	**4**
6	Create a HTML page for Demonstration of HTML Canvas	**4**
7	Create a HTML page for Demonstration of HTML Video HTML Audio tags	**4**
8	Create a HTML page for Demonstration of HTML YouTube tag	**4**
9	Create a HTML page for Demonstration of Style sheet (Internal, External, and Inline)	**4**
10	Create a HTML page for Demonstration of CSS Rounded Corners, Border Images, Backgrounds, Colors,Gradients, Shadows	**4**
11	Create a HTML page for Demonstration of Transitions and Animations CSS Style Images	**4**
12	Create a HTML page for Demonstration of Image reflection and masking	**4**
13	Create a HTML page for Demonstration of CSS Pagination CSS Multiple Columns	**4**
14	Create a HTML page to demonstrate use of frames	**4**
15	Create a HTML page for Demonstration of Script Tags	**4**
Study Resources	• Powell T. (2003), The Complete reference –Web Design, 2nd Ed. McGraw-Hill Education, • Corner D., (2006), The Internet Book: Everything You Need to	

	Know about Computer Networking and How the Internet Works, 4th Ed. Pearson • Holzner S., (2000), HTML Black Book: The Programmer's Complete, Dreamtech Press. • Web Study Resources: www.w3schools.com	

F.Y.B.Sc.
SEMESTER-II
COS-GOE-121 : Data Visualization and Analysis Tools

Total Hours: 30 **Credits: 2**

Course objectives	**Student will be able to** • customise the formatting of charts • create and use labels and names in a workbook • protect data in worksheets and workbooks • create and edit a PivotChart	
Course outcomes	**After successful completion of this course students are expected to :** • Demonstrating the basic mechanics and navigation of an spreadsheet. • Learning the use and utility of functions and formulas on spreadsheet. • Using clip art to enhance ideas and information in worksheets. • Analyzing data using Pivot Tables and Pivot Charts.	
Unit	**Content**	**Hours**
Unit I	**Excel Basics** o Getting Started with Excel, o Understanding OneDrive o Creating and Opening Workbooks, o Saving and Sharing Workbooks, o Cell Basics, Modifying Columns, Rows, and Cells, Formatting Cells.	**8**
Unit II	**Working with Sheets** o Understanding Number Formats o Working with Multiple Worksheets, o Hide or unhide worksheets, o Hide or unhide columns and rows, o Customize the Quick Access toolbar, o Modify document properties, o Using Find & Replace, o Checking Spelling, o Page Layout and Printing	**7**
Unit III	**Formulas and Functions** o Introduction to Formulas, o Creating More Complex Formulas, o Relative and Absolute Cell Study Resources, o Functions: mathematical, statistical, logical, date and time, etc.	**8**
Unit IV	**Working with Data** o Freezing Panes and View Options, o Sorting Data, Filtering Data, o Groups and Subtotals, o Tables, o Charts, o Conditional Formatting, o Track Changes and Comments, o Inspecting and Protecting Workbooks, o Introduction to PivotTables,	**8**

	○ Doing More with PivotTables.	
Study Resources	• Frandsen T., (2010), Microsoft Office Excel 2007, BookBoon • Curtis F.(2007), Microsoft Office Word Excel Step by Step • https://testbook.com/computer-awareness/microsoft-office • https://documentation.libreoffice.org/assets/Uploads/Documentation/en/GS5.0/PDF/GS5001-IntroducingLibreOffice.pdf • https://www.teachmint.com/tfile/studymaterial/b-com/ccc/libreofficecalcpdf/e66b485b-3992-44c9-8972-209158129d10	

F.Y.B.Sc.
SEMESTER-II
COS-SEC-121 : Office Automation-II

Total Hours: 30 **Credits: 2**

Course objectives	**Student will be able to** • customise the formatting of charts presentation • deal with shapes and images • use media in presenation • create and edit a PivotChart	
Course outcomes	**After successful completion of this course students are expected to :** • Demonstrating the basic mechanics and navigation of an spreadsheet. • Learning the use and utility of functions and formulas on spreadsheet. • Using clip art to enhance ideas and information in Excel worksheets. • Analyzing data using Pivot Tables and Pivot Charts.	
Unit	**Content**	**Hours**
Unit I	**Create and Manage Presentations** o Create a Presentation o Insert and Format Slides o Modify Slides, Handouts, and Notes o Change Presentation Options and Views o Configure a Presentation for Print o Configure and Present a Slide Show.	**7**
Unit II	**Insert and Format Text, Shapes, and Images** o Insert and Format Text o Insert and Format Shapes and Text Boxes o Insert and Format Images o Order and Group Objects	**8**
Unit III	**Insert Tables, Charts, SmartArt, and Media** o Insert and Format Tables o Insert and Format Charts o Insert and Format SmartArt graphics o Insert and Manage Media	**7**
Unit IV	**Apply Transitions and Animations** o Apply Slide Transitions o Animate Slide Content o Set Timing for Transitions and Animations	**8**
Study Resources	• Frandsen T., (2010), Microsoft Powerpoint 2007, BookBoon • Curtis F.(2007), Microsoft Office Powerpoint Step by Step • https://testbook.com/computer-awareness/microsoft-office • https://documentation.libreoffice.org/assets/Uploads/Documentation/en/GS5.0/PDF/GS5001-IntroducingLibreOffice.pdf • https://www.teachmint.com/tfile/studymaterial/b-com/ccc/libreofficecalcpdf/e66b485b-3992-44c9-8972-209158129d10	

F.Y.B.Sc.
SEMESTER-II
COS-SEC-122 : Practical Course Based on Office Automation-II

Total Hours: 30 **Credits: 1**

Course objectives	• To aquent basic knowledge of worksheet • To study various formatting of worksheet • To learn how to use various functions in worksheet • To learn drawing a charts in worksheet
Course Outcomes	After successful completion of this course, students are expected to: • Demonstrating the basic mechanics and navigation of an Excel spreadsheet. • Securing information in an Excel workbook • Working knowledge of organizing and displaying large amounts and complex data • Learning formulas, creating charts and graphs that can easily explain or simplify complex information or data.
Sr. No.	**Content**
1	Create a new presentation and insert different types of slides
2	Insert different shapes and images in presentation and apply formatting on it.
3	Insert tables and charts in presentation.
4	Demonstration on inserting media files in ppt.
5	Apply different slide transition and templates in presentation.
6	Apply animation to shapes and slides.
7	Demonstration of different views in powerpoint.
8	Apply different slide show options in presentation
Study Resources	• Frandsen T., (2010), Microsoft Powerpoint 2007, BookBoon • Curtis F.(2007), Microsoft Office Powerpoint Step by Step • https://testbook.com/computer-awareness/microsoft-office • https://documentation.libreoffice.org/assets/Uploads/Documentation/en/GS5.0/PDF/GS5001-IntroducingLibreOffice.pdf • https://www.teachmint.com/tfile/studymaterial/b-com/ccc/libreofficecalcpdf/e66b485b-3992-44c9-8972-209158129d10

Note: At least 06 experiments should be performed.