Anekant Education Society's

TuljaramChaturchand College, Baramati

(Autonomous)

Four Year B.Sc.Degree Program in Computer Science

(Faculty of Science & Technology)

CBCS Syllabus

F.Y.B.Sc.(Computer Science) Semester -I

For Department of Computer Science

TuljaramChaturchand College, Baramati

Choice Based Credit System Syllabus (2023 Pattern)

(As Per NEP 2020)

To be implemented from Academic Year 2023-2024

(Eligibility : 12th Science with Mathematics)

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Title of the Programme: F.Y.B,Sc (Computer Science)

Preamble

AES's TuljaramChaturchand College has made the decision to change the syllabus of across various faculties from June, 2023 by incorporating the guidelines and provisions outlined in the National Education Policy (NEP), 2020. The NEP envisions making education more holistic and effective and to lay emphasis on the integration of general (academic) education, vocational education and experiential learning. The NEP introduces holistic and multidisciplinary education that would help to develop intellectual, scientific, social, physical, emotional, ethical and moral capacities of the students. The NEP 2020 envisages flexible curricular structures and learning based outcome approach for the development of the students. By establishing a nationally accepted and internationally comparable credit structure and courses framework, the NEP 2020 aims to promote educational excellence, facilitate seamless academic mobility, and enhance the global competitiveness of Indian students. It fosters a system where educational achievements can be recognized and valued not only within the country but also in the international arena, expanding opportunities and opening doors for students to pursue their aspirations on a global scale.

In response to the rapid advancements in science and technology and the evolving approaches in various domains of Computer Science and related subjects, the Board of Studies in Computer Science at Tuljaram Chaturchand College, Baramati - Pune, has developed the curriculum for the first semester of F.Y.B.Sc.(Computer Science),which goes beyond traditional academic boundaries. The syllabus is aligned with the NEP 2020 guidelines to ensure that students receive an education that prepares them for the challenges and opportunities of the 21st century. This syllabus has been designed under the framework of the Choice Based Credit System (CBCS), taking into consideration the guidelines set forth by the National Education Policy (NEP) 2020, LOCF (UGC), NCrF, NHEQF, Prof. R.D. Kulkarni's Report, Government of Maharashtra's General Resolution dated 20th April and 16th May 2023, and the Circular issued by SPPU, Pune on 31st May 2023.

A degree in Computer Science subject equips students with the knowledge and skills necessary for a diverse range of fulfilling career paths-Career in Computer Science is considered one of the most high-paying jobs and is full of opportunities; particularly when India's prowess in information technology industry is recognized across the globe. The pool of talented computer professionals working in IT companies of the USA, Canadaand other

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countries shows that IT can take a person to higher levels. Numerous IT companies from India employ huge number of computer professionals in their Indian and overseas offices. Students who are interested in programming, software development, and have good analytical and reasoning skills may pursue this course. Job opportunities are available for Graduates and Post Graduates in Government as well as Private sector. Graduates may take up the following job posts- Software Engineer, Software Tester, Data Analyst, Project Manager, Network Administrator, database administrator and Application Developer.

Overall, revising the Computer Science syllabus in accordance with the NEP 2020 ensures that students receive an education that is relevant, comprehensive, and prepares them to navigate the dynamic and interconnected world of today. It equips them with the knowledge, skills, and competencies needed to contribute meaningfully to society and pursue their academic and professional goals in a rapidly changing global landscape.

ProgrammeSpecific Outcomes (PSOs)

for

B.Sc. (Computer Science)

PSO1: Apply fundamental principles and methods of Computer Science to a widerange of applications.

PSO2: Design, correctly implement and document solutions to significant computational problems.

PSO3: Impart an understanding of the basics of our discipline.

PSO4: Prepare for continued professional development.

PSO5: Understand the impact of the IT analyst solutions in societal and environmental contexts, and demonstrate the knowledge and need for sustainable development.

PSO6: Develop proficiency in the practice of computing.

PSO7: Develop the capacity to study and research independently that will help to develop skills for transition to employment in hardware/software companies.

Anekant Education Society's
TuljaramChaturchand College, Baramati
(Autonomous)

Board of Studies (BOS) in Computer Science

From 2022-23 to 2024-25

Sr.No.	Name	Designation
1.	Mr. UpendraChoudhari	Chairman
2.	Dr. Vilas Kardile	Member
3.	Mr. AbhijeetMankar	Member
4.	Mr. Vishal Shaha	Member
5.	Mrs. PrajaktaKulkarni	Member
6.	Mrs. AsmitaBhagat	Member
7.	Mr. Rahul Shah	Member
8.	Mr. ShashikantNakate	Member
9.	Mr. Purushottam Dixit	Member
10.	Mr. Swapnil Chemte	Member
11.	Mrs. Kalyani Londhe	Member
12.	Mrs. Poornima Gavimath	Member
13	Dr.Kavita A. Khobragade	Vice-Chancellor Nominee
14	Dr.Sudhakar Bhoite	Expert from other University
15	Dr.Suhas S. Satonkar	Expert from other University
16	Mr. Rohit Shah	Industry Expert
17	Mr. Yogesh More	Meritorious Alumni
18	Mr. Abhijeet Chopade	Student Representative
19	Miss. Rutuja Harihar	Student Representative
20	Mr. Akshada Kulkarni	Student Representative
21	Mr. Prajwal Nimbalkar	Student Representative

Credit Distribution Structure for F.YB.Sc.(Computer Science)-2023-2024

Level	SEM	Major		Minor	GE/OE	VSC, SEC (VSEC)	AEC, VEC, IKS	OJT, FP, CEP, CC, RP	Cum. Cr./ Sem.	Degree/ Cum. Cr.
		Mandatory	**Electives**							
4.5	**I**	**COS-101-MJM:** Basic Programming using C **COS-102-MJM:**DBMS-I **COS-103-MJM:**Computer Science Practical – I **Credits-2+2+2**	--	--	**COS-116-OE**Internet Awareness (TH) **COS-117-OE:**Introduction to MS-Office (PR) Credit- 2+2	**COS-126-SEC(ST):** Introduction to Statistical Software OR (PR) **COS-126-SEC(MT)** Mathematics for Computer Science OR **COS-126-SEC(EL)** Electronics Pract.-I **COS-121-VSC:(TH)** Problem Solving Skills & DBMS Using PostgreSQL Credit- 2+2	**ENG-131-AEC:**FunctionalEnglish – I **COS-137-IKS:**Evolution of Computer **COS-135-VEC:** Environmental Science Credit- 2+2+2	**CC:** NSS/NCC/Yoga/ Cultural Activity/Sports Credit- 2	22	**UG Certificate 44**
	II	**COS-151-MJM::** Advanced Programming Using C **COS-152-MJM:** DBMS-II **COS-153-MJM:** Computer Science Practical – II Credits-2+2+2		**COS-161-MN(ST)::** Exploratory Data Analysis-I OR **COS-161-MN(EL)::** Fundamentals of Electronics OR **COS-161-MN(MT):**Discrete Mathematics Credits-2	**COS-166-OE**Advanced MS-Excel **COS-167-OE** E-Banking Credit- 2+2	**COS-176-SEC:** Basic Graphics Design using C **COS-171-VSC:** Database Applications using PL/pgSQL Credit- 2+2	**ENG-181-AEC:** Functional English – II **COS-185-VEC:** Digital and Technological Solutions Credit- 2+2	**CC:** NSS/NCC/Yoga/ Cultural Activity/Sports Credit- 2	22	
	Cum Cr.	12	-	2	8	8	10	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

* 1 Credit = 15 hr.

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Course Structure for F.Y.B.Sc. (Computer Science)(2023 Pattern)

Sem.	Course Type	Course Code	Title of Course	Course Types	No. of Credits
I	Major Mandatory	COS-101-MJM	Basic Programming using C	Theory	2
	Major Mandatory	COS-102-MJM	DBMS-I	Theory	2
	Major Mandatory	COS-103-MJM	Computer Science Practical – I	Practical	2
	Open Elective (OE)	COS-116-OE	Internet Awareness	Theory	2
	Open Elective (OE)	COS-117-OE	Introduction to MS-Office	Practical	2
	Skill Enhancement Course (SEC) (Any one)	COS-126-SEC(ST) COS-126-SEC(MT) COS-126-SEC(EL)	Introduction to Statistical Software Mathematics for Computer Science Electronics	Practical	2
	Vocational Skill Course (VSC)	COS-121-VSC	Problem Solving Skills & DBMS Using PostgreSQL	Theory	2
	Ability Enhancement Course (AEC)	ENG-131-AEC	Functional English - I	Theory	2
	Value Education Course (VEC)	COS-135-VEC	Environmental Science	Theory	2
	Indian Knowledge System (IKS)	COS-137-IKS	Evolution of Computers	Theory	2
	Co-curricular Course (CC)	---------	To be selected from the Basket	------	2
Total Credits I:					**22**
II	Major Mandatory	COS-151-MJM	Advanced Programming Using C	Theory	2
	Major Mandatory	COS-152-MJM	DBMS-II	Theory	2
	Major Mandatory	COS-153-MJM	Computer Science Practical – II	Practical	2
	Minor (Any one)	COS-161-MN(ST) COS-161-MN(MT) COS-161-MN(EL)	Exploratory Data Analysis-I Discrete Mathematics Fundamentals of Electronics	Theory	2
	Open Elective (OE)	COS-166-OE	Advanced MS-Excel	Practical	2
	Open Elective (OE)	COS-167-OE	E-Banking	Theory	2
	Vocational Skill Course (VSC)	COS-171-VSC	Database Applications using PL/pgSQL	Theory	2
	Skill Enhancement Course (SEC)	COS-176-SEC	Basic Graphics Design using C	Practical	2
	Ability Enhancement Course (AEC)	ENG-181-AEC	Functional English – II	Theory	2
	Value Education Course (VEC)	COS-185-VEC	Digital and Technological Solutions	Theory	2
	Co-curricular Course (CC)	------	To be selected from the Basket	------	2
Total Credits II:					**22**
Cumulative Credits Semester I and II:					**44**

AES's T. C. College (Autonomous), Baramati. CBCS Syllabus 2023 Pattern as per NEP 2020

SYLLABUS (CBCS as per NEP 2020) FOR F. Y. B. Sc. (Computer Science)

(w. e. from June, 2023)

Name of the Programme   : B.Sc. Computer Science
Program Code   : USCOS
Class   **:** F.Y.B.Sc. (Computer Science)
Semester   **:** I
Course Type   : Major
Course Name   **:** Basic Programming using C (TH)
Course Code   **:** COS-101-MJM
No. of Lectures   **:**30
No. of Credits   **:** 02

A) CourseObjectives:
1. Introduce students to the C programming language
2. Develop problem-solving skills
3. Learn how to write and execute C programs
4. Understand the basic syntax and structure of C
5. Master the use of functions and modular programming
6. Gain proficiency in working with arrays and strings
7. Introduce file handling and basic I/O operations

B) CourseOutcomes:
CO1- Understand the fundamentals of C programming language:

    CO2- Develop problem-solving skills

    CO3-Gain proficiency in C programming syntax and semantics

    CO4- Gain a foundation for advanced programming concepts

    CO5- Apply C programming concepts to real-world problems

    CO6- Improve code efficiency and optimization

    CO7- Develop debugging and error handling skills

TOPICS/CONTENTS:

UNIT	CONTENT	No. of Lectures
Unit – I	**C Tokens** 1.1 Keywords 1.2 Identifiers 1.3 Variables 1.4 Constants – character, integer, float, string, escape sequences 1.5 Data types – built-in and user defined	5

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	1.6 Operators and Expressions	
Unit - II	**Control structures** 2.1 Decision making structures if, if-else, switch-case 2.2 Loop Control structures While, do-while, for 2.3 Jumping Statements break, continue and goto statement 2.4 Nested control structures	**10**
Unit – III	**Functions in C** 3.1 What is a function 3.2 Advantages of Functions 3.3 Standard library functions 3.4 User defined functions :Declaration,definition, function call, parameter passing (by value), return keyword 3.5 Scope of variables, storage classes 3.6 Recursion	**10**
Unit – IV	**Arrays** 4.1 Array Concept 4.2 Types – one, two and multidimensional 4.3 Array Operations - declaration,Initialization, accessing array elements 4.4 Passing arrays to functions 4.5 Array Applications	**5**

Book References:
1. Yashavant Kanetkar : Let Us C 7th Edition, PBP Publications
2. E Balaguruswamy : Programming in ANSI C 7th Edition, Tata Mc-Graw Hill Publishing Co.Ltd.-New Delhi
3. Brian W. Kernighan and Dennis M. Ritchie : The C Programming Language 2nd Edition, Prentice Hall Publication
4. Herbert Schildt , The Complete Reference to C
5. Harrow,Problem Solving with C

E-Resources:
1. **https://www.tutorialspoint.com/cprogramming/index.htm**
2. **https://www.w3schools.com/c/index.php**
3. **https://www.guru99.com/c-programming-tutorial.html**
4. **https://www.geeksforgeeks.org/c-programming-language/**
5. **https://nptel.ac.in/courses**

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AES's T. C. College (Autonomous), Baramati. CBCS Syllabus 2023 Pattern as per NEP 2020

Mapping of this course with Programme Outcomes

Course Outcomes	Programme Outcomes (POs)						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	1				2	
CO2	1	3	3	1		2	2
CO3	2	2	1				3
CO4	1		3				2
CO5		3	2			2	2
CO6			3				1
CO7		3			2	2	2

Weight: 1 - Partially related   2 - Moderately Related   3 - Strongly related

AES's T. C. College (Autonomous), Baramati. CBCS Syllabus 2023 Pattern as per NEP 2020

SYLLABUS (CBCS as per NEP 2020) FOR F. Y. B. Sc. (Computer Science)

(w. e. from June, 2023)

Name of the Programme	: B.Sc. Computer Science
Program Code	: USCOS
Class	: F. Y. B. Sc. (Computer Science)
Semester	: I
Course Type	: Major (TH)
Course Name	: DBMS-I
Course Code	: COS-102-MJM
No. of Lectures	: 30
No. of Credits	: 02

Course objective:

1. Students successfully completing this course will be able to:
2. Introducing students to the DBMS Database Language.
3. Students will learn the fundamentals of the relational data model, the entity-relationship model, the relational database architecture, and relational algebra. □
4. Able to Understand and development of essential DBMSconcepts.
5. Creating ER model to reflect straightforward database application scenarios.
6. Understanding of fundamental database access & storage approaches: Organization of files and pages, indexing techniques
7. Understand the basic concepts of database systems.
8. Talk about database management systems, databases, and their applications.

Course Outcomes:

CO1: Master the basics of database concepts and database managementsystem.

CO2: Model an application's data requirements using conceptual modeling tools like ER &relationalmodel.

CO3: Demonstrate the basic elements of a relational database management system.

CO4: Identify the data models for relevant problems.

CO5: Draw Entity-Relationship diagrams to represent simple database application scenarios.

CO6: Study the hashing, indexing, and file organization systems.

CO7: Additionally, using a database management system, students will be able to construct, assess, and design real database applications.

Units	Title & Content	No. of lecture
Unit 1	**1. Introduction to File organization &DBMS** 1.1 Introduction 1.2 Types of fileorganization 1.3 File system VsDBMS 1.4 Datamodels 1.5 Levels ofabstraction 1.6 Dataindependence 1.7 Structure ofDBMS 1.8 Users ofDBMS 1.9 Advantages of DBMS	06
Unit 2	**2.Conceptual Design (E-Rmodel)** 2.1 Overview of DBdesign 2.2 ER data model (entities, attributes, entity sets, relations, relationshi 2.3 Additional constraints (Key constraints, Mappingconstraints) 2.4 Conceptual design using ERmodelling. 2.5 Case studies	12
Unit 3	**3. Relational datamodel** 3.1 Structure of Relational Databases (concepts of a table, a row, a relation, a Tuple, and a key in a relationaldatabase) 3.2 Conversion of ER to Relationalmodel 3.3. Integrity constraints (primary key, referential integrity, unique constraint, Null constraint, Check constraint)	06
Unit 4	**4. Relationalalgebra** 4.1 Preliminaries **4.2** Relational algebra (selection, projection setoperations, renaming, joins,division) Problems.	06

References

1. Shamkant B. Navathe, Ramez Elmasri, Database Systems, ISBN:9780132144988, PEARSON HIGHEREDUCATION
2. Richard Stones, Neil Matthew, Beginning Databases with PostgreSQL: From Novice to Professional, ISBN:9781590594780,Apress
3. Korry Douglas,PostgreSQL, ISBN:9780672327568,Sams
4. JohnWorsley, Joshua Drake, Practical PostgreSQL (BCD), ISBN:9788173663925Shroff/O'reilly
5. Joshua D. Drake, John C Worsley, Practical Postgresql, (O'Reilly publications)
6. Bipin C Desai, "An introduction to Database systems", Galgotia Publications
7. Henrey Korth, Sudarshan, Silberschatz "Database System Concepts" (4th Ed), McGraw Hill.

Mapping of this course with Programme Outcomes

Course Outcomes	Programme Outcomes (POs)						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	2				2
CO2	3	2	2				
CO3	2	2	3				2
CO4	2	3	1				2
CO5	2	3	3				2
CO6	3	2	3				2
CO7	3	3	3				3

Weight: 1 - Partially related   2 - Moderately Related   3 - Strongly related

AES's T. C. College (Autonomous), Baramati. CBCS Syllabus 2023 Pattern as per NEP 2020

SYLLABUS (CBCS as per NEP 2020) FOR F. Y. B. Sc. (Computer Science)

(w. e. from June, 2023)

Name of the Programme : B.Sc. Computer Science
Program Code : USCOS
Class : F.Y.B.Sc. (Computer Science)
Semester : I
Course Type : Major
Course Name : Computer Science Practical – I (PR)
Course Code : COS-103-MJM
No. of Practical's : 15 (60 Hours)
No. of Credits : 02

A) CourseObjectives:

1. *Develop problem-solving skills*

2. *Learn how to write and execute C programs*

3. *Understand the basic syntax and structure of C*

4. *Master the use of functions and modular programming*

5. *Understand design and implementation of a database system.*

6. *Study physical, logical database designs and database modeling.*

7. *Understanding and development of essential DBMS concepts.*

B) CourseOutcomes:

CO1. Develop problem-solving skills
CO2. Apply C programming concepts to real-world problems
CO3. Gain a foundation for advanced programming concepts
CO4. Develop debugging and error handling skills
CO5. Master the basics of database concepts and database management system.
CO6. Model an application's data requirements using conceptual modeling tools like ER & relational model.
CO7. Write SQL commands to create tables, insert, update, delete and query data.

	Title of Experiment/ Practical
1	Assignment based on fundamental concepts of C
2	Assignment based on decision making statements of C
3	Assignment based on loops in C
4	Assignment to demonstrate menu driven programs
5	Assignment based on functions in C
6	Assignment based on recursive functions in C
7	Assignment based on Arrays (1-D)
8	Assignment based on Arrays (2-D)
9	Create simple tables, with only the primary key Constraint
10	Create more than one table with integrity constraint.
11	Create more than one table, with referential integrity constraint.
12	Drop a table from database, Alter the table.
13	Insert/Update/Delete statements.
14	Query for the tables using simple form of Select Statement
15	Query solving for table operations (Aggregate function)
16	Nested Query solving for table operations (Union, Intersect, Except, Set membership, Cardinality, Comparison)

Mapping of this course outcomes with Programme outcomes

Course Outcomes	Programme Outcomes (POs)						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	1	2				2
CO2	2	3	3				2
CO3	2	3	1				3
CO4	3	3	3				2
CO5	3	3	2				3
CO6	2	3	3				3
CO7	2	3	3				2

Weight: 1 - Partially related   2 - Moderately Related   3 - Strongly related

SYLLABUS (CBCS as per NEP 2020) FOR F. Y. B. Sc. (Computer Science)

(w. e. from June, 2023)

Name of the Programme	: B.Sc. Computer Science
Program Code	: USCOS
Class	: B.A./ B.com
Semester	: I
Course Type	: OE
Course Name	: Internet Awareness
Course Code	: COS-116-OE
No. of Lectures	: 30
No. of Credits	: 2

Course Objectives:

1. Understand the fundamental concepts and history of the Internet, including its infrastructure, protocols, and governance.
2. Identify and explain the various components of Internet infrastructure, such as ISPs, data centers, and content delivery networks.
3. Demonstrate knowledge of essential web technologies, including HTTP, HTML, and web development basics.
4. Explore and analyze different forms of online communication, such as email, instant messaging, social media, and online communities.
5. Recognize and address online safety and security threats.
6. Develop a sense of digital citizenship and ethical responsibility in online environments.
7. Cultivate information literacy skills and criticalthinking abilities for evaluating online sources, recognizing biases, and identifying misinformation.
8. Examine the social, cultural, and political implications of the Internet, including topics such as the digital divide, online commerce, censorship, and freedom of speech.
9. Explore emerging trends and technologies shaping the future of the Internet, including the Internet of Things,

Course Outcomes:

CO1: Explain the historical development and key concepts of the Internet, including its infrastructure, protocols, and governance.

CO2: Identify and describe the components of Internet infrastructure, such as ISPs, data centers, and content delivery networks.

CO3: Apply web technologies, including HTML, HTTP, and basic web development principles, to create and navigate web content.

CO4: Communicate effectively using various online communication tools, such as email, instant messaging, and social media platforms.

CO5: Evaluate and implement strategies to enhance online safety and security, including recognizing and mitigating common online threats.

CO6: Demonstrate ethical behaviour and responsible digital citizenship in online interactions.

CO7: Analyse the social, cultural, and political implications of the Internet, including its impact on access, commerce, censorship, and freedom of speech.

Contents:

UNIT I: Introduction to the Internet (5 Lectures)
- Definition and evolution of the Internet
- Key concepts: networks, protocols, IP addresses, domain names
- Internet governance and organizations

UNIT II: Internet Infrastructure (5 Lectures)
- Internet Service Providers (ISPs)
- Wired and wireless technologies (e.g. fiber optics, Wi-Fi, cellular, networks)
- Data centers and cloud computing

UNIT III: Web Technologies (5 Lectures)
- Hypertext Transfer Protocol (HTTP) and Hypertext Markup Language (HTML)
- Web browsers and search engines
- Web standards and accessibility

UNIT IV: Online Communication (5 Lectures)
- Email and instant messaging
- Voice over IP (VoIP) and video conferencing
- Social media platforms and their impact
- Online communities and forums

UNIT V: Online Safety and Security (5 Lectures)
- Password security and two-factor authentication
- Protecting personal information online
- Cyberbullying and online harassment

UNIT VI: Emerging Trends and Future of the Internet (5 Lectures)
- Internet of Things (IoT)

- Artificial intelligence and machine learning
- Virtual reality (VR) and augmented reality (AR)

References:

Books:
1. The Internet Book 5th Edition by Douglas E Comer
2. The Internet Basics: Discover the Basics of Internet by Freeda Vock
3. Encyclopedia of Computer Science Volume 1 to 5 by John Jacob

Weblinks:
1. https://www.tutorialspoint.com/html/html_tutorial.pdf
2. https://en.wikipedia.org/wiki/Internet_of_things
3. https://www.fusionvr.in/virtual-reality
4. https://en.wikipedia.org/wiki/Internet_safety

Mapping of this course with Programme Outcomes

Course Outcomes	Programme Outcomes (POs)						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3		2			2	3
CO2	3	1	3			2	3
CO3	3	1	3			2	3
CO4	3		3				3
CO5	3	1		1			3
CO6	3				3		3
CO7	3	1		1		2	3

Weight: 1 - Partially related   2 - Moderately Related   3 - Strongly related

SYLLABUS (CBCS as per NEP 2020) FOR F. Y. B. Sc. (Computer Science)

(w. e. from June, 2023)

Name of the Programme   : B.Sc. Computer Science
Program Code   : USCOS
Class   : F.Y.B. Sc. (Computer Science)
Semester   : I
Course Type   : OE
Course Name   : Introduction to MS-Office (PR)
Course Code   : COS-117-OE
No. of Lectures   :60 (15 Practical)
No. of Credits   : 2

A) CourseObjectives:

1. Apply the knowledge of computer fundamentals to IT application
2. Design solution for IT applications using latest technologies and develop and implement the solutions using various latest languages.
3. Use of Microsoft Office tool.
4. Understand the impact of the Office tools in societal and environmental contexts, and demonstrate the knowledge and need for sustainable development.
5. Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice using office tools.
6. Use of MS Excel inmultidisciplinary environment.
7. Identify opportunity, pursue that opportunity to create value and wealth for the betterment of the individual and society at large.

B) CourseOutcomes:

CO1: Students are able to use office tools in their office work.

CO2: Students can design Pay Sheet, Own Bio-data, Projects Reports etc.

CO3: Students are familiar with Microsoft Office tool.

CO4: Understand the impact of the Office tools in societal and environmental contexts, and

demonstrate the knowledge and need for sustainable development.

CO5: Apply ethical principles and commit to professional ethics and responsibilities and norms

of the engineering practice using office tools.

CO6: Use of MS Excel inmultidisciplinary environment.

CO7: Identify opportunity, pursue that opportunity to create value and wealth for the betterment of the individual and society at large.

TOPICS/CONTENTS:

UNIT1: Basic of Computer **(3 Practicals)**

      1.1 Introduction to Computer
      1.2 File Explorer
      1.3 Introduction – Notepad
      1.4 Introduction - WordPad
      1.5 Introduction – Paint

UNIT2: MS Word **(4 Practicals)**

      2.2 Home tab Operations
      2.2 Inserting Objects
      2.3 Designing Page Layout
      2.4 Mailing , Review , View

UNIT3: MS Excel **(4 Practicals)**

      3.1 Introduction to Excel Layout
      3.2 Inserting Charts
      3.3 Using Formulas
      3.4 Operations on Data

UNIT4: MS Power Point **(4 Practicals)**

      4.1 Introduction to Power Point
      4.2 Designing Slides
      4.3 Transition Effects
      4.4 Animations

References:

1.Microsoft Office 2007: Essentials Concepts & Techniques , Cengage Learning India Pvt. Ltd.

2.CCL - Microsoft Office 2010 , Bittu Kumar

3. Tutorials Point - https://www.tutorialspoint.com/word/index.htm

AES's T. C. College (Autonomous), Baramati. CBCS Syllabus 2023 Pattern as per NEP 2020

Mapping of this course with Programme Outcomes

Course Outcomes	Programme Outcomes (POs)						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	1	2	-	-	-	-
CO2	1	2	2	1	-	-	-
CO3	2	2	1	1	2	-	1
CO4	1	1	1	-	2	2	1
CO5	1	1	-	-	2	1	-
CO6	-	-	1	1	1	2	1
CO7	-	-	-	-	-	-	-

Weight :   1 - Partially related   2 - Moderately Related   3 - Strongly related

CBCS Syllabus as per NEP 2020 for F.Y.B.Sc. Statistics (2023 Pattern)

Name of the Programme   : B.Sc. (Computer Science)
Programme Code   : USCOS
Class   : F.Y.B.Sc. (Computer Science)
Semester   : I
Course Type   : SEC Practical
Course Code   : COS-126-SEC(ST)
Course Title   : Introduction to MS Excel and R-Software
No. of Credits   : 2
No. of Teaching Hours   : 60 (12+48)

Course Objectives:

1. To understand the basics of Microsoft Excel and its various applications.

2. To navigate the Excel interface proficiently and grasp the concepts of workbooks, worksheets, and cells.

3. To learn how to enter and edit data effectively in Excel.

4. To gain proficiency in using formulas and functions for calculations and data manipulation.

5. To understand the history, features, and importance of R software.

6. To identify and understand keywords in R.

7. To learn how to create vectors using functions.

Course Outcomes:

Student will be able to

CO1. demonstrate the basic mechanics and navigation of an Excel.

CO2. basic techniques of MS-Excel.

CO3. basic concept of R-Software.

CO4. statistical analysis with simple tools.

CO5. diagrammatic and graphical representation techniques.

CO6. learn Statistics using R software.

CO7. Data transformation, data import/export, combination techniques.

Topics and Learning Points

UNIT 1 - Fundamentals of MS-Excel   Introduction to Excel:

Overview of Microsoft Excel and its uses, Navigating the Excel interface, understanding workbooks, worksheets, and cells, Entering and editing data in Excel.

1. Basic Formulas and Functions:

   Understanding formulas and functions in Excel, using mathematical operators and basic functions, Performing calculations and using cell references, Using built-in functions for common tasks

2. Formatting and Cell Styling:

   Formatting cells, rows, and columns, applying number formats and text formatting, using cell styles and themes, Applying conditional formatting for data visualization.

3. Working with Worksheets and Workbooks:

   Managing multiple worksheets and workbooks, Renaming, inserting, and deleting worksheets, organizing data with freeze panes and split views, Linking data between worksheets and workbooks.

4. Data Management and Analysis:

   Sorting and filtering data, Using data validation for data integrity, creating and managing tables, Introduction to data analysis tools in Excel.

5. Data Visualization with Charts

   Creating basic charts (bar, line, pie), Customizing chart elements (titles, axes, legends) Formatting and enhancing charts, Creating combination charts and sparklines

UNIT 2 - Fundamentals of R

1. Introduction to R, History of R, features of R, Need and importance of R software, starting and ending R session, getting help in R, R commands and case sensitivity.

2. Data types: Character, Numeric

   a) Character Set: Alphabets, Numeric digits, Special Characters

   b) Keywords

3. Vectors and vector arithmetic

   a) Creation of vectors using R functions.

   b) Arithmetic operations on vectors using operators +, - , * , / , ^.

   c) Arithmetic expressions, Relational Operators, Logical Operators

List of Practicals:

Sr. No.	Title of the Experiment
1	Introduction to MS- Excel
2	Representation of raw data in excel worksheets, Pivot data analysis and Computation of summary statistics using MS-Excel.
3	Diagrammatic representation using MS-Excel
4	Graphical representation using MS-Excel.
5	Combinatorial Techniques, Probability distribution and Simulationusing MS-Excel
6	Introduction to Numerical Functions and Vector Access using R Software.
7	Managing Data Frames and Importing from Excel in R Software.
8	Combinatorial Techniques, Probability distribution and Simulationusing R Software.
9	Measures of central tendency for both grouped and ungrouped data using R Software.
10	Measures of dispersion for both grouped and ungrouped data using R Software
11	Implementing Conditional Statements with if-else, loop in R Software
12	Applying Excel and R skills for analysing and interpreting case studies.

Note: Everypractical isequivalenttofour hoursperbatchperweek

References:

1. M. L. Humphrey, Excel for Beginners
2. S. C. Gupta, V.K. Kapoor, Fundamental of Mathematical Statistics
3. William Fischer, Excel: Quickstart Guide for Beginner to Expert
4. Michkel Alexander, Dick Kusleika, John Walkenbeach, Microsoft Excel 2019 BIBLE The Comprehensive Tutorial Resource, Wiley Publication.
5. Frag Curtis (2013). Step by Step Microsoft Excel 2013, MS Press
6. Frye Curtis D. (2007). Step by step Microsoft Office Excel 2007, Microsoft Press
7. Salkind Neil J. and Frey Bruce B (2021). Statistics for people who (Think They) Hate Statistics, Using MS- Excel, Sage Publications.

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CBCS Syllabus as per NEP 2020 for F.Y.B.Sc.(Comp) Mathematics
(2023 Pattern)

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Name of the Programme   **:** B.Sc.(Computer Science)

Program Code   **:** USCOS

Class   **:**F.Y.B.Sc. (ComputerScience)

Semester   **:**I

Course Type   : Skill Enhancement Course (SEC)

Course Code   : COS-126-SEC(MT)

Course Name   **:** Mathematics for Computer Science

No. of Teaching Hours   **:** 60

No. of Credit   **:**02

Course Objectives:

1. Solve system of linear equation using multiple methods.
2. Learn how to create matrices, perform basic matrix operations.
3. Learn how to create plots, graphs and charts to represent and analyze data.
4. Apply Scilab to real-world problems and practice problem-solving skills.
5. Learn how to perform prime factorization, greatest common divisor (GCD), least common multiple (LCM).
6. Learn the basic principles of set, basic set equalities, the basic concepts of relations and functions.
7. Learn how to write an argument using logical notation and determine if the argument is valid or invalid.

Course Outcomes:

By the end of the course, students will be able to:

CO1.   Students will be able to understand the basic principles of set, basic set equalities, the basic concepts of relations and functions.

CO2.   Students will be able to write an argument using logical notation and determine if the argument is valid or invalid.

CO3.   Students will be able to apply these mathematical concepts in the study of computer science.

CO4. Students will be able to apply logical reasoning to solve a variety of problems.
CO5. Student will be able to solve linear equations.
CO6. Student will be able to identify the special properties of matrices.
CO7. Able to use Scilab and Maxima Software to solve problems.

Topics and Learning Points

Teaching Hours

Theory: **12**

1) Introduction to Matrices and operations on them.
2) Logical methods.
3) Graphs of functions.
4) Fundamental of Algebra
5) System of Linear Equation.

Practicals: **48**

1. IntroductionofScilab withsomebasiccommands.
2. Graph Plotting in 2-D and 3-D using Scilab.
3. Basicoperationsonmatrices using Scilab.
4. Solution for system of linear equation using Scilab.
5. Basic Commands for logic using Scilab.
6. Introduction of Maxima using basic commands.
7. Polynomial, Sets, Function and Inverse of a Function in Maxima.
8. Basic Commands for Numbers, Complex Number, Prime Numbers in Maxima.
9. Graph plotting in 2-D and 3-D using Maxima.
10. Basicoperationsonmatrices using Maxima.
11. Solution for system of linear equation using Maxima.
12. Basic Commands for logic using Maxima.

Reference Book:

1. Edwin L. Woollett, *Maxima by example: A step by step introduction to computer algebra using Maxima*
2. Tejas Sheth, Satish Annigeri and Rajesh Jakhotia, *Scilab: A practical introduction to programming and problem solving.*
3. Gilbert Strang, Linear Algebra and its applications (4th Edition).

CBCS Syllabus as per NEP 2020 for F. Y. B.Sc.(Computer Science) Electronics
(2023 Pattern)

Name of the Programme : B.Sc.(Computer Science)Electronics

Programme Code : USCOS

Class : F. Y. B.Sc.

Semester : I

Course Type : Skill Enhancement Course (Practical)

Course Code : COS-126-SEC(EL)

Course Title : Electronics Practical

No. of Credits : 02

No. of Teaching Hours : 60

Course Objectives:

1. To teach students how to know, identify, draw different symbols, logic diagrams and circuit diagrams.

2. To develop skill of circuit connections.

3. To train them to design and analyse circuits for specific purpose.

4. To motivate them to work on different mini projects.

Course Outcomes:

By the end of the course, students will be able to:

CO1. To identify different components, devices, IC's, as well as their types.

CO2. To understand basic parameters.

CO3. To know operation of different instruments used in the laboratory.

CO4. To connect circuit and do required performance analysis.

CO5. Develop hobby projects.

List of Practical: (Any 8)

1. Electronics components: Resistors, capacitors, Inductors,Transformer, Switches, Relays, Fuses, Batteries, Cables, Connectors,Color coding of resistors, series and parallel combinations of resistors, capacitors & Inductors, diode,clipper and clamper, transistor.

2. Ohms law, voltage and current dividers, Kirchhoff's Laws (KCL, KVL), Thevenin's theorem, Norton's theorem, Maximum power transfer theorem, Superposition theorem.

3. Concept of Logic Gates – Statement, Symbol, Expression, Truth table of basic gates, Pinout diagrams - IC 7400, IC 7402, IC 7432, IC 7408, IC 7486, Basic Binary Rules for

addition and subtraction, Half adder, Full adder, DE Morgan's theorem, Inter-conversion- Binary to Gray and Gray to Binary.

4. Use of measuring electronic Instruments (Multimeter, Signal Generators, Power supply)
5. Measurement of signal parameters (amplitude, period, frequency, peak voltage, peak to peak voltage, RMS value)
6. Study of electronic components (Resistor, Capacitor, inductor, Transformer, Switches, Fuses, Connectors, Cables, Diodes, Transistors, IC's)
7. Verification of network theorems: KCL / KVL.
8. Verification of network theorems: Thevenin/ Norton/ Maximum Power Transfer.
9. Build and test Clipper / Clampercircuit.
10. Verification of logic gates using IC's (7400, 7402, 7408, 7404, 7432, 7486)
11. Realization of basic gates using universal gates (NAND, NOR)
12. Study of Half & Full adder using gates.
13. Code converter : Binary to Gray and Gray to Binary
14. Verification of DE Morgan's theorem
15. To study Universal adder &subtractor

Activity:(Any one Activity equivalent to two experiments)
Students must perform at least one additional activity out of two activities in addition to eight experiments mentioned above. Total Laboratory work with additional activities should be equivalent to ten experiments.

SYLLABUS (CBCS as per NEP 2020) FOR F. Y. B. Sc. (Computer Science)

(w. e. from June, 2023)

Name of the Programme	: B.Sc. Computer Science
Program Code	: USCOS
Class	: F.Y.B.Sc. (Computer Science)
Semester	: I
Course Type	: VSC
Course Name (TH)	: Problem Solving Skills & DBMS Using PostgreSQL
Course Code	: COS-121-VSC
No. of Lectures	: 30
No. of Credits	: 02

A) *CourseObjectives:*

1. *Develop problem-solving skills.*

2. *Learn how to write and execute C programs.*

3. *Understand the basic syntax and structure of C.*

4. *Master the use of functions and modular programming*

5. *Understand design and implementation of a database system.*

6. *Study physical database designs and database modeling.*

7. *Understand creation, manipulation and querying of data in databases.*

B) *CourseOutcomes:*

CO1: Develop problem-solving skills.
CO2: Understand the fundamentals of C programming language.

CO3: Gain proficiency in C programming syntax and semantics.
CO4: Develop debugging and error handling skills.
CO5: Master the basics of database concepts and database management system.
CO6: Write SQL commands to create tables, insert, update, delete and query data.
CO7: Gain knowledge about query execution and its performance.

UNIT I	**Introduction to Computer programming languages** 1.1 Problem Solving 1.2 Algorithms & Flowcharts 1.3 Programming Languages Machine language Assembly language High level languages	**05**

UNIT II	**Problem solving Using Computer**
	  2.1 Problem solving using a computer.
	  2.2 Algorithms & flowcharts
	  2.3 Programming tools
	  2.4 Structure of a C program
	  2.5 C program development cycle
	  2.6 Application areas
		05

Unit III	**3. Introduction toSQL** 3.1 Introduction 3.2 Basic structure 3.3 Set operations. 3.4 Aggregate functions 3.5 Null values 3.6 SQL: Data types, Language structure 3.7 Design time constraints: (NOT NULL, UNIQUE, PRIMARY,FOREIGN, CHECK & EXCLUSION)	**08**

Unit IV	**4. Basics Queries Operations withSQL**
	4.1 NestedSubqueries
	   • Set Membership
	   • Set Comparison
	   • Test for Empty Relation
	   • Test for absence of duplicate tuples
	4.2 Modification of database
	   • Insert Command (Single & Multiple records)
	   • Delete Command
	   • Update Command
		04

Unit V	**5. Operational Queries** 5.1 DML (INSERT, SELECT, DELETE) 5.2 DDL (CREATE, ALTER, TRUNCATE, DROP, RENAME) 5.3 TCL (COMMIT, ROLLBACK, SAVEPOINT) 5.4 DCL (GRANT, REVOKE) 5.5 SQL mechanisms for joining relations (inner joins, outer joins, and their types) 5.6 SQL mechanisms for joining relations (inner joins, outer joins, and their types) 5.7 Evaluating Performance: EXPLAIN (Basics, ANALYZE & Caveats etc.) Solving Examples on SQL (Case Studies)	**08**

Mapping of this course with Programme Outcomes

Course Outcomes	Programme Outcomes (POs)						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	2				2
CO2	3	2	2				
CO3	2	2	3				2
CO4	2	3	1				2
CO5	2	3	3				2
CO6	3	2	3				2
CO7	3	3	3				3

Weight: 1 - Partially related   2 - Moderately Related   3 - Strongly related

SYLLABUS (CBCS as per NEP 2020) FOR F. Y. B. Sc. (Computer Science)

(w. e. from June, 2023)

Name of the Programme	: B.Sc. Computer Science
Program Code	: USCOS
Class	: F.Y.B.Sc. (Computer Science)
Semester	: I
Course Type	:IKS
Course Name	: Evolution of Computers
Course Code	: COS-137-IKS
No. of Lectures	: 30
No. of Credits	: 02

A) *Course Objectives:*

1. Students will understand about the history of computers.
2. Students will gain knowledge about the evolution of different programming languages.
3. Students will study program structure of some high level language.
4. Students will study the features of different types of scripting languages.
5. Students will study the features of different types of Operating Systems.
6. Students will study the features of different types of clouds.
7. Students will know the current trends in Computer Science.

B) *Course Outcomes:*

After completing this course, students will be able to

CO1: Compare different phases of development of computer and its components.
CO2: Categorize the programming languages based on its features.
CO3: Compare the programming languages based on program structure.
CO4: Distinguish among different scripting languages based on its features .
CO5: Compare among different types of Operating Systems.
CO6: Compare among different types of cloud.
CO7: Compare among recent computing techniques.

TOPICS/CONTENTS:

UNIT1: Early computing devices and beginning years   (08 Lectures)

- Early computing devices (Abacus, Pascal adding machine, Leibniz calculator, Difference
  Engine)
- Early inventors (Charles Babbage, Ada Lovelace, George Boole, Dr. Herman Hollerith,

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John Von Neumann, Howard Aiken)
- The Turing Machine (mathematical model) : Concept, Example
- First programmable computes – Colossus, ENIAC
- Solid State Transistors (1947) and emergence of second generation of computers
- High Level Programming Languages: COBOL, FORTRAN, LISP and their features
- Program structure in COBOL, FORTRAN and LISP
- Invention of Integrated Circuits by Kilby and Noyce

UNIT 2: Middle years   (10 Lectures)
- BASIC language
- Invention of ARPANET
- First ever communication on a mobile phone by Martin Cooper
- Development of TCP/IP (Vint Cert and Bob Kahn) and its features
- Launching of Apple-I(1976) and Apple-II(modern PC) (1977)
- VLSI
- Development of Pascal and its features
- Evolution of C language(1972) from B(1969), BCPL(1967), ALGOL 68(1968) and its features
- Development of Prolog language (1972) and its features
- Applications of Prolog
- Development of SQL by IBM (1972) and its features
- Importance of SQL
- Emergence of UNIX OS
- Rise of the Operating Systems (Linux, Microsoft Windows, Solaris, Mac OS)
- Comparison among different OS
- Evolution of C++ from C with classes (C + Simula 67)
- Features and applications of C++

UNIT 3: Moving ahead towards future   (12 Lectures)
- The Word Wide Web (www) and its importance
- Development of HTML
- Features and applications of HTML
- Development of Python, R, Java
- Features and applications of Python, R, Java
- Development of scripting languages: PHP, JavaScript, VBScript, ASP, JSP
- Features and applications of PHP, JavaScript, VBScript, ASP, JSP
- Comparison among PHP, JavaScript, VBScript, ASP, JSP
- Emergence of Cloud Computing
- Types of Cloud
- Artificial Intelligence: Machine Learning, Deep Learning
- Applications of Artificial Intelligence
- Internet of Things (IoT), Image Processing
- Development of Dart, Kotlin

- Features of Dart and Kotlin
- Recent trends : Quantum Computing, Edge Computing, Fog Computing, Robotics, Cybersecurity, Blockchain

References:

1. Basandra, S.K. (2010). Computer Today. Galgotia Publications Pvt. Ltd.
2. Rajaraman V.(2010). Fundamentals of Computer. PHI Learning Pvt. Ltd. New Delhi.

Web References:

1. https://en.wikipedia.org/wiki/
2. https://www.computerhistory.org
3. https://www.livescience.com/20718-computer-history.html
4. https://www.g2.com/articles/history-of-computers
5. https://home.cern/science/computing/birth-web/short-history-web

Mapping of this course with Programme Outcomes

Course Outcomes	Programme Outcomes (POs)						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1		2					
CO2		2					
CO3			2				
CO4			2				
CO5	2						
CO6			2				
CO7			2				

Weight: 1 - Partially related   2 - Moderately Relate3 - Strongly related

Examination Pattern / Evaluation Pattern

Teaching and Evaluation (for Major, Minor, AEC, VEC, IKS courses)

Course Credits	No. of Hours per Semester Theory/Practical	No. of Hours per Week Theory/Practical	Maximum Marks	CE 40 %	ESE 60%
1	15 / 30	1 / 2	25	10	15
2	30 / 60	2 / 4	50	20	30
3	45 / 90	4 / 6	75	30	45
4	60 / 120	4 / 8	100	40	60

Teaching and Evaluation (for VSC, SEC & CC courses)

- Evaluation to be done by Internal & External Experts
- No descriptive end semester written examination
- Evaluation to be done at Department level preferably prior to commencement of Theory /Practical Examinations
- Evaluation to be done on the Skills gained by student

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