

Shree Warana Vibhag Shikshan Mandal's

**WARANA UNIVERSITY,
WARANANAGAR**

(A State Public University established under Section 3 (6) of MPUA, 2016)

॥ विद्या सर्वस्य भूषणम् ॥



Established:2025

**Syllabus For
Bachelor of Science(B.Sc) in Computer Science**

UNDER

Faculty of Science

B.Sc.Part -I(Semester- I and II)

**STRUCTURE AND SYLLABUS IN ACCORDANCE WITH NATIONAL
EDUCATION POLICY - 2020**

HAVING CHOICE BASED CREDIT SYSTEM

WITH MULTIPLE ENTRY AND MULTIPLE EXIT OPTIONS

(TO BE IMPLEMENTED FROM ACADEMIC YEAR 2025-26 ON WORDS)

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

INDEX

Sr. No.	CONTENT	Page No
1	PREAMBLE	3
2	PROGRAMME LEARNING OUTCOMES(POs)	4
3	PROGRAMME SPECIFIC OUTCOMES (PSOs)	4
4	ELIGIBILITY	5
5	MEDIUM	5
6	EXAMINATION PATTERN	5
7	MEME INSTRUCTIONS	6
8	SCHEME OF TEACHING AND EXAMINATION	7
9	COURSE STRUCTURE B.SC.-I	9
10	COURSE STRUCTURE SUBJECT SPECIFIC	10
11	NOTE ON OE COURSE	11
12	STRUCTURE OF PROGRAMME	12
13	SYLLABUS	13 To 24
14	SCHEME OF EXAMINATION	25

Preamble:

The National Education Policy 2020 for higher education aims to transform the existing higher education system in India. This policy emphasizes on promoting interdisciplinary studies, introducing new subjects, and providing flexibility in courses and fresh opportunities for students. It aims to increase the Gross Enrolment Ratio (GER) in higher education, provide multiple entry and exit options, and allow students to choose courses according to their interests and aptitude. The policy envisions setting up of a National Research Foundation, a National Education Technology Forum, and setting up of more Higher Education Institutions in the country. The policy is aimed at creating a holistic and flexible education system that is adaptive to the needs of the 21st century.

The B.Sc. Computer Science syllabi are designed to provide a comprehensive and in-depth understanding of the fascinating world of Computer technology. We aim to nurture the intellectual curiosity, sharpen their scientific temper, preparing them for successful careers in various sectors of the computer sciences so that, students to keep updated on recent developments in the field. The Program exposes students to significant advances in computer sciences as well as related fields through learning; innovative pedagogies and assessment strategies; multidisciplinary and Interdisciplinary education; creative and critical thinking; student centric participatory learning; imaginative abilities and flexible curricular structures to enable creative combination of disciplines for the study.

General Objectives of the Program:

Computer Science is a pervasive subject. All the branches of science need computer Science technology. It is an experimental science and students need to trend in practicals to get expertise in doing fine experiments and handle. Along with the data obtained its statistical analysis is also required to establish authenticity in the fields like programming design, data base creating, web design etc.

There is an immense potentiality for technology and post graduates to undertake advanced research or in Industries as skilled computer science technology.

Program Outcomes:

PO-1:- Students will gain fundamental knowledge of Computer Sci. which will help them with PG Studies and Research

PO-2:- Students will be able to know good laboratory practices and lab safety.

PO-3:- To make the learner proficient in analyzing the various observations and chemical phenomena presented to him during the course.

PO-4:- Students will be able to apply the fundamental knowledge to address crosscutting issues such as sustainable development

PO-5:- Students will be able to solve various problems by identifying the essential parts of a problem, formulating a strategy for solving the problem, applying appropriate techniques to arrive at a solution, testing the precision and accuracy of the solution and interpreting the results.

PO-6:- Students will be able to communicate effectively, i.e., articulate, comprehend and write effective reports, make effective presentations and documentation and express the subject through technical writing and oral presentation.

Program Specific Outcomes:

PSO1:Technical Expertise:Implement fundamental knowledge of core and programming computer subjects like C programming, operating system etc. For developing effective technical and computing solutions by incorporating creativity and logical reasoning.

PSO2:Successful Career:Deliver professional services and knowledge with updated new technologies like, Python, HTML, and PHP etc. in Computer science career.

PSO3: Interdisciplinary and Life Long Learning: Develop Mathematical and Electronical, Computation abilities.It also develops analytical,reasoning and logical abilities of students.Under go higher studies, certifications and technology research as per market needs.

PSO4:Human Values and Ethics:Understand professional and ethical responsibilities in order to work at different positions in organizations and at a societal context.

ELIGIBILITY:-

Students must have completed his 10+2(class 12) education from a recognized board with a science stream, including subjects like physics, Chemistry, and Mathematics (PCM).

MEDIUM:-

The course is often taught in English, so students must be proficient in the language to follow lectures and complete assignments effectively.

Scheme of teaching and examination:-

- 1. DURATION:** B.Sc. in Computer Science Part–I. The duration of course shall be one year and two semesters.
- 2. PATTERN:** Pattern of examination will be semester.
- 3. EXAMINATION SCHEME**

Sr.no	Category of exam scheme	Maximum Marks	Minimum Marks	Duration
1	Theory	30	40%	1Hour
2	Internal	20	Minimum 8(M)	-
3	Practical	50	40%	2Hour

MEME Instructions:

In alignment with the National Education Policy (NEP) 2020, the Bachelor of Science (B.Sc.) program adopts the Multiple Entry and Multiple Exit (ME-ME) framework. This flexible structure is designed to provide students with academic mobility, skill development, and lifelong learning opportunities. Through ME-ME framework, the program enables students to enter and exit at different stages with appropriate certifications. Information regarding different entry and exit options available to students and respective mandatory number of credits to be earned by the students are provided in the table below.

Year	Stage of exit	Type of Award	Mandatory Credits to be earned	Minimum credits to be earned
1	After successful completion of One Year	Undergraduate Certificate in Science	44	40
2	After successful completion of Two Year	Undergraduate Diploma in Science	88	80
3	After successful completion of Three Year	Bachelor of Science Degree	132	120

Re-entry provision:

Students leaving after a undergraduate certificate or undergraduate diploma may re-enter the program within 5 years by earning required credits through Academic Bank of Credits.

SCHEME OF TEACHING AND EXAMINATION: [The scheme of teaching and examination should be given as applicable to the course/paper concerned.]

B.Sc. Programme Structure for Level 4.5 of B.Sc.-I Semester I														
Teaching Scheme						Examination Scheme								
Sr. No.	Theory (TH) & Practical (P)					Semester-end Examination (SEE)			Internal Assessment (IA)			Practical		
	Course Type	No. of Lectures	Practical	Hours	Credit S	Paper Hours	Max	Min	Internal	Max	Min	Paper Hours	Max	Min
1.	DSC-I	4	1	4 +4	6	1	30	12	Assignment	20	8	2	50	20
2.	DSC-I	4	1	4 +4	6	1	30	12		20	8	2	50	20
3.	DSC-I	4	1	4 +4	6	1	30	12		20	8	2	50	20
4.	OE -I	-	1	4	2	-	-	-		-	-	2	50	20
5.	VEC	-	-	-	-	-	-	-		-	-	-	-	-
6.	IKS (Generic)	2	-	2	2	2	50	20		-	-	-	-	-
Total					22	[DSC (60 X 3) + IKS 50] Total SEE = 230			DSC (40X3) Total IA = 120			Practical. = 50X4 Total Practical. = 200		
Total Semester –I = 550														

B.Sc. Programme Structure for Level 4.5 of B.Sc.-I Semester II														
Teaching Scheme						Examination Scheme								
Sr. No.	Theory (TH) & Practical (P)					Semester-end Examination (SEE)			Internal Assessment (IA)			Practical		
	Course Type	No. of Lectures	Practical	Hours	Credit S	Paper Hours	Max	Min	Internal	Max	Min	Paper Hours	Max	Min
1.	DSC-II	4	1	4 +4	6	1	30	12	Assignment	20	8	2	50	20
2.	DSC-II	4	1	4 +4	6	1	30	12		20	8	2	50	20
3.	DSC-II	4	1	4 +4	6	1	30	12		20	8	2	50	20
4.	OE -II	-	1	4	2	-	-	-		-	-	2	50	20
5.	VEC–I	2	-	2	2	2	50	20		-	-	-	-	-
6.	IKS (Generic)	-	-	-	-	-	-	-		-	-	-	-	-
Total					22	[DSC (60 X 3) + VEC 50] Total SEE = 230			DSC (40X3) Total IA = 120			Practical. = 50X4 Total Practical. = 200		
Total Semester –I = 550														

General Guidelines for the selection of subjects

1. In first year, student has to choose three DSC subjects from the basket for faculty of Science. (The DSC Basket for faculty of Science includes Mathematics, Physics, Chemistry, Botany, Zoology, Biochemistry, Industrial Microbiology and Computer Science)
2. At the start of second year, out of these 3 DSC subjects, he/she has to opt one subject as Major subject and one as Minor subject. The remaining DSC subject will be dropped.
3. Student cannot select a subject as major or minor other than the subjects taken in first year.
4. OE is to be chosen compulsorily from faculty other than that of the major. (B.Sc. students needs to select OE from faculty of Arts or Faculty of Commerce)
5. VSC is to be selected from the basket of Skill courses approved by the university.
6. IKS (Generic) will be provided by the university separate

Credit Distribution Structure for B.Sc.I in Computer Science with Multiple Entry and Exit Options.

COURSE CATEGORY	ABBREVIATION (Only 2 Letters)	DESCRIPTION	Sem.I Credit	Sem.II Credit
DSC	DSC (DS)	Discipline Specific Course	6x3=18	6x3=18
OE	OE(OE)	Open Elective	2x1=02	2x1=02
SEC	SEC (SE)	Skill Enhancement Course	----	-----
AEC/IKS/VEC	AEC(AE)	Ability Enhancement Course	-----	-----
	IKS(IK)	Indian Knowledge System (Generic)	2x1=02	-----
	VEC(VE)	Value Education Course	-----	2x1=02
CC/CEP	CC (CC)	Co-curricular Course		-----
	CEP(CE)	Community Engagement Project	-----	-----
			22	22
			Total 44	

Warana University, Warananagar
Bachelor of Science
Credit Framework
First-Year (B. Sc. I-Computer Science)

Level	Sem.	Subject-1 (Computer Science)	Subject-2	Subject-3	IDC/MDC/ OE/GE	SEC	AEC, VEC, IKS			OJT, FP, CEP, CC, RP			Total Credits
		DSC	DSC	DSC	OE	SEC	AEC	VEC	IKS	CC	FP/OJT	RP/ Dissert.	
4.5	I	BCP-101 Paper-I Basic of C Programming(2 Cr)	DSC-I (2 Cr)	DSC-I (2 Cr)	OEPR-101 Practical Paper-I Office Automation (2 Cr)	--	--	--	IKS-I (2 Cr) Introduction to IKS	--	--	--	--
		DC-102 Paper-II Databasse Concepts (2 Cr)	DSC-II (2 Cr)	DSC-II (2 Cr)									
		PRCS-103 Practical Paper-I (2 Cr)	DSC-P-I (2 Cr)	DSC-P-I (2 Cr)									
	Credits	4(T)+2(P) =6	4(T)+2(P) =6	4(T)+2(P) =6	2 (P) =2	--	--	--	2(T)	--	--	--	22
	II	ACP-201 Paper-III Advanced C Programming (2 Cr)	DSC-III (2 Cr)	DSC-I (2 Cr)	OEPR-201 Practical Paper-II Basics Of HTML (2 Cr)	--	--	VEC-I (2 Cr) Democracy, Election and Constitution	--	--	--	--	--
		AD-202 Paper-IV Advanced Database (2 Cr)	DSC-IV (2 Cr)	DSC-II (2 Cr)									
		PRCS-203 Practical Paper-II (2 Cr)	DSC-P-II (2 Cr)	DSC-P-II (2 Cr)									
	Credits	4(T)+2(P)=6	4(T)+2(P) =6	4(T)+2(P) =6	2 (P)=2	--	--	2(T)	--	--	--	--	22
Total Credits		12	12	12	4	--	--	2	2	--	--	--	44
		Exit Option: Award of UG Certificate in Major with 44 Credits and an additional 4 credits core NSQF course/ Internship/Skill Courses OR Continue											

1. Course Code Table

A-1)B.Sc.-I:SEMESTER-I(TOTALCREDITS-22):(Note:Put‘—’wherever‘NotApplicable’)

COURSECATEGORY		COURSENAME	COURSECODE	CREDITS
DSC	DS-I	Basic of C Programming	2502USCSMJ101	2
DSC	DS-I	Database Concepts	2502USCSMJ102	2
DSC	DS-I	Practical Labaratory	2502USCSMJ103	2
OE	OE-I	Office Automation	2502USCSOE101	2
SEC	SE-I	-----		—
AEC	AE-I	-----		—
IKS (Generic)	IK	Introduction to Indian Knowledge Systez	2502USGEIK101	2
CC	CC	-----		
CREDITSFORB.Sc.-I,SEM-I:				10

A-2)B.Sc.-I:SEMESTER-II(TOTALCREDITS-22):(Note:Put‘—’wherever‘NotApplicable’)

COURSECATEGORY		COURSENAME	COURSECODE	CREDITS
DSC	DS-II	Advanced C Programming	2502USCSMJ201	2
DSC	DS-II	Advanced Database	2502USCSMJ202	2
DSC	DS-II	Labaratory Practical	2502USCSMJ203	2
OE	OE-II	Basics of HTML	2502USCSOE201	2
SEC	SE-II	----	-----	—
AEC	AE-II	----	-----	—
VEC	VE	Democracy, Election and Constitution	2502USDEVE201	2
CEP	CE	----		—
CREDITS FOR B.Sc.-I,SEM-II:				10

(Annexure-II)

WARANA CLUSTER UNIVERSITY, WARANANAGAR
NEP-2020:CreditFramework forUG(B.Sc.) Programmes under Faculty of SCIENCE

SEM (Level)	COURSES			OE	VSC/SEC	AEC/VEC/IKS	OJT/FP/CEP /CC/RP	Total Credits	Degree/Cum. Cr. MEME
	Course-1	Course-2	Course-3						
SEMI (4.5)	DSC-I(2) DSC-II (2) DSC P-I(2)	DSC-I(2) DSC-II (2) DSC P-I(2)	DSC-I(2) DSC-II (2) DSC P-I(2)	OE-1(2) (T/P)		IKS-I(2)		22	UG Certificate 44
SEMII (4.5)	DSC-III(2) DSC-IV (2) DSC P-II(2)	DSC-III(2) DSC-IV (2) DSC P-II(2)	DSC-III(2) DSC-IV (2) DSC P-II(2)	OE-2(2) (T/P)		VEC-I(2) (Democracy, Election and Constitution)		22	
Credits	8(T)+4(P)=12	8(T)+4(P)=12	8(T)+4(P)=12	2+2=4 (T/P)	--	2+2=4	--	44	Exit Option:4 credits NSQF/Internship/Skill courses
	MAJOR		MINOR						
SEMIII (5.0)	Major V(2) Major VI (2) Major P III (2)	--	Minor V(2) Minor VI (2) Minor P III(2)	OE-3(2) (T/P)	VSC I (2) (P) (Major specific) SEC I(2) (T/P)	AEC I(2) (English)	CC-I (2)	22	UG Diploma 88
SEMIV (5.0)	Major VII(2) Major VIII (2) Major P IV (2)	--	Minor VII(2) Minor VIII (2) Minor P IV (2)	OE-4(2) (T/P)	SEC-II(2) (T/P)	AEC-II(2) (English) VEC-II(2) (Environmental studies)	CEP-I(2)	22	
Credits	8(T)+4(P)=12		8(T)+4(P)=12	2+2=4(T/P)	4(T/P)+2(P)=6	2+4=6	2+2=4	44	Exit Option:4 credits NSQF/Internship/Skill courses
SEMV (5.5)	Major IX(2) Major X (2) Major P V (4)	Major I (ELEC)(2) Major P-I (ELEC) (2)	-	OE-5(2) (T/P)	VSC II (2) (Major specific)(P)	AEC III(2) (English)	OJT (04)	22	UG Degree 132
SEMVI (5.5)	Major XI(2) Major XII (2) Major P VI (4)	Major II (ELEC)(2) Major P-II(2) (ELEC)	-		VSC III (2) (Major specific) (P) SEC III(2) (T/P)	AEC IV(2) (English) IKS 2 (Major specific) (2)	FP-(02)	22	
Credits	8(T)+8(P)=16	4(T)+4(P)=8	-	2(T/P)	2(T/P)+4(P)=6	4+2=6	4+2=6	44	
Total Credits	40+20=60		24	10	12	16	10	132	Exit Option

Note:-The Students of Science should select the open elective subject from the OE basket provided by faculty of Arts and Humanities or Faculty of Commerce and Management. the details of OE courses available are provided in the prospectus and posted on institutional websites.

B. Sc. I (NEP-2.0) Semester I, PAPER-I

BCP-101- Basics of C Programming

(Theory Credits-02, 30 hours)

Total Marks:-30

Course Outcomes:

After successful completion of this course, students will able to:

- 1) Demonstrate a familiarity of computer programming language concepts.
- 2) Understand to develop C programs on Linux platform.
- 3) Use basics of C language syntax as identifiers, variables, data types and operators.
- 4) Apply the concept of branching, looping, decision-making statements and Array for problem solving.

Module :-1 Problem Solving Using Computers	Sub Module	Topics	Lectures(Hours)
	A) Planning the Computer Program:	Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation.	15
	B) Logical Continuum of Program of Programming:	Linux Operating System and C Language, Introduction toGCC Compiler, Components of Compilation Process, C Program Structure, Vi Editor, Whittling the First 'C' Program, Checking Whether the Compiler Is Working, Execution of Make file, Character Set, C Tokens (Keywords, Identifiers, Constants, Stings, Special Symbols, Operators), Getting Used to the Data Types (Primary or fundamental, Derived and User-defined), Data type modifiers, Built-In Standard Library, Variable Declaration, Input / Output Statement, Format Specifiers, Escape Sequences, Operators, Operator Precedence.	

Module :-2 Control Structures and Arrays	Sub Module	Topics	Lectures(Hours)
	A) Decision Making and Looping Constructs:	Introduction, the if Statement, the if-else Statement, Nested if-else, The Switch Case Statement, the while Loop, the odd Loop (do while), the for Loop, Loop Control Statements, Infinite Loop.	15
	B) Arrays:	Features, Definition, Types of Arrays, Initialization of array, Memory representation of array, Single-Dimensional Array, Two-Dimensional Array, Multi-Dimensional Array	

Reference Books:

1. "C Programming in an Open Source Paradigm: A Hands on approach", K.S.Oza, S.R.Patil, R.K.Kamat River Publisher Series in Information Science and Technology, Netherland 978-87-93237-67-4 ,2015
2. ANSIC–E.Balgurusamy
3. LetusC–Y.C.Kanetkar
4. 'C'programming–DennisRitchie
5. Programmingin'C'-Venugopals

B. Sc. I (NEP-2.0) Semester I, PAPER-II

DC-102- Database concepts

(Theory Credits-02, 30 hours) Total Marks:-30

Course Outcomes:

After successful completion of this course, students will be able to:

- 1) Describe the basic concepts of DBMS and various databases used in real applications.
 - 2) Demonstrate the principles behind system at database design approaches.
 - 3) Describe the fundamental elements of Relational Database Management Systems.
 - 4) Use various commands in data languages with example.
-

	Topics	Lectures(Hours)
Module :-1 Basics of RDBMS	Characteristics of database approach, advantages and disadvantages of DBMS, Data models: Hierarchical, Network, Relational, Schema and Instances, DBMS architecture: Three Schema Architecture, Internal, Conceptual, External, Data independence: Logical, Physical, Concept of RDBMS, Terminologies: relation, attribute, domain, tuple, entities, Integrity Constraints (Domain, Entity, Referential), Entity Relationship Model, Entity Relationships: one-one, one-many, many-one, many-many, Key: Super key, Composite Key, Candidate Key, Primary Key, Alternate Key or Secondary Key, Foreign Key), Normalization: 1NF, 2NF, 3NF, De-normalization, Relational algebra.	15

	Topics	Lectures(Hours)
Module :-2 Basics of MySQL	Features of MySQL, Data types, User management, Database (Create, Use, Drop, Show, Copy), DDL, DML, DCL, TCL Commands, Clauses – Order by, where and group by, Operators : Arithmetic(DIV, /, -, +, *, %, MOD), Comparison operator(=, <>, >, <, >=, <=), Set operators: Union, Union all, Intersect, Minus Another Operator: like, in, not, between, exists, all, any, is null, is not null, distinct.	15

Reference Books:

1. R.Elmasri, S.B.Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education, 2010.
2. R. Ramakrishnan, J. Gehrke, Database Management Systems 3rd Edition, McGraw-Hill, 2002.
3. A.Silberschatz, H.F.Korth, S.Sudarshan, Database System Concepts 6th Edition, McGraw Hill, 2010.
4. R. Elmasri, S.B. Navathe Database Systems Models, Languages, Design and application Programming, 6th Edition, Pearson Education, 2013.
5. Database System Concept–Silberschatz, Korth
6. Introduction to Database Systems C.J.Date Pearsons Education
7. Learning MySQL-Hugh Williams, Saied Tahaghoghi
8. MySQL Lina Nutshell, 2nd Edition-A Desktop Quick Reference-Russell Dyer

B. Sc. I Semester I, Practical Course
PRCS-103-PRACTICAL PAPER-I
(Credits-02, 60 hours)

Total-50Marks

Course Outcomes:

After successful completion of this course, students will be able to:

- 1) Understand basic structure of C Programming, declaration and usage of variables, use of data type and operators.
 - 2) Implement control structures and array to develop a C program.
 - 3) Design data base for business applications.
 - 4) Use various commands in data languages on databases.
-

Practical Based on BCP-101

Following is a sample list of assignments for practical, instructors are advised to provide more lab assignments to students to meet the course specified outcomes.

1. Write a program to convert the given temperature from Fahrenheit to Celsius
2. Write a program to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
3. Write a program to accept 4 subject marks and calculate total marks, percentage and grade of student.
4. Write a program to input a number and find the given number is Odd or Even.
5. Write a menu driven program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
6. Write a program to find factorial of a given number.
7. Write a program to display the first n term Fibonacci sequence.
8. Write a program to print palindrome numbers between given range.
9. Write a program to find sum of the following series from terms: $1 - \frac{3}{2} + \frac{4}{3} - \dots - \frac{n}{n-1}$
10. Write a program to sort given array in ascending as well as descending order.
11. Write a program to calculate the product of two compatible matrices.
12. Write a program to check whether a given number is prime or not.
13. Write a program to find maximum and minimum numbers in given array.
14. Write a program to add and subtract two matrices

Practical Based on DC–102

Following is a sample list of assignments for practical ,instructors are advised to provide more lab assignments to students to meet the course specified outcomes.

1. A practical on create, use and drop database.
2. A practical on DDL commands–Create table,Alter table:Add,modify,drop,rename column, rename table using first/after; Drop, Rename, Truncate)
3. A practical on DML commands–insert record, update record, select and delete record
4. A practical on creating table and use of different constraints on table. Insert at least 10 records.
5. A practical on user management in MySQL.
6. A practical on DCL commands –Grant, Revoke
7. A practical on TCL commands–Rollback, Commit, Save point.

B. Sc. I (NEP-2.0) Semester II, PAPER-III

ACP-201- Advanced C Programming

(Theory Credits-02, 30 hours)

Total:-30Marks

Course Outcomes:

After successful completion of this course, students willable to:

- 1) Understand the concept and importance of pointers in C language.
 - 2) Demonstrate an understanding of functions in problem solving.
 - 3) Understand working of structure and dynamic memory allocation.
 - 4) Apply file handling techniques using C language.
-

	Sub Module	Topics	Lectures
Module :-1 Pointers and Functions:	A) Pointers:	Definition and Declaration, Pointer Declaration, Pointer Initialization, Pointer Arithmetic, Arrays and Pointers, Pointers and One-Dimensional Arrays, Pointers and Two-Dimensional Arrays, Call by value and call by reference, Dynamic Memory Allocation	15(Hrs)
	B) Programming for Functional Functions:	Introduction, types of functions, Function Declaration, Function Definition, Function Call, Scope of variables, Nested Functions, Recursion, Storage classes.	

Module :-2 Structures and File Handling	A) Structure:	User-Defined Data Types, Defining and declaring structure, size of structure, accessing members using Member direct selector operators(.), Nested Structure, Structure and Array.	15(Hrs)
	B) File Handling:	Defining and opening a file, File opening modes- read, write, append, closing a file, Input/Output Operations on file: getc(), putc(), getw(), putw(), fprintf(), fscanf(), ftell(), fseek(),rewind().	

Reference Books:

1. “C Programming in an Open Source Paradigm: A Hands on approach”, K.S.Oza, S.R.Patil, R.K.Kamat River Publisher Series in Information Science and Technology, Netherland 978-87-93237-67-4 ,2015
2. ANSIC–E.Balgurusamy
3. LetusC–Y.C.Kanetkar
4. ‘C’programming–DennisRitchie
5. Programmingin‘C’-Venugopal

B. Sc. I (NEP-2.0) Semester II, PAPER-III

AD-202- Advanced Database

(Theory Credits-02, 30 hours)

Total:-30Marks

Course Outcomes:

After successful completion of this course, students will able to:

- 1) Understand various functions and sub queries.
- 2) Understand various joins and views.
- 3) Use the control statements and stored procedures.
- 4) Use the cursors and triggers.

Module :-1 MySQL Functions, Sub queries and Join	Sub Module	Topics	Lectures
	A) Functions in MySQL	Aggregate functions (avg, count, min, max, sum), String Functions (concat, instr, mid, length, strcmp, trim, ltrim, rtrim), Math Functions (abs, ceil, floor, mod, pow, sqrt), Date and Time Functions (adddate, datediff, day, month, year, hour, min, sec)..	15(Hrs)
	B) Subqueries	Concepts of Subqueries, subqueries with IN, EXISTS, NOT EXISTS, subqueries restrictions, Nested subqueries, ANY/ALL clause, correlated sub queries, Group by and Having clause.	
	C) Concepts of Join.	Types of Joins-Inner Join,Outer Join,Left Join, Right Join,Cross Join	
	D) Views	(creating, altering dropping, renaming and manipulating views).	

	Sub Module	Topics	Lectures
Module :-2 Advanced MySQL	A) Control Statements	If, case and loop,	15(Hrs)
	B) Block Structure and Stored procedures	Creating and executing procedures with and without parameters,	
	C) Cursors	Declare, open, fetch, close,	
	D) Triggers	Create, show and drop trigger, Types of triggers.	

Reference Books:

1. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education, 2010.
2. R. Ramakrishanan, J. Gehrke, Database Management Systems 3rd Edition, McGraw-Hill, 2002.
3. A. Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts 6th Edition, McGraw Hill, 2010.
4. R.Elmasri,S.B.Navathe Database Systems Models,Languages,Design and application Programming, 6th Edition, Pearson Education, 2013.
5. Database System Concept–Silberschatz,Korth
6. Introduction to Database Systems C.J.Date Pearsons Education
7. Learning MySQL-Hugh Williams,Saied Tahaghoghi
8. MySQL in a Nutshell, 2ndEdition-ADesktopQuickReference-Russell Dyer

B. Sc. I Semester I, Practical Course
PRCS-203-PRACTICAL PAPER-III
(Credits-02, 60 hours)

Total-50Marks

After successful completion of this course, students will able to:

- 1) Understand how to reuse code using functions and pointers and MLC functions to allocate memory at run time.
- 2) Define a structure to declare the data members of different data types according to needs and handles different file handling techniques using C language.
- 3) Use of functions, queries, sub queries, joins and view son databases.
- 4) Use of stored procedures and triggers on databases.

Practical Based on DSC–III

Following is a sample list of assignments for practical ,instructors are advised to provide more lab assignments to students to meet the course specified outcomes.

1. Write a function which adds three number and display output on the screen.
2. Write a function to find factorial of a given number.
3. Write a function to reverse a given number.
4. Write a program to calculate factorial of given number using recursive function.
5. Write a program using function which swap two number using
 - a) call by value and b)call by reference.
6. Write a program to dynamically allocate memory of n items to an integer pointer, display their sum and average.
7. Write a program to dynamically allocate memory of n items to a character array, end it with ‘\0’ and count number of vowels, consonants and spaces in it.
8. Write a program which create student structure which accept-students rollno,student name, address, subject marks, percentage and display same on screen.
9. Write a file handling program which accept student information store it into disk file.
10. Write a program to separate even and odd numbers available in file.
11. Write a program to copy contain of text file into another text file.
12. Write a program to count number of lines and characters of given text file
13. Write a program to remove blank lines from a file.
14. Write a program to count the no. of words in a given text file.

Practical Based on DSC–IV

Following is a sample list of assignments for practical, instructors are advised to provide more lab assignments to students to meet the course specified outcomes.

1. A practical to demonstrate different date& time functions
2. A practical to demonstrate different mathematical functions
3. A practical to demonstrate different string functions
4. A practical to demonstrate different aggregate functions
5. A practical to demonstrate different other functions
6. A practical to demonstrate different clauses
7. A practical to demonstrate simple and nested query
8. A practical to demonstrate different join types.
9. A practical on how to create view and drop view.
10. A practical on how to create stored procedure and other operations.
11. A practical to demonstrate different iterative statements
12. A practical to demonstrate different control flow statements
13. A practical on how to create and drop triggers.

Nature of Theory Question Paper

Total :-30Marks

Q.1	Multiple choice Question	06M				
	a)					
	b)					
	c)					
	d)					
	e)					
	f)					
Q.2	Short answer questions (Attempt any Three)	12M				
	a)					
	b)					
	c)					
	d)					
	e)					
Q.3	Long answer questions (Attempt any two)	12M				
	a)					
	b)					
	c)					

Internal Exam :- 20Marks