SEMESTER– III										
S. No	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A23CPT305D	MICROCONTROLLER	MJD	4	0	0	4	25	75	100
2	A23CPT306C	PROGRAMMING IN C++	MJD	4	0	0	4	25	75	100
3	A23MAD308C	NUMARICAL METHODS	MID	3	1	0	4	25	75	100
4	A23ENM305C	CONTENT WRITING	MLD	3	0	0	3	25	75	100
5	A23CPL305D	MICROCONTROLLER LAB	SEC	0	0	4	2	50	50	100
6	A23CPL306C	PROGRAMMING IN C++ LAB	SEC	0	0	4	2	50	50	100
7	A23VAC303C	HEALTH AND WELLNESS, YOGA EDUCATION, SPORTS AND FITNESS	VAC	2	0	0	2	100	0	100
8	A23CPC303C	JAVA	EEC	0	0	0	0	100	0	100
							21	400	400	800

Department	**Computational Studies**	Programme: **B.Sc COMPUTER SCIENCE**						
Semester	**Third**	CourseCategoryCode: **MJD**			*End SemesterExamType:**TE**			
Course Code	**A23CPT305D**	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**MICROCONTROLLER**	**4**	**0**	**0**	**4**	**25**	**75**	**100**
Prerequisite	Basic knowledge about Microcontroller							

Course Objectives	• To understand and learn the architecture and assembly language program of 8085. • To understand and learn the architecture and assembly language program of 8086. • To explore the interfacing the peripherals and other chips to 8085. • To explore the architecture of 8086. • To understand the interfacing the peripherals and other chips to 8086.

Course Outcome	*After the completion of this course, the students will be able to:*		BT Mapping (Highest Level)
	CO1	Explain the basic architecture of 8085 microprocessors.	**K2**
	CO2	Articulate the knowledge of Communication based Interfacing with 8085.	**K3**
	CO3	Summarize the interfacing of various program-based peripherals to 8085.	**K3**
	CO4	Illustrate the architecture of the 8086 microprocessors.	**K4**
	CO5	Summarize the interfacing of various peripherals with 8086.	**K4**

UNIT-I	**INTEL 8085 MICROPROCESSORS**	**Periods:12**
Introduction – Need for Microprocessor – Evolution – 8085 Architecture – Pin diagram - Timing Diagram – Addressing Modes – Instruction Formats – Instruction Set.		**CO1**

UNIT-II	**COMMUNICATION BASED INTERFACING TO 8085**	**Periods:12**
Parallel Communication Interface (8255) – Serial Communication interface (8251) – D/A and A/D Interface.		**CO2**

UNIT-III	**PROGRAM BASED INTERFACING TO 8085**	**Periods:12**
Programmable Timer Controller (8254) – Keyboard/display controller (8279) – Programmable Interrupt Controller (8259) – DMA controller (8237).		**CO3**

UNIT-IV	**INTEL 8086 MICROPROCESSORS**	**Periods:12**
Introduction to 8086 Microprocessor – 8086 Architecture – Pin diagram – Addressing Modes – Instruction Format – Instruction Set – Interrupts – Assembler Directives – Assembly Language Programming.		**CO4**

UNIT-V	**INTERFACING 8086 MICROPROCESSORS**	**Periods:12**
8086 Functional Units – I/O Interfacing - D/A and A/D Interface – Stepper Motor interfacing - Serial communication standards, serial data transfer schemes, 8251 USART architecture and interfacing		**CO5**

Lecture Periods:60	**Tutorial Periods: -**	**Practical Periods: -**	**TotalPeriods:60**

Text Books

1. "ARM Microcontroller Interfacing: Hardware and Software" by Warwick A. Smith (Second Edition, 2022).
2. "Microcontrollers: From Assembly Language to C Using the PIC24 Family" by Robert B. Reese (Third Edition, 2021).

Reference Books

1. "Programming 16-Bit PIC Microcontrollers in C: Learning to Fly the PIC 24" by Lucio Di Jasio (Second Edition, 2019).

	2. "Microcontroller Technology: The 68HC11" by Peter Spasov (Fourth Edition, 2020).

Web References

1. https://swayam.gov.in/nd1_noc20_ee42/microprocessors-and-microcontrollers/
2. https://www.classcentral.com/course/swayam
3. https://freevideolectures.com/course/3018/microprocessors
4. https://www.arduino.cc/

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)						Program Specific Outcomes (PSOs)		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PSO1**	**PSO2**	**PSO3**
1	3	2	3	3	2	2	2	2	3
2	3	2	2	3	3	3	2	2	2
3	2	2	2	2	3	3	3	2	2
4	3	3	2	2	2	2	2	2	3
5	2	3	2	2	3	3	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	**CAT 2**	**Model Exam**	**Assignment***	**Attendance**		
Marks	10	5	5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	**Computational Studies**	Programme: **B.Sc. COMPUTER SCIENCE**					
Semester	**Third**	CourseCategoryCode: **MJD**		*End SemesterExamType:**TE**			
Course Code	**A23CPT306C**	Periods/Week			Credit	Maximum Marks	
		L	T	P	C	CAM	ESE	TM
Course Name	**Programming in C++**	4	0	0	4	25	75	100
(Common to B.Sc. (CS) & BCA)								

Prerequisite	Basic knowledge about information Technology

Course Objectives	• Define Encapsulation, Inheritance and Polymorphism. • Solve the problem with object-oriented approach. • Analyze the problem statement and build object-oriented system model. • Describe the characters and behavior of the objects that comprise a system. • Explain function overloading, operator overloading and virtual functions

Course Outcome	*After the completion of this course, the students will be able to:*		BT Mapping (Highest Level)
	CO1	Learn programming of C++	**K2**
	CO2	Understand Object oriented approach for finding Solutions.	**K3**
	CO3	Create C++ based solutions to Inheritance concept	**K3**
	CO4	Learn various concepts Files and Exception Handling techniques	**K4**
	CO5	Develop the applications using object-oriented programming with C++	**K4**

UNIT-I	**INTRODUCTION TO C++ AND BASICS OF OOPS**	**Periods:12**	
Basic components of a C++ - Program and program structure - Compiling and Executing C++ Program – Basic Concepts of Object-Oriented Programming: Benefits of OOP – Object Oriented Languages – Applications of OOP.			**CO1**

UNIT-II	**PRINCIPLES OF OBJECT-ORIENTED PROGRAMMING**	**Periods:12**	
Classes objects - data members - member functions –Access Specifiers- this Pointer - Friends - Friend Functions - Friend Classes - Friend Scope - Static Functions - Constructors and Destructors - Static variables and Functions in class - Operator Overloading in C++ - Overloading Unary Operators - Overloading binary operators.			**CO2**

UNIT-III	**INHERITANCE**	**Periods:12**	
Inheritance in C++ - Types of Inheritance - Multiple Inheritance. Virtual Functions - Polymorphism - Abstract classes. Real time examples in OOPS.			**CO3**

UNIT-IV	**POINTERS, EXCEPTION HANDLING AND FILES**	**Periods:12**	
Pointers - Objects and Pointers - Exception Handling: Exception – Basics – Exception Handling Mechanism – Throwing Mechanism – Catching Mechanism – Re-throwing Exception. Standard input and output operations: C++ IOstream hierarchy - File input and output: Reading a File - Managing I/O Streams - Opening a File – Different Methods - Checking for Failure with File Commands - Checking the I/O Status Flags - Dealing with Binary Files - Useful Functions.			**CO4**

UNIT-V	**TEMPLATES**	**Periods:12**	
Class templates: Implementing a class template - Implementing class template member functions - Using a class template - Function templates - Implementing function templates - Using template functions.			**CO5**

Lecture Periods:60	Tutorial Periods: -	Practical Periods: -	TotalPeriods:60

Text Books

1. E. Balagurusamy, "Object Oriented Programming with C++", McGraw Hill, 7th Edition, 2018.
2. Herbert Schildt, "C++ - The Complete Reference", McGraw Hill Education, 4th Edition, 2017.

Reference Books

1. Herbert Schildt, "C++ - From the Ground Up", McGraw Hill Education, 2nd Edition, 2018.
2. Thomas L. Floyd, "Electronic Devices", 9thEdition, Pearson Education, 2019.
3. Stanley B. Lippman, Stanley Lippman, Barbara Moo, "C++ Primer", Addison-Wesley Professional, 5thEdition 2020.

Web References

1. https://www.tutorialspoint.com/cplusplus/index.htm
2. http://www.cplusplus.com/doc/tutorial/
3. https://www.w3schools.com/cpp/
4. https://www.javatpoint.com/cpp-tutorial
5. https://www.geeksforgeeks.org/cpp-tutorial/

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)						Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
1	3	2	3	3	2	2	2	2	3
2	3	2	2	3	3	3	2	2	2
3	2	2	2	2	3	3	3	2	2
4	3	3	2	2	2	2	2	2	3
5	2	3	2	2	3	3	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10	5	5	5		75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	**Computational Studies**	Programme: **B.Sc. Computer Science**					
Semester	**Third**	Course Category Code: **SEC**			*End Semester Exam Type: **LE**		
Course Code	**A23CPL305D**	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	IM	ESE	TM
Course Name	**MICROCONTROLLER LAB**	**0**	**0**	**4**	**2**	**50**	**50**	**100**
Prerequisite	**Basic Knowledge in Microcontroller**							

Course Outcome		*After completion of the course, the students will be able to*	BT Mapping (Highest Level)
	CO1	Demonstrate simple programs with 8085.	**K3**
	CO2	Implement the interfacing with 8085.	**K3**
	CO3	Implement assembly language program using 8086 MASM.	**K3**
	CO4	Execute the interfacing with 8086.	**K4**

List of Experiment

1. 8-bit Addition & Subtraction using 8085.
2. 8-bit Multiplication & Division using 8085.
3. Searching operation using 8085.
4. 16-bit Addition & Subtraction using 8085.
5. 16-bit Multiplication & Division using 8085.
6. Code conversions using 8085.
7. DAC and ADC interfacing using 8085.
8. 16-bit addition and subtraction using 8086.
9. 16-bit multiplication and division using 8086.
10. Interfacing stepper motor with 8086.
11. Interfacing ADC and DAC with 8086.

Lecture Periods: -	Tutorial Periods: -	Practical Periods:30	Total Periods:30

Reference Books

1. Krishna Kant, "Microprocessors and Microcontrollers – Architectures, Programming and System Design 8085, 8086, 8051, 8096", PHI, 2019.

2. Ramesh S.Gaonkar, "Microprocessor Architecture, Programming and Applications with the 8085", Penram International publishing, 2018.

3. A.K. Ray, K.M. Bhurchandi, "Advanced Microprocessor and Peripherals", Tata McGraw-hill, Second edition, 2019.

Web References

1. https://nptel.ac.in/courses/108/103/108103157/
2. https://www.geeksforgeeks.org/microprocessor-tutorials/
3. https://swayam.gov.in/nd1_noc20_ee42/microprocessors-and-microcontrollers/
4. https://www.classcentral.com/course/swayam
5. https://freevideolectures.com/course/3018/microprocessors

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
1	2	3	3	3	3	2	2	2
2	3	3	2	3	2	3	3	2
3	2	2	3	3	2	3	3	2
4	3	3	2	2	2	3	3	3
5	2	2	2	3	3	3	2	2

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Internal Marks			End Semester Examination (ESE) Marks	Total Marks
	Model Exam	Record	Attendance	50	100
Marks	30	10	10		

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	**Computational Studies**			Programme **BCA COMPUTER APPLICATIONS**				
Semester	**Third**			Course Category Code: **SEC**		*End Semester Exam Type: **LE**		
Course Code	**A23CPL306C**			Periods/Week		Credit	Maximum Marks	
				L	T	P	C	IM	ESE	TM
Course Name	**PROGRAMMING IN C++ LAB**			0	0	4	2	50	50	100
Prerequisite	Basic Knowledge in C++ Program							

Course Outcome	*After completion of the course, the students will be able to*	BT Mapping (Highest Level)
	CO1 Understand the Object-Oriented concepts.	**K3**
	CO2 Understand the Functions and Arrays.	**K3**
	CO3 Construct the Classes and Objects.	**K3**
	CO4 Explain the Operator overloading and Inheritance concepts.	**K4**
	CO5 Describe Files and Exception Handling Methods.	**K4**

List of Experiment

Write C++ Programs for the followings:

1. Class Declarations, Definition, and Accessing Class Members.

2. Constructor, parameterized constructor and copy constructors.

3. Friend Function and Friend Class.

4. Function Overloading and Constructor Overloading.

5. Operator Overloading.

6. Inheritances.

7. Virtual Classes and Abstract Classes.

8. Exception Handling.

9. IOStream, IStream, Ostream classes and their usages.

10. File Stream Operations.

11. Template Based Program to Sort the Given List of Elements.

Lecture Periods: -	Tutorial Periods: -	Practical Periods:30	TotalPeriods:30

Reference Books

1. Herbert Schildt, "C++ - From the Ground Up", McGraw Hill Education, 2nd Edition, 2018.

2. Stanley B. Lippman, Stanley Lippman, Barbara Moo, "C++ Primer", Addison-Wesley Professional, 5th Edition2019.

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**
1	2	3	3	3	3	2	2	2
2	3	3	2	3	2	3	3	2
3	2	2	3	3	2	3	3	2
4	3	3	2	2	2	3	3	3
5	2	2	2	3	3	3	2	2

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Internal Marks			End Semester Examination (ESE) Marks	Total Marks
	Model Exam	**Record**	**Attendance**	**50**	100
Marks	30	10	10		

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus