CHHATRAPATI SHAHU INSTITUTE OF BUSINESS EDUCATION & RESEARCH KOLHAPUR

(An Autonomous Institute under UGC Act.)

DEPARTMENT OF COMPUTER STUDIES

STRUCTURE AND SYLLABUS OF

Master of Science (Computer Science) Programme

M.Sc. (Comp.Sci.)

Revised and Effective from 2021-22 C.B.C.S. Pattern

M.Sc.(Computer Sci.) SYLLABUS (Effective from 2021-22)

OBJECTIVE:

TodevelopacomprehensiveandadvancedknowledgeofComputerSciencetherebyenabling graduates to perform more effectively in the work place as well as to enhance their research capability.

INTRODUCTION:

The M. Sc. is offered on full-time basis. The programme is of two years (full time) duration, named as M. Sc. (Computer Science). Each year is divided into two semesters for the convenience of teaching and evaluation examination. In each semester, except the last, there will be teaching for 15 weeks followed by end-of-semester examination (EOS). The teaching for Semesters I, and III will be held between 1st July to 25th November, and the teaching of Semester II will be held between 1st January to 25th April. Semester IV that is the last semester of the programme, is reserved for research/industry project. During this semester a student is expected to work on a research/ software development project for a period of about 120 days and submit a report to the Examination Department for evaluation..

ELIGIBILITY:

1. A candidate for being eligible for admission to M.Sc. (COMPUTER SCIENCE) programme (Faculty of Science) must have passed B.C.S., B.Sc. (Computer Science) Degree, B.Sc.(Computer Technology / IT), B.Sc. (Mathematics), B.Sc. (Statistics) , B.Sc.(Electronics), B.Sc.(Physics), B.C.A. (Science Faculty) or B. Sc. Having computer as one of the subject at graduation level Examination of the Shivaji University or any other University recognized by A.I.U. (Association of Indian Universities) with minimum of 50% marks at the final year of examination.

2. The admission to M.Sc. programme will be made on the basis of entrance test conducted by the Institute.

3. The knowledge of Mathematics, Statistics or quantitative techniques up to the level of 12th std. is desirable.

DURATION:

M.Sc. (Computer Science) isa full time programme of **TWO** Years duration. The programme consists of Four Semesters. The examination to be held in the First and Second Semester will be called Part – I (First Year) and the examination to be held in the Third and Fourth Semester will be called Part – II (Second Year)

If a candidate fails to clear all heads of passing within **Six** years of his/her registration, the past performance will stand automatically nullified.

If a candidate discontinues any of the terms (i.e. Semester – I to IV) on any account, will be allowed to complete the incompleted terms in the subsequent years subject to it is within the stipulated time duration of **Six** years.

In addition to the above, once a student's term (Semester) is granted, he/she shall be allowed to appear and pass in any of the subsequent examinations held, provided the examinations are within the stipulated period of **Six** years.

In case the term (Semester) is not granted the student has to seek fresh admission in the next year and complete the term and pass the examination also within **Six** years of his/her registration.

- **Programme Completion with Break in Between:**

A student who has passed M.Sc. (Computer Science) – I and is seeking admission to M.Sc. (Computer Science) – II after a long gap (Provided the gap lies within the stipulated duration of **Six** years) should complete the course syllabus which is in existence at the time he has sought the admission for the second year.

ASSESSMENT:

Taking into considerations of the UGC and AICTE requirements SIBER has adopted "Choice Based Credit System." (CBCS). A course can be either full credit (4 credits) or half credit (2 credits). A full credit course shall be of 60 contact hours duration and a half credit course shall be of 30 contact hours duration.

For Theory paper of 100 marks (**Four** credits) the distribution of the marks will be as follows –

- Internal Marks i.e. Concurrent evaluation   -   40 Marks
- External Marks i.e. End of Semester examination   -   60 marks

For Theory paper of 50 marks (**Two** credits) the distribution of the marks will be as follows –

- Internal Marks i.e. Concurrent evaluation   -   20 Marks
- External Marks i.e. End of Semester examination   -   30 marks

Breakup of Internal Marks i.e. Concurrent evaluation -

Sr. No.	Head	Full Credit	Half Credit
1.	Class Participation	10 Marks	05 Marks
2.	Objective Test(Minimum One Test Per Unit)	10 Marks	05 Marks
3.	Seminar /Book Review/ Home Assignment/ Class Assignment	10 Marks	05 Marks
4.	Case Study / Term Paper	10 Marks	05 Marks
5.	Total	40 Marks	20 Marks

The final internal marks will be calculated using the heads shown in above table. **The internal marks obtained by the student have to be disclosed and signed by the student.**

For Practical examination of 50 marks there shall be three questions of 20 marks each, the student has to attempt any two. 10 marks reserved for journal.

- Journal marks   -   10 Marks
- Practical Marks i.e. End examination   -   40 Marks

The practical examination should be considered as one head of passing i.e. 40 marks.

For the Project Work of 100 marks, the distribution of the marks will be as follows –

- Internal Examiner   -   30 Marks
- External Examiner   -   30 Marks
- Seminar/Term Paper/ Industrial Seminar -   40 Marks

For Theory Paper Assessment

1. The assessment of papers will be done by an Internal and External examiner. A difference of more than **20%** in the marks awarded by these examiners would necessitate the valuation of these papers by the Third examiner. The **'nearest'** highest marks will be considered for determining the average mark of such papers.

2. Once the Student is passed in the internal head of passing (Concurrent evaluation out of 40) in the report submitted to the examination department, the same should be carried forward whenever required.

3. The students who failed in the internal head of passing (Concurrent evaluation out of 40) should reappear for the same and the revised marks will be considered further calculation.

4. There shall be seven questions of which question no.1 and 7 shall be compulsory and from question no. 2 to 6 student has to attempt any 3. Equal weightage should be given to each unit.

5. For AEC (Internal Course):

Internal Marks: Out of 50

i)	Class Participation	- 10 Marks
ii)	Quiz/Assignment/Journal	- 10 Marks
iii)	Practical courses based on practical examination and for other courses based on viva.	- 30 Marks

(30 marks evaluation done jointly by internal and external examiners.)

STANDARD OF PASSING:

1. In order to pass in each passing head, a candidate should obtain 50% in the internal marks (Concurrent evaluation), 40% marks in theory, and minimum of 50% of the marks in aggregate in passing head.

2. To pass the M.C.A. examination, a candidate will have to pass in all Four Semester in Two Parts i.e. Part – I (Semester – I to II) and Part – II (Semester – III & IV)

3. To pass the Project work / Seminar course/ Term paper a candidate must obtain a minimum of 50% of the total marks. If a candidate fails in the seminar / project report/ term paper and its viva-voce, he/she will be required to complete the particular seminar / project report/ term paper and its viva-voce as a fresh candidate in the subsequent year.

4. A candidate from first year MCA will be eligible to proceed to the semester III ,if he/she is not having more than five courses backlog (25% of passing heads) from the first year (i.e. Semester I and II)

5. Semester Performance Index (SPI)/Cumulative Performance Index(CPI) will be as follows.

Grading System:

Full Credit 100 Marks

Grade Table for Trimester/Semester Examination			
Marks Obtained	**Letter Grade**	**Grade Point**	**Description of Performance**
96-100	S+	10.0	SUPER
91-95	S	9.0	
86-90	E+	8.5	Exemplary
81-85	E	8.0	
76-80	O+	7.5	Outstanding
71-75	O	7.0	
66-70	A+	6.5	Good
61-65	A	6.0	
56-60	B+	5.5	Average
50-55	B	5.0	
--	X	0.0	Defaulter
--	XX	---	Incomplete

Half Credit 50 Marks

Grade Table for Trimester/Semester Examination			
Marks Obtained	**Letter Grade**	**Grade Point**	**Description of Performance**
48 – 50	S+	10.0	SUPER
46 – 47	S	9.0	
43 – 45	E+	8.5	Exemplary
41 – 42	E	8.0	
38 – 40	O+	7.5	Outstanding
36 – 37	O	7.0	
33 – 35	A+	6.5	Good
31 – 32	A	6.0	
28 – 30	B+	5.5	Average
25 – 27	B	5.0	
--	X	0.0	Defaulter
--	XX	---	Incomplete

6. Final Result: For the final result of the student Cumulative Performance Index (CPI) based on total earned credits vis-à-vis total earned grade points shall be calculated will be as follows.

Total earned grade points / Total credits i.e. **126** credits.

Result		
CPI	**Final Grade**	**Classification of Final Result.**
9.0 – 10.0	S	Extraordinary
8.0 – 8.9	E	Excellent
7.0 – 7.9	O	Outstanding
6.0 – 6.9	A	Very Good
5.5 – 5.9	B+	Good
5.0 – 5.4	B	Average
0.0 – 4.9	X	Unsatisfactory (Fail)

Note: An aggregate of **5.0** credit points are required to pass the MCA program.

CALCULATION OF PERFORMANCE INDICES:

A distinction of the performance of one student from the other student is rather impossible to carry out from the grades obtained by a student in all the courses taken by him in a semester/year. Hence, the evaluation of various courses is cumulated in two performance indices termed as semester performance index (SPI) and cumulative performance index (CPI), the explanation of which is given below:

Semester Performance Index (SPI):

The performance of a student in a semester is indicated by a number called Semester Performance Index (SPI). SPI is the weighted average of all the grade points obtained by him in all the courses registered during the semester. If G_i is a grade with numerical equivalent as G_i obtained by a student for the course with credit C_i then, SPI for that semester is calculated using formula.

$$SPI = \frac{\sum_i C_i g_i}{\sum_i C_i}$$

Where summation is for all the courses registered by a student in that Semester SPI is calculated to two decimal places and rounded off. SPI once calculated shall never be modified. Generally, for the students failed in regular examinations SPI is calculated only after the declaration of re-examination grades.

Cumulative Performance Index (CPI):

An up-to-date assessment of the overall performance of a student from the first semester till completion of the programme is obtained by calculating an index called as Cumulative Performance Index (CPI). The CPI is weighted average of the grade points obtained in all the courses registered by a student since the first semester of the programme.

$$CPI = \frac{\sum_i C_i g_i}{\sum_i C_i}$$

Besides SPI, CPI is also calculated at the end of every semester upto two decimal places and is rounded off. It is necessary to ensure that one course appears only once in calculation of CPI and the denominator in above equation does not exceed the total number of credits registered by him.

GRACE MARKS UNDER DIFFERENT ORDINANCE.

S.O. No. 1:-Grace Marks for Passing in each head of Passing (Theory/Practical/Oral/ Sessional/External).

The Examinee shall be given the benefit of grace marks only for passing in each head of Passing Theory/Practical/Oral/Sessional/ in External examination as follows.

Head of Passing	Grace Marks
Up to – 50	2
051-100	3
101-150	4
151-200	5
201-250	6
251-300	7
301-350	8
351-400	9
And 401 and above.	10

Provided that the benefit of such gracing marks in different heads of passing shall not exceed 1% of the aggregate marks in that examination.

Provided further that the benefit of gracing of Marks under this Ordinance shall be applicable only if the candidate passes the entire examination of Semester.

Provided further that this gracing is concurrent with the rules and guidelines of Professional statutory bodies at the All India level such as AICTE, MCI, Bar Council, CCIM, and CCIII. NCTE, UGC etc.

S.O. No. 2:- **Grace Marks for getting higher Class**

A Candidate who passes in all the courses and heads of passing in the examination without the benefit of either gracing or condonation rules and whose total number of Marks falls short for securing Second Class/Higher Second Class or First Class by marks not more 1% of the aggregate marks of that examination or up to 10 marks, whichever is less, shall be given the required marks to get the next higher class of grade as the case may be.

Provided that benefits of above mentioned grace marks shall not be given, if the candidate fails to secure necessary passing marks in the aggregate head of passing also, if prescribed in the examination concerned.

Provided further that the benefits of above mentioned grace marks shall be given to the candidate for such examination/s only for which provision of award of class has been prescribed.

Provided further that this gracing is concurrent with the rules and guidelines of Professional statutory bodies at the All India level such as AICTE, MCI, Bar Council, CCIM, and CCIII. NCTE, UGC etc.

S.O. No. 3 Condonation

If a candidate fails in more than one head of passing, his/her deficiency of marks in such head of passing may be condoned by not more than 1% at the aggregate marks of the examination. However condonation, whether in one head of passing or aggregate head of passing be restricted to maximum upto 10 marks only.

Condonation of deficiency of marks be shown in the statement of Marks in the form of asterisk and Ordinance number

Provided further that this gracing is concurrent with the rules and guidelines of Professional statutory bodies at the All India level such as AICTE, MCI, Bar Council, CCIM, and CCIII. NCTE, UGC etc..

BACKLOG:

1. A candidate will be permitted to proceed to the second Semester even though he/she fails in one or more courses of the first semester, provided the first semester term is granted..

2. The students who have a backlog of not more than **five courses (25% of passing heads)** in the First year examination (Semester I & II) will be eligible to be admitted to the Second year (III Semester) of M.Sc. (Comp. Sci.)

3. A Candidate will be permitted to proceed to the Fourth Semester even though he/she fails in one or more courses of the third semester, provided the third semester term is granted.

Program Specific Outcomes (PSO)

PSO1. Demonstrate knowledge about computer science concepts and solutions effectively and professionally

PSO2. Use and application of computing knowledge to produce effective designs and solutions for problem under consideration.

PSO3. Use of modern software development tools, systems, and platforms effectively and efficiently.

Program Outcomes (PO)

PO1 : Provide Sound theoretical knowledge to understand computer science concepts.

PO2 : Analyse the given problem to get clear idea about what should be done and prepare alternatives solutions for the given problem.

PO3: Design and develop complete solution using computer system to solve the given problem.

PO4: use modern tools to design and develop the solution and verify and validate the solution.

PO5 : Develop ability to work in a team as a responsible member and/or leader in a diversified team.

PO6 : Inculcate lifelong learning ability to learn and understand new methods, techniques and tools for solving complex problems.

PO7 : Develop research attitude to contribute new concepts, ideas, tools, techniques and methods to the field of computer science.

M.Sc.(Computer Sci.) SYLLABUS (Effective from 2021-22)

CHHATRPATI SHAHU INSTITUTE OF BUSINESS EDUCATION AND RESEARCH (CSIBER)
University Road, Kolhapur – 416 004
Out Line Theory Question paper for all the programmes
(Four Unit Course)

Class:
Course Name: **Paper no. :**
Time: Three hours   **Total marks: 60**

INSTURUCTIONS:

1.   Question no. 1 is **COMPULSORY**

2.   Attempt any **FOUR** from Q. No.2 to Q. No.7.

3.   Figures to right indicate **FULL** marks

		Marks
Q. 1)	**Case study / Problems / Program (Based on Unit I to IV)**	**(12)**
Q. 2)	**Long Question / Brief answer Questions A and B (Based on Unit I)**	**(12)**
Q. 3)	**Long Question / Brief answer Questions A and B (Based on Unit II)**	**(12)**
Q. 4)		**(12)**
	a) Question (Based on Unit III)	06
	b) Question (Based on Unit III)	06
Q. 5)		**(12)**
	a) Question (Based on Unit IV)	06
	b) Question (Based on Unit IV)	06
Q. 6)		**(12)**
	a) Question (Based on Unit III)	06
	b) Question (Based on Unit IV)	06
Q. 7)	**Write Short answers**	**(12)**
	a) Based on Unit I	03
	b) Based on Unit II	03
	c) Based on Unit III	03
	d) Based on Unit IV	03

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CHHATRPATI SHAHU INSTITUTE OF BUSINESS EDUCATION AND RESEARCH (CSIBER)
University Road, Kolhapur – 416 004
Out Line Theory Question paper for all the programmes
(Two Unit Course)

Class:
Course Name: **Paper no. :**
Time: Two hours   **Total marks: 30**

    INSTURUCTIONS:
        1.   Question no. 1 is **COMPULSORY**

        2.   Attempt any **THREE** from Q. No.2 to Q. No.5.

        3.   Figures to right indicate **FULL** marks

		Marks
Q. 1)	**Case study / Problems / Program (Based on Unit I or II)**	**(6)**
Q. 2)	**Long Answer Question (Based on Unit I)**	**(8)**
Q. 3)	**Long Answer Question (Based on Unit II)**	**(8)**
Q. 4)		**(8)**
	a) Brief Answer Question (Based on Unit I)	4
	b) Brief Answer Question (Based on Unit II)	4
Q. 5)		**(8)**
	a) Brief Answer Question (Based on Unit II)	4
	b) Brief Answer Question (Based on Unit I)	4

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CHHATRPATI SHAHU INSTITUTE OF BUSINESS EDUCATION AND RESEARCH (CSIBER)
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NATURE OF PRACTICAL QUESTION PAPER

Time : 2 Hours   **Total Marks : 50**

Instructions:

     1.   **Attempt any two questions.**

     2.   **10 Marks are reserved for journal**

                                                   Marks

Q. 1)   **(20)**

Q. 2)   **(20)**

Q. 3)   **(20)**

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M.Sc.(Computer Sci.) SYLLABUS (Effective from 2021-22)

M.Sc. (Computer Science) Part-I Semester – I

Course Code	Course Name	Credits	Contact hours	Int. /Pract. Marks	EOS marks	Total Marks
CC-101	Computer Organization and Architecture	4	60	40	60	100
CC-102	Software Engineering and Project Management	4	60	40	60	100
CC-103	Design and Analysis of Algorithms	4	60	40	60	100
CC-104	Object Oriented Programming with C++	4	60	40	60	100
CC-105	Web Design and Development	4	60	40	60	100
LAB-I	Based on CC-104	2	45	10	40	50
LAB-II	Based on CC-105	2	45	10	40	50
DSE-I	A. Theoretical Computer Science (TCS) B. Cloud Computing C. Information Security & Cryptography	4	60	40	60	100
AEC-I	a)Cross Platform Skills b)Problem Solving and Logical Skills c)Social Ethics d)Stress Management	2	30	50	--	50
		30	480	310	440	750

M.Sc. (Computer Science) (Part-I) Semester – II

Course Code	Course Name	Credits	Contact hours	Int./Pract. Marks	EOS marks	Total Marks
CC-201	Operating Systems	4	60	40	60	100
CC-202	Linux Administration and Programming	4	60	40	60	100
CC- 203	Database Management System	4	60	40	60	100
CC- 204	Java Programming	4	60	40	60	100
CC-205	Data and File Structures	4	60	40	60	100
LAB-III	Based on CC-204	2	30	--	50	50
LAB-IV	Based on CC-205	2	30	--	50	50
Project-I	Mini Project and Viva-Voce	4	60	40	60	100
DSE-II	a) Big Data and Hadoop b) Computer graphics c) Ethical Hacking and Network Defense	4	60	40	60	100
GE-I	a) Fundamentals of Management b) Environment and Development c) Indian Social Problems and Services d) Principles of Economics	2	30	20	30	50
AECC-I	Professional Communication Skills	2	30	20	30	50
		36	540	320	580	900

M.Sc. (Computer Science) (Part-II) Semester –III

Course Code	Course Name	Credits	Contact hours	Int./Pract. Marks	EOS marks	Total Marks
CC-301	Computer Networks	4	60	40	60	100
CC-302	Artificial Intelligence	4	60	40	60	100
CC-303	Data Warehousing and Data Mining	4	60	40	60	100
CC-304	.NET programming	4	60	40	60	100
CC-305	Mobile Computing	4	60	40	60	100
LAB-V	Based on CC-304	2	30	--	50	50
LAB-VI	Based on CC-305	2	30	--	50	50
DSE-III	a) Advanced Java b) Advanced Data Analytics c) Cryptanalysis	4	60	40	60	100
GE-II	a) Entrepreneurship Development b) Disaster Management d) Corporate Social Responsibility e) Basics of Indian Economy	2	30	20	30	50
AEC-II	f) Deployment Skills g) Open Source Platform h) Work Ethics i) Organization Behavior	2	30	50	00	50
AECC- II	Employability Skills	2	30	50	00	50
		34	510	380	470	850

M.Sc. (Computer Science) (Part-II) Semester –IV

Course No.	Project Component Name	Credit	Hours	Nature of EOS exam.	Total
CC-4.1	Project report			Report Documentation	100
CC-4.2	Confidential Report	12	728/2 = 364	Report From Industry	100
CC-4.3	Viva-Voce			Viva –Voce	100
CC-4.4	Project presentation			Project Presentation	100
	Total	**12**	**364**		**400**

Total Credits:

Semesters	Core Credits	DSE	GE	AEC	AECC	Total
I	5 x 4 = 20 (Pract.)2x 2 = 04	1 x 4= 4	--	1 x 2= 2	--	**30**
II	5x 4 = 20 (Pract.) 2x 2 = 04 (Project)4x1 = 04	1 x 4= 4	1 x 2= 2	--	1 x 2= 2	**36**
III	5x 4 = 16 (Pract.)2x 2 = 04	1 x 4= 4	1 x 2= 2	1 x 2= 2	1 x 2= 2	**34**
IV	12	--	--	--	--	**12**
Total	**88**	**12**	**04**	**04**	**04**	**112**
Percentage	**76.92**	**11.53**	**3.85**	**3.85**	**3.85**	**100**
Total Marks	**2300**	**300**	**100**	**100**	**100**	**2900**