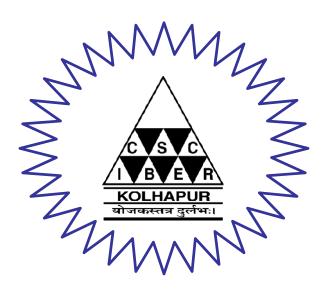# CHHATRAPATI SHAHU INSTITUTE OF BUSINESS
EDUCATION & RESEARCH KOLHAPUR
(An Autonomous Institute under UGC Act)

DEPARTMENT OF COMPUTER STUDIES

STRUCTURE AND SYLLABUS OF

MASTER OF SCIENCE (CYBER SECURITY)
Programme
M.Sc. (Cyber Security)

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

M.Sc.(Cyber Security) SYLLABUS (Effective from 2021-22)

OBJECTIVE:

To develop a comprehensive and advanced knowledge of Computer Science thereby enabling graduates to perform more effectively in the work place as well as to enhance their research capability.

INTRODUCTION:

The **M.Sc. (Computer Science in Cyber Security)** is offered on full-time basis. The duration of the programme is of two years. Each year is divided into two semesters for the convenience of teaching and evaluation. 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 industrial project. During this semester a student is expected to work on an industrial 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 in Cyber Security)** programme (Faculty of Science) must have passed B.C.S., B.Sc. (C.S. with Cyber Security) Degree, B.Sc.(Computer Technology / IT), B.Sc. (Mathematics/ Statistics/Electronics/Physics), B.E./ B.Tech.(C.S.E./ IT), B.C.A. (Science Faculty) or B. Sc. having computer as one of the subjects at final year 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 qualifying examination.

2) The admission to **M.Sc. (Computer Science in Cyber Security)** programme will be made on the basis of entrance test conducted by the Institute.

DURATION:

The **M.Sc. (Computer Science in Cyber Security)** is a full time TWO years programme consisting of Four Semesters. The pattern of examination will be semester system.

If a candidate fails to clear any of the theory papers, practicals, term papers and project report 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) will be allowed to complete the term in the subsequent years within the stipulated time duration 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 within **Six** years of his/her registration.

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

A student who has passed First Year and is seeking admission to Second Year after a long gap (provided the gap lies within the stipulated duration of **Six** years) should complete the programme syllabus which is in existence at the time he has sought the admission for the academic year.

Programme Outcomes

PO 1: Apply the knowledge of computing, mathematics, and security fundamentals appropriate to the discipline.

PO 2: Analyse a problem, and identify and formulate the security requirements appropriate to its solution.

PO 3: Design, implement, and evaluate a computer-based solution to meet desired needs with appropriate consideration for society.

PO 4: Design and conduct experiments, as well as to analyse and interpret results.

PO 5: Use current techniques, skills, and modern tools necessary for computing and security practice.

PO 6: Understanding professional, ethical, legal, security and social issues and responsibilities.

PO 7: Function effectively individually and on teams, including diverse and multidisciplinary, to accomplish a common goal.

PO 8: Communicate effectively, comprehend and write effective reports and make effective presentations.

ASSESSMENT:

1. For the theory paper is of 100 marks, the distribution of marks will be–

    i)   Internal Credit(practical/term paper/seminar)   - 40Marks

    ii) Theory Paper   - 60 Marks.

2. For the practical paper is of 50 marks, the distribution of marks will be–

    i)   Practical examination   - 40 Marks

    ii) Journal   - 10 Marks

3. For Project report (Fourth Semester) the marks will be:–

    i)   Project Report   - 100Marks

    ii)   Confidential Report   - 100 Marks

    iii) Viva-Voce   - 100Marks

    iv)   Project Presentation.   - 100 Marks

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'** marks will be considered for determining the average mark of such papers.
2. The criteria for passing each head is as follows-
    i.   Internal/ Term Work/ Seminar/ Term Paper   - 50 %
    ii.   Theory/ Practical/ Project   - 40 %
    iii. Combined head of Passing   - 50 %
3) If the student fails in Term Work/ Internal Passing Heads, he/she will get a chance to improve it in subsequent semesters. Once the marks of Internal/ Term Work/ Seminar/ Term Paper are submitted to the Examination Department it should be carried forward whenever required. If the student clears internal head of passing he/ she will not be allowed to improve under any circumstances.
4) If a candidate fails in any one of head of passing he/she shall appear for only the head in which he/she has failed.

Breakup of Internal Marks i.e. Concurrent evaluation –

Sr. No.	Head	Marks
1.	Class Participation	10 Marks
2.	Objective Test (Minimum One Test Per Unit)	10 Marks

3.	Seminar /Book Review/ Home Assignment/ Class Assignment	10 Marks
4.	Case Study / Term Paper	10 Marks
5.	Total	40 Marks

Each student is expected to appear for a minimum **Four** Class Test. The final internal marks will be calculated using the heads shown in above table. **The internal marks obtained by the student has to be disclosed and signed by the student.**

STANDARD OF PASSING:

1) In order to pass in each passing head, a candidate will have to 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 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 join the particular seminar / project report/ term paper and its viva-voce as a fresh candidate in the subsequent semester.
4) A candidate from first year 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)

M.Sc.(Cyber Security) SYLLABUS (Effective from 2021-22)

CGPA System:

Full Credit 100 Marks

Grade Table for Trimester/Semester Examination			
Marks Obtained	**Letter Grade**	**Grade Point**	**Description of Performance**
96-100	S+	10	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	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

5. 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 as follows.

Total earned grade points / Total credits i.e. **120** 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)

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 GI is a grade with numerical equivalent as Gi obtained by a student for the course with credit Ci 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 Examiner 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
Upto –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 Trimester/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, CCIII. NCTE, UGC etc.

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

A Candidate who passes in all the subjects 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, 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,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 subjects 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.(C.S.)

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

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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M.Sc.(Cyber Security) 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
(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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M.Sc.(Cyber Security) SYLLABUS (Effective from 2021-22)

CHHATRPATI SHAHU INSTITUTE OF BUSINESS EDUCATION AND RESEARCH (CSIBER)
University Road, Kolhapur – 416 004

NATURE OF PRACTICAL QUESTION PAPER

Time : 2 Hours   **Total Marks : 40**

Instructions:
    1.   **Attempt any two questions.**
    2.   **10 Marks are reserved for journal**

	Marks
Q. 1)	**(15)**
Q. 2)	**(15)**
Q. 3)	**(15)**

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M.Sc.(Cyber Security) SYLLABUS (Effective from 2021-22)

M. Sc. (Cyber Security) Semester-I

Course Code	Course Name	Credits	Contact hours	Int./Pract. Marks	EOS marks	Total Marks
CC-101	Operating System	4	60	40	60	100
CC-102	Database Management System	4	60	40	60	100
CC-103	Mathematical Foundation for Security	4	60	40	60	100
CC-104	Python Programming	4	60	40	60	100
CC-105	Secure Programming using C	4	60	40	60	100
DSE-I	A. Secure Software Design B. Identity Access and Management	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	20	30	50
LAB-I	Python Programming	2	60	--	50	50
LAB-II	Secure Programming using C	2	60	--	50	50
	Total	**30**	**510**	**260**	**490**	**750**

M. Sc. (Cyber Security) Semester-II

Course Code	Course Name	Credits	Contact hours	Int./Pract. Marks	EOS marks	Total Marks
CC-201	Ethical Hacking	4	60	40	60	100
CC-202	Information Security and Cryptography	4	60	40	60	100
CC-203	Cloud Computing and Security	4	60	40	60	100
CC-204	Web Development	4	60	40	60	100
CC-205	Communication Network & Programming	4	60	40	60	100
DSE-II	A. Machine Learning for Security B. Java for Cyber Security	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
LAB-III	Web Development	2	60	--	50	50
LAB-IV	Network Programming	2	60	--	50	50
	Total	**32**	**540**	**280**	**520**	**800**

M.Sc.(Cyber Security) SYLLABUS (Effective from 2021-22)

M. Sc. (Cyber Security) Semester-III

Course Code	Course Name	Credits	Contact hours	Int./Pract. Marks	EOS marks	Total Marks
CC-301	Cyber Crime and Law	4	60	40	60	100
CC-302	Mobile and Wireless Security	4	60	40	60	100
CC-303	Fundamentals of Block Chain and Crypto Currency	4	60	40	60	100
CC-304	Linux Administration	4	60	40	60	100
CC-305	Penetration Testing	4	60	40	60	100
DSE-III	a) Web Security b) Digital Forensics	4	60	40	60	100
GE-II	a. Entrepreneurship Development b. Disaster Management c. Corporate Social Responsibility d. Basics of Indian Economy	2	30	20	30	50
AEC-II	a. Deployment Skills b. Open Source Platform c. Work Ethics d. Organization Behavior	2	30	50	00	50
AECC-II	Employability Skill	2	30	20	30	50
LAB-V	Linux Administration	2	60	--	50	50
LAB-VI	Penetration Testing	2	60	--	50	50
	Total	**34**	**570**	**330**	**520**	**850**

Semester-IV

Course Code	Course Name	Credits	Contact hours	Int./Pract. Marks	EOS marks	Total Marks
CC-401	Industrial Project Report	4	120	--	100	100
CC-402	Industrial Project Viva	4	120	--	100	100
CC-403	Industrial Project Presentation	4	120	--	100	100
CC-404	Industrial Confidential Report	4	120	--	100	100
	Total	**16**	**480**	**--**	**400**	**400**

Credit Table

Courses	Semester-I	Semester-II	Semester-III	Semester-IV	Total Credits	Percentage
Core	5 x 4 = 20 2 x 2 = 4	5 x 4 = 20 2 x 2 = 4	5 x 4 = 20 2 x 2 = 4	4 x 4 = 16	88	78.57%
DSE	1 x 4 = 4	1 x 4 = 4	1 x 4 = 4	--	12	10.72%
GE	--	1 x 2 = 2	1 x 2 = 2	--	4	03.57%
AEC	1 x 2 = 2	--	1 x 2 = 2	--	4	03.57%
AECC	--	1 x 2 = 2	1 x 2 = 2	--	4	03.57%
Total Credits	**30**	**32**	**34**	**16**	**112**	**100 %**
Marks	**750**	**800**	**800**	**400**	**2750**	**--**