Dr. Vishwanath Karad
MIT WORLD PEACE UNIVERSITY | PUNE
TECHNOLOGY, RESEARCH, SOCIAL INNOVATION & PARTNERSHIPS

SYLLABUS

DR VISHWANATH KARAD MIT - WORLD PEACE UNIVERSITY

Faculty Of Engineering & Technology

B.Sc. Computer Science (Cyber Security)
(3 Years)

B.Sc. Computer Science (Cyber Security) (Hons)
(4 Years)

BATCH- 2022-2026

w.e.f. – 2022-23

Dr. C. H. Patil
Head,
School of Computer Science,
MIT-WPU

Dr. Shubhalaxmi Joshi
Associate Dean and BoS
Chairperson
Faculty of Science

Prof. Dr. Prasad D. Khandekar,
Head -Division-I,
Dean - Engineering & Technology,
MIT-WPU

PROGRAMME STRUCTURE

Preamble:

B.Sc. Computer Science (Cyber Security) Hons is a four-year fulltime program. It is based on semester pattern and choice-based credit-based system, it prepares the student for a future prospectus in IT Industry. This program aims to provide a foundational platform for Cyber Security Aspirants by providing CyberSecurity Awareness and Training that heighten the chances of catching a scam or attack before it isfully enacted, minimizing damage to the resources and ensuring the protection of information technology assets. The syllabus of Cyber Security subjects along with that of the three allied subjects(Mathematics, Basic Programming Languages and Statistics) in first year forms the required basics for pursuing higher studies

At first year a course in basic Cyber Security, Computer Organization, Basic programming, and a course in database fundamentals forms the preliminary skill set, helps to solve computational problems. One practical course in computer science/Cyber Security related subject per semester is designed including the programming and database fundamentals to supplement the theoretical training. Along with Computer Science courses basic science courses are also included i.e Discrete Mathematics & Applied Statistics theory and practical to help in building a strong foundation.

At second year skills are further strengthened by advanced Network security concepts. Practical courses in Cyber Security in each Semester is designed including the RDBMS, PHP programming, Network security and Digital Marketing tools course improve students in area other than programming.

At third year latest technologies in along with their practical's are offered. Students can choose the courses in Cyber Security from the pool of Discipline Specific Elective courses which helps them to learn different skills.

During the fourth year Advanced subjects like Artificial Intelligence, Web application Security etc are included which gives students to explore need of different applications and solutions. Also Students have MOOCs courses build on the engagement of students to self-organize their participation according to learning goals, prior knowledge and skills, and common interests.6-months Full time Industrial training (Internship) gives hands on experience in working on real application development.

Vision and Mission of the Programme

Vision:

To contribute to the society through excellence in scientific and knowledge-based education utilizing the potential of Cyber Security with a deep passion for wisdom, culture and values.

Mission:

- Preparing cybersecurity professionals in both academic and industrial settings capable of leading, designing and developing various projects in different areas of cybersecurity
- Provide quality undergraduate and graduate education in both the theoretical and applied foundations of Cyber Security
- Train students to effectively apply this education to solve real-world problems thus amplifying their potential for lifelong high-quality careers
- To provide the required security services to individuals and to public and private institutions in the Kingdom, and to contribute to the development of society.
- To achieve a distinguished position in cloud computing domain through innovative teaching learning methods and research.
- To diagnose the cyber problems and to build the system with advance solution to solve problem with cyber ethics.

- **Programme Outcomes**

Name of the Program: B. Sc. Computer Science (Cyber Security)	
PO1	An ability to apply fundamental knowledge of computing, mathematics, science and engineering appropriate to the discipline.
PO2	An ability to analyze a problem, identify and formulate the computing requirements appropriate to its solution.
PO3	An ability to design, implement, and evaluate a computer - based system, process, component, or program for various applications like public health, environmental safety, human resource management, economical sustainability, cross - cultural and societal needs.
PO4	An ability to use current techniques, skills, and modern tools necessary for computing practice.
PO5	An understanding of professional, ethical, legal, security and social issues and responsibilities.
PO6	An ability to function effectively individually and on teams, including diverse and multidisciplinary, to accomplish a common goal.

Programme Educational Objectives

- Students will acquire the knowledge, skills and attitude necessary for the analysis of Cybersecurity problems and the subsequent design of appropriate solutions using best practices that will enable them to be distinguished and innovative and to acquire top positions in the job market.
- Students will apply cutting-edge solutions within a professional, legal and ethical framework and will operate effectively in multidisciplinary teams.
- Students will practice continued, self-learning to keep their knowledge and skills up to date and to remain abreast of the latest developments in cybersecurity.

Programme Specific Outcomes

- Full Time Industry Project – Internship gives hands on experience in solving a real-world problem.
- To analyze, design and develop computing solutions by applying foundational concepts of computer science and engineering.
- B.Sc. Computer Science (Cyber Security) graduates can go for higher study in programmes like Master ofComputer Application, M.Sc. in IT, M.Sc. Cloud Computing etc.

Programme Structure:

(a) Programme duration: 4 Years Full Time

(b) System followed: Semester

(c) Credits System:

(i) Per Year

First Year – 46

Second Year – 41

Third Year – 42

Fourth Year-41

(ii) Total in the programme – 170

(d) Assessment Criteria:

i. If student fail to score 4 CGPA but earned more than 50% of credits out of total number of credits for one course year then he/she will be declared as a FAIL. But these FAIL students are Allow To Keep next Trimester (ATKT) i.e. allowed to take admission in next academic year.

ii. The students with ATKT should improve the grade with in subjects he/she failed or replace the subject (in case of elective only) with another subject to score required grades.

iii. If the student score less than 4 CGPA AND less than 50% of credits out of total number of credits are declared as a FAIL. These students are NOT allowed to take admission in next year unless they fulfil the condition A or B stated above.

iv. The student should pass all subjects in Trimester 1 with at least 4 GPA for getting admission in Trimester 7 (if applicable). Similarly, the student should clear all subjects in Trimester 2 with at least 4 CGPA for getting admission in Trimester 8 and so on.

(e) Medium of Instruction and Examination: English

(f) Eligibility criteria for admission to the programme:

1. **Maharashtra State (MS) Candidature**

(i) Candidate should be an Indian Nationality.

(ii) Passed 10+2 / 12th / HSC Examination in science stream with Mathematics subject (OR) Three Years Engineering Diploma Recognized by Government Competent Authority (OR) Passed its equivalent examination with 50% Marks in aggregate (45% in case of candidates of backward class categories and Persons with Disability belonging to Maharashtra State only).

2. **Other Than Maharashtra (OMS) Candidature**

a. Candidate should be an Indian Nationality.

b. Passed 10+2 / 12th / HSC Examination in science stream with Mathematics subject (OR)

Three Years Engineering Diploma Recognized by Government Competent Authority (OR) Passed its equivalent examination with 50% Marks in aggregate

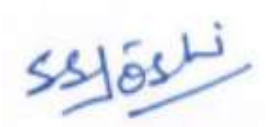
3. Foreign Nation / NRI / OCI / PIO, Children of Indian workers in the Gulf countries:

Passed 10+2 / 12th / HSC Examination in science stream with Mathematics subject (OR) its equivalent examination in any stream with 50% marks in aggregate

(g) Selection Criteria

Step 1: MITWPU UGPET Computer Science 2022-Online proctored entrance 100 marks

Step 2: Personal Interview-50 Marks



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Chairperson
Faculty of Science

B. Sc. Computer Science (Cyber Security)2022-26

A. Definition of Credit:-

3 Hr. Lecture / Tutorial per week	2 credit
3 Hours Practical(Lab) per week	1 credit

B. Credits:-

Total number of credits for four year undergraduate B.Sc.Computer Science (Cyber Security) Programme would be 170

C. Structure of Credits for Undergraduate B. Sc. Computer Science (Cyber Security) By Hons Program:-

Sr. No.	Category	Suggested Breakup of Credits(Total)
1	Humanities and Social Sciences and Peace Programmes including Management courses and Yoga	14
2	Basic Science courses including laboratory	10
3	Professional core courses including Laboratory	107
4	Discipline Specific Elective	9
5	Full Time Industrial Training	20
6	Open Elective courses	4
7	MOOC	4
8	AECC Courses	2
	Total	**170**

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Structure of Credits for Undergraduate B. Sc. Computer Science (Cyber Security) by Research Program:-

Sr. No.	Category	Suggested Breakup of Credits(Total)
1	Humanities and Social Sciences and Peace Programmes including Management courses and Yoga	14
2	Basic Science courses including laboratory	10
3	Professional core courses including Laboratory	87
4	Discipline Specific Elective	9
5	Research	10
6	Dissertation	30
7	Open Elective courses	4
8	MOOC	4
9	AECC Courses	2
	Total	**170**

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A. Course code and definition:-

Course code	Definitions
L	Lecture
T	Tutorial
WP	Humanities and Social Sciences and Peace
SEC	Skill Enhancement Courses
AECC	Ability Enhancement Compulsory Courses
MOOC	Massive Open Online Courses
OEC	Open Elective Courses
DEC	Discipline Specific Elective
BCS	B.Sc.(Computer Science)
MS	M.Sc.(Computer Science)

B. Grading Scheme:

Grades & Grade Points Marks Out of 100	Grade	Grade Point
80-100	O: Outstanding	10
70-79	A+: Excellent	9
60-69	A: Very Good	8
55-59	B+: Good	7
50-54	B: Above Average	6
45-49	C: Average	5
40-44	Pass	4
0-39	Fail	0
Ab	Absent	NA

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B. Sc. Computer Science (Cyber Security) (First Year) (w.e.f. 2022-26)
Semester – I

Sr. No.	Course Code	Name of Course	Type	Weekly Workload, Hrs			Credits		Assessment, Marks			
				Theory	Tutorial	Lab	Theory	Lab	CCA*	LCA*	End Term Test	Total
1		Computer Organization	Core	3	-	-	3	-	60	-	40	100
2		Introduction to Information Security	Core	3	-	-	3	-	60	-	40	100
3		Discrete Mathematics	Core	3	-	-	3	-	60	-	40	100
4		Database Management System	Core	3	-	-	3	-	60	-	40	100
5		C Programming	Core	3	-	-	3	-	60	-	40	100
6		Lab on C	Core	-	-	4		2	-	60	40	100
7		Lab on DBMS	Core	-	-	4	-	2	-	60	40	100
8		Lab on Digital Electronics	Core			2		1	-	60	40	100
9		Peaceful Communication and Collaborative Human Dynamics	WP	3	-	-	3	-	90		60	150
10		Yoga for Excellence in Life - I	SEC	-	1	-	1	-	50	-	-	50
		Total	-	18	1	10	19	05	440	180	380	1000

**Assessment Marks are valid only if Attendance criteria are met

Weekly Teaching Hours: 29

Total Credits: First Year B. Sc. Computer Science (Cyber Security) Semester I: 24

*CCA: Class Continuous Assessment

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B. Sc. Computer Science (Cyber Security) (First Year) (w.e.f. 2022-26)

Semester – II

Sr. No.	Course Code	Name of Course	Type	Weekly Workload, Hrs			Credits		Assessment Marks **			
				Theory	Tutorial	Lab	Theory	Lab	CCA*	LCA*	End Term Test	Total
1		Computer Networks	Core	3	-	-	3	-	60	-	40	100
2		Information Security Management System	Core	3	-	-	3	-	60	-	40	100
3		Applied Statistics	Core	3	-	-	3	-	60	-	40	100
4		Data Structure using C	Core	3	-	-	3	-	60	-	40	100
5		Introduction to Cloud Computing & Security Concepts	Core	3	-	-	3	-	60	-	40	100
6		Lab on Data Structure	Core	-	-	4		2	-	60	40	100
7		Lab on Computer Network	Core	-	-	4	-	2	-	60	40	100
8		Communication Skills	AECC	2	-	-	2	-	60	-	40	100
9		Yoga for Excellence in Life - II	SEC	-	1	-	1	-	50	-	-	50
10		National Rural Immersion	SEC	-	-	-		1	-	-	-	
		Total :	-	17	1	8	18	5	410	120	320	850

Weekly Teaching Hours: 26

Total Credits: First Year B. Sc. Computer Science (Cyber Security) Semester II: 23

**Assessment Marks are valid only if Attendance criteria are met
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B. Sc. Computer Science (Cyber Security) (Second Year) (w.e.f. 2022-26)

Semester – III

Sr. No.	Course Code	Name of Course	Type	Weekly Workload, Hrs			Credits		Assessment Marks**			
				Theory	Tutorial	Lab	Theory	Lab	CCA*	LCA*	End Term Test	Total
1		Network Security	Core	3	-	-	3	-	60	-	40	100
2		Web Development	Core	3	-	-	3	-	60	-	40	100
3		Introduction to Cyber Security Management	Core	3	-	-	3	-	60	-	40	100
4		Cyber Laws	Core	3	-	-	3	-	60	-	40	100
5		Environmental Science	Core	2	-	-	2	-	60	-	40	100
6		Lab on Web Development	Core			2		1		60	40	100
7		Lab on Network Security	Core			4		2		60	40	100
8		Universal Human Values - II	WP	3	-	-	3	-	90	-	60	150
		Total :	-	17		6	17	03	390	120	340	850

Weekly Teaching Hours: 23

Total Credits: Second Year B.Sc. Computer Science Cyber Security Semester III: 20

**Assessment Marks are valid only if Attendance criteria are met

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B. Sc. Computer Science (Cyber Security) (Second Year) (w.e.f. 2022-23)

Semester – IV

Sr. No.	Course Code	Name of Course	Type	Weekly Workload, Hrs			Credits		Assessment, Marks			
				Theory	Tutorial	Lab	Theory	Lab	CCA*	LCA*	End Term Test	Total
1		Internet Programming using PHP	Core	3	-	-	3	-	60	-	40	100
2		Mobile and Wireless Security	Core	3	-	-	3	-	60	-	40	100
3		Operating Systems	Core	3	-	-	3	-	60	-	40	100
4		Cryptography	Core	3	-	-	3	-	60	-	40	100
5		Lab on Internet Programming using PHP	Core	-	-	4		2		60	40	100
6		Lab on Python Programming	Core	-	-	2		1		60	40	100
7		Discipline Specific Elective (DSE)-I	Core	3	-		3		60	-	40	100
8		Vishwadharmi Prof . Dr. Vishwanath Karad's Theory of World Peace	WPC	3	-	-	3	-	150	-		150
		Total :	-	18	-	6	18	03	450	120	280	850

Weekly Teaching Hours: 24

Total Credits: Second Year B. Sc. Computer Science (Cyber Security) Semester IV: 21

**Assessment Marks are valid only if Attendance criteria are met

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B. Sc. Computer Science (Cyber Security) (Third Year) (w.e.f. 2022-26)

Semester – V

Sr. No.	Course Code	Name of Course	Type	Weekly Workload, Hrs			Credits		Assessment Marks **			
				Theory	Tutorial	Lab	Theory	Lab	CCA*	LCA*	End Term Test	Total
1		Cyber Threat & Modelling	Core	3	-	-	3	-	60	-	40	100
2		Advanced Cryptography	Core	3	-	-	3	-	60	-	40	100
3		Machine Learning	Core	3	-	-	3	-	60	-	40	100
4		Theoretical Computer Science	Core	3	-	-	3	-	60	-	40	100
5		Linux/Windows Administration Lab	Core		-	2	-	1	-	60	40	100
6		Open Elective-I	OEC	2	-		2		60	-	40	100
7		Introduction to Distributed Systems	Core	3	-	-	3	-	60	-	40	100
8		Discipline Specific Elective (DSE)-II	Core	3	-	-	3	-	60	-	40	100
		Total :		20	-	02	20	1	420	60	320	800

Weekly Teaching Hours: 24
Total Credits: Third Year B. Sc. Computer Science (Cyber Security) Semester V: 21

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B. Sc. Computer Science (Cyber Security) (Third Year) (w.e.f. 2022-26)

Semester – VI

Sr. No.	Course Code	Name of Course	Type	Weekly Workload, Hrs			Credits		Assessment Marks **			
				Theory	Tutorial	Lab	Theory	Lab	CCA*	LCA*	End Term Test	Total
1		Digital Forensics	Core	3	-	-	3	-	60	-	40	100
2		Management Information Systems	Core	3	-	-	3	-	60	-	40	100
3		Vulnerability Assessment and Penetration Testing	Core	3	-	-	3	-	60	-	40	100
4		Ethical Hacking and Network Defense	Core	3	-	-	3	-	60	-	40	100
5		Lab on Ethical Hacking	Core	-	-	2	-	1	-	60	40	100
6		Digital Forensics Lab	Core	-	-	2	-	1	-	60	40	100
7		Discipline Specific Elective (DSE)-III	Core	3	-	-	3	-	60	-	40	100
8		Indian Tradition, Culture and Heritage	WPC	3	-	-	3	-	90	-	60	150
		Total :	-	18	-	4	18	2	390	120	340	850

Weekly Teaching Hours: 22
Total Credits: Third Year B. Sc. Computer Science (Cyber Security) Semester VI: 20

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B. Sc. Computer Science (Cyber Security Hons.) (Fourth Year) (w.e.f. 2022-26)

Semester – VII

Sr. No.	Course Code	Name of Course	Type	Weekly Workload, Hrs			Credits		Assessment Marks **			
				Theory	Tutorial	Lab	Theory	Lab	CCA*	LCA*	End Term Test	Total
1		Web Application Security	Core	3	-	-	3	-	60	-	40	100
2		Information Security Audit	Core	3	-	-	3	-	60	-	40	100
3		Artificial Intelligence for Cyber Security	Core	3	-	-	3	-	60	-	40	100
4		Entrepreneurship development (IPR)	Core	3	-	-	3	-	60	-	40	100
5		Lab on Web Application Security	Core	-	-	4	-	2	-	60	40	100
6		Lab on Artificial Intelligence	Core	-	-	2	-	1	-	60	40	100
7		Open Elective-II	OEC	2	-		2		60	-	40	100
8		MOOC-I	Core				2					100
		Total	-	17		6	16	3	300	120	280	800

Weekly Teaching Hours: 23

Total Credits: Fourth Year B. Sc. Computer Science (Cyber Security Hons.) Semester VII: 19

**Assessment Marks are valid only if Attendance criteria are met

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B. Sc. Computer Science (Cyber Security Hons.)(Fourth Year) (w.e.f. 2022-26)

Semester – VIII

Sr. No.	Course Code	Name of Course	Type	Weekly Workload, Hrs			Credits		Assessment Marks**			
				Theory	Tutorial	Lab	Theory	Lab	CCA*	LCA*	End Term Test	Total
1		Full Time Industry Project - Internship	Core	-	-	40	-	20	-	100	100	200
2		MOOC-II	Core	-	-	-	2	-	-	-	100	100
		Total :	-			40	2	20	0	100	200	200

Weekly Teaching Hours: 40
Total Credits: Fourth Year B. Sc. Computer Science (Cyber Security Hons.) Semester VIII: 22

**Assessment Marks are valid only if Attendance criteria are met
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ElectiveNo.	Title	Title	Title
DSE – I	Big Data & IoT	Introduction to Data Science using Python	Cyber Forensics
DSE – II	Software Project Management	Data Mining & Applications	Security Governance, Risk and compliance
DSE - III	Machine Learning and Artificial Intelligence	Introduction to Blockchain Technology	Biometric Security

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B. Sc. Computer Science (Cyber Security Hons.Research) (Fourth Year) (w.e.f. 2022-26)

Semester – VII

Sr. No.	Course Code	Name of Course	Type	Weekly Workload, Hrs			Credits		Assessment Marks **			
				Theory	Tutorial	Lab	Theory	Lab	CCA*	LCA*	End Term Test	Total
1		Research Methodology	Core	3	-	-	3	-	60	-	40	100
2		Research Publication Ethics	Core	3	-	-	3	-	60	-	40	100
3		Lab on Lab on research paper writing	Core	-	-	2	-	1	-	60	40	100
4		Dissertation-I	Core	-	-	20	-	10	-	60	40	100
5		MOOC-I	Core	-	-		2	-	-	-	100	100
		Total	-	6		22	8	11	120	120	260	500

Weekly Teaching Hours: 28

Total Credits: Fourth Year B. Sc. Computer Science (Cyber Security Hons. Research) Semester VII: 19

**Assessment Marks are valid only if Attendance criteria are met

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B. Sc. Computer Science (Cyber Security Hons.Research) (Third Year) (w.e.f. 2022-26)

Semester – VIII

Sr. No.	Course Code	Name of Course	Type	Weekly Workload, Hrs			Credits		Assessment Marks**			
				Theory	Tutorial	Lab	Theory	Lab	CCA*	LCA*	End Term Test	Total
1		Dissertation-II	Core	-	-	40	-	20	-	60	40	200
2		MOOC-II	Core	-	-	-	2	-	-	-	100	100
		Total :	-			40	2	20	0	60	140	300

Weekly Teaching Hours: 40

Total Credits: Fourth Year B. Sc. Computer Science (Cyber Security Hons.Research) Semester VIII: 22

**Assessment Marks are valid only if Attendance criteria are met

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