Nagindas Khandwala College (Autonomous)

Re-accredited by NAAC with 'A' Grade (3rd Cycle)

ISO 9001:2015 Certified

Bhavishya Bharat Campus, S. V. Road, Malad (West)

Mumbai-400 064

Proposal for
Master of Science Computer Science
(Specialization in Cybersecurity)
Two Year Integrated Programme

Four Semesters

Course Structure

Under Choice Based Credit, Grading and Semester System

Implemented during the Academic Year 2021-2022

About Khandwala College

Khandwala College is a multi-faculty institution (Estd. 1983), affiliated to University of Mumbai. It offers 23 UG, 7 PG, 4 Add On, 3 Ph. D with 9 Departments and 2 Research Centres imparting education to more than 6500 students. The Vision of the institute includes Education for all, Education for the youth and Education for the future of our country. The Mission is to serve the society at large and students belonging to linguistic minority in particular with commitment, dedication and devotion. The Quality Policy includes commitment towards imparting Quality Education to youth, enabling them to develop the right attitude, professional competence and inculcating right ethical values.

The institution has been awarded "A" Grade (Third Cycle) by National Assessment and Accreditation Council, Best College by University of Mumbai (2012), lead college for a cluster of colleges, Educational Excellence Award by Indus Foundation, USA and Best Ensemble Faculty (Academic Brilliance Awards – 2013) by Education Expo TV's Research Wing for Excellence in Professional Education & Industry and ISO 9001:2015 certified by TUV Nord. We have been awarded IMC Ramkrishna Bajaj National Quality Commendation Certificate in 2013-14. Our college has been awarded Autonomous status from 2016.

1.1 Vision and Mission of Khandwala College

Vision
Education for all
Education for the youth
Education for the future of our country

Mission
The college's focus is on the future of our students irrespective of their gender and place in society. Every student is like a flame reaching out to the brightness of the sun i.e. the bright future of India

Program Educational Objectives (PEO):

PEO1	:	Demonstrate the application of Computer Science and application through development of innovative tools that are beneficial for the society.
PEO2	:	To provide in depth and specialized knowledge in cybersecurity ensuring the protection of information technology assets.
PEO3	:	Demonstrate high standard of ethical conduct, positive attitude and societal responsibilities.

Program Outcomes (PO):

PO1	:	Demonstrate their knowledge and skills in computer science in identifying concepts, algorithms and applicable data structures in order to devise optimal solutions to complex problems
PO2	:	Apply computer science theory and software development concepts to construct computing-based solutions.
PO3	:	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using mathematics, basic sciences, and computer science and engineering specially in the field of Cybersecurity.
PO4	:	Analyse and understand the computational trade-offs involved in applying different Cybersecurity techniques and models.
PO5	:	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions
PO6	:	Identify the conclusions and underpinning knowledge and rationale clearly and unambiguously to specialist and non- specialist audiences

Eligibility, Selection and Admission Criterion

Candidates for being eligible for admission to the two-year course leading to the Degree of Master of Science Computer Science (Specialization in Cybersecurity), shall be required to have passed the B. Sc./BE/B. Tech. / BCA/ BCS or an equivalent qualification in Science stream from a recognized University.

Eligibility Criterion:

The student must be a graduate with B. Sc./BE/B. Tech. / BCA/ BCS or equivalent, from a recognized University with more than 55% . Lateral Entry shall be applicable for students who have pursued similar or related Programmes from any University. Eligibility Criteria shall be applicable for lateral entry.

Selection and Admission Criterion for Eligible Candidates:
The interested students shall register for Aptitude Test, Group Discussion, and Personal Interview.
Reservations as per University rules will be applicable.

The admission of students shall be based on:

- Academic and non- academic credentials till date
- Performance in Aptitude Test [comprising of questions in Mathematics/Statistics, English, Logical Reasoning, Analytical Ability] and Performance in Personal Interview
- The candidate has to fulfil all the prescribed admission requirements / norms of the College
- In all matters relating to admission to the programme the decision of the Management of institute/college shall be final
- At any time after admission, if found that a candidate has not fulfilled one or many of the requirements stipulated by the Institute, or submitted forged certificates, the Institute has the right to revoke the admission and will forfeit the fee paid. In addition, legal action may be taken against the candidate as decided by the Management of institute/college

Eligibility for the award of the Degree
- A candidate shall be eligible for the award of the Degree only if he/she has undergone the prescribed course of study for a period of not less than three academic years, passed the examinations of all the Six Semesters earning 104 credits, and letter grade of at least D or above (i.e. O/ A+/A/ B+/B/C/D) in core.
- No dues to the College, Libraries etc.; and
- No disciplinary action is pending against him / her.

Faculty under which the Degree is awarded

Master of Science Computer Science (Specialization in Cybersecurity) Programme is awarded under Faculty of Science.

Intake and Fees

Intake of 20 Students in the first year with an additional division of 20 students from the second year onwards. Additional 15% shall be permitted to make provision for any cancellation of Admissions. Additional admissions to the extent of 15% will be permitted for foreign students every year.

Programme Fees for each Semester - Rs. 97,500/- . The fees can be increased by 12% every year.

Attendance
- A student has to obtain a minimum 75% cumulative attendance for the theory lectures, practical and tutorial (wherever prescribed) separately will be required out of the total number of lectures, practical and tutorials on the subject conducted in the term.
- 25% allowance in attendance is given to account for activities under NCC / NSS / Cultural / Sports / Minor Medical conditions etc.
- A student with a cumulative attendance of less than 75%, will not be permitted to appear for the end semester examination for all the courses in that semester and will be categorized as "DE", meaning Detained due to shortage of attendance. The students with the "DE" category cannot proceed to the subsequent semester.
- Such students shall register for all the courses of the semester in which DE has occurred, in the subsequent year by paying the prescribed fee.
- Additional condonation may be considered in rare and genuine cases which includes, approved leave for attending select NCC / Sports Camps, Internships, Training, cases requiring prolonged medical treatment and critical illness involving hospitalization.
- For medical cases, submission of complete medical history and records with prior information from the parent / guardian to the institute is mandatory. Such condonation is

permitted only twice for a student in the entire duration of the programme.

Scheme of Examination

The Examination shall be divided into parts i.e. Continuous Internal Evaluation including Assignment, Projects, Seminars, Case Studies and Class Tests which will be of 40 marks and the Semester End Examinations which will be of 60 marks. The semester wise Credit Points will be varied from course to course but the value of Credits for Post-Graduate Programme shall be of 104 Credits. The examinations can be conducted in online/offline mode. The institute may decide the examination pattern - written, oral, practical, presentation, project etc. for any or all courses/subjects as appropriate.

The Credits are defined in terms of the learner's hours which are divided into two parts such as Actual and Notional. The value of a particular course can be measured in number of Credit Points. The value of One (01) Credit is equal to 15 Hours of learners' load. Notional learning hours include direct contact hours with teachers and trainers, time spent in self learning, preparation for assignments, carrying out assignments and assessments etc

Course Matrix / Course architecture

Course code	Definitions	Credits	Courses
CC	Core courses	63	14
SEC	Skill Enhancement course	17	4
PE	Program Elective	24	3
Total		**104**	**21**

Course Matrix:

FIRST SEMESTER

A. THEORY/PRACTICAL						
S. No.	**SUBJECT NAME**	**SUBJECT TYPE**	**HOURS / WEEK**			**CREDITS**
			L	**T**	**P**	
1	Mathematical Foundations For Cybersecurity	CC-1	3	-	2	4
2	Cybersecurity Fundamentals	CC-2	3	-	2	4
3	Advanced Data Structures	CC-3	4	-	4	6

S.No.	SUBJECT NAME	SUBJECT TYPE	L	T	P	CREDITS
4	Advanced Database Management Systems	CC-4	3	-	2	4
5	Data Security and Network Security	CC-5	3	-	2	4
6	Software Security	CC-6	3	-	2	4
				Total of Theory and Tutorial		19
				Total of Practical		7
				Total of Semester		26

SECOND SEMESTER

A. THEORY/PRACTICAL

S.No.	SUBJECT NAME	SUBJECT TYPE	PERIODS/WEEK			CREDITS
			L	T	P	
1	Security and Risk Management	CC-7	3	-	2	4
2	Ethical Hacking	CC-8	4	-	4	6
3	Software Engineering Concepts and Methodologies	CC-9	3	-	0	3
4	Cryptography and Biometrics	CC-10	3	-	2	4
5	Securing the cloud	CC-11	3	-	2	4
6	Defense in depth	CC-12	3	-	2	4
				Total of Theory and Tutorial		19
				Total of Practical		6
				Total of Semester		25

THIRD SEMESTER

A. THEORY/PRACTICAL

S.No.	SUBJECT NAME	SUBJECT TYPE	PERIODS/WEEK			CREDITS
			L	T	P	
1	IoT Security	CC-13	4	-	4	6
2	Digital Forensics and Investigation	CC-14	4	-	4	6
3	Program Elective I	PE-1	3	-	2	4
4	Program Elective - II	PE-2	3	-	2	4
5	English for Research Paper writing	SEC-1	4	-	-	4

6	Placement training	SEC-2	2	-	0	2
			Total of Theory & Tutorial			**20**
			Total of Practical			**6**
			Total of Semester			**26**

Departmental Elective I
IT Governance, Risk and Compliance
Secure Coding

Departmental Elective II
Introduction to Data Science
Big Data Analytics

FOURTH SEMESTER

A. THEORY/PRACTICAL						
S.No.	**SUBJECT NAME**	**SUBJECT TYPE**	**PERIODS/WEEK**			**CREDITS**
			L	**T**	**P**	
1	Final Project/ Internship and Viva	PE-3	-	-	32	16
2	Research Methodology	SEC-3	5	-	-	5
3	Research Project	SEC-4	-	-	12	6
			Total of Theory & Tutorial			**5**
			Total of Practical			**22**
			Total of Semester			**27**

Syllabus

FIRST SEMESTER

A. THEORY/PRACTICAL						
S. No.	**SUBJECT NAME**	**SUBJECT TYPE**	**HOURS / WEEK**			**CREDITS**
			L	**T**	**P**	
1	Mathematical Foundations For Cybersecurity	CC-1	3	-	2	4
2	Cybersecurity Fundamentals	CC-2	3	-	2	4
3	Advanced Data Structures	CC-3	4	-	4	6
4	Advanced Database Management Systems	CC-4	3	-	2	4
5	Data Security and Network Security	CC-5	3	-	2	4