NAGINDAS KHANDWALA COLLEGE OF COMMERCE, ARTS &

MANAGEMENT STUDIES (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

Two Year Integrated Programme

Four Semesters
Course Structure

Under Choice Based Credit, Grading and Semester System

Implemented during 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 Objectives:

The M.Sc (Computer Science) has been designed to cater to the regional, national and global requirements of the IT professionals. Further, the graduate will able to articulate and solve the problems in the related fields and can take up interdisciplinary projects as well. The objective is to prepare entrepreneurs and workforce for the public and private sector in the related areas.

Program Educational Objectives:

1. To prepare the post graduates as leading professionals in government, academia, corporate, and research organizations along with entrepreneurial pursuits.

2. To prepare post graduates with an ability to articulate and solve problems using different Computer Science Techniques.

3. To prepare the post graduates with strong learning quotients having adaptability to the constantly changing technological environment with strong knowledge in Computer Science.

4. To prepare the post graduates to lead and initiate ethically the professional and organizational goal in the area of specialization and develop innovative and research-oriented methodology to solve the complex problems.

Program Outcomes:

The main outcomes of this program are given here. At the end of the program a student is expected to have:

1. **Abilities**: An ability to adapt existing models, techniques, algorithms, data structures, etc. for efficiently solving problems.

2. **Modern Tool Usage**: Create, select and apply appropriate techniques, resources and IT tools (Python Programming, R Studio, PyCharm, Jupiter Notebook, Julia / Android Studio, Xcode, Atom, Visual Studio and Cordova / comprehensive cloud computing techniques like Virtualization (Hyper-V) and providers like Amazon web services/ Microsoft Azure) and IT tools including Kubernetes to solve real world problem.

3. **Real World Challenge**s: An ability to design, develop and evaluate new computer based systems for novel applications which meet the desired needs of industry and society.

4. **Communication Efficacy**: Communicate effectively with all the stack holders as well as society by being able to comprehend effective documentations and presentations.

5. **Individual & Team Work:** Ability to work in diverse teams and also as an individual in multidisciplinary environment.

6. **Research skills**: An ability to undertake original research at the cutting edge of computer science & its related areas.

7. **Innovation**: Identify opportunities, entrepreneurship vision and use of innovative ideas to create value and wealth for the betterment of the individual and society.

8.	**Project Management and Finance**: Ability to understand, management and computing principles with computing knowledge to manage projects in multidisciplinary environments.
9.	**Professional skills:** Collaborative skills, ability to write grants & articles for journals and sit in for various competitive and professional certifications in the field of Computer Science and (data science/ information security/ cloud computing/ mobile application).
10.	**Professional Ethics**: An understanding of professional and ethical responsibility.
11.	**Life-long Learning**: An ability to learn independently and engage in life- long learning.

Program Specific Outcomes (PSOs):

1.	Students will able to demonstrate the ability to systematically and independently solve complex problems of research and development in the field of computer science and (data science/ information security/ cloud computing/ mobile application) formulating sub-tasks, and proposing innovative solutions.
2.	Students will be able to apply database, data structures, testing, and along with elective technology's related concepts.
3.	Students will able to identify and explain the core issues of computer science and Demonstrate competence in application of computer science and engineering principles.
4.	Students will be able to provide the appropriate solution for (data science/ information security/ cloud computing/ mobile application).

PEO-PO-PSO mapping

Cos	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PSO 1	PSO 2	PSO 3	PSO 4
PEO 1	H	M	M	M	M	H	M	L	M	M	M	H	H	H	M
PEO 2	H	H	H	H	M	H	H	H	M	H	M	H	H	H	H
PEO 3	M	H	H	H	M	L	M	M	L	H	H	M	H	M	H

PEO 4	M	M	L	M	H	M	H	M	H	M	H	H	M	H	M

*Note: H – Higher, M- Medium, L- Low

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, 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 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. 37,500/- . 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	40	8
SEC	Skill Enhancement course	26	6
OE	Open Elective courses	3	1
PE	Program Elective	35	6
Total		**104**	**21**

Course Matrix:

FIRST SEMESTER

A. THEORY/PRACTICAL							
S. No.	**CODE**	**SUBJECT NAME**	**SUBJECT TYPE**	**HOURS / WEEK**			**CREDITS**
				L	**T**	**P**	
1		Mathematical foundations of Computer Science	CC-1	3	1	-	4
2		Distributed Operating System	CC-2	4	-	4	6
3		Advanced Data Structures and Algorithms	CC-3	4	-	4	6
4		Advanced Database Management Systems	CC-4	3	-	4	5
5		Software Engineering Concepts and Methodologies	CC-5	3	-	-	3
6		Python Programming	SEC-1	3	-	2	4
				Total of Theory and Tutorial			**21**
				Total of Practical			**7**
				Total of Semester			**28**

SECOND SEMESTER

A. THEORY/PRACTICAL							
S.No.	**CODE**	**SUBJECT NAME**	**SUBJECT TYPE**	**PERIODS/WEEK**			**CREDITS**
				L	**T**	**P**	

S.No.		SUBJECT NAME	SUBJECT TYPE	L	T	P	CREDITS
1		Advanced Java Programming	CC-6	4	-	4	6
2		Inferential Statistics	CC-7	3	-	2	4
3		Program Elective-I	PE-1	3	-	0	3
4		Program Elective-II	PE-2	3	-	2	4
5		Program Elective-III	PE-3	3	-	2	4
6		English for Research Paper Writing	SEC-2	4	-	0	4
			Total of Theory and Tutorial				**20**
			Total of Practical				**5**
			Total of Semester				**25**

Program Elective-I
Introduction to Data Science using Python
Introduction to Information security
Introduction to Cloud Computing
Mobile Application Development

Program Elective-II
Machine Learning
Ethical Hacking
Storage and Data Centres
Android Application Development

Program Elective-III
Real Time Data Processing
Digital Forensics
Principles of Virtualization
Advance Android Application Development

THIRD SEMESTER

A. THEORY/PRACTICAL							
S.No.	**CODE**	**SUBJECT NAME**	**SUBJECT TYPE**	**L**	**T**	**P**	**CREDITS**
1		Software Verification and Validation Testing	CC-8	4	-	4	6
2		Program Elective-IV	PE-4	3	-	2	4
3		Program Elective-V	PE-5	3	-	2	4
4		Open Elective-1	OE-1	3	-		3
5		Placement training	SEC-3	2	-	0	2

6		Mini Project	SEC-4	0		10	5
			Total of Theory & Tutorial				**15**
			Total of Practical				**9**
			Total of Semester				**24**

Program Elective-IV
Data Visualization
Data Encryption & Compression
Cloud Web Services
Java Script Frame works

Program Elective-V
Data Mining
Web Security and SDLC
Hybrid Cloud Computing
Cross Platform Application Development

Open Elective-I
Business Analytics / Operations Research/Cost Management of Engineering Projects

FOURTH SEMESTER

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