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

Programme Code: PMSGI

M.Sc. in Geoinformatics

Two Year Programme

Four Semesters

Course Structure

Under Choice Based Credit, Grading and Semester System

Implemented during Academic Year- 2020-21

INDEX

Sr. No.	Content	Page No.
1	Preamble	3
2	Programme Objectives & Outcomes	5
3	Eligibility, Selection & Admission Criterion	6
4	Scheme of Examination	8
5	Teaching Methodology	13
6	Ad-Hoc Board of Studies	15
7	Programme Structure	16
8	Detailed Curriculum	19

1. Preamble

Geoinformatics is an interdisciplinary subject, with applications in almost every discipline. This is a newly emerging discipline developing gradually worldwide. There is an increased dependency of organizations, businesses, and governments on the integrative and analytical power of Geoinformatics to address real-world issues.

The field of Geoinformatics consists of Remote Sensing, Geographic Information System (GIS), and Global Navigation Satellite System (GNSS) with Information Technology. Many fields benefit from Geoinformatics, including urban planning and land use management, navigation systems, public health, environmental modeling and analysis, military, transport network planning and management, agriculture, meteorology and climate change, oceanography and atmosphere modeling, business location planning, architecture and archaeological reconstruction, telecommunications, criminology and crime simulation, business management, aviation and maritime transport. Geoinformatics has become very important for decision-makers across the globe. Many national and international agencies are using spatial data for managing their day to day activities.

Students applying for this course would be from interdisciplinary academic backgrounds such as Geography, Geology, Science, Agriculture, Environment, Forestry, Engineering, IT and Computer science. The students acquiring this degree and expertise in this field would find vast opportunities in academics, government sector, private industry, and in the non-profit sector.

This **Master of Science Program** is designed to provide theoretical background as well as practical skills to equip them in their career advancement. This programme would help the mid-level professionals who could be trained in their respective professional occupation. Prior knowledge of remote sensing and GIS is desirable.

1.1 About Khandwala College

Khandwala College is a multi-faculty institution (Estd. 1983), affiliated to University of Mumbai. It offers 23 UG, 6 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 minorities 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 Ramakrishna Bajaj National Quality Commendation Certificate in 2013-14. Our college has been awarded Autonomous status from 2016. Khandwala College, as an Autonomous College; is offering a new M.Sc. in Geoinformatics, as a Two Year Integrated Programme – with Four Semesters Course Structure -Under Choice Based Credit, Grading and Semester System.

1.2 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

2. Programme Objectives & Outcomes
2.1 Programme Objectives
1. To acquire advanced knowledge and understanding in the field of modern geographic information technology to explore and analyse real world problems
2. To gain the practical knowledge, project management skill and hands-on training
3. To enable learners to be effective managers and decision-makers
4. To obtain the knowledge of scientific and technological components of Geoinformatics for applications in different fields

5. To introduce the fundamentals, concepts, spatial and non-spatial structure in Geographical Information System and equip the learners familiar in handling and managing elements of cartographic database for mapping and visualization through GIS

2.2 Programme Outcomes

After successful completion of the Programme the learner will be able to:

1. Apply clear understanding of concepts, information and techniques of remote sensing and GIS in different fields.
2. Demonstrate adequate spatial knowledge associated with geographical information system relevant to the industry and society.
3. Develop latest advancement in the field of Geoinformatics
4. To formulate, plan and execute Geospatial techniques for planning programmes
5. To acquire sound knowledge of Web GIS

3. Eligibility, Selection and Admission Criterion

3.1 Eligibility Criterion:

Candidates for being eligible for admission to the two-year course leading to the Degree of M.Sc. in Geoinformatics, shall be required to have passed BA/BSc Degree Examination with Geography /Geology/Physics/Environmental Sciences/Computer Science/Computer Applications/Information Technology/ Agriculture/Remote Sensing as the main subject of study or Geography as one of the subjects of study or BE Civil Engineering/ B. Arch in Architecture or any Information Technology related fields or an examination of any other University accepted by the syndicate as equivalent thereto. Candidates with degrees in other subject areas will be considered if they can demonstrate interest, aptitude and experience in a field relevant to the application of geospatial technology

3.2 Selection and Admission Criterion for Eligible Candidates:

The interested students shall register for Interview.

The admission of students shall be based on:

- Academic and non- academic credentials till date

- 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 Khandwala 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 Khandwala college

3.3 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 in Khandwala College affiliated to the University for a period of not less than two academic years, passed the examinations of all the Four Semesters earning 108 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.

3.4 Faculty under which the Degree is awarded:

M.SC. in Geoinformatics is awarded under the faculty of Science.

3.5 Intake & Fees

One Division with maximum 20 Students in the first year.

Total Programme Fees Rs. 3,00,000/- (i.e per year fees Rs. 1,50,000/-)

3.6 Attendance

- A student has to obtain a minimum 75% cumulative attendance for the theory lectures and practical separately will be required out of the total number of lectures and practical
- 25% allowance in attendance is given to account for activities under NCC / NSS / Cultural / Sports / Minor Medical conditions etc.
- Some lectures will be conducted On Line. Lectures will be arranged according to the convenience of all. Students will have lectures in college for 4 days a week.

3.7 Eligibility for Faculty

Master's degree with 55% marks in Geography/ Geoinformatics

3.8 Duration of the Course

The duration of the course is for two academic years consisting of FOUR semesters. Medium of Instruction is English

4. 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 108 Credits.

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.

Scheme of Total Credits

Sr. No.	Year	Credits
1	Year 1	48
2	Year 2	52
	Total Credits from Academics	100
	Additional Credits	8
	Total Credits for Award of Degree	108

4.1 Credit Based Evaluation System Scheme of Examination

For all 4 semesters, the performance of the learners shall be evaluated into two components. The first component shall carry 40% marks which will be a Continuous Internal Evaluation while the second component shall carry 60% marks at semester end examination.

The allocation of marks for the Continuous Internal Evaluation 40% and Semester End Examination 60% are as shown below:

4.2 Structure of Continuous Internal Evaluation – 40% = 40 marks

Sr.No.	Particulars	Marks
1	Class test held in the given semester	20 marks
2	Subject specific Term Work Module/assessment modes – as decided by the department in the beginning of the semester (like Extension/field/experimental work, Short Quiz; Objective test, open book test etc. and written assignments, Case study, Projects, Posters and exhibits etc. for which the assessment is to be based on class presentations wherever applicable)	10 marks
3	Attendance & Active participation in routine class instructional deliveries (and in practical work, tutorial, field work, cultural activities etc. as the case may be)	10 marks

4.3 Structure of End Examination – 60% = 60 marks

Semester End Examination will be organized after all modules of the course are taught in the class. It will be a written examination and a practical examination. This examination will be for 60 marks for theory papers and 100 marks for practical papers.

The assessment of Continuous Internal Evaluation and Semester End Examination as mentioned above for the Semesters I to IV shall be processed by the College – 'Institutions of their Learners' and issue the grade cards to them after the conversion of marks into grades as the procedure mentioned below.

The learners to pass a course shall have to obtain a minimum of 40% marks in aggregate for each course where the course consists of Continuous Internal Evaluation & Semester End Examination. The learner shall obtain a minimum of 40% marks (i.e. 16 out of 40) in the Continuous Internal Evaluation and 40% marks in Semester End Examination (i.e. 24 Out of 60) separately, to pass the course and a minimum of Grade D in each project, wherever applicable, to pass a particular

semester. A learner will be said to have passed the course if the learner passes the Continuous Internal Evaluation & Semester End Examination together.

4.4 Question Paper Pattern

A) Written Class Test (20 Marks) - 30 mins

1.	Match the Column / Fill in the Blanks/ Multiple Choice Questions (1 Marks each) (Any Six out of Eight)	05 Marks
2.	Answers the following (Attempt Any Two of the Three) (Concept based Questions) (2 Marks each)	05 Marks
3.	Answer in Brief (Attempt Any Two of the Three) (5 Marks each)	10 Marks

4.5 Passing Standards

Grade	Marks	Grade Points
O	80 and Above	10
A+	70 to 79.99	9
A	60 to 69.99	8
B+	55 to 59.99	7
B	50 to 54.99	6
C	45 to 49.99	5
D	40 to 44.99	4
F	Less than 40	0

- The learners shall obtain a minimum of 40% marks (i.e. 16 out of 40) in the Continuous Internal Evaluation (CIE) and 40% marks in Semester End Examination (i.e. 24 out of 60) separately, to pass the course and a minimum of Grade D to pass a particular semester. For the practical papers the learners have to score 40 % marks (i.e. 40 out of 100)
- Learners who fail to clear Class Test I or were unable to appear for Class Test I on account of Medical grounds or Bereavement of a family member can appear for Class Test II

- If a student fails in Class Test I, he/she shall have the opportunity to appear for Class Test II to improve his/her performance only once in the Semester. The re-conduct of the Class Test shall be completed before the commencement of Semester End Examinations.

- If just prior to or during the CIE a bereavement (of an immediate family member) occurs. (Note: In this case the Death Certificate of the departed and the Parent's note will have to be given to the College within 2 days of returning to College, for this clause to hold).

- A learner will be said to have passed the course if the learner passes the Continuous Internal Evaluation (CIE) and Semester End Examination.

4.6 Failure in Class Test II

Students failing to clear the Class Test will have to submit a project on a topic approved by the subject teacher.

The allocation of marks will be as follows:

- Written Assignment – 30 marks
- Presentation- 10 marks

5. Teaching Methodology:

The Course is a combination of lectures, demonstrations, seminars, practical and project workshops offered under Choice Based Credit System (CBCS).

There will be regular conduction of online lectures.

6. Ad-hoc Board of Studies

Following Academicians, Faculty members & Experts have been consulted for the contents and development of the Syllabus for this course:

- Principal Dr. (Mrs.) Ancy Jose- Principal, Khandwala College
- Dr. Dipti Mukerji, Adjunct Professor - Expert
- Principal Venkataramani - Academician
- Ms. P. Sindhu - Faculty
- Dr. Moushumi Datta, Professor, Department of Geography, Course Coordinator

M.Sc. in Geoinformatics

Under Choice Based Credit, Grading and Semester System

Curriculum Framework

(To be implemented from Academic year 2020-2021)

First Year Semester I

(To be implemented from Academic year 2020-2021)

Course Code	Course Title	No. of Hours	Exam Duration	Maximum Marks			Credits
				CIE	SEE	Total	
2021PGIFRS	Fundamentals of Remote Sensing[1]	120	2 hrs 30 minutes	40	60	100	4
2022PGIFES	Fundamentals of the Earth's System [2]	120	2 hrs 30 minutes	40	60	100	4
2023PGIFMS	Fundamentals of Mathematics [3]	120	2 hrs 30 minutes	40	60	100	4
2024PGIFCM	Fundamentals of Computers [4]	120	2 hrs 30 minutes	40	60	100	4
2025PGITTG	Tools and Techniques in Geo informatics - I [5]	120	4 hrs	Nil	100	100	4
2026PGITTG	Tools and Techniques in Geo informatics - II[6]	120	4 hrs	Nil	100	100	4
	Total						**24**

*Note:

1- Core Course

2- Core Course

3- Core Course

4- Core Course

5- DSC (Discipline Specific Compulsory Course)

6- DSC (Discipline Specific Compulsory Course)

First Year Semester II

(To be implemented from Academic year 2020-2021)

*Note:

1- Core Course

2- Core Course

3- Core Course

Course Code	Course Title	No. of Hours	Exam Duration	Maximum Marks			Credits
				CIE	SEE	Total	
2011PGIIGI	Introduction to Geo informatics [1]	120	2 hrs 30 minutes	40	60	100	4
2012PGISAS	Spatial Analysis on Statistical Methods [2]	120	2 hrs 30 minutes	40	60	100	4
2013PGIDIP	Digital Image Processing[3]	120	2 hrs 30 minutes	40	60	100	4
2014PGIPPY	Programming with Python [4]	120	2 hrs 30 minutes	40	60	100	4
2015PGITTG	Tools and Techniques in Geo informatics – III[5]	120	4 hrs	Nil	100	100	4
2016PGITTG	Tools and Techniques in Geoinformatics – IV[6]	120	4 hrs	Nil	100	100	4
	Total						**24**

4- Core Course

5- DSC (Discipline Specific Compulsory Course)

6- DSC (Discipline Specific Compulsory Course)

Second Year Semester III

(To be implemented from Academic year 2021-2022)

Course Code	Course Title	No. of Hours	Exam Duration	Maximum Marks			Credits
				CIE	SEE	Total	
2131PGIRMY	Research Methodology [1]	120	2 hrs 30 minutes	40	60	100	6
2132PGIARST	Advances in Remote Sensing and Advanced Techniques in Spatial Data Processing [2]	120	2 hrs 30 minutes	40	60	100	6
2133PGIGIS	Advances in GIS[3]	120	2 hrs 30 minutes	40	60	100	6
2134PGWDS	Web Designing[5]	120	4 hrs	Nil	100	100	6
2135PGIPRJ	Project[6]	120	----	20	80	100	6
	Total						**30**

*Note:

1- Core Course

2- DSE (Discipline Specific Elective Course)

3- DSE (Discipline Specific Elective Course)

4- DSC (Discipline Specific Compulsory Course)

5- DSC (Discipline Specific Compulsory Course)

6- DSC (Discipline Specific Compulsory Course)

Second Year Semester IV

(To be implemented from Academic year 2021-2022)

Course Code	Course Title	No. of Hours	Exam Duration	Maximum Marks			Credits
				CIE	SEE	Total	
2141PGIGHC	Geoinformatics and Health Care [1]	120	2 hrs 30 minutes	40	60	100	6
2142PGIDMS	Database Management Systems[2]	120	2 hrs 30 minutes	40	60	100	6
2143PGIDISN	Dissertation[3]	200	-	20	80	100	10
	Total						**22**

*Note:

1- Core Course

2- DSE (Discipline Specific Elective Course)

3- DSC (Discipline Specific Compulsory Course)

Additional 8 Credits

- ✐ Students have to earn 8 extra credits
- ✐ Degree will not be awarded until the students earn the above extra 8 credits
- ✐ Total Credits -------
- ➢ Semester 1 --- ----------24 credits
- ➢ Semester 11 ------------24 credits
- ➢ Semester 111 -----------30 credits
- ➢ Semester 1V ------------22 credits
- ➢ Total -------------------100 and extra 8 credits = **108 credits**