File Ref.No.70516/GA - IV - J3/2019/Admn

UNIVERSITY OF CALICUT

Abstract

General & Academic - CBCSS PG Regulations 2019 - Scheme and Syllabus of M.Sc Mathematics Programme w.e.f 2020 Admission onwards -Incorporating Outcome Based Education - Implemented - Subject to ratification of Academic Council - Orders Issued.

G & A - IV - J

U.O.No. 5335/2021/Admn Dated, Calicut University.P.O, 17.05.2021

Read:-1) U.O.No. 8953/2019/Admn Dated 06.07.2019.
2) U.O.No. 1336/2020/Admn Dated 31.01.2020.
3) Item no.2 in the minutes of the meeting of Board of Studies in Mathematics PG, Dated 09.04.2021.
4) Remarks of the Dean, Faculty of Science, Dated 08.05.2021.
5) Orders of the Vice Chancellor in the file of even no, Dated 10.05.2021.

ORDER

1. The scheme and syllabus of M.Sc Mathematics Programme under CBCSS PG Regulations 2019 in the affiliated Colleges of the University, w.e.f 2019 admission onwards has been implemented, vide paper read (1) above and same has been modified, vide paper read (2) above.

2. The Board of Studies in Mathematics PG has resolved to incorpate Outcome Based Education (OBE) in the scheme and syllabus of M.Sc Mathematics Programme under affiliated colleges of the University, in tune with the new CBCSS PG Regulations 2019 with effect from 2020 Admission onwards, Vide paper read (3) above.

3. The Dean, Faculty of Science, vide paper read (4) above, has approved to implement the scheme and syllabus of M.Sc Mathematics Programme (CBCSS-PG-2019) incorporating Outcome Based Education (OBE) , in the syllabus forwarded by the Chairperson, Board of Studies in Mathematics PG, in tune with the new CBCSS PG Regulations 2019 with effect from 2020 Admission onwards.

4. Considering the urgency, the Vice Chancellor has accorded sanction to implement the scheme and syllabus of M.Sc Mathematics Programme incorporating Outcome Based Education (OBE) ,in the syllabus forwarded by the Chairperson,Board of Studies in Mathematics in tune with the new CBCSS PG Regulations under affiliated colleges of the University with effect from 2020 Admission onwards, subject to ratification by the Academic Council.

5. Scheme and syllabus of M.Sc Mathematics Programme (CBCSS) incorporating Outcome Based Education (OBE) is therefore implemented with effect from 2020 Admission onwards under affiliated colleges of the University, subject to ratification by the Academic Council.

6. Orders are issued accordingly.

7. U.O.No.1336/2020/Admn Dated 31.01.2020, is modified to this extend.(syllabus appended)

Arsad M

Assistant Registrar

To

The Principals of all Affiliated Colleges
Copy to: PS to VC/PA to PVC/ PA to Registrar/PA to CE/DR, SDE/JCE I/JCE V/DoA/EX and EG
Sections/GA I F/CHMK Library/Information Centres/SF/DF/FC

Forwarded / By Order

Section Officer

UNIVERSITY OF CALICUT

SYLLABUS FOR MSc MATHEMATICS (CBCSS) PG PROGRAMME

EFECTIVE FROM 2020 ADMISSION ONWARDS

Total Credits :80

PROGRAMME OUTCOME:

Upon completing the M. Sc degree in the field of Mathematics, students have/capable of:

- **A solid understanding of graduate level algebra, analysis and topology.**
- **Using their mathematical knowledge to analyze certain problems in day to day life.**
- **Identifying unsolved yet relevant problems in a specific field.**
- **Undertaking original research on a particular topic.**
- **Communicate mathematics accurately and effectively in both written and oral form.**
- **Conducting scholarly or professional activities in an ethical manner.**

SEMESTER 1

Course Code	Title of the Course	No. of Credits	Work Load Hrs./week	Core/Audit Course
MTH1C01	Algebra- I	4	5	Core
MTH1C02	Linear Algebra	4	5	Core
MTH1C03	Real Analysis I	4	5	Core
MTH1C04	Discrete Mathematics	4	5	Core
MTH1C05	Number Theory	4	5	Core
MTH1A01	Ability Enhancement Course[a]	4	0	Audit Course

SEMESTER 2

Course Code	Title of the Course	No. of Credits	Work Load Hrs./week	Core/ Elective
MTH2C06	Algebra- II	4	5	Core
MTH2C07	Real Analysis II	4	5	Core
MTH2C08	Topology	4	5	Core
MTH2C09	ODE & Calculus of Variations	4	5	Core
MTH2C10	Operations Research	4	5	Core
	Professional Competency Course[a]	4	0	Audit Course

SEMESTER 3

Course Code	Title of the Course	No. of Credits	Work Load Hrs./week	Core/Elective
MTH 3C11	Multivariable Calculus & Geometry	4	5	Core
MTH3C12	Complex Analysis	4	5	Core
MTH3C13	Functional Analysis	4	5	Core
MTH3C14	PDE & Integral Equations	4	5	Core
	Elective I*	3	5	Elec.

SEMESTER 4

Course Code	Title of the Course	No. of Credits	Work Load Hrs./week	Core/Elective

MTH4C15	Advanced Functional Analysis	4	5	Core
	Elective II**	3	5	Elec.
	Elective III**	3	5	Elec.
	Elective IV**	3	5	Elec.
MTH4P01	Project	4	5	Core
MTH4 V01	Viva Voce	4		Core

[a] Evaluation of these courses will be as per the latest PG regulations.
* This Elective is to be selected from list of elective courses in third semester
** This Elective is to be selected from list of elective courses in fourth semester

List of Elective Courses in Third Semester

1. MTH3E01 Coding theory
2. MTH3E02 Cryptography
3. MTH3E03 Measure and Integration
4. MTH3E04 Probability Theory

List of Elective Courses in Fourth Semester

1. MTH4E05 Advanced Complex Analysis
2. MTH4E06 Algebraic Number Theory
3. MTH4E07 Algebraic Topology
4. MTH4E08 Commutative Algebra
5. MTH4E09 Differential Geometry
6. MTH4E10 Fluid Dynamics
7. MTH4E11 Graph Theory
8. MTH4E12 Representation Theory
9. MTH4E13 Wavelet Theory

ABILITY ENHANCEMENT COURSE(AEC)

Successful fulfilment of any one of the following shall be considered as the completion of AEC. (i) Internship, (ii) Class room seminar presentation, (iii) Publications, (iv) Case study analysis, (v) Paper presentation, (vi) Book reviews. A student can select any one of these as AEC.

Internship: Internship of duration 5 days under the guidance of a faculty in an institution/department other than the parent department. A certificate of the same should be obtained and submitted to the parent department.

Class room seminar: One seminar of duration one hour based on topics in mathematics beyond the prescribed syllabus.

Publications: One paper published in conference proceedings/ Journals. A copy of the same should be submitted to the parent department.

Case study analysis: Report of the case study should be submitted to the parent department.

Paper presentation: Presentation of a paper in a regional/ national/ international seminar/conference. A copy of the certificate of presentation should be submitted to the parent department.

Book Reviews: Review of a book. Report of the review should be submitted to the parent department.

PROFESSIONAL COMPETENCY COURSE (PCC)

A student can select any one of the following as Professional Competency course:

1. Technical writing with LaTeX.
2. Scientific Programming with Scilab.
3. Scientific Programming with Python.

PROJECT

The Project Report (Dissertation) should be self contained. It should contain table of contents, introduction, at least three chapters, bibliography and index. The main content may be of length not less than 30 pages in the A4 format with one and half line spacing. The project report should be prepared preferably in LaTeX. There must be a project presentation by the student followed by a viva voce. The components and weightage of External and Internal valuation of the Project are as follows:

Components	External(weightage)	Internal (weightage)
Relevance of the topic & statement of problem	4	1
Methodology & analysis	4	1
Quality of Report & Presentation	4	1
Viva Voce	8	2
Total weightage	20	5

The external project evaluation shall be done by a Board consisting two External Examiners. The Grade Sheet is to be consolidated and must be signed by the External Examiners.

Viva Voce Examination

The Comprehensive Viva Voce is to be conducted by a Board consisting of two External Examiners. The viva voce must be based on the core papers of the entire programme. There should be questions from at least one course of each of the semesters I, II, and

III. Total weightage of viva voce is 15. The same Board of two External Examiners shall conduct both the project evaluation and the comprehensive viva voce examination. The Board of Examiners shall evaluate at most 10 students per day.

EVALUATION AND GRADING

The evaluation scheme for each course except audit courses shall contain two parts.
(a)**Internal Evaluation:** 20% Weightage
(b) **External Evaluation:** 80% Weightage
Both the Internal and the External evaluation shall be carried out using direct gradingsystem as per the general guidelines of the University. Internal evaluation must consist of
(i) 2 tests (ii) one assignment (iii) one seminar and (iv) attendance, with weightage 2 fortests (together) and weightage 1 for each other component.

Each of the two internal tests is to be a 10 weightage examination of duration one hourin direct grading. The average of the final grade points of the two tests can be used to obtain the final consolidated letter grade for tests (together) according to the following table.

Average grade point (2 tests)	Grade for Tests	Grade Point for Tests
4.5 to 5	A+	5
3.75 to 4.49	A	4
3 to 3.74	B	3
2 to 2.99	C	2
Below 2	D	1
Absent	E	0

Table 1: Internal Grade Calculation: Examples

Tests	Grade Point of Test1	Grade Point of Test2	Average Test Grade Point	Test Grade	Test Grade Point	Test Weightage	Test Weighted Grade Point
Student1	4.8	3.5	4.15	A	4	2	8
Student2	5	4.8	4.9	A+	5	2	10
Student3	2.3	4.7	3.5	B	3	2	6

Assignment	Assignment Grade	Assignment Grade Point	Assignment Weightage	Assignment Weighted Grade Point
Student1	A+	5	1	5
Student2	A	4	1	4
Student3	C	2	1	2

Seminar	Seminar Grade	Seminar Grade Point	Seminar Weightage	Seminar Weighted Grade Point
Student1	B	3	1	3
Student2	A+	5	1	5
Student3	D	1	1	1

Attendance	Attendance Grade	Attendance Grade Point	Attendance Weightage	Attendance Weighted Grade Point
Student1	A+	5	1	5
Student2	A+	5	1	5
Student3	C	2	1	2

Consolidation	Total Weighted Grade Point	Total Weightage	Total Internal Grade Point	Final Internal Grade
Student1	21	5	21/5 = 4.2	A+
Student2	24	5	24/5 = 4.8	O
Student3	11	5	11/5 = 2.2	F