

K. J. SOMAIYA COLLEGE OF SCIENCE AND COMMERCE , AUTONOMOUS

Diploma course in Calculus

Course Details

Department of Mathematics
2019-2020

This document contains the structure of course, details of syllabus and evaluation pattern.

Course Details

- ❖ **Course type** : Diploma
- ❖ **Course Title** : Diploma Course in Calculus

- ❖ **Objectives of course :**

Mathematics is an integral component for study of any Science education. It has been found that a student with a good background of Mathematics can understand and apply many concepts of any subjects. For this reason Mathematics has been termed as queen of all Sciences. This course is planned looking at the requirements of students from various fields of Science. Presently students are found to have weak foundation in Mathematics and thereby find any of the Science areas difficult whenever they deal with any mathematical calculation. Calculus course is one among many courses that a student is expected to have good background.

- ❖ **Learning Outcomes :**

This course will specifically benefit those students who want to major in Mathematics, Statistics, Physics, Chemistry, Computer Science, Information Technology, Geology and other subjects. To a great extent it will also benefit Biological Science students. A student who completes the course successfully should be able to apply them in their field of study. Lecture duration for the course will be of 1 hour/lecture, 30 lectures each module.

- ❖ **Prerequisites / Eligibility Criteria** : XIIth Science.

- ❖ **Intake Capacity** : 20 maximum 25

- ❖ **Duration** : 3 semesters.

- ❖ **Course Coordinator** : Subhash Krishnan

❖ **Syllabus** :

Semester I:

Module 1. Preliminary

Trigonometry, sets, 1-1 and onto function, conic section, 3-D surfaces, sketching regions in R^2 .

Module 2. Real number system.

Absolute value function, neighborhood, deleted neighborhood, interval, open set and closed set in R . Supremum, Infimum, Archimedes property, Density property.

Module 3. Sequence of real numbers, bounded sequence, convergence, Monotonic sequence, Cauchy sequence.

Module 4. Limits and Continuity, sequential continuity.

Semester II:

Module 5. Derivatives and application including Mean Value theorem and Taylors theorem.

Module 6. Integration, definite integration

Module 7. Application including volume of revolution, arc length etc improper integration, beta- gamma function.

Module 8. Differential equation first and higher order (D operator method).

Semester III:

Module 9. Functions of two variables, Limits and Continuity of function on two/ three variables.

Module 10. Partial derivatives, Gradient, Vectors perpendicular to a surface, Tangent plane, Maxima-Minima, LaGrange multiplier.

Module 11. Double and triple integration. Application of Greens theorem and Stokes theorem and related topics.

The following Experiential learning Modules will be part of each semester.

Each will be of 10 lectures in each semester.

Module 1. Practical on above topics using Maple.

Module2 . Documentation using LaTeX.

Module 3. Project A on any one topic stated above (theoretical)

Module 4. Project B Maple based project on Project A/ any other topic.

Module 5. Institutional and industrial visit.

❖ **Evaluation Pattern** :The course is spread over 3 semesters. In each semester the student will be evaluated out of 100 marks. 40% of the course is assessed internally as practical and 60 % will be assessed as semester end examination. The student need 40% marks to pass the course. There is no separate head of passing in the internal and semester end examination. A student will have a maximum 5 semesters to complete his course. Internal examination will be of continuous assessment basis. Practical examination will be conducted during regular practical. Semester end Examination schedule will tentatively be arranged as follows:

Semester I	December
Semester II	June
Semester III	December

Certificates will be distributed in the month of February/March.
The student will be assessed as per the following grade scale:

Marks	Grade points	Grade	Performance
80 and above	10	O	OUTSTANDING
70 – 80	9	A+	EXCELLENT
60 – 70	8	A	VERY GOOD
55 – 60	7	B+	GOOD
50 – 55	6	B	ABOVE AVERAGE
45 – 50	5	C	AVERAGE
40 – 45	4	D	PASS
Less than 40	0	F	FAIL

❖ **Reference Books** :

1. Real analysis by Goldberg

2. Mathematical analysis vol 1&2 by Apostol

3. Introduction to calculus and analysis vol 1&2 by Courrant and John

4. Intermediate calculus by Protter and Morrey

5. Calculus and analytic geometry by Thomas and Finney.