

COURSE TEMPLATE

1.	Department/Centre proposing the course	Mathematics
2.	Course Title (<i>< 45 characters</i>)	CALCULUS
3.	L-T-P structure	3-1-0
4.	Credits	4
5.	Course number	MAL 110
6.	Status (<i>category for program</i>)	Core course

7.	Pre-requisites (<i>course no./title</i>)	Nil
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8.	Status vis-à-vis other courses (<i>give course number/title</i>)	
8.1	Overlap with any UG/PG course of the Dept./Centre	No
8.2	Overlap with any UG/PG course of other Dept./Centre	No
8.3	Supercedes any existing course	No

9.	Not allowed for (<i>indicate program names</i>)	Nil
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10.	Frequency of offering	☒ Every sem ☐ 1 st sem ☐ 2 nd sem ☐ Either sem
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11.	Faculty who will teach the course Faculty of Mathematics Department	
12.	Will the course require any visiting faculty?	No

13.	Course objective (<i>about 50 words</i>): To introduce concepts of differential and Integral calculus of single and multi variables to the under graduate students of all disciplines.	
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14.	Course contents (<i>about 100 words</i>) (<i>Include laboratory/design activities</i>): Review of limit, continuity and differentiability, uniform continuity. Mean value theorems and applications, Taylor's theorem, maxima and minima. Sequences and series, limsup, liminf, convergence of sequences and series of real numbers, absolute and conditional convergence. Riemann integral, fundamental theorem of integral calculus, applications of definite integrals, improper integrals, beta and gamma functions. Functions of several variables, limit and continuity, partial derivatives and differentiability, gradient, directional derivatives, chain rule, Taylor's theorem,	
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maxima and minima and the method of Lagrange multipliers.

Double and triple integration, Jacobian and change of variables formula. Parameterization of curves and surfaces, vector fields, divergence and curl. Line integrals, Green's theorem, surface integral, Gauss and Stokes' theorems with applications.

15. Lecture Outline (with topics and number of lectures)

Module no.	Topic	No. of hours
1	Review of limit, continuity and differentiability, uniform continuity.	3
2	Mean value theorems and applications, Taylor's theorem, maxima and minima.	4
3	Sequences and series, limsup, liminf, convergence of sequences and series of real numbers, absolute and conditional convergence.	4
4	Riemann integral, Fundamental theorem of integral calculus.	3
5		
6	Applications of definite integrals, improper integrals, beta and gamma functions.	5
7	Functions of several variables, limit and continuity, partial derivatives and differentiability, gradient, directional derivatives, chain rule,	5
8	Taylor's theorem, maxima and minima and the method of Lagrange multipliers.	5
9	Double and triple integration, Jacobian and change of variables formula.	3
10	Vector fields, divergence and curl., Parameterization of curves, Line integrals, Green's theorem,	4
11	Parametrization of Surfaces, Surface integral, Gauss and Stokes' theorems with applications	6
12		
COURSE TOTAL (14 times 'L')		42

16. Brief description of tutorial activities

Problem sheets will be distributed in advance and students are expected to attempt the problems using the concepts learned in the lectures. During the tutorial hours teachers will help the students to clear doubts and to solve the difficult problems if any. Tutorial sheets will include problems covering theoretical, numeric and applications.

17. Brief description of laboratory activities

Module no.	Experiment description	No. of hours
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
COURSE TOTAL (14 times 'P')		

18. Suggested texts and reference materials

STYLE: Author name and initials, Title, Edition, Publisher, Year.

1. G.B. Thomas and R.L. Finney, Calculus and Analytic Geometry (9th Edition), Addison-Wesley, 1998.
2. N. Piskunov, Differential and Integral Calculus (Volume I and II), Mir Publications and CBS Publishers, Indian Reprint, 1996.

3.K. A. Ross, Elementary Analysis - Theory of Calculus. Springer (2010)

19. Resources required for the course (*itemized & student access requirements, if any*)

19.1	Software	Nil
19.2	Hardware	Nil
19.3	Teaching aides (videos, etc.)	Nil
19.4	Laboratory	Nil
19.5	Equipment	Nil
19.6	Classroom infrastructure	Mike, Tablet PC, Projector.
19.7	Site visits	Nil

20. Design content of the course (*Percent of student time with examples, if possible*)

20.1	Design-type problems	No
20.2	Open-ended problems	No
20.3	Project-type activity	No
20.4	Open-ended laboratory work	No
20.5	Others (please specify)	No

Date: 28th February, 2013


(Signature of the Head of the Department)