

DON BOSCO ARTS & SCIENCE COLLEGE
(Affiliated to Kannur University)
ANGADIKADAVU, IRITTY, KANNUR



COURSE PLAN

B.Sc Maths

SEMESTER - 5

ACADEMIC YEAR 2015 - 16

SL No.	Name of Subjects	Name of the Teacher	Duty Hours per week	
V Sem B.Sc (2013 – 16)				
1.	5B05 MAT – Vector Analysis	Jimi Joseph	4	
2.	5B06 MAT – Real Analysis	Neenu P Sunny	5	
3.	5B07 MAT – Abstract Algebra	Feeba Joseph	5	
4.	5B08 MAT – Graph Theory	Alen Mathew	4	
5.	5B09 MAT – Differential Equations and Numerical Analysis	Feeba Joseph	5	
6.	5D01 MAT – Business Mathematics	Feeba Joseph	2	

TIME TABLE

Day	9.50am– 10.45am	10.45am– 11.40am	11.55am– 12.50am	1.40am– 2.35am	2.35am – 3.30am
1	5B05 MAT – Vector Analysis	5B07 MAT – Abstract Algebra	5B06 MAT – Real Analysis	5B09 MAT – Differential Equations and Numerical Analysis	5B08 MAT – Graph Theory
2	5B07 MAT – Abstract Algebra	5B05 MAT – Vector Analysis	5B09 MAT – Differential Equations and Numerical Analysis	5B06 MAT – Real Analysis	5B08 MAT – Graph Theory
3	5B07 MAT – Abstract Algebra	5B05 MAT – Vector Analysis	5B08 MAT – Graph Theory	5B06 MAT – Real Analysis	5B09 MAT – Differential Equations and Numerical Analysis
4	5B07 MAT – Abstract Algebra	5B05 MAT – Vector Analysis	5D01 MAT – Business Mathematics	5B09 MAT – Differential Equations and Numerical Analysis	5B06 MAT – Real Analysis
5	5B07 MAT – Abstract Algebra	5B08 MAT – Graph Theory	5D01 MAT – Business Mathematics	5B06 MAT – Real Analysis	5B09 MAT – Differential Equations and Numerical Analysis

5B05 MAT - VECTOR ANALYSIS

No of Credits: 3

No of contact hours: 72

Aim of the course: To introduce graph theory which is one of the branch of discrete Mathematics which has a surprising number of applications.

Objectives of the Course:

1. Perform standard operations on vectors in two-dimensional space and three-dimensional space
2. Compute the dot product of vectors, lengths of vectors, and angles between vectors
3. Compute the cross product of vectors and interpret it geometrically
4. Determine the extrema of functions of several variables
5. Use the Lagrange multiplier method to find extrema of functions with constraints
6. Define double integrals over rectangles

SYLLABUS

Module – I:

Vectors and analytic geometry in space. A quick review of vectors in plane, Cartesian co-ordinates and vectors in space, dot product, cross product, triple product lines and planes in space. Cylinders, sphere, cone and quadric surfaces (ellipsoid, elliptic, parabolic, elliptic cone, hyperboloid of one sheet, hyperboloid of two sheets, hyperboloid parabolic,) cylindrical and spherical co-ordinates Vector valued function and motion in space. Vector valued function and space curve, length and unit tangent vector, curvature, torsion and T N B frame (section 10.1 to 10.7, 11.1, 11.3 and 11.4)

Module – II:

Multivariable function and partial derivatives, functions of several variable – limits and continuity, partial derivatives, Euler theorem on homogeneous functions, differentiability – chain rule – directional directives, gradient and tangent plane – extreme values and saddle points –Lagrange’s multipliers. (section 12.1 to 12.9)

Module – III:

Multiple integrals Double integrals, area of bounded region in the plane, double integral in polar form, triple integral in rectangular co ordinates, triple integral in cylindrical and spherical co ordinates, substitution in multiple integrals (section 13.1 to 13.4, 13.6, 13.7)

Module – IV:

Integrals in vector fields Line integrals, vector fields, work, circulation, path independence, potential function, conservative fields, exact differential form, Green’s theorem, in plane (with out proof) surface area and surface integral, stokes theorem (with out proof), divergence theorem (with out proof),(section 14.1 to 14.8)

Text: Calculus Thomas / Finny 9 edn

References:

1. vectors analysis – Schaum’s outline series (Spiegel)
2. Engineering mathematics – S.S. Sastri 3rd Edn
3. Advanced Engg. Mathematics Kreyszig 8th Edn
4. Vector analysis - M.D. Resingunia

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	01-06-2015 To 05-06-2015	01	Vector algebra
		02	Dot product of vectors
		03	Cross product of vectors
		04	Cross product of vectors
2	08-06-2015 To 12-06-2015		Spoken English Course
			Spoken English Course
			Spoken English Course
			Spoken English Course
3	15-06-2015 To 19-06-2015	05	Vector projection
		06	Scalar triple product
		07	Vector equation for the line
		08	Line segment joining two points
4	22-06-2015 To 26-06-2015	09	Distance from a point to a line
		10	Equation for planes in space
		11	The intersection of a line and a plane
		12	Distance from a point to a plane
5	29-06-2015 To 03-07-2015	13	Angles between planes
		14	Cylinders, sphere, cone
		15	ellipsoid, elliptic, paraboloid, elliptic cone
		16	Cylindrical co-ordinate system
6	06-07-2015 To 10-07-2015	17	Spherical co-ordinate system
		18	Limit and continuity of vector valued functions
		19	Differentiation of vector valued functions
		20	Integrals of vector functions
7	13-07-2015 To 17-07-2015	21	The unit tangent vector
		22	The curvature of a plane curve
		23	Normal vectors for space curve
		24	Torsion and the binormal vector
			Ramsan - Holiday
8	20-07-2015 To 24-07-2015	25	Test paper
		26	Functions of several variables
		27	Graphs and level curves of functions of two variables
		28	Limit of a function of two variable
9	27-07-2015 To 31-07-2015	29	Continuity of a function of two variable
		30	Partial derivatives
		31	Euler's theorem on homogeneous functions
		32	Chain rules
10	03-08-2015 To 07-08-2015	33	Directional derivatives in the plane
		34	Gradient vector
		35	Equation for tangent line to level curves
		36	Constrained maxima and minima / Seminar
11	10-08-2015 To 14-08-2015	37	Lagrange multipliers with two constraints
		38	Revision
			First Internal for UG/PG
			First Internal for UG/PG
12	17-08-2015		Karkkida Vavu -Holiday First Internal for UG/PG

No of Weeks	Dates	Session	Topic
	To 21-08-2015		First Internal for UG/PG
			First Internal for UG/PG
			First Internal for UG/PG
			Onam Celebration
13	24-08-2015 To 28-08-2015		Holiday
			Holiday
			Holiday
			Holiday
14	31-08-2015 To 04-09-2015	39	Double integration / Problems
		40	Application double integral
		41	Double integrals in polar form
		42	Social extension activity
15	07-09-2015 To 11-09-2015	43	Triple integrals in rectangular coordinates
		44	Application triple integral
		45	Substitutions in double integrals
		46	Substitutions in triple integrals / Bicentenary
16	14-09-2015 To 18-09-2015	47	Test paper
		48	Evaluation for smooth curves / Mass and moment
		49	Quiz competition for other departments
			Annual Retreat
			Annual Retreat
17	21-09-2015 To 25-09-2015		Sree Narayana Guru Samadhi - Holiday
		50	The work done by a force
		51	Flow integrals and circulation
			Bakrid - Holiday
			Comet
18	28-09-2015 To 02-10-2015	52	Flux across a plane curve
		53	The fundamental theorem of line integrals
		54	The component test for conservative fields
		55	Revision
			Gandhi Jayanthi - Holiday
19	05-10-2015 To 09-10-2015		Second internal for UG/PG
			Second internal for UG/PG
			Second internal for UG/PG
			Second internal for UG/PG
			Second internal for UG/PG
20	12-10-2015 To 16-10-2015	56	Determination of a potential function
		57	Exact differential forms
		58	Green's theorem
		59	Surface area / Trecking
21	19-10-2015 To 23-10-2015	60	Parametrized surfaces
		61	Stokes's theorem
		62	Divergence theorem
			Mahanavami - Holiday
22	26-10-2015 To 30-10-2015		Vijayadasami - Holiday
		63	Previous year question paper discussion
		64	Previous year question paper discussion
			Study Leave

No of Weeks	Dates	Session	Topic
			Study Leave
			Study Leave
23	02-11-2015 To		Study Leave
			Study Leave
	06-11-2015	04 - Nov	V Sem UG University Exam Begins

5B06 MAT - Real Analysis

No of Credits: 4

No of contact hours: 90

Objectives: Aim To introduce fundamental concepts and techniques of real analysis as a tool applicable to almost all other branches of Mathematics.

Text: Introduction to Real analysis – Robert G. Bartle, Donald.R. Sherbert John Wiley & Sons inc. (3rd Edition)

SYLLABUS

Module – I: The real Numbers (Section 2.1, 2.2, 2.3, 2.4, 2.5)

The Algebraic and order properties of \mathbb{R} , Absolute Value and Real Line, the completeness property of \mathbb{R} , Applications of the Supremum property, intervals.

Module – II: Sequences (sections 3.1, 3.2, 3.3, 3.4, 3.5)

Sequences and their limits, limit theorems, monotone sequences, subsequences and Balzano – weierstrass theorem, the Cauchy criterion.

Module – III: Infinite series (sections 3.7, 9.1, 9.2, 9.3)

Introduction to series, absolute convergence, test for absolute convergence, test for non-absolute convergence.

Module – IV: Continuous functions, (Sections 5.3, 5.4, 5.5)

Continuous functions on intervals, uniform continuity monotone and inverse functions

References: -

1. Richard.R. Goldberg – Methods of Real Analysis
2. Principles of Mathematical Analysis – Rudin .W
3. Mathematical Analysis – Binmore K.G.
4. Mathematical Analysis – Apostol T.M
5. Fundamentals of Real Analysis – V.K. Krishnan
6. A first course in Mathematical Analysis – Somasundaram, Choudhari
7. Real Analysis H.L. Royden
8. A course of Mathematical Analysis – Shanti Narayan

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	01-06-2015 To 05-06-2015	01	Real numbers
		02	Real numbers
		03	Algebraic properties of R
		04	Order properties of R
		05	Order properties of R
2	08-06-2015 To 12-06-2015		Spoken English Course
			Spoken English Course
			Spoken English Course
			Spoken English Course
			Spoken English Course
3	15-06-2015 To 19-06-2015	06	Order properties of R-theorems
		07	Order properties of R-theorems
		08	Cauchy's Inequality
		09	Triangle Inequality
		10	Triangle Inequality-problems
4	22-06-2015 To 26-06-2015	11	Bernolli's Inequality
		12	Test paper
		13	Absolute value
		14	Real line
		15	Suprema and Infima
5	29-06-2015 To 03-07-2015	16	Completeness Property
		17	Applications of the Supremum Property
		18	Archimedian property
		19	Density theorem
		20	Intervals
6	06-07-2015 To 10-07-2015	21	Characterization of intervals
		22	The uncountability of R
		23	Revision
		24	Test paper
		25	Sequences
7	13-07-2015 To 17-07-2015	26	Limit of a Sequences
		27	Tail of sequences
		28	Limit theorems
		29	Limit theorems
			Ramsan – Holiday
8	20-07-2015 To 24-07-2015	30	Bounded sequence
		31	Monotone sequences
		32	Monotone converges theorem
		33	Euler's number
		34	Subsequences
9	27-07-2015 To 31-07-2015	35	Divergence criteria
		36	Bolzano Weierstrass theorem
		37	Bolzano Weierstrass theorem
		38	Cauchy Sequence
		39	Cauchy convergence criterion
10	03-08-2015 To 07-08-2015	40	Test paper
		41	Infinite series
		42	Cauchy Criterion for series
		43	Comparison Tests

No of Weeks	Dates	Session	Topic
		44	Seminar
11	10-08-2015 To 14-08-2015	45	Revision
		46	Revision
			First Internal for UG/PG
			First Internal for UG/PG
112	17-08-2015 To 21-08-2015		Karkkida Vavu –Holiday
			First Internal for UG/PG
			First Internal for UG/PG
			First Internal for UG/PG
13	24-08-2015 To 28-08-2015		Onam Celebration
			Holiday
			Holiday
			Holiday
14	31-08-2015 To 04-09-2015		Holiday
		47	Absolute convergence
		48	Rearrangements of Series
		49	Limit comparison test
		50	Root & Ratio test / The integral test
15	07-09-2015 To 11-09-2015	51	Social extention activity
		52	Rabbe's test
		53	Tests for non absolute convergence
		54	Abel's test
		55	Test paper
16	14-09-2015 To 18-09-2015	56	Bicentenary
		57	Continuos functions
		58	Maximum-Minimum Theorem
		59	Location of Roots Ttheorem
			Annual Retreat
17	21-09-2015 To 25-09-2015		Annual Retreat
			Annual Retreat
			Annual Retreat
			Sree Narayana Guru Samadhi – Holiday
		60	Bolzano's Intermediate Value Theorem
18	28-09-2015 To 02-10-2015	61	Uniform Continuity
			Bakrid - Holiday
			Comet /
		62	Lipschitz Functions / Approximation
		63	Continuity and Gauges
19	05-10-2015 To 09-10-2015	64	Revision
		65	Revision
			Gandhi Jayanthi – Holiday
			Second Internal for UG/PG
			Second Internal for UG/PG
20	12-10-2015 To 16-10-2015		Second Internal for UG/PG
			Second Internal for UG/PG
			Second Internal for UG/PG
			Second Internal for UG/PG
		66	Existence of delta finite partitions
		67	Revision
		68	Test Paper
		69	Real numbers- Revision

No of Weeks	Dates	Session	Topic
		70	Trecking
21	19-10-2015 To 23-10-2015	71	Sequences- Revision
		72	Test Paper
		73	Infinite Seres-Revision
			Mahanavami – Holiday
			Vijayadasami – Holiday
22	26-10-2015 To 30-10-2015	74	University question paper discussion
		75	University question paper discussion
			Study Leave
			Study Leave
			Study Leave
23	02-11-2015 To 06-11-2015		Study Leave
			Study Leave
			V Sem UG University Exam Begins

5B07 MAT - ABSTRACT ALGEBRA

No of Credits: 4

No of contact hours: 90

Objectives: -On completion of the course students

1. Will have learnt basic facts, methods and ideas related to the algebraic structures of groups, rings, fields and integral domains.
2. Will be able to read and write mathematical proofs and do computations related to the above topics.
3. Will be able to do more specialized study in algebra
4. Will be able to understand the necessity of abstraction and how it widens the scope of application especially related to number theory

SYLLABUS

Module – I Groups and Subgroups

Introduction and examples, Binary operations. Groups, Subgroups, Cyclic Groups

Module – II Permutations and Cosets

Groups of permutations. Orbits. Cycles and the alternating Groups

Module – III Homomorphisms and Factor groups

Homomorphisms, Factor Groups, Factor group Computations and Simple groups

Module – IV Rings and Fields

Rings and fields, Integral Domains, Fermat's and Eulers Theorems

References: - Text book for the course: A First Course in Abstract Algebra - John B Fraleigh, Seventh Edition Published by Pearson Education. Inc 2003.

Topics: Chapter I: Sections 2,4,5 and 6 ; Chapter II: Sections 8,9 and 10 ; Chapter III: Sections 13,14 and 15; Chapter IV: Sections 18,19 and 20.

- 1) Contemporary Abstract Algebra- Joseph A. Gallian, Narosa Publishing House
- 2) Basic Abstract Algebra - P. B. Bhattacharya, S. K. Jain, S. R. Nagapaul. Cambridge University Press
- 3) Topics in Algebra- IN Herstein, Wiley Second Edition
- 4) Abstract Algebra - David S Dummit, Wiley; 3 edition
- 5) A Course in the Theory of Groups- Derek J.S. Robinson. Springer; Second Edition
- 6) Permutation Groups - John D. Dixon, Springer; First Edition

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	01-06-2015 To 05-06-2015	01	Introduction of the subject
		02	Introduction of the subject
		03	Introduction of complex numbers and problems
		04	Introduction to binary operations
		05	Introduction to binary operations
2	08-06-2015 To 12-06-2015		Spoken English Course
			Spoken English Course
			Spoken English Course
			Spoken English Course
			Spoken English Course
3	15-06-2015 To 19-06-2015	06	Examples of binary operations, structure
		07	Definition of groups and examples
		08	Properties of group theorems
		09	Problems relating to group
		10	Problems relating to group
4	22-06-2015 To 26-06-2015	11	Subgroups, examples
		12	Problems in subgroup
		13	Two important subgroup structure
		14	Cayley tables and subgroup diagram
		15	Properties of sub group
5	29-06-2015 To 03-07-2015	16	Finite group and subgroup diagram
		17	Cyclic group, generator- definition, example
		18	Problems to check cyclic or not
		19	Theorems on cyclic group
		20	Theorems on cyclic group
6	06-07-2015 To 10-07-2015	21	Theorems on cyclic group
		22	Conclusion of first module
		23	Definition of functions and types of functions
		24	Operations of functions
		25	Permutation group-definition ,examples
7	13-07-2015 To 17-07-2015	26	Construction of S_3 and D_4
		27	Alternating group, definition and examples
		28	Odd and even permutation
		29	Cycles and transpositions
			Ramsan – Holiday
8	20-07-2015 To 24-07-2015	30	Theorems relating to permutations
		31	Cosets - definition ,problems
		32	Results on cosets
		33	Problems relating to Lagrange theorem
		34	Theorem relating to the order of the group
9	27-07-2015 To 31-07-2015	35	Theorem relating to the order of the group
		36	Problems in sub groups
		37	Problems in sub groups
		38	Homomorphism -definition ,examples
		39	Types of homomorphism
10	03-08-2015 To 07-08-2015	40	Types of homomorphism
		41	Problems relating to homomorphism
		42	Problems relating to homomorphism
		43	Properties of homomorphism

No of Weeks	Dates	Session	Topic
		44	Seminar
11	10-08-2015 To 14-08-2015	45	Revision
		46	Revision
			First Internal for UG/PG
			First Internal for UG/PG
			Karkkida Vavu –Holiday
12	17-08-2015 To 21-08-2015		First Internal for UG/PG
			First Internal for UG/PG
			First Internal for UG/PG
			First Internal for UG/PG
			Onam Celebration
13	24-08-2015 To 28-08-2015		Holiday
			Holiday
			Holiday
			Holiday
			Holiday
14	31-08-2015 To 04-09-2015	47	Kernel of Homomorphism
		48	Theorems on Kernal
		49	Normal subgroups
		50	Factor groups
		51	Social extention activity
15	07-09-2015 To 11-09-2015	52	Theorems of factor group
		53	Fundamental homomorphism theorem
		54	Inner automorphism
		55	Factor group computation
		56	Problems relating to factor group
16	14-09-2015 To 18-09-2015	57	Bicentenary
		58	Theorems relating to simple groups
		59	Simple group
			Annual Retreat
			Annual Retreat
			Annual Retreat
17	21-09-2015 To 25-09-2015		Sree Narayana Guru Samadhi – Holiday
		60	Rings examples
		61	Homomorphism of rings, results
			Bakrid - Holiday
			Comet /
18	28-09-2015 To 02-10-2015	62	Isomorphism of rings
		63	Definition of unit, unity, problems
		64	Theorems on rings
		65	Cancelation law in rings
			Gandhi Jayanthi – Holiday
19	05-10-2015 To 09-10-2015		Second Internal for UG/PG
			Second Internal for UG/PG
			Second Internal for UG/PG
			Second Internal for UG/PG
			Second Internal for UG/PG
			Second Internal for UG/PG
20	12-10-2015 To 16-10-2015	66	Definitions- Integral domain, Zero divisor unit...
		67	Characterstics of a ring and its problems
		68	Definitions- Integral domain, Zero divisor unit...
		69	Results of I D Theorems relating to I D

No of Weeks	Dates	Session	Topic
		70	Euler theorem and its application
21	19-10-2015 To 23-10-2015	71	Fermat's theorem and its application
		72	Problems of Fermat's Theorem
		73	Revision
			Mahanavami – Holiday
			Vijayadasami – Holiday
22	26-10-2015 To 30-10-2015	74	University question paper discussion
		75	University question paper discussion
			Study Leave
			Study Leave
			Study Leave
23	02-11-2015 To 06-11-2015		Study Leave
			Study Leave
			V Sem UG University Exam Begins

5B08 MAT - GRAPH THEORY

No of Credits: 3

No of contact hours: 72

Aim of the course: To introduce graph theory which is one of the branch of discrete Mathematics which has a surprising number of applications.

Objectives of the Course:

- To introduce the basic concepts in Graph theory.
- To create the ability to understand and appreciate mathematical arguments or proof logically.
- Helps to strengthen the ideas.

Text: John Clark and Derek Allen Halton – A first look at graph theory.

SYLLABUS

Module – I:

An introduction to graphs – Definition of a graph, graphs as models, vertex, degree, sub-graph, paths and cycles matrix representation of graphs fusion.
(Sections 1.1 to 1.8)

Module – II:

Trees and connectivity, Definitions and simple properties, bridges, spanning trees connector problems cut vertices and connectivity (section 2.1 to 2.4, 2.6)
(Algorithms deleted)

Module – III:

Euler Tours, Hamiltonian Graphs and matching. Euler tours, Chinese postman problem, Hamiltonian graphs, traveling salesman problem, matching's and augmenting paths, the marriage problem, the personnel assignment problem, the optimal assignment problem
(section 3.1 to 3.4, 4.1 to 4.4) algorithm deleted)

Module – IV:

Directed graphs – definition – in degree and out degree, tournaments, traffic flow
(Section 7.1 to 7.4) (Algorithms deleted)

References: - A text book of graph theory

R. Balakrishnan and K. Ranganathan

2) Graph theory – Harary

3) Basic Graph theory – Prof. K.R. Parthasarathy

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	01-06-2015 To 05-06-2015	01	Introduction to graphs
		02	Introduction to graphs
		03	Graphs ,vertices and edges
		04	Graphs ,vertices and edges
2	08-06-2015 To 12-06-2015		Spoken English Course
			Spoken English Course
			Spoken English Course
			Spoken English Course
3	15-06-2015 To 19-06-2015	05	Loop, parallel edges, isolated vertex
		06	Adjacent vertices, neighbourhood set, simple graphs
		07	Graph isomorphism and its examples
		08	Complete graphs and examples
4	22-06-2015 To 26-06-2015	09	Bipartite graphs and complete bipartite graphs
		10	Incident edges and adjacent vertices
		11	Odd vertices and even vertices
		12	Degree of vertices
5	29-06-2015 To 03-07-2015	13	First theorem of graph theory
		14	Regular graphs
		15	Problems
		16	Problems
6	06-07-2015 To 10-07-2015	17	Sub graph and super graph
		18	Vertex deleted and edge deleted sub graphs
		19	Induced sub graphs
		20	Union and intersection of sub graphs
7	13-07-2015 To 17-07-2015	21	Complement of a graph
		22	Complement of a graph
		23	Walks, trails and paths of a graph
		24	Walks, trails and paths of a graph
			Ramsan - Holiday
8	20-07-2015 To 24-07-2015	25	Connected graphs
		26	Matrix representations
		27	Matrix representations
		28	Test
9	27-07-2015 To 31-07-2015	29	Trees
		30	Trees
		31	Bridges
		32	Bridges
10	03-08-2015 To 07-08-2015	33	Spanning trees
		34	Test
		35	Connector problems
		36	Cut vertices and connectivity
11	10-08-2015 To 14-08-2015	37	Cut vertices and connectivity
		38	Seminar
			First Internal for UG/PG
			First Internal for UG/PG
			Karkkida Vavu -Holiday
12	17-08-2015		First Internal for UG/PG

No of Weeks	Dates	Session	Topic
	To 21-08-2015		First Internal for UG/PG
			First Internal for UG/PG
			First Internal for UG/PG
			Onam Celebration
13	24-08-2015 To 28-08-2015		Holiday
			Holiday
			Holiday
			Holiday
14	31-08-2015 To 04-09-2015	39	n-connected graphs
		40	Euler tour
		41	Euler tour
		42	Chinese postman problem
15	07-09-2015 To 11-09-2015	43	Social extention activity
		44	Hamiltonian graphs
		45	Travelling salesman problem
		46	Matching
16	14-09-2015 To 18-09-2015	47	The marriage problem
		48	The personal assignment problem
		49	Quiz competition for other departments/ the personel assignment problem
			Annual Retreat
			Annual Retreat
			Annual Retreat
17	21-09-2015 To 25-09-2015		Sree Narayana Guru Samadhi - Holiday
		50	The optimal assignment problem
		51	The optimal assignment problem
			Bakrid - Holiday
			Comet
18	28-09-2015 To 02-10-2015	52	Directed graphs
		53	Revision
		54	Revision
		55	Revision
			Gandhi Jayanthi - Holiday
19	05-10-2015 To 09-10-2015		Second Internal for UG/PG
			Second Internal for UG/PG
			Second Internal for UG/PG
			Second Internal for UG/PG
			Second Internal for UG/PG
			Second Internal for UG/PG
20	12-10-2015 To 16-10-2015	56	Directed cycles
		57	Directed walks ,trails, paths
		58	Unilaterally connected graphs
		59	Isomorphic digraphs
21	19-10-2015 To 23-10-2015	60	Isomorphic digraphs
		61	Strongly connected and weakly connected graphs
		62	Directed Hamiltonian cycles
			Mahanavami - Holiday
22	26-10-2015 To		Vijayadasami - Holiday
		63	Previous year question paper discussion
		64	Previous year question paper discussion

No of Weeks	Dates	Session	Topic
	30-10-2015		Study Leave
			Study Leave
			Study Leave
23	02-11-2015		Study Leave
	To		Study Leave
	06-11-2015	04 - Nov	V Sem UG University Exam Begins

5B09 MAT - DIFFERENTIAL EQUATIONS AND NUMERICAL ANALYSIS

No of Credits: 4

No of contact hours: 90

Objectives: -On completion of the course students

The group "Differential Equations and Numerical Analysis" works in many facets:

- 1, partial differential equations,
- 2, numerical methods,
- 3, calculus of variations
- 4, mathematical models in physical and biological sciences, etc

SYLLABUS

Module – Introduction

Some basic mathematical models, direction fields, solutions of some differential equations, classification of differential equations, historical remarks (section 1.1 to 1.4 of Text 1)

First order differential equations Linear equations with variable coefficients, separable equations, modeling with first order equations, differences between linear equations and nonlinear equations, exact equations and integrating factors, the existence and uniqueness theorem (without proof) (Sections 2.1 to 2.4, 2.6, 2.8 of Text 1)

Module – II Second order linear equations

Homogeneous equations with constant coefficients, fundamental solution of linear homogeneous equations, linear independence and the wronskian, complex roots of the characteristic equation, repeated roots, reduction of order, non-homogeneous equations, method of undetermined coefficients, variation of parameters, (sections 3.1 to 3.7 of Text 1)

Basic theory of systems of first order linear equations (section 7.4 of Text 1)

Module – III Partial differential equations

Two-point boundary value problems, separation of variables, heat conduction in a rod, other heat conduction problems, the wave equation, vibrations of an elastic string, Laplace's equations (sections 10.1 to 10.5, to 10.8 of Text 1)

Module – IV Numerical Analysis

1. Numerical Analysis - Solution equations by iteration. Finite differences interpolation Numerical integration differentiation.

2. Numerical methods in linear algebra: Systems of linear equation. Gauss eliminations. Matrix inversion. (Relevant Chapters in Text 2). Numerical methods for differential equations. Numerical methods for first order equation Taylor series method - Picard's method Euler's method- Runge-Kutta methods of fourth order. (Relevant Chapters in Text 2)

References: - Text 1: Boyce, W.E. and DiPrima, R.C. Elementary Differential Equations and Boundary value problems, John Wiley & sons Inc., New York (2003)

Text 2: Kreyzig, Advanced Engineering Mathematics, 5th Edition

1. Yankosky, Differential equations and the calculus of variations, mio publications, Moscow (1997)
 2. Collins, P.J Differential and integral equations, oxford university press (2006)
 3. Ahsan,Z, Differential equations and their applications (2nd edn.) prentice Hall of India Pvt. Ltd., New Delhi (2004)
 4. Mcowan, R.C., partial differential equations – methods and applications (2nd edn) Pearson Educaiton Inc., Delhi (2004)
 5. Wylie, C.R. and Burrett, L.C., Advanced Engineering mathematics (6th edn) Tata Mc Graw –Hill Publishing Company LTd., Delhi (2003)
 6. Sastri S.S., Advanced Engineering Mathematics (2nd edn.) (2002)
- Module Teaching hours Aggregate Weightage Maximum Weightage

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	01-06-2015 To 05-06-2015	01	Introduction to the subject
		02	Introduction to the subject
		03	Some basic mathematical models
		04	Direction fields
		05	Direction fields
2	08-06-2015 To 12-06-2015		Spoken English Course
			Spoken English Course
			Spoken English Course
			Spoken English Course
			Spoken English Course
3	15-06-2015 To 19-06-2015	06	Formation of differential equations
		07	Solutions of some differential equations
		08	Solutions of some differential equations
		09	Classification of differential equations
		10	Classification of differential equations
4	22-06-2015 To 26-06-2015	11	Linear equations with variable coefficients
		12	Problems of Linear equations with variable coefficients
		13	Separable equations and its problems
		14	Homogeneous equations with constant coefficients
		15	Homogeneous equations with constant coefficients
5	29-06-2015 To 03-07-2015	16	Exact differential equations and application
		17	Problems in exact differentialequations
		18	Integrating Factors
		19	Problems to find integrating
		20	Problems to find integrating
6	06-07-2015 To 10-07-2015	21	Solution of non exact D E
		22	Bernoulli,s equations and its solution
		23	Existence and uniqueness theorem of first order
		24	Conclusion of first module
		25	Introduction to second order D E
7	13-07-2015 To 17-07-2015	26	Theorem:Principle of superposition
		27	Solution of second order linear homogenous D E
		28	Charactersti equation of second order D E
		29	Three types of Charactersti roots
			Ramsan – Holiday
8	20-07-2015 To 24-07-2015	30	Real and distinct roots of Characteristic equation
		31	Repeated roots of Characteristic equation
		32	Repeated roots of Characteristic equation
		33	Complex roots of the characteristic equation
		34	Complex roots of the characteristic equation
9	27-07-2015 To 31-07-2015	35	Complex roots of the characteristic equation
		36	Solution of non-homogeneous equations
		37	Linear independence and dependence
		38	Wronskian of D E
		39	Wronskian of D E
10	03-08-2015 To 07-08-2015	40	Methods of undetermined coefficients type 1
		41	Methods of undetermined coefficients type 1
		42	Methods of undetermined coefficients combaind form

No of Weeks	Dates	Session	Topic
		43	Seminar
		44	Seminar
11	10-08-2015 To 14-08-2015	45	Reduction of order
		46	Conclution of second module
			First Internal for UG/PG
			First Internal for UG/PG
			Karkkida Vavu –Holiday
12	17-08-2015 To 21-08-2015		First Internal for UG/PG
			First Internal for UG/PG
			First Internal for UG/PG
			First Internal for UG/PG
			Onam Celebration
13	24-08-2015 To 28-08-2015		Holiday
			Holiday
			Holiday
			Holiday
			Holiday
14	31-08-2015 To 04-09-2015	47	Basic theory of systems of first order linear equations
		48	Two-point boundary value problems
		49	Two-point boundary value problems
		50	Heat conduction problem
		51	Other heat conduction problems
15	07-09-2015 To 11-09-2015	52	The wave equation
		53	Vibrations of an elastic string
		54	Laplace's equations
		55	Conclution of third module
		56	Test Paper
16	14-09-2015 To 18-09-2015	57	Solution equations by interaction
		58	Solution equations by interaction
		59	Finite differences interpolation
			Annual Retreat
			Annual Retreat
		Annual Retreat	
17	21-09-2015 To 25-09-2015		Sree Narayana Guru Samadhi – Holiday
		60	Finite differences interpolation
		61	Numerical integration differentiation
			Bakrid - Holiday
			Comet /
18	28-09-2015 To 02-10-2015	62	Numerical methods in linear algebra
		63	Systems of linear equation
		64	Solutions of Systems of linear equation
		65	Solutions of Systems of linear equation
			Gandhi Jayanthi – Holiday
19	05-10-2015 To 09-10-2015		Second Internal for UG/PG
			Second Internal for UG/PG
			Second Internal for UG/PG
			Second Internal for UG/PG
			Second Internal for UG/PG
20	12-10-2015 To	66	Gauss eliminations
		67	Problems using Gauss eliminations

No of Weeks	Dates	Session	Topic
	16-10-2015	68	Matrix inversion method
		69	Problems using Matrix inversion
		70	Euler's method
21	19-10-2015 To 23-10-2015	71	Problems in Euler's method
		72	Picard's method
		73	Problems in Picard's method
			Mahanavami – Holiday
			Vijayadasami – Holiday
22	26-10-2015 To 30-10-2015	74	Runge-Kutta methods of fourth order
		75	Problems using Runge-Kutta methods of fourth order
			Study Leave
			Study Leave
			Study Leave
23	02-11-2015 To 06-11-2015		Study Leave
			Study Leave
			V Sem UG University Exam Begins

5D01 MAT - BUSINESS MATHEMATICS

No of Credits: 2

No of contact hours: 36

Objectives: To update and expand basic knowledge of Mathematics.

To review the basic concepts and knowledge in differentiation and integration

To impart skills to enable students to use mathematics in business studies

SYLLABUS

Module – I

Function, limit and continuity definition Differentiation rules of differentiation parametric function logarithmic differentiation successive differentiation application to Business local maximum and local minimum Integration rules of integration some standard results application to Business consumer's surplus producers surplus investment and capital formation.

Module – II

Basic mathematics of Finance nominal rate of interest, effective rate of interest continuous compounding compound interest present value interest and discount rate of discount equation of value depreciation

Text: B.M Aggarwal: Business mathematics and statistics Ane Books Pvt. Ltd

References:

Shanthi Narayan : Differential Calculus

Shanthi Narayan : Integral Calculus

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	22-06-2015 To 26-06-2015	1	Function
		2	Graph of function
2	29-06-2015 To 03-07-2015	3	Limit of function
		4	Problems on limit functions
3	06-07-2015 To 10-07-2015	5	Continuity functions
		6	Discontinuity functions
4	13-07-2015 To 17-07-2015	7	Problems on continuity function
		8	Differentiation
5	20-07-2015 To 24-07-2015	9	Parametric function
		10	logarithmic differentiation
6	27-07-2015 To 31-07-2015	11	successive differentiation
		12	Problems of successive differentiation
7	03-08-2015 To 07-08-2015	13	Application of differentiation
		14	Problems of differentiation
8	10-08-2015 To 14-08-2015	15	Revision
		16	Revision
		12 - Aug	First internal for UG/PG
		13 - Aug	First internal for UG/PG
		14 - Aug	Karkkida Vavu -Holiday
9	17-08-2015 To 21-08-2015	17 - Aug	First internal for UG/PG
		18 - Aug	First internal for UG/PG
		19 - Aug	First internal for UG/PG
		20 - Aug	First internal for UG/PG
		21 - Aug	Onam Celebration
10	24-08-2015 To 28-08-2015		Onam Vacation
			Onam Vacation
			Onam Vacation
			Onam Vacation
			Onam Vacation
11	31-08-2015 To 04-09-2015	17	Integration
		18	Problems of intergration
12	07-09-2015 To 11-09-2015	19	Application of intergration
		20	Problems of integration
13	14-09-2015 To 18-09-2015	21	Consumer surplus problems
		22	Producer's surplus problems
14	21-09-2015	23	Simple interest

No of Weeks	Dates	Session	Topic
	To 25-09-2015	24	Compound interest
15	28-09-2015 To	25	Continuous compounding
	02-10-2015	26	Present value
16	05-10-2015 To 09-10-2015	05 - Oct	Second Internal for UG/PG
		06 - Oct	Second Internal for UG/PG
		07 - Oct	Second Internal for UG/PG
		08 - Oct	Second Internal for UG/PG
		09 - Oct	Second Internal for UG/PG
		10 - Oct	Second Internal for UG/PG
17	12-10-2015 To	27	Depreciation
	16-10-2015	28	Problems on depreciation
18	19-10-2015 To	29	Revision
	23-10-2015	30	Revision
19	26-10-2015 To	31	Previous year question paper discussion
	30-10-2015	32	Study Leave
20	02-11-2015 To 06-11-2015		Study Leave
			Study Leave
		04 - Nov	V Sem UG University Exam Begins