

NALLAMUTHU GOUNDER MAHALINGAM COLLEGE (AUTONOMOUS)-POLLACHI

22	B.Sc. CT	Skill Based Major Elective I: Python Programming Lab	18UCT5S1	2018
23	B.Sc. CT	Elective III: Internet of Things	18UCT624	2018
24	B.Sc. CT	Elective I: Artificial Intelligence	18UCT519	2018
25	B.Sc. CT	Programming Lab VI: Software Testing	18UCT416	2018
26	M.Sc. Chemistry	Inorganic Chemistry -I	18PCY101	2018
27	B.A. English	CORE III: Fiction	19UEL101	2019
28	B.A. English	CORE III : Children's Literature	19UEL408	2019
29	B.A. English	CORE III: Translation Studies and World Literature in Translation	19UEL511	2019
30	B.A. English	CORE III: Computing Skills for Research	19UEL513	2019
31	B.A. English	CORE III : Survey of Literature in English (For cracking UGC NTA NET/SET/JRF/TRB/TET)	19UEL619	2019
32	B.A.Economics	Core III : History of Economic Thought	19UEO407	2019
33	B.A.Economics	Skill Based: Network and Information Security	19UEO5S1	2019
34	B.A.Economics	Skill Based: Cyber Security Ethical Hacking	19UEO5S2	2019
35	B.Sc. Mathematics	Allied I: Mathematical Statistics-I	19UMS1A1	2019
36	B.Sc. Mathematics	Core III: Trigonometry, Vector Calculus and Fourier Series	19UMS203	2019
37	B.Sc. Mathematics	Core IV: Analytical Geometry 2D and 3D	19UMS204	2019
38	B.Sc. Mathematics	Elective I: Programming in C	19UMS5E1	2019
39	B.Sc. Mathematics	SBE: Network and Information Security	19UMS5S1	2019
40	B.Sc. Mathematics	SBE: Cyber security-Ethical Hacking	19UMS5S2	2019
41	B.Sc. Botany	Skill based subjects - Network and Information security.	19UBY5S1	2019
42	B.Sc. Botany	Skill based subjects (Major electives) -Cyber Security- Ethical Hacking.	19UBY5S2	2019
43	B. Sc. Zoology	Core Major Paper-VII - Developmental Biology	19UZY507	2019
44	B. Sc. Zoology	Core Major Paper-X Bioinformatics and Biochemistry	19UZY510	2019
45	B. Sc. Zoology	Skill Based elective (SBE)- Online- Network and Information Security	19UZY5S1	2019
46	B. Sc. Zoology	Skill Based elective (SBE)- Online- Cyber security - Ethical Hacking	19UZY5S2	2019

BoS Minutes Highlighted



BOARD OF STUDIES IN MATHEMATICS UG (AIDED & SF) & PG

SATURDAY: 16.02.2019: 10.00 A.M.

S.No.	NAMES OF THE MEMBERS	SIGNATURE
1	Dr. M. Sheik John (Chairman)	 16/02/19.
2	Dr. P. Dhanalakshimi Associate Professor & Head Dept. of Applied Mathematics Bharathiar University Coimbatore-641 046. (University Nominee)	ABSENT
3	Dr. N. Rajeswari Associate Professor of Mathematics Sri GVG Visalakshi College for Women Palani Road, Udumalpet- 642 128. (Subject Expert(UG))	Rajeswari N 16.2.19
4	Dr. P. Ponnusamy Head & Associate Professor of Mathematics Govt. Arts College(Autonomous) Arts College Road Coimbatore 641 018. (Subject Expert(PG))	P. Ponnusamy 16/2/19
5	Mr. S. Mahalingam Sri Jayam Coir Products Chennaiur, Pollachi (Industrialist)	ABSENT
6	Dr. P. Rajarajeshwari Asst. Prof of Mathematics Chikkanna Govt. Arts College Tiruppur-641 602. (Alumni)	P. Rajarajeshwari 16/2/18

Minutes

The board approves the following resolutions;

With slight modifications, the board approves the syllabi and scheme of examinations for both UG and PG Courses from the academic year 2018-2019.

No major changes are done in the syllabi, expecting complete revision of syllabi in the next academic year (2019-2020) due to the changes in the +1 and +2 syllabi.

The following suggestions are recorded for the future revision in the syllabi.

1. A special course for advanced learners with extra credits may be offered.
2. Operations Research may be offered in a single course.
3. Dynamics Course may be offered ahead of Statics Course.

[Signature]
16/12/19.

P. Perumal
16/2/19

V. Jithin
16/2/19

P. Rajan
16/2/19.

Dr. J. Jayasultha (Refractive Course)

Rajasekari N
16-2-19

[Signature]

[Signature]

7	Dr. V. Inthumathi	V. Inthumathi: 16/2/19
8	Dr. J. Jayasudha	RC
9	Dr. R. Santhi	RS
10	Dr. V. Chitra	V. Chitra
11	Dr. S. Sivasankar	RC
12	Mr. P. Siravanan	-
13	Dr. S. Kaleeswari	KS
14	Ms. M. Amsaveni	MdA
15	Ms. A. Gnanasoundari	A-Gandhi
16	Mr. K. Dhineshkumar	KD
17	Ms. N. Udayarani	N. Udayarani
18	Mr. S. Earnest Rajadurai	S. Earnest Rajadurai
19	Ms. N. Nithya	N. Nithya
20	Mr. V. Sree Ramakrishnan	V. Sree Ramakrishnan

• Dr. S. Sivasankar (Refresher Course)

• ~~P. S. S.~~

• M. A. S.

• A. C. S.

• K. S. S.

N. S. S.

S. S. S.
S. S. S.

V. S. S.

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Percentage of Revision of B. Sc. Mathematics Syllabus under Regulation 2019

DEPARTMENT OF MATHEMATICS

S.No	Course Code	Course Title	Change Details	% of Changes	Content Deleted	Content Updated	Reason for Change
1	19UMS101	Classical Algebra	Modified	18%	Unit V: Matrices-Characteristic roots- Characteristic vectors	Unit V: Introduction-Associated Matrices- Unitary and Orthogonal Matrix-Linear Transformations-The Characteristic equation of transformation-Properties of the Eigen vectors-Cayley-Hamilton theorem (statement only)	These concepts have a wide range of applications in several fields like Machine Learning, communication systems etc.
2	19UMS102	Calculus	Modified	18%	-	Unit IV: Two important results regarding Jacobians - Change of variable in the case of two variables - Change of variable in the case of three variables. Beta and Gamma Functions: Definitions - Convergence of $\Gamma(n)$ - Recurrence formula of Gamma functions - Properties of Beta functions - Relation between Beta and Gamma functions - Examples	To get knowledge in special functions.
3	19UMS1A1	Mathematical Statistics -I	Modified	50%	Unit II: Relation between Cumulant and central moment. Unit III: Finding mean and variance of Binomial Distribution and Poisson Distribution. Unit IV: Normal distribution - Finding mean and variance- Recurrence relation - Additive property (Self study) Unit V: Gamma distribution - Finding	Unit I: Mathematical Expectation: Introduction-Expected value of function of a Random variable - Properties of Variance Unit II: Moment Generating Functions:	To gain the knowledge in fundamental concepts of Mathematical Statistics-I

					mean and variance	Uniqueness of Moment Generating Functions - Properties of Cumulants. Unit III: Special Discrete Probability Distributions: Binomial distribution - Moments of Binomial Distribution - Recurrence Relation for the Moments of Binomial Distribution. Poisson distribution - Moments of Poisson distribution Unit IV: C.G.F. of Normal distribution - Moments of Normal Distribution - A linear combination of independent normal variates - Simple problems. Moments of Rectangular distribution - Characteristic function of Rectangular distribution - Mean Deviation about Mean. Unit V: C.G.F. of Gamma distribution - Constants of Beta distributions of first kind - Constants of Beta distributions of second kind.	
4	19UMS203	Trigonometry, Vector Calculus and Fourier Series	Modified	20%	Unit I: - Expansions of $\cos^n \theta$ and $\sin^n \theta$ Unit II: Separation of real and imaginary parts of $\sin(\alpha+i\beta)$, $\cos(\alpha+i\beta)$, $\tan(\alpha+i\beta)$, $\sinh(\alpha+i\beta)$, $\cosh(\alpha+i\beta)$, $\tanh(\alpha+i\beta)$ and $\tan^{-1}(\alpha+i\beta)$.	Unit I: Expansion of $\tan(A+B+C+\dots)$, Powers of sines and cosines of θ in terms of functions of multiples of θ	To apply the trigonometry functions in various fields of Applied Mathematics.

						Unit II: Relations between hyperbolic functions corresponding to relations between circular functions	
5	19UMS204	Analytical geometry 2D and 3D	Modified	20%	Unit II : Straight Lines: Co-planarity of two lines -Feet of the common perpendicular. Unit V: Cone: Right circular cone - Right circular cylinder.	Unit -I : Polar Co-ordinates: Equation of a Straight line Unit II: Straight Lines: Conditions for various situations of a line.	To gain knowledge about the geometry of straight line.
6	19UMS306	Numerical Techniques	Modified	10%	-	Unit III: Interpolation with Unequal Intervals: Lagrange Interpolation formula-Inverse Interpolation	To know the mathematical technique to estimate the values of unknown data points.
7	19UMS5E1	Programming in C	Modified	20%	Unit III: Length and Area (Self study) Unit V: Pointers to functions - Simple programs	Unit I: Basic Structure of C: Programs-Programming Style- Constants ,Variables and Data Types: Introduction -C Tokens Operators and Expressions: Introduction -Bitwise operators - Special operators Unit V: Pointers: Array of Pointers Functions returning Pointers	To know about the fundamental concepts of C Programming.
8	19UMS5S1	Network and Information Security	Full paper	100%	-	-	To know about Network Security and Ethical

							Hacking
9	19UMS5S2	Cyber Security- Full paper Ethical Hacking		100%	-	-	To know about Network Security and Ethical
10	19UMS6E4	OOP with C++	Modified	10%	-	Unit IV: Member classes : Nesting of Classes Unit V: Pure Virtual Functions	To apply Nesting and Virtual functions in advanced versions like JAVA.


Head of the Department
 Head, Department of Mathematics
 NGM College (Autonomous)
 (Affiliated to Bharathiar University)
 Pollachi - 642 001


Principal
PRINCIPAL
 NGM COLLEGE, POLLACHI

N.G.M COLLEGE - CURRICULUM DEVELOPMENT CELL
B. Sc. MATHEMATICS SCHEME OF EXAMINATION FOR (2019 – 2022 Batch)
CHOICE BASED CREDIT SYSTEM & OBES

Part No.	Subject Code	Subject Title	Lecture + Practical Hours/Week	Duration of Exam Hrs	Max. Marks			Credit points
					CIA	ESE	TOTAL	
SEMESTER – I								
I	19UTL101	Tamil / Hindi Paper-I	6	3	25	75	100	3
II	19UEN101	English Paper-I	5	3	25	75	100	3
III	19UMS101	CORE I: Classical Algebra	5	3	25	75	100	4
III	19UMS102	CORE II: Calculus	6	3	25	75	100	5
III	19UMS1A1	ALLIED I:Mathematical Statistics I	6	3	25	75	100	5
IV	19UHR101	Human Rights in India	1	2	--	50	50	2
IV	19UEC101	Human Excellence: Personal values and sky yoga practice -I	1	2	-	50	50	1
V	–	Extension Activities (See Annexure -I)	--	--	--	--	--	--
		Total -					600	23
SEMESTER – II								
I	19UTL202	Tamil / Hindi Paper- II	6	3	25	75	100	3
II	19UEN202	English Paper –II	5	3	25	75	100	3
III	19UMS203	CORE III: Trigonometry , Vector Calculus and Fourier Series	5	3	25	75	100	4
III	19UMS204	CORE IV: Analytical Geometry 2D and 3D	5	3	25	75	100	4
III	19UMS2A2	ALLIEDII:Mathematical Statistics II	6	3	25	75	100	5
IV	19EVS201	Environmental Studies	2	3	--	50	50	2
IV	19HEC202	Human Excellence: Family values and sky yoga practice-II	1	2	-	50	50	1
V	–	Extension Activities (See Annexure - I)	--	--	--	--	--	--
		Total					600	22

SEMESTER – III								
I	19UTL303	Tamil / Hindi Paper- III	5	3	25	75	100	3
II	19UEN303	English Paper –III	6	3	25	75	100	3
III	19UMS305	CORE V: Dynamics	5	3	25	75	100	4
III	19UMS306	CORE VI: Numerical Techniques	4	3	25	75	100	3
III	19UMS3A1	ALLIED III: Physics for Mathematics and Chemistry-I	8	3	25	75	100	4
IV	19UMS3N1/ 19UMS3N2	NME - Quantitative Aptitude - I / Astronomy- I	1	2	--	50	50	2
IV	19HEC303	Human Excellence: Professional values and sky yoga practice-III	1	2	-	50	50	1
V	–	Extension Activities (See Annexure -I)	--	--	--	--	--	--
		Total					600	20

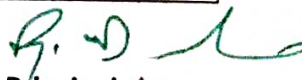
SEMESTER – IV								
I	19UTL404	Tamil / Hindi Paper - IV	5	3	25	75	100	3
II	19UEN404	English Paper - IV	6	3	25	75	100	3
III	19UMS407	CORE VII: Statics	4	3	25	75	100	4
III	19UMS408	CORE VIII: Operation Research-I	5	3	25	75	100	4
III	19UMS4A2	ALLIED IV: -Physics for Mathematics and Chemistry-II	8	3	25	75	100	4
III	19UMS4A3	ALLIED PRACTICAL: Physics lab for Mathematics and Chemistry	--	3	40	60	100	2
IV	19UMS4N3/ 19UMS4N4	NME - Quantitative Aptitude - II/ Astronomy -II	1	2	--	50	50	2
IV	19HEC404	Human Excellence: Social values and sky yoga practice-IV	1	2	--	50	50	1
V	–	Extension Activities (See Annexure -I)	--	--	--	50	50	1
		Total					750	24

SEMESTER-V								
III	19UMS509	CORE IX: Modern Algebra	6	3	25	75	100	4
III	19UMS510	CORE X: Real Analysis-I	6	3	25	75	100	4
III	19UMS511	CORE XI: Operation Research-II	5	3	25	75	100	4
III	19UMS512	CORE XII: Theory of Numbers	5	3	25	75	100	4
III	19UMS5E1	ELECTIVE-I- Programming in C	4	3	25	75	100	3
III	19UMS5E2	ELECTIVE PRACTICAL - Programming lab in C	2	3	20	30	50	2
IV	19UMS5S1/ 19UMS5S2	SBE: Network and Information Security/ Cyber security – Ethical Hacking	1	2	--	50	50	2
IV	19GKL501	General Knowledge and General Awareness	SS	2	--	50	50	2
IV	19HEC505	Human Excellence: National values and sky yoga practice :V	1	2	--	50	50	1
		Total					700	26

SEMESTER – VI								
III	19UMS613	CORE XIII: Linear Algebra	6	3	25	75	100	4
III	19UMS614	CORE XIV: Real Analysis-II	6	3	25	75	100	4
III	19UMS615	CORE XV: Complex Analysis	5	3	25	75	100	4
III	19UMS6E3	ELECTIVE-II- Discrete Mathematics	5	3	25	75	100	5
III	19UMS6E4	ELECTIVEIII- OOP with C++	4	3	25	75	100	3
III	19UMS6E5	ELECTIVE PRACTICAL- Programming lab in OOP with C++	2	3	20	30	50	2
IV	19UMS6S3/ 19UMS6S4	SBE - Mathematics for Finance/ Actuarial Mathematics	1	2	--	50	50	2
IV	19HEC606	Human Excellence: Global values and sky yoga practice-IV	1	2	--	50	50	1
		Total					650	25
		Grand Total					3900	140


Head of the Department

Dr. V. Inthumathi, Ph.D.,
Associate Professor & Head
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N.G.M College, Pollachi - 642 001.


Principal

Dr. R. MANICKA CHEZIAN M.Sc.,M.S.,Ph.D.,
PRINCIPAL i/c
Nallamuthu Gounder Mahalingam College
Pollachi - 642 001, Coimbatore District.

N.G.M COLLEGE - CURRICULUM DEVELOPMENT CELL
M. Sc. MATHEMATICSScheme of Examination For (2021 – 2023 Batch)
CHOICE BASED CREDIT SYSTEM & OBES

Subject Code	Subjects	Ins Hrs/week	Examinations				Credits
			Dur. Hrs	CIA	ESE	Total	
SEMESTER I							
21PMS101	Core I: Algebra	6	3	50	50	100	4
21PMS102	Core II: Real Analysis	6	3	50	50	100	4
21PMS103	Core III: Complex Analysis	6	3	50	50	100	4
21PMS104	Core IV: Ordinary Differential Equations	6	3	50	50	100	4
21PMS1E1/ 21PMS1E2	Major Elective I : Matlab/Special Functions	4	3	25	25	50	3
21PMS1E3	Major Elective Practical II : Programming Lab in Matlab	2	3	25	25	50	2
TOTAL		30	-	250	250	500	21
SEMESTER II							
21PMS205	Core V: Linear Algebra	6	3	50	50	100	4
21PMS206	Core VI: Mathematical Statistics	6	3	50	50	100	4
21PMS207	Core VII: Partial Differential Equations	5	3	50	50	100	4
21PMS208	Core VIII: Mechanics	6	3	50	50	100	4
21PMS209	Core IX: Numerical Analysis	4	3	25	25	50	3
21PMS210	Core Practical X: Programming lab in Numerical Analysis using Matlab	2	3	25	25	50	2
21PMS2N1/ 21PMS2N2	Non-Major Elective: Mathematical Statistics and Techniques/Mathematics in Finance	1	3	50	50	100	2
21PMS2VA	Value Added Course: Internet of Things	-	-	-	-	-	2*
TOTAL		30	-	300	300	600	23

SEMESTER III							
21PMS311	Core XI: Topology	6	3	50	50	100	4
21PMS312	Core XII: Functional Analysis	6	3	50	50	100	4
21PMS313	Core XIII: Combinatorics	6	3	50	50	100	4
21PMS314	Core XIV: Graph Theory	6	3	50	50	100	4
21PMS3E1/ 21PMS3E2	Major Elective III: Latex/ Mathematical Modelling	4	3	25	25	50	3
21PMS3E3	Major Elective Practical IV: Programming Lab in Latex	2	3	25	25	50	2
21PMS3AL	Advanced Learner Course (Optional) : Algebraic Number Theory	-	-	50	50	100	4*
21PMS3CC	Certificate Course: Data Analytics with Python	-	-	-	-	-	2*
TOTAL		30	-	250	250	500	21
SEMESTER IV							
21PMS415	Core XV: Fluid Dynamics	6	3	50	50	100	4
21PMS416	Core XVI: Operator Theory	6	3	50	50	100	4
21PMS417	Core XVII: Algebraic Topology	6	3	50	50	100	4
21PMS4E1/ 21PMS4E2	Major Elective V: Mathematical Methods/Fuzzy Logic and Fuzzy sets	6	3	50	50	100	5
21PMS4P1	Core XVIII: Project	4+ 2(Lab)	----	100	100	200	8
TOTAL		30	----	300	300	600	25
GRAND TOTAL		120		1100	1100	2200	90


Head of the Department

Dr. V. Inthumathi, Ph.D.,
Associate Professor & Head
Department of Mathematics
N.G.M College, Pollachi - 642 001.


Principal

Dr. R. MANICKA CHEZIAN M.Sc., M.S., Ph.D.,
PRINCIPAL i/c
Nallamuthu Gounder Mahalingam College
Pollachi - 642 001, Coimbatore District.

Programme Code:	B.Sc.	Programme Title :	Mathematics	
Course Code:	19UMS1A1	Title	Batch :	2019-2022
		MATHEMATICAL STATISTICS - I	Semester	I
Hrs/Week	6		Credits :	5

Course Objective

The aim of this course is to introduce the concept of discrete and continuous random variables, probability functions, expectations, moment generating functions and some discrete and continuous distributions and should have developed skills to apply them to various real life situations.

Course Outcomes (CO)

On successful completion of the course, the students will be able to

K1	CO1	understand random variables and probability distributions.
K2	CO2	know the difference between discrete and continuous random variables.
K3	CO3	compute expected value and variance of discrete and continuous random variables.
K4	CO4	acquire the knowledge by using Binomial distribution, Poisson distribution etc.

Unit -1

Mathematical Expectation: Introduction - Mathematical Expectation or Expected value of Random variable - Expected value of function of a Random variable - Properties of Expectation - Addition and Multiplication Theorem - Properties of Variance - Covariance - Simple problems - Chebychev's inequality - Simple problems.

Chapter 6: Sections: 6.1-6.6 & 7.5

[16 Hours]

Unit -2

Moment Generating Functions: Moment Generating Functions - Properties of Moment Generating Functions - Uniqueness of Moment Generating Functions - Cumulants - Properties of Cumulants - *Characteristic Function (Self study)* - Properties of Characteristic Function - Simple problems.

Chapter 7: Sections: 7.1, 7.1.2, 7.1.3, 7.2, 7.2.1, 7.3, 7.3.1

[15 Hours]

Unit -3

Special Discrete Probability Distributions:

Binomial distribution - Moments of Binomial Distribution - Recurrence Relation for the Moments of Binomial Distribution - Moment Generating function of Binomial Distribution - Additive property of Binomial Distribution- Simple problems.

Poisson distribution - Moments of Poisson distribution - Recurrence relation for Moments of the Poisson distribution - Moment Generating function of Poisson Distribution - Additive property of Poisson Distribution- Simple problems.

Chapter 8: Sections: 8.4-8.4.2, 8.4.6, 8.4.7, 8.5, 8.5.2, 8.5.4, 8.5.5, 8.5.8

[16 Hours]

Unit -4

Special Continuous Probability Distributions:

Normal distribution - Chief Characteristics of the Normal Distribution - M.G.F. of Normal distribution - C.G.F. of Normal distribution - Moments of Normal Distribution - A linear combination of independent normal variates - Simple problems.

Rectangular distribution - Moments of Rectangular distribution - MGF of Rectangular distribution - Characteristic function of Rectangular distribution - Mean Deviation about Mean - Simple problems.

Chapter 9: Sections: 9.2, 9.2.2, 9.2.5, 9.2.6, 9.2.7, 9.2.8, 9.3-9.3.4. [15 Hours]

Unit -5

Special Continuous Probability Distributions:

Gamma Distribution - M.G.F. of Gamma distribution - C.G.F. of Gamma distribution Additive property of Gamma Distribution - Beta distributions of first kind - Constants of Beta distributions of first kind - Beta distributions of second kind - Constants of Beta distributions of second kind - Exponential distribution - M.G.F. of Exponential distribution -

Chapter 9: Sections: 9.5-9.5.3, 9.6-9.6.1, 9.7-9.7.1, 9.8-9.8.1. [16 Hours]

Seminar, Assignment.

Text Book:

Gupta S. C. and Kapoor V. K, *Fundamentals of Mathematical Statistics, Eleventh Edition* S. Chand & Sons, 2009.

Books for Reference:

1. Hogg R.V. and Craigh A. G, *Introduction to Mathematical Statistics*, Pearson Education publications, 2004.
2. Veerarajan .T, *Fundamentals of Mathematical Statistics*, Yes Dee Publishing Pvt.Ltd, 2017.
3. Vital P. R, *Mathematical Statistics*, Margham publications, 2004.

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5
CO1	H	S	M	M	S
CO2	S	H	H	S	H
CO3	S	S	H	M	H
CO4	H	H	M	S	S

S - Strong; H- High; M- Medium; L- Low

Course Designed by	Verified by HOD	Checked by CDC	Approved by COE
	For, 		

Dr. V. Inthumathi, Ph.D.,
Associate Professor & Head
Department of Mathematics
N.G.M College, Pollachi - 642 001.

Dr. M. DURAIRAJU, M.Sc., M.Phil., B.Ed., PGDGC, Ph.D.,
Associate Professor / Co-ordinator,
Curriculum Development Cell (CDC)
NGM College (Autonomous)
Pollachi - 642 001.

Dr. R.MUTHUKUMARAN
Controller of Examinations
NGM College (Autonomous)
POLLACHI - 642 001.

Programme Code:	B.Sc.	Programme Title :	Mathematics	
Course Code:	19UMS203	Title	Batch :	2019-2022
		TRIGONOMETRY, VECTOR CALCULUS AND FOURIER SERIES	Semester	II
Hrs/Week	5		Credits :	4

Course Objective

This paper enables the students to provide basic knowledge of trigonometry, vector calculus and Fourier series.

Course Outcomes (CO)

On successful completion of the course, the students will be able to

K1	CO1	understand the expansions of trigonometric functions, the nature of hyperbolic functions, Fourier Series, Vector point functions.
K2	CO2	find the Fourier co-efficient for Periodic functions and its applications.
K3	CO3	apply the concepts of Gradient, Divergence and Curl in solving vector differentiation problems.
K4	CO4	solve the multiple integrals by applying Gauss divergence theorem, Stoke's theorem and Green's theorem.

Unit -1

Expansions: Expansions of $\cos n\theta$ and $\sin n\theta$ - Expansions of $\tan n\theta$ in powers of $\tan \theta$ - Expansion of $\tan (A+B+C+\dots)$, Examples on formation of equations - Powers of sines and cosines of θ in terms of functions of multiples of θ , Expansions of $\sin \theta$ and $\cos \theta$ in a series of ascending powers of θ .

Text Book 1: Chapter 3: Sections: 1 - 5.

[14 Hours]

Unit -2

Hyperbolic Functions - Relations between hyperbolic functions, Relations between hyperbolic functions corresponding to relations between circular functions -Inverse hyperbolic functions.

Text Book 1: Chapter 4: Sections: 1 - 2.

[13 Hours]

Unit -3

Fourier Series: Definition - Finding Fourier co-efficient for given periodic functions with period 2π - Even and odd functions - Half range series.

Text Book 2: Chapter 6: Sections: 1 - 5.2.

[13 Hours]

Unit -4

Vector differentiation: Gradient, Curl and Divergence- Scalar and vector point functions - Level surface - Gradient of a scalar point function - Directional derivative of a scalar point function - Theorems (statement only) - *Equations of tangent plane and normal line to a level surface (Self study)* - Divergence and curl of a vector point function - Solenoidal vector - Irrotational vector - Vector identities.

Text Book 3: Chapter 1.

[12 Hours]

Unit -5

Vector integration: Line integral - Theorems on line integrals - Surface and Volume integrals - Gauss Divergence theorem - Stoke's theorem - Green's theorem in plane. (Statement only and relevant problems).

Text Book 3: Chapter 2.

[13 Hours]

Seminar, Assignment.

Text Books:

1. Narayanan S. and Manicavachagom pillay T. K, *Trigonometry*, Viswanathan S, Pvt. Ltd, 2012.
2. Narayanan S., Manicavachagom Pillay T. K, Viswanathan S., *Calculus Volume III*, (Printers & Publishers), Pvt. Ltd, 2010.
3. Vittal P. R., Malini V., *Vector Analysis*, Margham publication, 1997.

Books for Reference :

1. Gupta R, *Vector Calculus*, Firewall media.
2. Mittal S. C, Pragathi prakasan, *Trigonometry*, 1969.

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	H	H
CO2	H	S	S	M	H
CO3	S	H	M	H	S
CO4	H	M	H	S	S

S - Strong; H- High; M- Medium; L- Low

Course Designed by	Verified by HOD	Checked by CDC	Approved by COE
	For, 		

Dr. V. Inthumathi, Ph.D.,
Associate Professor & Head
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Programme Code:	B.Sc.	Programme Title :	Mathematics	
Course Code:	19UMS204	Title	Batch :	2019-2022
		ANALYTICAL GEOMETRY 2D AND 3D	Semester	II
Hrs/Week	5		Credits :	4

Course Objective

This paper enables the student to gain fundamental ideas about co-ordinate geometry and gives clear knowledge about regular geometrical aspects and their properties in two dimensional and three dimensional analytical geometry.

Course Outcomes (CO)

On completion of this course, the students will be able to:

K1	CO1	recollect the properties of circle, sphere and can able to gain a deep knowledge in it.
K2	CO2	get the clear idea about the relation between polar and rectangular Cartesian co-ordinates.
K3	CO3	apply the concept of skew lines in evaluating the shortest distance between them.
K4	CO4	analyze the concepts of right circular cone, enveloping cone, General quadric cone and their properties.

Unit -1

Polar Co-ordinates: Polar Co-ordinates - Relation between polar and rectangular Cartesian co-ordinates -- Equation of a Straight line - Equation of a circle- Equation of a conic.

Text book 1: Chapter 9: Sections: 9.1 - 9.4 and 9.6. [13 Hours]

Unit -2

Straight Lines: Conditions for various situations of a line - Shortest distances between two skew lines.

Text book 2: Chapter 4: Sections: 4.2 , 4.6. [13 Hours]

Unit -3

Sphere: Equation of a sphere - Results based on properties of a sphere - Tangent plane to a sphere - Equations of a circle - *Equation of smallest sphere through the circle (Self study).*

Text book 2: Chapter 5: Sections: 5.1, 5.3, 5.4, 5.6, 5.7. [13 Hours]

Unit -4

Cone, Cylinder and Conicoids: Cone - Equation of a cone - Cone whose vertex is at the origin - Quadratic cone with vertex at the origin - *General quadratic cone (Self study).*

Text book 2: Chapter 6: Sections: 6.1 - 6.5. [14 Hours]

Unit -5

Cone, Cylinder and Conicoids: Cylinder - Equation of a cylinder - Enveloping cone

Text book 2: Chapter 6: Sections: 6.6, 6.7, 6.11.

[12 Hours]

Seminar, Assignment.

Text Books:

1. Duraipandian P, Laxmi Duraipandian, Muhilan D, *Analytical Geometry 2 dimensional*, Emerald publishers, 2000.
2. Duraipandian P, Laxmi Duraipandian, Muhilan D, *Analytical Geometry 3 dimensional*, Emerald publishers, 2000.

Books for Reference :

1. Manicavachagom Pillai T. K, Natarajan T, *A text book of Analytical Geometry part-I two dimensions*, S. Viswanathan printers & publishers Pvt. Ltd, 2010.
2. Manicavachagom Pillai T. K, Natarajan T, *A text book of Analytical Geometry part-I three dimensions*, S. Viswanathan printers & publishers, Pvt. Ltd, 2010.

3. Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5
CO1	H	S	M	M	S
CO2	S	H	H	H	H
CO3	S	M	S	M	H
CO4	H	H	S	S	M

S - Strong; H- High; M- Medium; L- Low

Course Designed by	Verified by HOD	Checked by CDC	Approved by COE
	For, 		

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Programme Code:	B.Sc.	Programme Title :	Mathematics	
Course Code:	19UMS5E1	Title	Batch :	2019-2022
		PROGRAMMING IN 'C'	Semester	V
Hrs/Week	4		Credits :	3

Course Objective

C is a general- purpose structured programming language that is powerful, efficient and compact. The programming language C finds a wide variety of applications in the development of software. This course provides the students with all the fundamental concepts of the C language with some practical experience. Also helps the students to develop their programming skills and to build large programs.

Course Outcomes (CO)

On successful completion of the course, the students will be able to

K1	CO1	understand the use of structured program development in C as applied to small programming projects.
K2	CO2	analyze the use of decision making statement and loop structures.
K3	CO3	gain a high level understanding of the structure of 'C' functions.
K4	CO4	acquire knowledge about arrays & pointers.

Unit -1

Overview of C:History of C - Importance of C - Basic Structure of C Programs - Programming Style.

Constants ,Variables and Data Types: Introduction - Character set - C Tokens - Keywords and identifiers - Constants - Variables - Data types - Declaration of variables - Assigning values to variables - Defining symbolic constants

Operators and Expressions: Introduction - Arithmetic operators - Relational operators - Logical operators - Assignment operators - increment and Decrement operators - conditional operators - Bitwise operators - Special operators - Arithmetic expressions - Evaluation of expressions - *Precedence of arithmetic operators (Self study)* - Type conversions in expressions - Operator precedence - Mathematical functions.

Chapter 1: Sections : 1.1,1.2,1.8, 1.9, Chapter 2: Sections : 2.1-2.8,2.10,2.11

Chapter 3: Sections : 3.1-3.12, 3.14-3.16

[11 Hours]

Unit -2-

Managing Input and Output Operations: Introduction - Reading a character - Writing a character - Formatted input - Formatted output.

Decision Making and Branching: Introduction - Decision making with if statement - Simple if statement - The If ... else statement - Nesting of if ... else statements - The else if ladder - The switch statement - The ?: operator - The Go to statement.

Decision Making and Looping: Introduction - The while statement - The do statement - The for statement - Jumps in loops - Simple programs.

Chapter 4: Sections: 4.1- 4.5, Chapter 5: Sections : 5.1-5.9 ,Chapter 6: Sections :6.1-6.5.
[11 Hours]

Unit -3

Arrays: Introduction - One dimensional arrays - Declarations of One dimensional arrays - Initializations of One dimensional arrays - Two dimensional arrays - Initializing Two dimensional arrays.

Arrays and Strings: Introduction - Declaring and initializing string variables - Reading strings from terminal - Writing strings to screen - Arithmetic operations on characters - Putting strings together - comparison of two strings - String handling functions - *Table of strings (Self study)*.

Chapter 7 : Sections : 7.1 - 7.6 , Chapter 8: Sections : 8.1 - 8.9. [10 Hours]

Unit -4

User defined Functions: Introduction - Need for user defined functions - Multi- function Program - Elements of user defined functions - Definitions of functions - Return values and their types - Function Calls - Function Declaration - Category of Functions - No arguments and no return values - Arguments but no return values - Arguments with return values - No arguments but returns a value - Functions that return multiple values - Nesting of functions - Recursion.

Chapter 9 :Sections : 9.1 - 9.16. [10 Hours]

Unit -5

Pointers: Introduction - Understanding pointers - Accessing the address of a variable - Declaring pointer variables - Initialization of pointer variables - Accessing a variable through its pointer - Chain of Pointers - Pointer expressions - Pointer increments and scale factor - Pointers and arrays - Pointers and characters strings - Array of Pointers - Pointers as function arguments - Functions returning Pointers - Pointers to Functions .

Chapter 11: Sections: 11.1-11.15. [10 Hours]

Seminar, Assignment.

Text Book:

Balagurusamy E, *Programming in ANSI C*, 7th Edition, Tata McGraw Hill Publishing Company Ltd, 2017.

Books for Reference :

1. Kernighan B. W and Ritchie D. M, *The C programming language*, Prentice Hall, 1997.
2. Kochan S. G, *Programming in C*, Hyden, 1983.
3. Venugopal, K. R and Prasad S. R, *Programming with C*, Tata McGraw Hill Publishing company ltd, 1997.

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5
CO1	S	S	H	M	S
CO2	H	S	S	H	S
CO3	H	H	S	M	H
CO4	M	H	H	M	S

S - Strong; H - High; M - Medium; L - Low

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Programme code:	B.Sc.	Programme Title :	Mathematics	
Course Code:	19UMS5S1	Title	Batch :	2019-2022
		Network and Information Security	Semester	V
Hrs/Week:	1		Credits:	2

Course Objective

To impart knowledge of Network security, Wi-Fi security, hackers, secure networking and password managers.

Course Outcomes (CO)

On completion of the course, the students will be able to

K1	CO1	remember the basic concepts of network
K2	CO2	understand the network hacking techniques
K3	CO3	deploy information and network security
K4	CO4	interpret the common threats today in computer network

Unit 1:

Basics of Network - Network Media - Various Operating Systems - Basics of Firewalls on all Platforms including Windows, MacOS and Linux. [3 Hours]

Unit 2:

Security Vulnerabilities across an entire network - Network Hacking techniques and Vulnerability scanning. [3 Hours]

Unit 3:

Configure and architect a small network for physical and wireless security - Firewalls configuration on Windows platform and Linux platform. Network privacy issues. [2 Hours]

Unit 4:

Network monitoring to discover and identify potential hackers and malware using tools like WIRESHARK and SYSLOG. Online tracking by hackers. [2 Hours]

Unit 5:

Best methods of authentication including passwords, multifactor authentication including soft tokens and hard tokens. Best password managers to use - how passwords are cracked - how to mitigate the password attacks. [3 Hours]

Google classroom

Course Materials will be made online through NGM Open source learning platforms.

PSO \ CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	M	H	S
CO2	H	M	H	H	H
CO3	M	H	M	M	M
CO4	M	H	H	H	H

Course Designed by	Verified by HOD	Checked by CDC	Approved by COE
A. Gumbo	V. Githinethi	g/m	

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Programme code:	B.Sc.	Programme Title :	Mathematics	
Course Code:	19UMS5S2	Title	Batch :	2019-2022
		Cyber security – Ethical Hacking	Semester	V
Hrs/Week:	1		Credits:	2

Course Objective

To understand the basics of cyber security and how ethical hacking is done on Cyber space and how to secure and protect them like security experts.

Course Outcomes (CO)

On completion of the course, the students will be able to

K1	CO1	remember the basic concepts of cyber security
K2	CO2	understand the knowledge about ethical hacking
K3	CO3	deploy the use of hacking tools
K4	CO4	analyze the details about internet connection

Unit 1:

To Understand how websites work, how to discover and exploit web application vulnerabilities and to gain full control over websites. Secure systems from all the known attacks. Secret tracking and hacking infrastructure. [3 Hours]

Unit 2:

Ethical hacking in Cyber space - its fields and the different types of hackers. Hack & secure both Wi-Fi & wired networks [2 Hours]

Unit 3:

Discover vulnerabilities & exploitation of hacking in cyber network servers. How secure systems are hacked using client-side and social engineering attacks. Use of hacking tools such as Metasploit, Aircrack-ng, SQLmap.....etc. [2 Hours]

Unit 4:

Network basics & how devices interact inside a network - Network Penetration. Control connections of clients in network by password cracking. Fake Wi-Fi network creation with internet connection and spy on clients. To Gather detailed information about clients and networks like their OS, opened ports ...etc. [2 Hours]

Unit 5:

Explore the threat landscape - Darknets, dark markets, zero day vulnerabilities, exploit kits, malware, phishing and much more. Master defenses against phishing, SMShing, vishing, identity theft, scam, cons and other social engineering threats. [3 Hours]

Google classroom

Reference:

Course Materials will be made online through NGM Open source learning platforms.

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	M	H	S
CO2	H	M	H	M	H
CO3	M	H	M	M	M
CO4	M	M	H	H	H

S-Strong; H-High; M-Medium; L-Low

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