



SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE
(An Autonomous Institution)

(Approved by AICTE, New Delhi and Affiliated to Pondicherry University)
(Accredited by NBA-AICTE, New Delhi and Accredited by NAAC with “A” Grade,
Madagadipet, Puducherry)



SCHOOL OF ARTS AND SCIENCE

DEPARTMENT OF MATHEMATICS

MINUTES OF BOARD OF STUDIES 3rd MEETING

Venue

Department of Mathematics
School of Arts and Science (Block)
Sri Manakula Vinayagar Engineering College

Date & Time

06.08.2021 & 10.00 am to 12.00 pm


SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

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 (Accredited by NBA-AICTE, New Delhi, ISO 9001:2000 Certified Institution &
 Accredited by NAAC with "A" Grade)
 Madagadipet, Puducherry - 605 107


DEPARTMENT OF MATHEMATICS
Minutes of Board of Studies 3rd Meeting

The Board of Studies 3rd meeting was held on 06.08.2021 (Friday) at 10.00 A.M in the department of Mathematics, Sri Manakula Vinayagar Engineering College, with Head of the Department in the Chair.

The following members were present for the BoS meeting

Sl.No	Name of the Member with Designation and official Address	Members as per UGC norms
1	Dr. T. Gayathri M.Sc., M.Phil., Ph.D. Professor and Head Department of Mathematics Sri Manakula Vinayagar Engineering College Puducherry – 605107 gayathrithiyagu@smvec.ac.in / 9486580058	Chairman
2	Dr. S. Tamilselvan M.Sc., M.Phil., Ph.D. Professor and Head Department of Mathematics Annamalai UIniversity Chidambaram- 608 002 stamilselvan@hotmail.com /9443073937	Subject Expert (University Nominee)
3	Dr. P. Balaji M.Sc., M.Phil., Ph.D. Assistant Professor (Stage II) Department of Mathematics SCSVMV university, Kanchipuram-631561 pbr1002017@gmail.com /9486082115	Subject Expert (Academic Council Nominee)
4	Dr. S. Srinivasan M.Sc., M.Phil., Ph.D. Assistant Professor Department of Mathematics Periyar Government Arts and Science College, Cuddalore -607003 smrail@gmail.com /7010939424	Subject Expert (Academic Council Nominee)
5	Mr. G. Indragoby Associate Director Sensipie Software Solutions(p)Ltd., Chennai indragoby@gmail.com /98432223234	Member (Representative from Industry)
6	Dr. I. Silambarasan M.Sc., M.Phil., Ph.D. Assistant Professor Department of Mathematics Sri Manakula Vinayagar Engineering College Puducherry – 605107 silambarasanmaths@smvec.ac.in /9578123368	Internal Member
7	Mr. P. Krishnamoorthy M.Sc., M.Phil. Assistant Professor Department of Mathematics Sri Manakula Vinayagar Engineering College Puducherry – 605107 krishnamoorthymaths@smvec.ac.in /9750028056	Internal Member

8	Dr. B. Kanimozhi M.Sc., M.Phil., Ph.D. Professor Department of Mathematics Sri Manakula Vinayagar Engineering College Puducherry – 605107 kanimozhimaths@smvec.ac.in /7708824215	Internal Member
9	Prof. N. Vijayan M.Sc., M.Phil. Associate Professor Department of Mathematics Sri Manakula Vinayagar Engineering College Puducherry – 605107 vijayan@smvec.ac.in /8678935461	Internal Member
10	Mr. M. Egalite Francis M.Sc., M.Phil. Associate Professor Department of Mathematics Sri Manakula Vinayagar Engineering College Puducherry – 605107 francisece@smvec.ac.in /9940912911	Internal Member
11	Mr. K. Ganesan M.Sc., M.Phil. Assistant Professor Department of Mathematics Sri Manakula Vinayagar Engineering College Puducherry – 605107 ganesanmaths@smvec.ac.in /9942575123	Internal Member
12	Ms. D. Dheebia M.Sc., M.Phil. Assistant Professor Department of Mathematics Sri Manakula Vinayagar Engineering College Puducherry – 605107 dheebia@smvec.ac.in /8098405675	Internal Member
13	Mrs. C. Bavani M.Sc., M.Phil. Assistant Professor Department of Physics Sri Manakula Vinayagar Engineering College Puducherry – 605107 bavanic@smvec.ac.in /9944132117	Internal Member
14	Dr. M. Rajeswari M.Sc., M.Phil., Ph.D. Associate Professor Department of Chemistry Sri Manakula Vinayagar Engineering College Puducherry – 605107 rajeswarim@smvec.ac.in /9003850438	Internal Member
15	Mr. M. Elamaran M.A., M.Phil. Assistant Professor Department of English Sri Manakula Vinayagar Engineering College Puducherry - 605107 elamaraneng@smvec.ac.in / 9500712597	Internal Member

Agenda of the Meeting**Item No : BOS /2021 /SAS / UG / MA / 3.1**

Welcome Address, Introduction about the Institution and Department, Introduction of BoS Members.

Item No : BOS /2021 /SAS / UG / MA / 3.2

To Confirm the minutes of Board of Studies 2nd meeting.

Item No : BOS /2021 /SAS / UG / MA / 3.3

To Improve the Curriculum.

Item No : BOS /2021 /SAS / UG / MA / 3.4

To discuss about the Improvisation of syllabus from I to IV semester

Item No : BOS /2021 /SAS / UG / MA / 3.5

Any other item with the permission of chair.

Minutes of the Meeting

Item No : BOS /2021 /SAS / UG / MA / 3.1	Dr. T. Gayathri, the Chairman, BoS officially announced the opening of the meeting and welcomed the external, internal members and also thanked them for accepting the invite and their presence as member of the Board of Studies. The meeting thereafter deliberated on agenda items that had been approved by the Chairman.					
Item No : BOS /2021 /SAS / UG / MA / 3.2	The Chairman, BoS, appraised the minutes BoS 2 nd meeting, then it is confirmed with the approval for the incorporation of minor revisions needed as mentioned below.					
	Sl.No	Regulation	Semester	Course Title/ Course Code	Unit	Particulars
	1	R20	I	Differential Calculus/ A20MAT101	I and II	The board proposes to shift the topic Jacobian from Unit- I to Unit-II in the course titled “Differential Calculus”- A20MAT101
2	R20	I	Analytical Geometry 3D	The Complete	Suggested to rename the	

				/A20MAS101	Course	course title “ Analytical Geometry 3D ” as “ Analytical Geometry ”.
	3	R20	IV	Discrete Mathematics/ A20MAT408	I and III	In the course Discrete Mathematics , Unit I can be renamed as Mathematical Logics and in Unit III, the topics Ring and Fields can be removed.
The above changes are incorporated in the curriculum and syllabus as per the suggestion of BoS members. The details are given in the Annexure I						
Item No : BOS /2021 /SAS /UG /MA /3.3	The curriculum was discussed and the following suggestions were given by BoS members.					
	Sl.No	Regulation	Semester	Course Title/ Course Code	Unit	Particulars
	1	R20	I and II	Hindi-I/ A20HNT101 Hindi-II/ A20HNT202 French-I/ A20FRT101 French-II/ A20FRT202	The Complete Course	Suggested to include Hindi / French along with Tamil as Modern Indian Languages (MIL)
2	R20	II	Allied Chemistry/ A20MAD203 and Chemistry Practical/ A20MAD204	The Complete Course	Suggested to change the Interdisciplinary course as Financial and Management Accounting - I and Accounting Software Lab instead of Allied	

					Chemistry and Chemistry Practical in II - semester.
3	R20	III, IV, V and VI	1. Entrepreneurship and Innovation/ A20CME301 2. Financial and Management Accounting-II/ A20CME402 3. Income Tax Law and Practice/ A20CME503 4. Financial Management/ A20CME604	The Complete Course	Suggested to introduce the accounting and commerce courses as Discipline Specific Electives in the semesters III, IV, V and VI

The above corrections are incorporated in curriculum and the details are given in the **Annexure II**

The syllabi of the B.Sc. Mathematics from first semester to fourth semester were presented by the chairman of BoS and the following suggestions were given by BoS members.




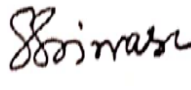
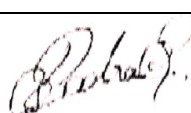
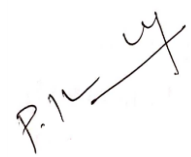
SI.No	Regulation	Semester	Course Title/ Course Code	Unit	Particulars
1	R20	I	Trigonometry/ A20MAT102	III	Include the topic relation between circular and Hyperbolic function in Unit III
2	R20	I	Ancillary Physics – I/ A20MAD101	The Complete Course	Rename the course as Allied Physics instead of Ancillary Physics – I
3	R20	II	Ordinary Differential Equations/ A20MAT204	V	Rename the Unit V title as Differential Equations with Variable



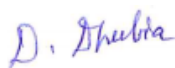



Item No :
BOS /2021 /SAS / UG / MA / 3.4

						coefficients instead of Differential Equations with constant coefficients
						Rename the Unit III title as One dimensional wave Equation instead of Applications of PDE
						Rename the Unit IV title as One dimensional Heat Equation instead of One dimensional Heat flow
4	R20	III	Partial Differential equations/ A20MAT305	III, IV and V		Rename the Unit V heading as Two dimensional Heat Equation instead of Steady State Heat flow in Two Dimension.
5	R20	III	Fourier Series and Fourier Transforms/ A20MAT306	I and II		Rename the Unit I heading as Periodic Function and Special wave forms instead of Fourier Series.

						Rename the Unit II heading as Fourier Series instead of Fourier Series for Periodic Functions .
	6	R20	III	Numerical Methods/ A20MAE301	I	Include the Regula False Method and Power Method and remove the Iterative Method in Unit I.
	7	R20	III	Statistics –I Lab/ A20MAD306	The Complete Exercises	Change the complicated exercises into simple exercises.
	8	R20	IV	Operations Research/ A20MAT409	I	Remove the topic Travelling salesman problem in Unit I
	9	R20	IV	Statistics-II Lab/ A20MAD408	The Complete Exercises	Change the complicated exercises into simple exercises.
<p>These suggestions were incorporated in the syllabi and approved by the expert members and Recommended to Academic Council. [Details are Attached in Annexure III]</p>						
Item No : BOS /2021 /SAS / UG / MA / 3.5	Any other agenda – Nil					

The meeting was concluded at 12:00 PM with vote of thanks by **Dr. T. Gayathri**, Chairman, Board of Studies, Department of Mathematics, Sri Manakula Vinayagar Engineering College.

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1	Dr. T. Gayathri M.Sc., M.Phil., Ph.D. Professor and Head Department of Mathematics Sri Manakula Vinayagar Engineering College Puducherry – 605107 gayathrihithiyagu@smvec.ac.in / 9486580058	Chairman	
2	Dr. S. Tamilselvan M.Sc., M.Phil., Ph.D. Professor & Head Department of Mathematics Annamalai University, Chidambaram- 608 002 stamilselvan@hotmail.com /9443073937	Subject Expert (University Nominee)	
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5	Mr. G. Indragoby Associate Director Sensipie Software Solutions(p)Ltd., Chennai indragoby@gmail.com /98432223234	Member (Representative from Industry)	
6	Dr. I. Silambarasan M.Sc., M.Phil., Ph.D. Assistant Professor Department of Mathematics Sri Manakula Vinayagar Engineering College Puducherry – 605107 silambarasanmaths@smvec.ac.in /9578123368	Internal Member	
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Chairman/BOS
(Dr. T.Gayathri)



Dean SAS
(Dr. S. Muthulakshmi)



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SCHOOL OF ARTS AND SCIENCE

DEPARTMENT OF MATHEMATICS

MINUTES OF BOARD OF STUDIES 3rd MEETING

ANNEXURE I

A20MAT101	DIFFERENTIAL CALCULUS	L	T	P	C	Hrs
		3	1	0	4	60

Course Objectives

- To learn the differentiation techniques.
- To gain the knowledge of Tangents and normal.
- To understand the concept of Maxima and minima of function of two and three variables.
- To introduce the angle between the curves.
- To know the notion of curvatures, Evolutes & Involutives and polar co-ordinates.

Course Outcomes

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

CO1 – Know the basics of differential calculus.

CO2 – Understand the tangent and normal concepts.

CO3 – Find maxima and minima for the functions.

CO4 – Solve the angle between the curves.

CO5 – Sketch curves in Cartesian and polar coordinate systems.

UNIT I DERIVATIVES**(12 Hrs)**

Definition of a derivative – Differentiation techniques – Differentiation of Implicit functions – n^{th} derivative – Leibnitz formula for the n^{th} derivative and applications

UNIT II FUNCTIONS OF SEVERAL VARIABLES**(12 Hrs)**

Total differential coefficients – Homogeneous functions and Euler's theorem – Partial differentiation – Functions of two and three variables – Jacobians – Equations of tangent and normal – Taylor's theorem.

UNIT III MULTIPLIERS AND NORMAL CURVE**(12 Hrs)**

Maxima and Minima of two variables – Method of Lagrange's method of undetermined multipliers – Angle of intersection of curves – Sub tangent and Sub Normal

UNIT IV ANGLE BETWEEN TWO CURVES**(12 Hrs)**

Angle between the radius vector and tangent – Angle between the intersection of two curves – Polar sub tangent and subnormal.

UNIT V CALCULUS**(12 Hrs)**

Curvature – Radius of curvature in Cartesian and in Polar Coordinates – Centre of curvature – Evolutes and Involutives.

Text Books

1. T. K. Manicavachagom Pillai, "Calculus Volume – I", Printers and Publishers, 1992.
2. S. Narayanan and T. K. Manicavachagom Pillai, "Calculus Volume I", S.Viswanathan Printers Publishers Pvt Limited, 2011.
3. P. Kandasamy, K. Thilagavathy, "Mathematics for B.Sc", Vol - I & II", S.Chand & Company Ltd., New Delhi, 2004

Reference Books

1. S. Arumugam and Isaac, "Calculus, Volume I", New Gamma Publishing House, 1991.
2. G. B. Thomas and R. L. Finney, "Calculus and Analytic Geometry", Addison Wesley, 9th Edition, 1995.
3. P. R. Vittal, "Calculus", Margham Publication, 2004.

Web References

1. <https://youtu.be/Cn54abNI2TI>
2. <https://youtu.be/Em5EUstK8Rw>
3. [https://www.sakshieducation.com/Engg/EnggAcademia/CommonSubjects/M1-Curvature Evolutes & Envelopes CurveTracing.pdf](https://www.sakshieducation.com/Engg/EnggAcademia/CommonSubjects/M1-Curvature%20Evolutes%20&%20Envelopes%20CurveTracing.pdf)

A20MAS101	ANALYTICAL GEOMETRY	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To learn analytical geometry in two dimensions
- To acquire knowledge of planes and its properties as 3-dimensional objects
- To understand the concepts of skew lines and spheres
- To know the concept related to geometry of three dimension
- To familiarize the basics of conicoid.

Course Outcomes

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

CO1 – Gain a good knowledge about conic sections.

CO2 – Study more about straight lines using coplanar and shortest distance between the lines.

CO3 – Analyze the concept associated with spheres and solve problems using sphere.

CO4 – Analyze more about three dimensions using cone and cylinder.

CO5 – Familiarize the congruent conic.

UNIT I TWO DIMENSIONS**(9 Hrs)**

Analytical geometry of 2D – polar coordinates equation of a conic – directrix – chord – tangent – normal – simple problems – only in deriving equation of a conic.

UNIT II THREE DIMENSIONS**(9 Hrs)**

Analytical Geometry 3D – straight lines – coplanarity of straight line – shortest distance (S.D) and equation of S.D between two lines – simple problems.

UNIT III SPHERE**(9 Hrs)**

Sphere: standard equation sphere – results based on the properties of a sphere – tangent plane to a sphere – equation of a circle.

UNIT IV CONE AND CYLINDER**(9 Hrs)**

Cone and Cylinder: Cone whose vertex is at the origin – envelope cone of a sphere – right circular cone – equation of a cylinder – right circular cylinder.

UNIT V CONICOIDES**(9 Hrs)**

Nature of a conicoid – standard equation of central conicoid – enveloping cone – tangent plane – condition for tangency – director Sphere – director plane.

Text Books

1. P. Durai Pandian & others, "Analytical Geometry", United Kingdom Publication, 1968.
2. Thomas Grenfell Vivian, "Analytical Geometry for Beginners: Part I. the Straight Line and Circle" Nabu Press, 2010.
3. T. K. Manicavachagom Pillai & T. Natrajan, "Analytical Geometry, Part II -Three dimensions", S.Viswanathan, Printers & Publishers Pvt. Ltd. Chennai, 2011.

Reference Books

1. T.K. M. Pillai & Others, "Analytical Geometry of 2D", Viswanathan Publications, 2006.
2. M. L. Khanna, "Solid Geometry" Jainath & Co Publishers, Meerut, 2015.
3. D. Chatterjee, "Analytical Geometry: Two and Three Dimensions", Alpha Science International Limited, 2009.

Web References

1. <https://www.coursera.org/lecture/fe-exam/analytic-geometry-and-trigonometry-straight-lines-SV8UL>
2. <https://www.askiitians.com/iit-jee-3d-geometry/>
3. <http://paulbourke.net/geometry/circlesphere/>

A20MAT408	DISCRETE MATHEMATICS	L	T	P	C	Hrs
		3	1	0	4	60

Course Objectives

- To learn inference theory.
- To Understand the concept of Permutations and combinations.
- To Know the basic concepts of Boolean algebra.
- To learn formal languages in automata.
- To familiarize the concept of finite state automata.

Course Outcomes

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

CO1 – Gain knowledge of the applications of inference theory.

CO2 – Known the applications of Permutations and combinations.

CO3 – Understand the concept of Boolean Algebra.

CO4 – Write the language according to grammars.

CO5 – Convert nonfinite automata to finite automata.

UNIT I MATHEMATICAL LOGIC**(12 Hrs)**

Propositional logic – Propositional equivalences – Predicates and quantifiers – Nested quantifiers – Rules of inference – Introduction to proofs – Proof methods and strategy.

UNIT II COMBINATORICS**(12 Hrs)**

Mathematical induction – Strong induction and well ordering – The basics of counting – The pigeonhole principle – Permutations and combinations – Recurrence relations – Solving linear recurrence relations – Generating functions – Inclusion and exclusion principle and its applications

UNIT III LATTICES AND BOOLEAN ALGEBRA**(12 Hrs)**

Partial ordering – Poset – Lattices as poset – Properties of lattices – Lattices as algebraic systems – Sub lattices – Direct product and homomorphism – Some special lattices – Boolean algebra.

UNIT IV FORMAL LANGUAGES**(12 Hrs)**

Languages and grammars – Phrase structure, grammar – Classification of grammars – Pumping lemma for regular languages – Context free languages.

UNIT V FINITE STATE AUTOMATA**(12 Hrs)**

Finite state automate – Deterministic finite state automate (DFA) – Nondeterministic finite state automata (NFA) – Equivalence of DFA and NFA – Equivalence of NFA and Regular Languages.

Text Books

1. Tremblay, J.P. and Manohar, R., "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw Hill Pub. Co. Ltd, New Delhi, 30th Reprint, 2011.
2. Rosen, K.H., "Discrete Mathematics and its Applications", Tata McGraw Hill Pub. Co. Ltd., New Delhi, Special Indian Edition, 7th Edition, 2011.
3. T.veerarajan, "Discrete Mathematics", McGraw Hill Education, 2017.

Reference Books

1. Grimaldi, R.P. "Discrete and Combinatorial Mathematics: An Applied Introduction", 4th Edition, Pearson Education Asia, Delhi, 2007.
2. Lipschutz, S and Mark Lipson, "Discrete Mathematics", Schaum's Outlines, Tata McGraw Hill Pub. Co. Ltd., New Delhi, 3rd Edition, 2010.
3. Koshy. "Discrete Mathematics with Applications" Elsevier Publications, 2006.

Web Resources

1. <https://nptel.ac.in/courses/111/107/111107058/>
2. <https://nptel.ac.in/courses/111/104/111104026/>
3. <https://nptel.ac.in/courses/106/106/106106183/>



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SCHOOL OF ARTS AND SCIENCE

DEPARTMENT OF MATHEMATICS

MINUTES OF BOARD OF STUDIES 3rd MEETING

ANNEXURE II

REVISED CURRICULUM

SEMESTER – I										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A20TAT101 / A20HNT101 / A20FRT 101	Tamil – I / Hindi-I / French - I	MIL	3	0	0	3	25	75	100
2	A20GET101	General English I	ENG	3	0	0	3	25	75	100
3	A20MAT101	Differential Calculus	DSC	3	1	0	4	25	75	100
4	A20MAT102	Trigonometry	DSC	3	1	0	4	25	75	100
5	A20MAD101	Allied physics	IDC	3	1	0	4	25	75	100
Practical										
6	A20MAD102	Allied Physics practical	IDC	0	0	4	2	50	50	100
Skill Enhancement Courses										
7	A20MAS101	Analytical Geometry	SEC	3	0	0	3	100	0	100
Ability Enhancement Compulsory Course										
8	A20AET101	Environmental Studies	AECC	2	0	0	2	100	0	100
Employability Enhancement Course										
9	A20MAC101	Certificate Course-I	EEC	0	0	4	-	100	0	100
							25	475	425	900

SEMESTER – II										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A20TAT201 / A20HNT201 / A20FRT201	Tamil – II / Hindi-II / French - II	MIL	3	0	0	3	25	75	100
2	A20GET202	General English II	ENG	3	0	0	3	25	75	100
3	A20MAT203	Sequence and Series	DSC	3	1	0	4	25	75	100
4	A20MAT204	Ordinary Differential Equations	DSC	3	1	0	4	25	75	100
5	A20CMD201	Financial and Management Accounting - I	IDC	3	1	0	4	25	75	100
Practical										
6	A20CMD202	Accounting Software Lab	IDC	0	0	2	2	50	50	100
Skill Enhancement Courses										
6	A20MAS202	Integral Calculus	SEC	3	0	0	3	100	0	100
Ability Enhancement Compulsory Course										
7	A20AET202	Public Administration	AECC	2	0	0	2	100	0	100
Extension Activity										
8	A20EAL201	National service scheme [NSS]	EA	0	0	2	1	100	0	100
Employability Enhancement Course										
9	A20MAC202	Certificate Course-II	EEC	0	0	2	-	100	0	100

SEMESTER – III										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A20MAT305	Partial Differential Equation	DSC	3	1	0	4	25	75	100
2	A20MAT306	Fourier Series & Fourier Transforms	DSC	3	1	0	4	25	75	100
3	A20MAT307	Mechanics I (statics)	DSC	3	1	0	4	25	75	100
4	A20MAD305	Statistics - I	IDC	3	1	0	4	25	75	100
5	A20MAE3XX	DSE I*	DSE	3	1	0	4	25	75	100
6	A20XXO3XX	Open Elective-I**	OE	2	0	0	2	25	75	100
Practical										
7	A20MAD306	Statistics – I Lab [Using MATLAB]	IDC	0	0	4	2	50	50	100
Skill Enhancement Courses										
8	A20MAS303	Numerical Method using C	SEC	3	0	0	3	100	0	100
Employability Enhancement Course										
9	A20MAC303	Certificate Course-III	EEC	0	0	2	-	100	0	100
							27	400	500	900
							26	525	425	1000

* EEC are not included for CGPA calculation

SEMESTER – IV										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A20MAT408	Discrete Mathematics	DSC	3	1	0	4	25	75	100
2	A20MAT409	Operations Research	DSC	3	1	0	4	25	75	100
3	A20MAT410	Mechanics II (Dynamics)	DSC	3	1	0	4	25	75	100
4	A20MAD407	Statistics - II	IDC	3	1	0	4	25	75	100
5	A20MAE4XX	DSE II*	DSE	3	1	0	4	25	75	100
6	A20XXO4XX	Open Elective-II**	OE	2	0	0	2	25	75	100
Practical										
7	A20MAD408	Statistics – II Lab [Using R]	IDC	0	0	4	2	50	50	100
Skill Enhancement Courses										
8	A20MAS404	Quantitative Aptitude & Reasoning - I	SEC	3	0	0	3	100	0	100
Employability Enhancement Course										
9	A20MAC404	Certificate Course-IV	EEC	0	0	2	-	100	0	100
							27	400	500	900

*Discipline Specific Electives are to be selected from the list given in Annexure I

**** Open electives are to be selected from the list given in Annexure II**

SEMESTER – V										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A20MAT511	Abstract Algebra	DSC	3	1	0	4	25	75	100
2	A20MAT512	Real Analysis-I	DSC	3	1	0	4	25	75	100
3	A20MAT513	Complex Analysis	DSC	3	1	0	4	25	75	100
4	A20MAE5XX	DSE III*	DSE	3	1	0	4	25	75	100
Skill Enhancement Courses										
5	A20MAS505	Quantitative Aptitude & Reasoning - II	SEC	3	0	0	3	100	0	100
Employability Enhancement Course										
6	A20MAC505	Certificate Course-V	EEC	0	0	2	-	100	0	100
							19	300	300	600

SEMESTER – VI										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A20MAT614	Linear Algebra	DSC	3	1	0	4	25	75	100
2	A20MAT615	Real Analysis-II	DSC	3	1	0	4	25	75	100
3	A20MAT616	Graph Theory	DSC	3	1	0	4	25	75	100
4	A20MAE6XX	DSE IV*	DSE	3	1	0	4	25	75	100
Skill Enhancement Courses										
5	A20MAS606	Mathematical Modelling	SEC	3	0	0	3	100	0	100
Employability Enhancement Course										
6	A20MAC606	Certificate Course-VI	EEC	0	0	2	-	100	0	100
							18	300	300	600

**Discipline Specific Electives are to be selected from the list given in Annexure I*

**** Open electives are to be selected from the list given in Annexure II**

REVISED STRUCTURE FOR UNDERGRADUATE PROGRAMME

Sl. No	Course Category	Breakdown of Credits
1	Modern Indian Language (Tamil / Hindi / French)	06
2	English	06
3	Discipline Specific Core Courses (DSC)	64
4	Discipline Specific Elective Courses (DSE)	16
5	Interdisciplinary courses (IDC)	24
6	Skill Enhancement Courses (SEC)	18
7	Employability Enhancement Courses (EEC*)	-
8	Ability Enhancement Compulsory Courses (AECC)	04
9	Open Elective (OE)	04
10	Extension Activity (EA)	01
Total		143

REVISED SCHEME OF CREDIT DISTRIBUTION – SUMMARY

Sl.No	Course Category	Credits per Semester						Total Credits
		I	II	III	IV	V	VI	
1	Modern Indian Language (Tamil / Hindi / French)	3	3	-	-	-	-	06
2	English	3	3	-	-	-	-	06
3	Discipline Specific Core Courses (DSC)	8	8	12	12	12	12	64
4	Discipline Specific Elective Courses (DSE)	-	-	4	4	4	4	16
5	Interdisciplinary courses (IDC)	6	6	6	6	-	-	24
6	Skill Enhancement Courses (SEC)	3	3	3	3	3	3	18
7	Employability Enhancement Courses (EEC*)	-	-	-	-	-	-	-
8	Ability Enhancement Compulsory Courses (AECC)	2	2	-	-	-	-	04
9	Open Elective (OE)	-	-	2	2	-	-	04
10	Extension Activity (EA)	-	1	-	-	-	-	01
Total		25	26	27	27	19	19	143

REVISED DISCIPLINE SPECIFIC ELECTIVE COURSES

Discipline Specific Elective – I (Offered in Semester III)		
Sl. No.	Course Code	Course Title
1	A20MAE301	Numerical Method
2	A20MAE302	Differential Geometry
3	A20CME301	Entrepreneurship and Innovation
Discipline Specific Elective – II (Offered in Semester IV)		
Sl. No.	Course Code	Course Title
1	A20MAE404	Bessel's Functions
2	A20MAE405	Number Theory
3	A20CME402	Financial and Management Accounting – II
Discipline Specific Elective – III (Offered in Semester V)		
Sl. No.	Course Code	Course Title
1	A20MAE507	Machine Learning
2	A20MAE508	Artificial Intelligence
3	A20CME503	Income Tax Law and Practice
Discipline Specific Elective – IV (Offered in Semester VI)		
Sl. No.	Course Code	Course Title
1	A20MAE610	Fuzzy Algebra
2	A20MAE611	Astronomy
3	A20CME604	Financial Management

	PART I – FRENCH	L T P C	Hrs
A20FRT101	(for all U.G. Programmes)	3 0 0 3	45

FOUNDATION COURSE FRENCH – I

UNITÉ - 1

LeÇon 1 : Je m'appelle Elise. Et Vous ?

LeÇon 2 : Vous Dansez ? D'accord.

LeÇon 3 : Monica, Yukiko et compagnie

LeÇon 4 : Les Voisins de Sophie

UNITÉ - 2

LeÇon 5 : Tu vas au Luxembourg ?

LeÇon 6 : Nous Venons pour l'inscription

LeÇon 7 : A Vélo, en tain, en avoin

LeÇon 8 : Pardon, monsieur, le BHV s'il vous plait ?

UNITÉ - 3

LeÇon 9 : Au marche

LeÇon10 : On déjeune ici ?

LeÇon11 : On va chez ma copine ?

LeÇon12 : Chez Susana

Reference Books

Prescribed Textbook : *FESTIVAL 1* - Méthode de Français

Authors : Sylvie POISSON-QUINTON

Michèle MAHEO-LE COADIC

Anne VERGNE-SIRIEYS

Edition : CLE International, Nouvelle Édition révisée : 2009.

Portions : Unités : 1, 2, 3.

	PART II – FRENCH	L T P C Hrs
A20FRT202	(for all U.G. Programmes)	3 0 0 3 45

FOUNDATION COURSE FRENCH – I**UNITÉ - 4**

Leçon 13 : Qu'est -ce qu'on leur offre ?

Leçon 14 : On solde !

Leçon 15 : Découvrir Paris en bus avec l'open Tour

Leçon 16 : Si vous gagne vous ferez quoi

UNITÉ - 5

Leçon 17 : Parasol ou parapluie ?

Leçon 18 : Quand il est midi à Paris

Leçon 19 : Vous allez Vivre

Leçon 20 : L'avenir du Français

UNITÉ - 6

Leçon 21 : Souvenirs d'enfance

Leçon 22 : j'ai fait mes études à Lyon 2

Leçon 23 : Retour des Antilles

Leçon 24 : Au voleur ! Au voleur

Reference Books:

Prescribed Textbook : *FESTIVAL 1* - Méthode de Français
 Authors : Sylvie POISSON-QUINTON
 Michèle MAHEO-LE COADIC
 Anne VERGNE-SIRIEYS
 Edition : CLE International, Nouvelle Édition révisée : 2009.

A20CMD201	FINANCIAL AND MANAGEMENT ACCOUNTING-I	L	T	P	C	Hrs
	(Common to B.C.A. & B.Sc. Mathematics)	4	0	0	4	60

Course Objectives

- To develop a deeper understanding of the Fundamentals of Accounting
- To appreciate the role and significance of subsidiary books in accounting system
- To learn the preparation of basic financial statements of small business entities.
- To gain knowledge about the preparation of cash flow statements.
- To develop the knowledge of accounting in computerised environment.

Course Outcomes

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

CO1 – Explain the concepts of accounting and solve simple problems on fundamentals of accounting

CO2 – Prepare various subsidiary books including different types of cash books.

CO3 – Prepare the basic financial statements of various business entities

CO4 – Handle the preparation and understanding of cash flow statements

CO5 – Explain the role of computers in Accounting and Automation.

UNIT I THEORETICAL FRAMEWORK OF ACCOUNTING (10 Hrs)

Meaning and Scope of Accounting – Nature and Objectives of Accounting – Distinction between Book-Keeping and Accountancy – Accounting Transactions – Principle of Double Entry – Branches of Accounting: Financial, Cost and Management Accounting – Accounting Equation – Significant Accounting Concepts and Conventions: Business Entity, Money Measurement, Going Concern, Materiality, and Conservatism.

UNIT II ACCOUNTING PROCESS (16 Hrs)

Business Transactions – Recording of Business Transactions in Accounting – Book of Prime Record: Journal, Steps in Journalising – Book of Main Record: Ledger – Posting to Ledger. Extracting Trial Balance from Ledger Accounts. Simple Problems in Journal, Ledger and Trial Balance.

Subsidiary Books – Meaning and Importance – Types of Subsidiary Books – Types of Cash Book – Simple Problems in Sales Book, Purchases Book, and Simple Cash Book.

UNIT III BASIC FINANCIAL STATEMENTS (16 Hrs)

Profit and Loss Account or Income Statement – Meaning, Contents, and Preparation – Balance Sheet or Position Statement – Meaning, Contents and Preparation – Adjustments in Final Accounts (Closing Stock, Expenses and Income Outstanding, Expenses paid and Income received in advance, Depreciation, Provision for Bad and Doubtful Debts, Provision for Discount on Creditors, Interest on Capital and Interest on Drawings). Practical Problems on Financial Statements with basic adjustments.

Vertical Form of Financial Statements – Income Statement and Balance Sheet.

UNIT IV CASH FLOW STATEMENT (12 Hrs)

Concept of Funds and Cash in Accounting – Importance of Cash Flow in Business – Meaning and Need of Cash Flow Statement – Use of Accounting Standard 3 in the preparation of Cash Flow Statement – Classification of Cash Flow based on activities: Operating, Investing and Financing. Preparation of Cash Flow Statements. Simple Problems.

UNIT V ACCOUNTING IN COMPUTERISED ENVIRONMENT (6 Hrs)

Role of Computer in Accounting and Automation – Accounting as an Information System – Accounting Process under Manual and Computerised Accounting – Software for Accounting. Framework of Accounting Software – Grouping of Accounts – Data Entry in Accounting Software – Generation of Reports – Use of Spreadsheets in Accounting Analysis.

Text Books

1. K.L. Nagarajan, N. Vinayagam & P.L. Mani, "Principles of Accountancy", S. Chand & Sons, 4th Edition, 2016.
2. T.S. Reddy & Y. Hari Prasad Reddy, "Financial and Management Accounting", Margham Publications, 4th Edition, 2018.
3. S.N. Maheswari, Suneel K. Maheswari & Sharad K. Maheswari, "An Introduction to Accountancy", Vikas Publishing House, 12th Edition, 2019.

Reference Books

1. N. Ramachandran & Ram Kumar Kakani, "Financial Accounting for Management", McGraw Hill, 5th Edition, 2020.
2. Hanif & Mukherjee, "Financial Accounting", Tata McGraw Hill, 2nd Edition, 2019.
3. S.P. Jain & K.L. Narang, "Financial Accounting", Kalyani Publishers, 12th Edition, 2014.

Web References

1. <https://www.civilserviceindia.com/subject/Management/notes/financialaccounting.html>
2. <https://www.taxmann.com/blogpost/2000001622/accounting-principles-andconcepts.aspx>
3. <https://courses.lumenlearning.com/sac-finaccounting/chapter/ledgers-journals-andaccounts/>

A20CMD202	ACCOUNTING SOFTWARE LAB	L	T	P	C	Hrs
	(Common to B.C.A. & B.Sc. Mathematics)	0	0	4	2	60

Course Objectives

- To develop a deeper knowledge in fundamentals of accounting software.
- To understand the working of business transactions.
- To learn the importance of MIS.
- To gain knowledge about GST and TDS.

Course Outcomes

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

CO1 – Work with chart of accounts in accounting software.

CO2 – Prepare various business transactions in software.

CO3 – Generate various reports including customized reports

CO4 – Handle the preparation and understanding of GST and TDS

UNIT I CHART OF ACCOUNTS**(15 Hrs)**

An Overview of Accounting Fundamentals – Double Entry Book keeping – Types of Accounts – Golden Rules of Accounts – Source Documents for Accounting – Accounting Equation – Recording Business Transactions – Journal – Ledger – Trial Balance – Subsidiary Books – Financial Statements: Profit and Loss Account – Balance Sheet.

Getting Started with Accounting Software – Company Creation and Management – Company Features and Configuration – Chart of Accounts – Ledger – Grouping – Creation, Display and Deletion. Inventory Masters – Creating Inventory Masters: Stock Group, Units of Measure, Stock Items, Godown/Warehouse – Stock Category Reports.

UNIT II RECORDING DAY-TO-DAY TRANSACTIONS**(20 Hrs)**

Business Transactions – Source Document for Voucher – Recording Transactions in Accounting Software – Accounting Vouchers: Receipt Voucher, Contra Voucher, Payment Voucher, Purchase Voucher, Sales Voucher, Debit Note Voucher, Credit Note Voucher, Journal Voucher.

Accounts Payables and Receivables – Maintaining Bill-wise details – Stock Category Report – Changing Financial Year.

UNIT III MIS REPORTS**(5 Hrs)**

Management Information System (MIS) – MIS Reports in Accounting Software – Trial Balance – Balance Sheet – Profit and Loss Account – Cash Flow Statement – Accounting Ratios. Books and Reports: Day Book – Receipts and Payments – Purchase Register – Sales Register – Bills Receivable and Bills Payable.

UNIT IV HANDLING GST AND TDS**(20 Hrs)**

Goods and Services Tax (GST) – Recording GST in Accounting Software – Generating GST Reports. Tax Deducted at Source (TDS) – TDS in Accounting Software – TDS Activation – Statutory Masters – Configuring TDS – Booking of Expenses in Purchase Voucher – TDS Reports.

Text Books

1. Tally Education, Tally Essential Level 1, Sahaj Enterprises, 1st Edition, 2021.
2. Tally Education, Tally Essential Level 2, Sahaj Enterprises, 1st Edition, 2021.
3. Tally Education, Tally Essential Level 3, Sahaj Enterprises, 1st Edition, 2021.

Reference Books

1. DT Editorial Services, "Tally ERP 9 with GST", DreamTech Press, 1st Edition, 2020.
2. Tally Education, "Tally ERP 9 with GST", BPB Publishers, 1st Edition, 2018.
3. Vikas Gupta, "Comdex Tally ERP 9 with GST and MS Excel", DreamTech Press, 1st Edition, 2018.

Web References

1. https://www.youtube.com/watch?v=rG_eHA3vN1I
2. <https://www.youtube.com/watch?v=Sw2H56aMe-g>
3. <https://www.youtube.com/watch?v=eA8oK3wn1p4>

A20CME301	ENTREPRENEURSHIP	L	T	P	C	Hrs
	AND INNOVATION	3	0	2	4	75

Course Objectives

- To develop the knowledge of basic concepts in the area of entrepreneurship.
- To generate innovative business ideas in the emerging industrial scenario.
- To be familiar with the key steps in the elaboration of business idea.
- To help students to develop personal creativity and entrepreneurial initiative.
- To acquire requisite knowledge and skills for becoming successful entrepreneurs.

Course Outcomes

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

- CO1** – Familiarize with the concepts of entrepreneurship.
CO2 – Analyse the business environment in order to identify business opportunities.
CO3 – Understand the institutional support to entrepreneurial development.
CO4 – Understand the ethical challenges and social responsibility in a business setting.
CO5 – Demonstrate the ability to create business plan and interpret their own business plan.

UNIT I ENTREPRENEUR AND ENTREPRENEURSHIP (15 Hrs)

Introduction - Entrepreneurship - concept, growth, characteristics, types - Functions of an entrepreneur - Entrepreneurship in India - Entrepreneurship in developing countries - Intrapreneurs - Women Entrepreneurs - problems and prospects - Rural Entrepreneurs - problems and prospects - Social Entrepreneurs.

Entrepreneurship in Practice: Field Study on Rural Entrepreneurs or Women Entrepreneurs.

UNIT II ENTREPRENEURIAL DEVELOPMENT (15 Hrs)

Factors influencing Entrepreneurship - Entrepreneurial process - development and motivation - EDP - Need, objective, relevance and role of EDP, phases of EDP - Institutions for Industrial Entrepreneurs - Small scale and Export Entrepreneurs.

Creativity and Innovation in an Entrepreneurial Organisation – Tools for Environmental Scanning: SWOT Analysis – PESTLE Analysis – Michael Porter's Approach to Industry Analysis. Environmental Screen Process – Types of Environmental Scanning – Assessment of Business Opportunities.

UNIT III ENTREPRENEURSHIP IN ACTION (15 Hrs)

Concept and Definition of MSME - Scope, Role of Government in promoting SSI - Business idea generation techniques - Registration of Industries and licencing - Identification of business opportunities - Marketing, Financial, Technical, Legal feasibility - Locational feasibility - Government rules and regulations. Simple Case Studies on Entrepreneurial Challenges.

Entrepreneurship in Practice: Field Study on in one of the MSMEs in your locality.

UNIT IV INSTITUTIONAL FINANCE TO ENTREPRENEURS (15 Hrs)

Central Government store purchase program - National small Industrial corporation - SIDBI, IDBI, TCO, IIFT, IFCI, ICICI, IRBI, Export Import Bank, Trade Development Authority, ECGC, MDA, EDII, IRDP, DIC, SSIB, SISI, SFC, Seed capital. Start-ups and Mudra Banks.

Entrepreneurship in Practice: Field Study in District Industries Centre or Financing Institution.

UNIT V EMERGING TRENDS IN ENTREPRENEURSHIP (15 Hrs)

Introduction - Venture capital financing concept and features - Strategic role of venture capital - Venture capital in India - Social and Ethical responsibility of Entrepreneurs – Fillip to Indian Entrepreneurs: Make in India Scheme.

Franchising and acquisition - Marketing mix strategies - Production planning - Manpower planning and Industrial relations - Successful Entrepreneurs.

Entrepreneurship in Practice: Field Study on Successful Entrepreneurs in your locality.

Text Books

1. C.B.Gupta & N.P.Srinivasan, "Entrepreneurial Development", Sultan Chand & Sons, 1st Edition, 2013.
2. S.S. Khanka, "Entrepreneurial Development", Sultan Chand & Sons, 1st Edition, 1999.
3. E. Gordon & K. Natarajan, "Entrepreneurship Development", Himalaya Publishing house, 5th Edition, 2015.

Reference books

1. Abhijit Chatterjee & V. Sharma, "Entrepreneurship Development", Vayu Education of India, 1st Edition, 2020.
2. Vasant Desai, "Dynamics of entrepreneurial development", Wiley Eastern limited, 2nd Edition, 2016.
3. Lall, M & Sahai. S, "Entrepreneurship", Excel Book Publishers, 2nd Edition, 2013.

Web References

1. <https://www.crectirupathi.com/entrepreneurialdevelopment-notes/>
2. <http://simplynotes.in/entrepreneurialdevelopment>
3. <https://lecturenotes.in/subject/35/entrepreneurship-development-ed>

A20CME402	FINANCIAL AND MANAGEMENT ACCOUNTING-II	L	T	P	C	Hrs
	(Common to B.C.A. & B.Sc. Mathematics)	4	0	0	4	60

Course Objectives

- To develop a deeper understanding on financial statement analysis.
- To make them understand the accounting ratios.
- To learn the preparation of cost sheet.
- To be familiar with marginal costing and break-even analysis.
- To develop the knowledge of budgeting

Course Outcomes

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

CO1 – Work with the tools of financial analysis

CO2 – Compute Accounting Ratios from financial statements

CO3 – Prepare the cost sheet with unit cost details

CO4 – Work with marginal costing and break-even analysis

CO5 – Prepare the Sales, Production, Cash and Flexible Budgets.

UNIT I FINANCIAL STATEMENTS ANALYSIS (10 Hrs)

Financial Statements – Significance – Users of Financial Statements – Analysis of Financial Statements – Tools of Financial Analysis: Horizontal Analysis, Vertical Analysis, Trend Analysis, and Ratio Analysis. Preparation of Comparative Financial Statements and Common-size Financial Statements. Simple Problems.

UNIT II ACCOUNTING RATIOS (12 Hrs)

Accounting Ratios – Classification of Ratios – Basis of Origin and Functional Classification. Ratios to test Solvency, Profitability, Liquidity, Efficiency and Performance of the business – Computation of Accounting Ratios and Interpretation. Problems on Computation of Ratios from given Financial Statements and other information.

UNIT III COST CONCEPTS AND COST SHEET (12 Hrs)

Cost – Concept and Meaning – Classification of Costs – Elements of Cost – Statement of Cost – Unit Costing – Problems on Cost Sheet.

UNIT IV MARGINAL COSTING AND BREAK-EVEN ANALYSIS (14 Hrs)

Marginal Cost and Marginal Costing – Concept of Contribution – Profit-Volume Ratio – Margin of Safety – Break-Even Analysis: Preparation of Break-Even Chart – Problems on Break-Even Analysis.

Uses of Marginal Costing in decision-making – Pricing Decisions – Make or Buy Decisions – Accepting a Foreign Offer – Sales Mix Decisions.

UNIT V BUDGETING (12 Hrs)

Budget and Budgeting – Types of Budgets – Functional Budgets: Sales Budget, Production Budget, Materials Purchase Budget, Cash Budget. Concept of Flexible Budgeting – Concept of Zero Base Budgeting. Problems on preparation of Sales, Production, Cash and Flexible Budgets.

Text Books

1. P. Periyasamy, "Financial, Cost and Management Accounting", Himalaya Publishing House, 1st Edition, 2011.
2. T.S. Reddy & Y. Hari Prasad Reddy, "Financial and Management Accounting", Margham Publications, 4th Edition, 2018.
3. R.S.N. Pillai & B.N. Bagavathi, "Management Accounting", S. Chand & Sons, 5th Edition, 2010.

Reference Books

1. N. Ramachandran & Ram Kumar Kakani, "Financial Accounting for Management", McGraw Hill, 5th Edition, 2020.
2. M.N. Arora, "Cost and Management Accounting", Vikas Publishing House, 10th Edition, 2019.
3. I.C. Jain, "Management Accounting", Vikas Publishers House, 6th Edition, 2018.

Web References

1. <https://www.civilserviceindia.com/subject/Management/notes/financialaccounting.html>
2. <https://www.taxmann.com/blogpost/2000001622/accounting-principles-andconcepts.aspx>
3. <https://www.dynamictutorialsandservices.org/2018/10/management-accounting-notes.html>



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Madagadipet, Puducherry)



SCHOOL OF ARTS AND SCIENCE

DEPARTMENT OF MATHEMATICS

MINUTES OF BOARD OF STUDIES 3rd MEETING

ANNEXURE III

A20MAT102	REVISED TRIGONOMETRY	L	T	P	C	Hrs
		3	1	0	4	60

Course Objectives

- To familiarize the Expansions of trigonometric functions and their Applications.
- To learn the types of hyperbolic functions.
- To study the basic concept of hyperbolic functions.
- To know the DeMoivre's Property and logarithm.
- To understand the concept of series in trigonometric functions.

Course Outcomes

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

CO1 – Expand Trigonometric functions.

CO2 – Apply the Basic rules of Expansions of power series.

CO3 – Understand the basic concepts of Hyperbolic Functions.

CO4 – Solve the problems by using DeMoivre's Property.

CO5 – Understand various methods for the summation of infinite trigonometric series.

UNIT I EXPANSION OF θ AND EQUATIONS (12 Hrs)

Expansions of $\cos n\theta$, $\sin n\theta$ – Expansion of $\tan n\theta$ in terms of $\tan \theta$ – Expansion of $\tan(A+B+C+...)$ – Formation of Equations.

UNIT II MULTIPLES OF θ AND CIRCULAR FUNCTIONS (12 Hrs)

Powers of sine's and cosines of θ in terms of functions of multiples of θ – Expansion of $\sin \theta$ and $\cos \theta$ in a series of ascending powers of θ – Expansion of Inverse Circular Functions.

UNIT III HYPERBOLIC FUNCTIONS (12 Hrs)

Definition – Hyperbolic function – Relation between Circular and Hyperbolic Functions – Inverse Hyperbolic Functions.

UNIT IV PROPERTIES ON CIRCLE AND FACTORS (12 Hrs)

Resolving into Factors – Simple Problems only – De Moivre's Property on the Circle and Cote's Property on the Circle – Logarithm of complex quantities.

UNIT V SUMMATION OF TRIGONOMETRIC SERIES (12 Hrs)

Summation of Trigonometric Series: Method of Differences – Gregory Series – Euler Series.

Text Books

1. S. Narayanan and, T. K. Manicavachagom Pillai, "Trigonometry", S.Viswanathan Printers & Publishers Pvt.Ltd. Chennai, 2004.
2. P. Kandasamy, K. Thilagavathy, "Mathematics for B.Sc. Vol.- I, II, III & IV", S. Chand & Company Ltd., New Delhi-55, 2004.
3. N. P. Bali, "Trigonometry", Krishna Prakasan Mandhir, 9, Shivaji Road, Meerut (UP), 1994.

Reference Books

1. S. L. Loney, "Plane Trigonometry", Part II, Cambridge University Press, London.
2. S. Duraipandian and Laxmi Duraipandian, "Trigonometry". Emerald Publishers, Chennai, 1984.
3. B. S. Grewal "Higher Engineering Mathematics". Khanna Publishers, New Delhi, 2003.

Web References

1. <http://web.mit.edu/jorloff/www/18.01a-esg/OCWTrig.pdf>
2. <https://faculty.atu.edu/mfinan/trigbook.pdf>
3. <https://users.auth.gr/~siskakis/GelfandSaul-Trigonometry.pdf>

	REVISED				
A20MAD101	ALLIED PHYSICS	L	T	P	C
	(For B. Sc. Maths Students)	3	1	0	4
					Hrs
					60

Course Objectives

- The course presents an introduction to the physics of the objects whose sizes span from atomic dimensions to macroscopic, human scale dimensions, and beyond: atoms, molecules, gases, liquids, and solids.
- The aim is to show how the properties of macroscopic bodies can be derived from the knowledge that matter is made up from atoms.
- Recognize the difference between physical and chemical properties.
- Distinguish between extensive and intensive properties.
- To learn the mathematical formulations of dynamics problems.

Course Outcomes

On Completion successful students will be able to demonstrate an understanding of:

CO1 – To describe the various phenomenon of Kinematics, Mechanics of Solids.

CO2 – To describe the various phenomenon of Sound & Acoustics of different structures.

CO3 – The relationships between physics on the atomic scale and the properties of matter. Techniques for finding appropriate averages to predict macroscopic behavior.

CO4 – To describe the relationship and thermal behavior of various systems.

CO5 – To describe various concepts of Optics, spectroscopy, Application of light, Fiber Optics etc.,

UNIT I MECHANICS**(12 Hrs)**

Projectile –range of horizontal and inclined plane- impulse – impact – Impulsive force – laws of impact – direct and oblique impact of smooth sphere – loss in kinetic energy - impact of smooth sphere on a smooth horizontal plane - Rotational motion and moment of inertia - calculation of Moment of inertia of ring - Hollow cylinder and sphere and Fly wheel - Acceleration of a body rolling down on an inclined plane - Compound Pendulum.

UNIT II SOUND**(12 Hrs)**

Introduction to longitudinal waves – Sound waves in gases – Energy distribution in sound waves – Intensity of sound waves – Longitudinal waves in a solid – Example: earthquake – Doppler Effect - Reflection and transmission of sound waves at boundaries – Diffraction of sound waves - Noise and music – Limits of human audibility – The decibel unit - Reverberation time - Sabine's formula for growth and decay – Acoustics of auditoriums and halls – Introduction to acoustic transducers.

UNIT III PROPERTIES OF MATTER**(12 Hrs)**

Stress – Strain – Hooke's law – Relation between elastic constants – poisson's Ratio – Expression for poisson's ratio in terms of elastic constants – work done in twisting –torsional pendulum – determination of rigidity modulus – Young's modulus – determination – uniform – non-uniform bending - Bending of beam, Torsion of cylinder, Bending beam, Determination of γ , η and σ .

UNIT IV THERMAL PHYSICS**(12 Hrs)**

Thermal conductivity – good & bad conductors – Forbe's method - Lee's disc method– relationship between thermal and electrical conductivities - Wiedemann Franz's law - Radiation- Prevost's theory of heat exchanges - law of cooling – Black body radiation - Kirchhoff's law - Wien's laws of energy distribution in black body radiation - Wien's displacement law- Rayleigh-Jean's law -Plank's law – pyrometry - solar constant – sources of solar energy & applications.

UNIT V OPTICS**(12 Hrs)**

Snell's law of reflection and refraction, reflection and refraction at spherical surfaces: formula for refraction at single spherical surface, sign convention - Electromagnetic spectrum – spectral responds of human eye – UV and IR spectroscopy – Raman Effect – Experimental arrangement – application of Raman effect - Fiber optic communication: Introduction – optic fiber – numerical aperture – coherent bundle – fiber optic communication system and its advantage – multimode fiber optic sensors.

Text Books

1. Sound, Saigal, S. Chand & Co, 1996
2. Mechanics, D.S. Mathur, S. Chand & Co, 2000
3. Properties of Matter, Brijlal Subramaniam, S.Chand & Co, 2002

Reference Books

1. Fundamentals of Physics, Resnick Halliday & Walker, Wiley Publishing Co,
2. Principles of Physics, Resnick Halliday & Walker, Wiley Publishing Co,
3. Concepts of Physics, HC Verma, Bharati Bhavan Publisher

Web References

1. <https://ocw.mit.edu/courses/physics/>
2. <https://www.einstein-online.info/en/category/elementary/>
3. <https://www.physicsclassroom.com/>

A20MAT204	REVISED ORDINARY DIFFERENTIAL EQUATIONS	L	T	P	C	Hrs
		3	1	0	4	60

Course Objectives

- To identify an ordinary differential equation and its order.
- To evaluate first order differential equations.
- To find solutions of exact equations.
- To know about the particular integral.
- To solve differential equations using variation of parameter.

Course Outcomes

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

CO1 – Understand the order, degree of differential equation.

CO2 – Determine solutions to first order linear differential equations.

CO3 – Familiarize the orthogonal trajectory of the system of curves on a given surface.

CO4 – Solving linear differential equation with constant coefficient.

CO5 – Find the complete solution of a differential equation with constant coefficients by variation of Parameter.

UNIT I FIRST ORDER DIFFERENTIAL EQUATIONS (12 Hrs)

Differential Equation, Order and Degree of a Differential equation – Formation of a differential equation – Wronskian – definition – linearly dependent and independent set of functions.

UNIT II EXACT DIFFERENTIAL EQUATIONS (12 Hrs)

Equation of first order and first degree – separation of variables – Necessary and sufficient conditions for a differential equation of first order and first degree to be exact – integrating factor – linear Differential equation – Equation reducible to linear form (Bernoulli's equation).

UNIT III DIFFERENTIAL EQUATIONS (12 Hrs)

Trajectories – orthogonal trajectories (cartesian and polar co-ordinates) – Equation solvable for p – Equation solvable for x and y – Equation in Clairaut's form - General and singular solution.

UNIT IV DIFFERENTIAL EQUATIONS (HIGHER ORDER) (12 Hrs)

Linear differential equations with constant coefficients – finding complementary function and Particular Integrals of the form e^{mx} , $\sin mx$, x^m , $e^{ax} X$ where X is a function of x - Solving Homogeneous linear equations (Cauchy- Euler Equations).

UNIT V DIFFERENTIAL EQUATIONS WITH VARIABLE COEFFICIENTS (12 Hrs)

Equation reducible to Homogeneous linear form (Legendre's linear equations) – Method of variation of parameters – Solving ordinary simultaneous differential equation with constant coefficients.

Text Books

1. M. D. Raisinghania, "Ordinary and Partial Differential Equations", S. Chand & Company Ltd, 2020.
2. E. A. Coddington, "An Introduction to Ordinary Differential Equations", Prentice Hall of India, 1991.
3. S. C. Deo, Y. Lakshmi Nathan and V. Raghavendra, "Text Book of Ordinary Differential Equation", Tata McGraw Hill, New Delhi, 2nd Edition, 2002.

Reference Books

1. S.Narayanan, T.K. Manickavachagom Pillal, "Differential Equations and its Applications", Viswanathan Printers & Publishers Pvt. Ltd., 2015.
2. Dr. Arumugam and Mr. A. Thangapandi Issac, "Differential Equations and its Applications", New Gamma Publishing House, 2014.
3. E. A. Coddington and H. Davinson, "Theory of Ordinary Differential Equations", McGraw Hill, 1955.

Web References

1. <https://mathworld.wolfram.com/OrdinaryDifferentialEquation.html>
2. <https://nptel.ac.in/courses/111/106/111106100/>
3. <https://www.youtube.com/watch?v=FU-7xJLpoWg>

	REVISED	L	T	P	C	Hrs
A20MAT305	PARTIAL DIFFERENTIAL EQUATION	3	1	0	4	60

Course Objectives

- To know the general solution, singular solution & complete solution.
- To solve the simultaneous linear partial differential equation.
- To gain knowledge in application of Partial Differential equation.
- To learn the nature of one dimensional heat flow equation.
- To learn the nature of two-dimensional heat equation in Cartesian form.

Course Outcomes

After completion of the course, the students shall have able to

CO1 – Classify the Solution of partial differential equations.

CO2 – Know the linear partial differential equations.

CO3 – Know the Transformation of wave and heat equation.

CO4 – Solve one dimensional heat equation.

CO5 – Solve two dimensional heat equation.

UNIT I SOLUTION OF PARTIAL DIFFERENTIAL EQUATION (12 Hrs)

Introduction – Formation of partial differential equations – Elimination of Arbitrary constants and Functions – Solution of PDE – General Solution – Singular solution – Complete solution - General Solution of PDE.

UNIT II LINEAR PARTIAL DIFFERENTIAL EQUATION (12 Hrs)

Lagrange's Linear Equation – solution of simultaneous equation – Linear PDE of Higher order with constant coefficient – complementary function for a non- homogeneous linear equation – Method of separation of variables

UNIT III ONE DIMENSIONAL WAVE EQUATION (12 Hrs)

Introduction – Transverse vibration of stretched string – One dimensional wave equation – Transmission Line Equation – Variable Separable solution of the wave equation – Solution of Damped vibrating string equation

UNIT IV ONE DIMENSIONAL HEAT EQUATION (12 Hrs)

Introduction – Equation of Variable Heat flow in one dimension – Variable separable solutions of the Heat equation

UNIT V TWO DIMENSIONAL HEAT EQUATION (12 Hrs)

Introduction – Equation of variable heat flow in two dimensions in Cartesian form – variable separable solution of Laplace equation

Text Books

1. T.Veerarajan, "Transforms and Partial Differential Equation", Tata McGraw Hill, 2011
2. C. Zachmanoglou, Dale W. Thoe, "Introduction to Partial Differential Equations with Applications", Dover Publication, New York, 1986.
3. Maciej Borodzik, Paweł Goldstein, PiotrRybka, Anna Zatorska-Goldstein, "Problems on Partial Differential Equation", Springer publications, 1986.

Reference Books

1. K. S. Rao, "Introduction to Partial Differential Equations", PHI Learning Pvt Ltd, New Delhi, 2010
2. T. Amaranath, "An Elementary Course in Partial Differential Equations", 2nd Edition, Narosa Publishing House, New Delhi, 2014.
3. Amaranath.T, "An Elementary Course in Partial Differential Equations", 2nd edition, Narosa Publishing House, 2012

Web References

1. <https://www.youtube.com/watch?v=ly4S0oi3Yz8>
2. <https://nptel.ac.in/courses/111/103/111103021/>
3. <https://ocw.mit.edu/courses/mathematics/18-152-introduction-to-partial-differential-equations-fall-2011/lecture-notes/>

A20MAT306	REVISED	L	T	P	C	Hrs
	FOURIER SERIES & FOURIER TRANSFORMS	3	1	0	4	60

Course Objectives

- To learn the concept of periodic functions.
- To understand the rules of Fourier series.
- To analyze the asymptotic performance of half range Fourier series.
- To understand the fundamental concept of Fourier Transform.
- To analyze various problems in Fourier Transform.

Course Outcomes

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

- CO1** – Know the different types of functions.
CO2 – Calculate the Fourier coefficients.
CO3 – Find the Half range Fourier series.
CO4 – Familiarize the basics of Fourier Transform.
CO5 – Know the applications of inverse Fourier Transform.

UNIT I PERIODIC FUNCTION AND SPECIAL WAVE FORMS (12 Hrs)

Introduction, Periodic functions- Properties, Even & Odd functions- Properties, Special wave forms- Square wave, Half wave Rectifier, Full wave Rectifier, Saw-toothed wave, Triangular wave.

UNIT II FOURIER SERIES (12 Hrs)

Euler's Formulae for Fourier Series, Fourier Series for functions of period 2π , Fourier Series for functions of period $2l$, Dirichlet's conditions, Sum of Fourier Series – Problems.

UNIT III HALF RANGE FOURIER SERIES (12 Hrs)

Half Range Fourier series - Construction of Half range Sine Series, Construction of Half range Cosine Series. Parseval's identity, examples. Harmonic Analysis.

UNIT IV FOURIER TRANSFORM (12 Hrs)

Fourier Integral Theorem, Fourier Transform of a function, Fourier Sine and Cosine Integral Theorem, Fourier Cosine and Sine Transforms. Fourier Cosine and Sine Transforms of elementary functions. Properties of Fourier Transform- Linearity, Shifting, Change of scale, Simple problems.

UNIT V INVERSE FOURIER TRANSFORM (12 Hrs)

Fourier Transform of Derivatives, examples – Convolution Theorem (statement only), inverse of Fourier Transform, examples.

Text Books

1. Dr. A. Singaravelu, "Transforms and Partial Differential Equations", 18th reprint, Meenakshi Agency, 2011.
2. A. NeelArmstrong, "Transforms and Partial Differential Equations" Third edition, D.D.Publications,2012
3. Elias M. Stein, "Fourier Analysis: An Introduction ", published by Princeton University Press, New Jersey 2003

Reference Books

1. R. Harding, "Fourier Series and Transforms", Taylor and Francis Group, New York, 1985
2. Ronald N. Bracewell, "The Fourier Transform and Its Applications", McGraw-Hill International Editions - Paperback – July 1, 1986.
3. Javier Duoandikoetxe, "Fourier analysis", McGraw-Hill International Editions - Paperback – January 2012.

Web References

1. <https://mathworld.wolfram.com/FourierSeries.html>
2. <https://mathworld.wolfram.com/FourierTransform.html>
3. <https://see.stanford.edu/materials/lssoftaee261/book-fall-07.pdf>

A20MAE301	REVISED NUMERICAL METHODS	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To know the solution of algebraic and transcendental equations.
- To learn the techniques of solving simultaneous equations.
- To introduce the numerical techniques of differentiation and integration.
- To solve ordinary differential equations by using numerical methods.
- To know the solution of partial differential equations by using numerical methods.

Course Outcomes

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

CO1 – Use numerical techniques to solve algebraic and transcendental equations.

CO2 – Find the solution of simultaneous equations.

CO3 – Analyze and apply the knowledge of differentiation and integration by using numerical methods.

CO4 – Solve the solution of ordinary differential equations by Runge Kutta methods.

CO5 – Solve the partial differential equations in iterative methods.

UNIT I SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS (9 Hrs)

Introduction to numerical analysis –The solution of algebraic and transcendental equations – Bisection method – False Position Method – Newton-Raphson method – Power Method.

UNIT II LINEAR SIMULTANEOUS EQUATIONS (9 Hrs)

Solution of simultaneous linear algebraic equations – Direct methods – Gauss elimination method – Gauss-Jordan method – Iterative methods – Jacobi method – Gauss-Seidal method.

UNIT III INTERPOLATION (9 Hrs)

Finite differences – Differences of a polynomial – Factorial polynomial – Interpolation for equal intervals –Gregory-Newton interpolation formulae – Interpolation with unequal intervals – Lagrange's interpolation formula – Inverse interpolation.

UNIT IV SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS (9 Hrs)

Single step methods –Taylor series method Picard's method – Euler method and Improved Euler method – Runge Kutta method of fourth order only.

UNIT V SOLUTION OF PARTIAL DIFFERENTIAL EQUATIONS (9 Hrs)

Solution of Laplace and Poisson equations – Leibmann's iterative method – Diffusion equation: Bender-Schmitt method and Crank-Nicholson.

Text Books

1. P. Kandasamy, K. Thilagavathy, K. Gunavathy, "Numerical Methods", S. Chand & Company limited, New Delhi, 2009.
2. Rajesh Kumar Gupta, "Numerical Methods - Fundamentals and Applications", Cambridge University Press, 2019.
3. Grewal B.S., "Numerical Methods in Engineering and Science", Mercury learning and Information, Kindle Edition, 2018.

Reference Books

1. C. Xavier, "C Language And Numerical Methods", New Age International, 2007.
2. P. Siva Ramakrishna Das, "Numerical Analysis", Kindle Edition, 2016.
3. Timo Heister, Leo G. Rebholz, Fei Xue, "Numerical Analysisan Introduction", Publisher De Gruyter, 2019.

Web References

1. http://www.bdu.ac.in/academics/equivalent-papers/courses/pg_science/MCA/RQG28.pdf
2. <https://www.youtube.com/watch?v=Gkit1hUTsX8>
3. https://www.lkouniv.ac.in/site/writereaddata/siteContent/202004032250571912siddharth_bhatt_engg_Numerical_Differentiation_and_Integration.pdf

	REVISED	L	T	P	C	Hrs
A20MAD306	STATISTICS – I [Using MATLAB]	0	0	4	2	30

Course Objectives

- To familiarize the concept of Descriptive Statistics.
- To know Correlation and Regression analysis.
- To learn the concept of Special Random Variables.
- To understand Skewness and Kurtosis.
- To introduce the concepts of Conditional Probability.

Course Outcomes

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

CO1 – Gain knowledge in the concepts of Random Variables and Expectation.

CO2 – Trained for data collection on various fields of survey enabling them to classify them statistically.

CO3 – Familiarized in various statistical software.

CO4 – Find the correlation between two variables.

CO5 – Compute regression.

LIST OF EXERCISES

1. Mean
2. Median
3. Mode
4. Quartile Deviation
5. Standard deviation
6. Mean deviation
7. Skewness
8. Kurtosis
9. Correlation
10. Regression

Text Books

1. S.C Gupta and V.K. Kapoor, "Elements of Mathematical Statistics ", Sultan Chand Publishers, New Delhi. 2009.
2. Aliaga, Gunderson, "Interactive Statistics", 2nd Edition – Pearson/Prentice Hall
3. Hamilton, "Statistics with STATA", 8thEdition, Duxbury 2004.

Reference Books

1. P.R.Vittal, "Mathematical Statistics II", Margham Publications -2002- Reprint 2012.
2. Weisberg, S, "Applied Linear Regression", John Wiley and Sons, New York - 1980.
3. Kokoska, "Introductory Statistics: A Problem-Solving Approach", Review copy, Freeman2011.

Web References

1. <https://www.mccormick.northwestern.edu/documents/students/undergraduate/introduction-to-matlab.pdf>
2. <https://www.mn.uio.no/astro/english/services/it/help/mathematics/matlab/getstart.pdf>
3. <https://www.mathworks.com/videos/introduction-to-matlab-81592.html>

A20MAT409	REVISED OPERATIONS RESEARCH	L	T	P	C	Hrs
		3	1	0	4	60

Course Objectives

- To Learn LPP using different techniques.
- To impart knowledge in concepts and tools of Operations Research.
- To understand queuing models.
- To gain knowledge in Game theory.
- To study the networks of project activities PERT – CPM.

Course Outcomes

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

CO1 – Solve Linear Programming Problems.

CO2 – Solve Transportation and Assignment Problems.

CO3 – Understand the application of queuing models.

CO4 – Understand the usage of game theory and Simulation for Solving Business Problems.

CO5 – Understand the network planning techniques of PERT and CPM.

UNIT I LINEAR PROGRAMMING PROBLEM (12 Hrs)

Formulation and Graphical Method – Simplex Method – Artificial Variable Techniques – Big-M Method – Duality

UNIT II TRANSPORTATION AND ASSIGNMENT PROBLEM (12 Hrs)

Mathematical Formulation of Transportation Problem – Methods of solution of Transportation Problem – Balanced and unbalanced Transportation problem – Maximization in Transportation – Degeneracy and non degeneracy transportation problem – Assignment Algorithm – Unbalanced Assignment Models.

UNIT III QUEUEING THEORY (12 Hrs)

Queueing Theory – Introduction – Queueing system – Characteristics of Queueing system – symbols and Notation – Classifications of queues – Problems in (M/M/1): (∞ /FIFO); (M/M/1): (N/FIFO); (M/M/C): (∞ /FIFO); Models.

UNIT IV GAME THEORY (12 Hrs)

Game Theory – Two person zero sum game – The Maxmin – Minimax principle – problems – Solution of $m \times n$ rectangular Games – Domination Property – ($2 \times n$) and ($m \times 2$) – Graphical method – Problems.

UNIT V PROJECT MANAGEMENT (12 Hrs)

Network scheduling by PERT / CPM – Introduction – Network and basic components – Rules of Network construction – Time calculation in Networks – CPM. PERT – PERT calculations – Cost Analysis – Crashing the Network – Problems.

Text Books

1. Kanti Swarup, P. K. Gupta, Man Mohan, *Operations Research*, S. Chand & Sons Education Publications, New Delhi, 12th Revised edition, 2014.
2. Gupta P.K. and Hira D.S., *Problems in Operations Research*, S.Chand & Co.
3. R.Paneerselvam, "Operation Research", Prentice Hall india Pvt. Ltd., 2004.

Reference Books

1. V.Sundaresan, K.S.Ganapathy Subramanian & K.Ganesan, Resource Management Techniques, AR Publications, Chennai, 2015.
2. V.Sundaresan, K.S.Ganapathy Subramanian & K.Ganesan, Applied Operations Research for Management, A.R.S. Publications, Arapakkam, Tamilnadu, 2006.
3. Ravindran A., Phillips D.T. and Solberg J.J., Operations research, John wiley & Sons.

Web References

1. https://www.researchgate.net/publication/313880623_Introduction_to_Operations_Research_Theory_and_Applications
2. <https://easyengineering.net/operations-research-p-ramamurthy/>
3. <https://examupdates.in/operation-research-notes/>

	REVISED STATISTICS II LAB	L	T	P	C	Hrs
A20MAD408	[Using R]	0	0	4	2	30

Course Objectives

- To familiarize the concept of Mean and Standard deviation.
- To know Statistical Inferences -Continuous Probability Distribution.
- To learn the concept of Frequency Distribution.
- To understand Poisson distribution.
- To introduce the concepts of Hypothesis Testing.

Course Outcomes

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

CO1 – Gain knowledge in the concepts of Continuous Probability Distribution.

CO2 – Trained for data collection on various fields of survey enabling them to classify them Statistically.

CO3 – Familiarized in various statistical software.

CO4 – Find the Mean and Standard Deviation.

CO5 – Compute Hypothesis Testing.

LIST OF EXERCISES

1. Binomial Distribution
2. Poisson distribution
3. Geometric Distribution
4. Normal Distribution
5. Gamma Distribution
6. Beta Distribution
7. Weibull Distribution
8. Exponential Distribution
9. χ^2 Distribution
10. t - Test

Web References

1. https://spia.uga.edu/faculty_pages/rbakker/pols4150/RLabManual.pdf
2. <https://www.lbrce.ac.in/SP%20with%20R%20Lab%20syllabus.pdf>
3. https://www.youtube.com/watch?v=_V8eKsto3Ug