



# **SOURASHTRA COLLEGE, MADURAI- 625004**

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

**B.Sc. MATHEMATICS – SYLLABUS (Under CBCS based on OBE)**

**(with effect from 2021-22)**

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## **DEPARTMENT PROFILE:**

The Department of Mathematics was established in the year 1975 with under graduate programme and upgraded as PG Department in the year 1986. The Department consists of 10 teaching staff. The Department has been producing exemplary results and university rank holders right from its inception. The Department is constantly concentrating on the overall development of students. So far forty-three batches of UG students and thirty-three batches of PG students have successfully finished their courses and professionally placed as Auditors, Income tax officers, Assistant commissioner of police, Lawyers, Project leaders, HR in various MNC. Many students have joined in prestigious institutions like M.I.T., I.I.T., C.M.I., M.K.U., Sourashtra College, etc., for their higher studies and have been well placed in various field in India and abroad. The Department library consists of approximately 1500 books which is useful for lending purpose to students and staff. Department is equipped with 2 computers and one printer. We have well-furnished classrooms and a separate room with LCD Projector for conducting seminars. The Department motivates the students to take part in all the job oriented competitive examinations like UPSC., SSC., TNPSC., RRB., NET, SLET, Bank exams etc., The Department has separate library (Donors book bank) with more than 200 books related to job oriented competitive examinations donated by the Staff members of the Department and Alumni. The Department is providing RO water to all students which is sponsored by our Alumni.

## **VISION:**

Aims to create an erudite, disciplined and well-rounded mathematician by imparting high quality subject knowledge and life values to excel both academically and professionally.

## **MISSION:**

- To guide, teach mathematical knowledge and support the students towards mathematical excellence by embracing them into our group of mathematicians, share our ideas, grow in knowledge and thus improving their capabilities and apply all learned concepts to excel in all fields.
- To develop quantitative, computational, reasoning, problem solving skills and critical thinking for the upcoming mathematicians to model, formulate and solve real life applications.
- To encourage the students with strong foundational skills and abilities to pursue higher studies and research.

Signature of the Chairman/HOD



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## DISTRIBUTION OF CREDITS: (UG PROGRAMME)

PART	SEM	COURSES	NUMBER OF COURSES	HOURS	CREDITS	TOT CREDITS
I	I-IV	LANGUAGE	4	6	3	12
II	I-IV	ENGLISH	4	6	3	12
III	I-II	CORE	4	6	4	16
III	III-IV	CORE	4	6	5	20
III	V,VI	CORE	6	6	5	30
III	V,VI	CORE	2	6	3	6
III	I-II	ALLIED - ANICILLARY	2	6	5	10
III	III-IV	ALLIED	2	4	3	6
III	V,VI	ELECTIVE	2	6	5	10
IV	I-IV	SKILL BASED SUBJECTS (SBS)	6	2	2	12
IV	I	VALUE EDUCATION	1	2	2	2
IV	II	ENVIRONMENTAL STUDIES	1	2	2	2
IV	III,IV	NON MAJOR ELECTIVE (NME)	2	2	2	4
V	IV	EXTENSION ACTIVITY	1	0	1	1
<b>TOTAL CREDITS</b>						<b>143</b>



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## Undergraduate (UG) Programme Outcomes (POs)

Undergraduate (B.A., B.Sc., B.Com., B.C.A., B.B.A., etc.) is a 3-year degree programme with 6 semesters consisting the following Programme Outcomes (POs) under various criteria including critical thinking, problem solving, effective communication, societal/ citizenship/ ethical credibility, sustainable growth and employable abilities.

<b>PO 1</b>	<b>Critical Thinking:</b> Intellectual exploration of knowledge towards actions in clear and rational manner by understanding the logical connections between ideas and decisions.
<b>PO 2</b>	<b>Problem Solving:</b> Understanding the task/ problem followed by planning and narrow execution strategy that effectively provides the solution.
<b>PO 3</b>	<b>Effective Communication:</b> Knowledge dissemination by oral and verbal mechanisms to the various components of our society.
<b>PO 4</b>	<b>Societal/ Citizenship/ Ethical Credibility:</b> Realization of various value systems/ moral dimensions and demonstrate the empathetic social concern as well as equity in all the decisions, executions and actions.
<b>PO 5</b>	<b>Environmental Concern and Sustainable Growth:</b> Understanding the emerging environmental challenges and provide the possible contribution in sustainable development that integrates environment, economy and employment.
<b>PO 6</b>	<b>Skill Development and Employable Abilities:</b> Adequate training in relevant skill sector and creating employable abilities among the under graduates.

## PROGRAMME SPECIFIC OUTCOMES (PSOs)

After completion of UG programme, students will be able to

<b>PSO1</b>	develop required skills such as arithmetical/analytical/computer programming skills etc., and provide a systematic understanding of the fundamental concepts and theories of mathematics.
<b>PSO2</b>	get expertisewith skills to handle data,problems, to frame hypothesis, evaluate and validate results, and apply various concepts.
<b>PSO3</b>	gain advanced knowledge in the field of various applications of mathematics and apply knowledge of principles, concepts and results in specific subject area to analyse.
<b>PSO4</b>	develop the mathematical ability and abstract intelligence and to become good academician
<b>PSO5</b>	pursue higher studies which in turn will offer them job opportunities in various sectors like banks ,central government institutions etc.,



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## B.Sc. MATHEMATICS -COURSE STRUCTURE

### I SEMESTER

S.No.	Sub. Code	Subject Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Tot	Credits
1	21UACT11/ H11/S11	Tamil/Hindi/Sanskrit	6	3	25	75	100	3
2	21UACE11	English	6	3	25	75	100	3
3	21UMSC11	Core – 1 Differential Calculus	4	3	25	75	100	4
4	21UMSC12	Core – 2 Theory of Equations	4	3	25	75	100	4
5	21UMSS11	SBS -1 Arithmetic Ability	2	3	25	75	100	2
6	21UMSA11	Allied- Ancillary Mathematics-I	6	3	25	75	100	5
7	21UACVE1	Value Education	2	3	25	75	100	2
<b>TOTAL</b>			30					23

### II SEMESTER

S.No.	Sub. Code	Subject Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Tot	Credits
1	21UACT21/ H21/S21	Tamil/Hindi/Sanskrit	6	3	25	75	100	3
2	21UACE21	English	6	3	25	75	100	3
3	21UMSC21	Core – 3 Integral Calculus	4	3	25	75	100	4
4	21UMSC22	Core – 4 Analytical Geometry of Three Dimensions	4	3	25	75	100	4
5	21UMSS21	SBS -2 Vector Calculus	2	3	25	75	100	2
6	21UMSA21	Allied - Ancillary Mathematics-2	6	3	25	75	100	5
7	21UACES1	Environmental Studies	2	3	25	75	100	2
<b>TOTAL</b>			30					23

Passed in the BOS Meeting held on 18-03-2020



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## III SEMESTER

S.No.	Sub. Code	Subject Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Tot	Credits
1		Tamil/Hindi/Sanskrit	6	3	25	75	100	3
2		English	6	3	25	75	100	3
3		Core – 5 Mechanics	5	3	25	75	100	5
4		Core – 6 Graph Theory	5	3	25	75	100	5
5		SBS -3 MS Office Lab	2	3	40	60	100	2
6		Allied – 3 Astronomy	4	3	25	75	100	3
7		NME	2	3	25	75	100	2
<b>TOTAL</b>			30					23

## IV SEMESTER

S.No.	Sub. Code	Subject Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Tot	Credits
1		Tamil/Hindi/Sanskrit	6	3	25	75	100	3
2		English	6	3	25	75	100	3
3		Core – 7 Differential Equations	5	3	25	75	100	5
4		Core – 8 Sequences and Series	5	3	25	75	100	5
5		SBS – 4 Programming in C Lab	2	3	40	60	100	2
6		Allied – 4 Programming in C Theory	4	3	25	75	100	3
7		NME	2	3	25	75	100	2
<b>TOTAL</b>			30					23



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## V SEMESTER

S.No.	Sub. Code	Subject Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Tot	Credits
1		Core – 9 Modern Algebra	6	3	25	75	100	5
2		Core – 10 Real Analysis	6	3	25	75	100	5
3		Core – 11 Operations Research - I	6	3	25	75	100	5
4		Core – 12 Programming C++ Theory	4	3	25	75	100	3
5		SBS – 5 Programming in C++ Lab	2	3	40	60	100	2
6		Elective – 1 Statistics I	6	3	25	75	100	5
7		Elective – 2 Number Theory	6	3	25	75	100	5
8		Elective – 3 : Python - Theory	4	3	25	75	100	3
9		Elective – 4 : Python – Lab	2	3	40	60	100	2
10		Soft skill	-	-	50	50	100	-
<b>TOTAL</b>			30					25

## VI SEMESTER

S.No.	Sub. Code	Subject Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Tot	Credits
1		Core – 13: Linear Algebra	6	3	25	75	100	5
2		Core – 14: Complex Analysis	6	3	25	75	100	5
3		Core – 15: Operations Research – II	6	3	25	75	100	5
4		Core – 16: Programming in JAVA – Theory	4	3	25	75	100	3
5		SBS – 6: Programming in JAVA Lab	2	3	40	60	100	2
6		Elective – 5: Numerical Analysis	6	3	25	75	100	5
7		Elective – 6: Discrete Mathematics	6	3	25	75	100	5
8		General Knowledge	-	3	-	-	100	-
<b>TOTAL</b>			30					25

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## **I SEMESTER**

<b>S.No.</b>	<b>Sub. Code</b>	<b>Subject Title</b>	<b>Hrs. / Week</b>	<b>Exam (Hrs.)</b>	<b>CA</b>	<b>SE</b>	<b>Tot</b>	<b>Credits</b>
1	21UACT11/ H11/S11	Tamil	6	3	25	75	100	3
2	21UACE11	English	6	3	25	75	100	3
3	21UMSC11	Core – 1 Differential Calculus	4	3	25	75	100	4
4	21UMSC12	Core – 2 Theory of Equations	4	3	25	75	100	4
5	21UMSS11	SBS -1 Arithmetic Ability	2	3	25	75	100	2
6	21UMSA11	Allied Ancillary Mathematics-I	6	3	25	75	100	5
7	21UACVE1	Value Education	2	3	25	75	100	2
<b>TOTAL</b>			<b>30</b>					<b>23</b>



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<b>CORE- 1</b>	<b>DIFFERENTIAL CALCULUS</b>	<b>SUBJECT CODE : 21UMSC11</b>
<b>SEMESTER - I</b>	<b>4 HOURS / WEEK</b>	<b>CREDITS : 4</b>

## COURSE DESCRIPTION:

This course is designed to learn various concepts of differentiation.

## OBJECTIVES:

- To apply the differentiation methods for higher derivatives and  $n^{\text{th}}$  order differentiation using Leibnitz formula.
- To define polar sub tangent and subnormal and angle between the curves.
- To explain curvatures and pedal equation of curves.
- To calculate the evolutes and envelopes.
- To explain the maxima and minima of functions of two variables.

## COURSE OUTCOMES (COs):

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

<b>No.</b>	<b>Course Outcome</b>	<b>Knowledge Level (According to Bloom's Taxonomy)</b>
<b>CO 1</b>	calculate the differentiation of any type of functions.	K1, K2
<b>CO2</b>	describe the concepts of subtangent and subnormal and length of arc.	K1,K2
<b>CO3</b>	find the radius of curvature and pedal equation to the given curves.	K1, K3
<b>CO4</b>	calculate the evolutes and the envelopes of the given curves.	K2, K3
<b>CO5</b>	find the maximum and minimum values to the functions and Jacobian	K1, K3

**K1- KNOWLEDGE (REMEMBERING), K2-UNDERSTANDING, K3-APPLICATION**





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## DIFFERENTIAL CALCULUS

### UNIT- I

Higher derivatives- $n^{\text{th}}$  derivative of some standard functions – Leibnitz theorem.

### UNIT – II

Applications of differentiation – Tangent, normal, sub tangent, subnormal, polar subtangent, polar subnormal, polar curves- Angle of intersection of two polar curves.

### UNIT - III

Pedal equation of a curve - Curvature.

### UNIT - IV

Evolutes – Centre and circle of curvature – Envelopes.

### UNIT - V

Maxima and minima of functions of two variables (Examples only) – Jacobians.

### TEXT BOOK:

Calculus - Arumugam and Issac (New gamma publishing house – January 2011)

UNIT I - sec 2.11 to 2.13 (page no 43 to 71)

UNIT II -sec 3.1,3.2 (page no. 91 to 110)

UNIT III - sec 3.3,3.4 (page no. 111 to 143)

UNIT IV - sec 3.5,3.6 (page no. 144 to 164).

UNIT V -sec 3.7, 3.9 (page no. 165 to179) (page no. 195 to 202).

### REFERENCE BOOKS:

1. Calculus Volume I – T.K.Manikkavasagam Pillai, Natarajan (S.Viswanathan Publications)

2. Differential Calculus – Santhi Narayanan (S. Chand Publications)

### Mapping of CO with PSO

CO/PSO	PSO				
	1	2	3	4	5
CO1	M				
CO2		S			
CO3			M		
CO4				M	
CO5					S

S – STRONG, M – MEDIUM, L – LOW



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<b>CORE- 2</b>	<b>THEORY OF EQUATIONS</b>	<b>SUBJECT CODE : 21UMSC12</b>
<b>SEMESTER - I</b>	<b>4 HOURS / WEEK</b>	<b>CREDITS : 4</b>

### COURSE DESCRIPTION:

This course is designed to learn various concepts of solving equations

### OBJECTIVES:

- To understand the methods of forming an equation
- To understand the symmetric functions of roots and Newton's theorem.
- To solve the reciprocal equations.
- To get the knowledge about the increase or decrease the roots.
- To find the roots using Newton's, Horner's, Cardon's and Ferrari methods.

### COURSE OUTCOMES (COs):

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

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the methods of forming equations	K1, K2
CO2	understand the symmetric functions of roots and Newton's theorem.	K1, K3
CO3	solve the reciprocal equations	K3
CO4	discuss the increase or decrease the roots.	K2
CO5	find the roots using Newton's, Horner's, Cardon's and Ferrari methods	K3

**K1- KNOWLEDGE (REMEMBERING), K2-UNDERSTANDING, K3-APPLICATION**



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## THEORY OF EQUATIONS

### UNIT – I

Formation of equations - relation between the roots and coefficients of equation.

### UNIT – II

Symmetric functions of the roots – sum of the powers of the roots of an equation – Newton’s theorem.

### UNIT – III

Transformations of equations – roots multiplied by a given number – reciprocal roots – reciprocal equations.

### UNIT – IV

Standard form to increase or decrease the roots of the given equation by the given quantity – removal of terms – Horner’s method.

### UNIT – V

Descarte’s rule of sign – Cardon’s method – Ferrari’s method.

### TEXT BOOK:

Algebra Volume I by T.K. MANICAVACHAGAM PILLI, T. NATARAJAN AND K.S. GANAPATHY

S. Viswanathan Printers and Publishers Pvt. Ltd.,

UNIT I - sec 1 to 11 (page number 282 to 303)

UNIT II - sec 12 to 14 (page number 303 to 317)

UNIT III - sec 15, 16 (page number 318 to 327)

UNIT IV - sec 17 to 20, 30 (page no. 327 to 340, 376 to 381).

UNIT V - sec 24, 34.1, 35 (page no. 351 to 355, 390 to 398).

### REFERENCE BOOK:

1. ALGEBRA by S.ARUMUGAM and THANGAPANDI ISAAC (New Gamma Publications)

2. ALGEBRA (Part I) by N.P.BALI (Laxmi Publications)

### Mapping of CO with PSO

CO/PSO	PSO				
	1	2	3	4	5
CO1	S				
CO2		M			
CO3			S		
CO4				M	
CO5					M

S- Strong:

M-Medium

L-Low



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<b>SBS - I</b>	<b>ARITHMETIC ABILITY</b>	<b>SUBJECT CODE : 21UMSS11</b>
<b>SEMESTER - I</b>	<b>2 HOURS / WEEK</b>	<b>CREDITS :2</b>

## COURSE DESCRIPTION:

Objective of the course is how to face the Competitive Examinations

## OBJECTIVES:

- To understand the averages
- To understand how to solve the problems related to ages.
- To find the areas of various geometrical shapes.
- To get the knowledge about the time and distance.

## COURSE OUTCOMES (COs):

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

<b>No.</b>	<b>Course Outcome</b>	<b>Knowledge Level (According to Bloom's Taxonomy)</b>
CO 1	solve various types of solving problem involving numbers	K2
CO2	understand the averages	K3
CO3	find the areas of various geometrical shapes.	K2,K3
CO4	get the knowledge about the time and distance.	K2, K3
CO5	solve the problems on trains and logarithms	K1,K3

**K1- KNOWLEDGE (REMEMBERING), K2-UNDERSTANDING, K3-APPLICATION**



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## ARITHMETIC ABILITY

### UNIT- I

Problems on numbers.

### UNIT - II

Averages and Problems on ages.

### UNIT - III

Ratios and proportion - area

### UNIT - IV

Time and distance.

### UNIT – V

Problems on train –Logarithms

### TEXT BOOK:

Quantitative Aptitude by Dr.R.S.Agarwal. (S.Chand Company Private Limited-2014)

UNIT I - Chapter 7 (page number 161 to 163)

UNIT II -Chapter 6 ad 8 (page number139 to 141 and 182, 183)

UNIT III - Chapter 12, 24 (page number 294 to296 and 499 to 505)

UNIT IV – Chapter(page number384 to 386)

UNIT V - Chapter 18, 23 (page number 405 to 407 and 487 to 488).

### Mapping of CO with PSO

CO/PSO	PSO				
	1	2	3	4	5
CO1	S				
CO2		M			
CO3			S		
CO4				M	
CO5					S

S- Strong:

M-Medium

L-Low



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<b>ALLIED - I</b>	<b>ANCILLARY MATHEMATICS –I</b>	<b>SUBJECT CODE: 21UMSA11</b>
<b>SEMESTER - I</b>	<b>6 HOURS/WEEK</b>	<b>CREDITS : 5</b>

## OBJECTIVES:

To enable the students to acquire the knowledge of correlation, Fourier series and matrices.

## COURSE OUTCOMES (COs):

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

<b>No.</b>	<b>Course Outcome</b>	<b>Knowledge Level (According to Bloom's Taxonomy)</b>
CO -1	discuss the measure of degree of association or correlation and rank correlation between the two sets of values.	K2, K3
CO-2	find the fourier series expansions of various functions and half range fourier series.	K1, K2
CO-3	define various types of index numbers and the application of index numbers in practical life like fixing of wages, cost of living etc.,.	K1, K3
CO-4	define various matrices and find the rank of the matrix and the consistency of simultaneous linear equations.	K1, K2
CO-5	find the inverse of a square matrix using Cayley-Hamilton theorem and compute its Eigen values and Eigen vectors.	K1, K3

**K1- KNOWLEDGE (REMEMBERING), K2-UNDERSTANDING, K3-APPLICATION**



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## ANCILLARY MATHEMATICS – I

### UNIT - I

Correlation-Rank Correlation---regression.

### UNIT – II

Fourier series-even and odd functions-sine and cosine series.

### UNIT – III

Index numbers.

### UNIT – IV

Matrices-rank of a Matrix-Consistency of equations.

### UNIT – V

Cayley-Hamilton Theorem-Eigen values and Eigen vectors.

### TEXT BOOK:

Allied Mathematics-PaperII by ARUMUGAM ISAAC.

### Mapping of CO with PSO

CO/PSO	PSO				
	1	2	3	4	5
CO1	M				
CO2		M			
CO3			S		
CO4				S	
CO5					M

S- STRONG,

M-MEDIUM,

L-LOW



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## II SEMESTER

S.No.	Sub. Code	Subject Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Tot	Credits
1	21UACT21/ H21/S21	Tamil	6	3	25	75	100	3
2	21UACE21	English	6	3	25	75	100	3
3	21UMSC21	Core – 3 Integral Calculus	4	3	25	75	100	4
4	21UMSC22	Core – 4 Analytical Geometry of Three Dimensions	4	3	25	75	100	4
5	21UMSS21	SBS -2 Vector Calculus	2	3	25	75	100	2
6	21UMSA21	Allied: Ancillary Mathematics-2	6	3	25	75	100	5
7	21UACES1	Environmental Studies	2	3	25	75	100	2
<b>TOTAL</b>			30					23





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<b>CORE- 3</b>	<b>INTEGRAL CALCULUS</b>	<b>SUBJECT CODE : 21UMSC21</b>
<b>SEMESTER - II</b>	<b>4 HOURS / WEEK</b>	<b>CREDITS : 4</b>

## COURSE DESCRIPTION:

This course is designed to learn various concepts of Integration.

## OBJECTIVES:

- To calculate the reduction formula for various functions.
- To explain the method of evaluating double integral problems.
- To evaluate the triple integrals.
- To explain the beta and gamma functions.
- To get the equivalent series of functions as Fourier series

## COURSE OUTCOMES (COs):

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

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO 1	find the reduction formula for various functions	K1,K2
CO2	evaluate the double integral problems	K3
CO3	evaluate the triple integrals	K2,K3
CO4	do the problems using beta and gamma functions.	K2
CO5	solve problems on Fourier series	K1,K3

**K1- KNOWLEDGE (REMEMBERING), K2-UNDERSTANDING, K3-APPLICATION**



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## INTEGRAL CALCULUS

### UNIT - I

Reduction formulae

### UNIT – II

Evaluation of double integrals.

### UNIT - III

Triple integrals

### UNIT – IV

Beta and Gamma functions

### UNIT - V

Fourier series – full range – half range –arbitrary range.

### TEXT BOOK:

1. Calculus - Arumugam and Isaac
2. Fourier Series by Arumugam Isaac – New Gamma Publications (November 2012)  
New gamma publishing house – January 2011  
Unit I – Sec 2.8 (page no. 381 to 396)  
Unit II – Sec 3.2 (page no. 409 to 422)  
Unit III – Sec 3.4 (page no. 426 to 429)  
Unit IV – Sec 4.1 (page no. 440 to 456)  
Unit V – Sec 1.3 to 1.5 (page number F 27 to FS 45)

### Mapping of CO with PSO

CO/PSO	PSO					
	1	2	3	4	5	
CO1	S					
CO2		S				
CO3			M			
CO4				M		
CO5					M	

**S- STRONG, M-MEDIUM, L-LOW**



# SOURASHTRA COLLEGE, MADURAI- 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

**B.Sc. MATHEMATICS – SYLLABUS (Under CBCS based on OBE)**

**(with effect from 2021-22)**

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<b>CORE - 4</b>	<b>ANALYTICAL GEOMETRY OF THREE DIMENSIONS</b>	<b>SUBJECT CODE : 21UMSC22</b>
<b>SEMESTER - II</b>	<b>4 HOURS / WEEK</b>	<b>CREDITS : 4</b>

## COURSE DESCRIPTION:

To enable the students to understand the concepts of planes, straight lines, sphere, cone and cylinder and applies the knowledge gained in solving problems.

## OBJECTIVES:

1. To explain angle and distance between two planes, lengths of perpendicular, bisecting planes.
2. To calculate the Symmetric form of Straight line, image of a point about a plane, image of line about a plane.
3. To explain the Plane and straight line, angle between a plane and a straight line, coplanar lines.
4. To evaluate the Shortest Distance between two lines, skew lines, intersection of four planes.
5. To explain the Sphere, equation of the sphere, equation of the tangent plane orthogonal sphere.

## COURSE OUTCOMES (COs):

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

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO 1	find angle and distance between two planes, lengths of perpendicular, bisecting planes	K1, K2
CO2	learn the Symmetric form of Straight line, image of a point about a plane, image of line about a plane	K2, K3
CO3	understand the Plane and straight line, angle between a plane and a straight line, coplanar lines.	K2
CO4	evaluate the Shortest Distance between two lines, skew lines, intersection of four planes	K1, K3
CO5	know about the Sphere, equation of the sphere, equation of the tangent plane, orthogonal sphere.	K1, K2, K3

**K1- KNOWLEDGE (REMEMBERING), K2-UNDERSTANDING, K3-APPLICATION**



**ANALYTICAL GEOMETRY OF THREE DIMENSIONS**

**UNIT - I**

Plane – Angle between two planes – lengths of perpendicular – distance between two planes –bisecting planes

**UNIT - II**

Straight line: Symmetric form – image of a point about a plane – image of line about a plane

**UNIT - III**

Plane and straight line – angle between a plane and a straight line – coplanar lines. Shortest Distance between two lines – skew lines.

**UNIT - IV**

Sphere – equation of the sphere – equation of the tangent plane – simple problems.

**UNIT - V**

Right circular Cone-Right circular cylinder

**TEXT BOOK:**

1. THREE DIMENSION ANALYTICAL GEOMETRY AND VECTOR CALCULUS by DR.S. ARUMUGAM AND ISSAC. Publications: New Gamma 2006.
2. Text book of analytical geometry of three dimension (for unit V only) by T.K.M. PILLAI AND T. NATARAJAN.

**Mapping of CO with PSO**

CO/PSO	PSO					
	1	2	3	4	5	
CO1	M					
CO2		M				
CO3			M			
CO4				S		
CO5					M	

**S- STRONG, M-MEDIUM, L-LOW**



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**(with effect from 2021-22)**

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<b>SBS - 2 SKILL BASED</b>	<b>VECTOR CALCULUS</b>	<b>SUBJECT CODE: 21UMSS21</b>
<b>SEMESTER - II</b>	<b>2 HOURS/WEEK</b>	<b>CREDITS :2</b>

## OBJECTIVE:

To enable the students to acquire the knowledge of vector analysis and fourier series.

## COURSE OUTCOMES (COs):

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

<b>No.</b>	<b>Course Outcome</b>	<b>Knowledge Level (According to Bloom's Taxonomy)</b>
CO -1	understand the concepts of differentiation of vectors.	K1, K2
CO-2	understand the concepts of gradient, divergence and curl and its properties.	K2, K3
CO-3	discuss solenoidal and irrotational of vector function.	K2
CO-4	evaluate the integral of a vector valued function using line and surface integrals.	K2, K3
CO-5	understand the concepts of Green's and Gauss divergence theorem.	K3

**K1- KNOWLEDGE (REMEMBERING), K2-UNDERSTANDING, K3-APPLICATION**



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## VECTOR CALCULUS

### UNIT - I

Scalar product – cross product - Vector differentiation – differentiation of sum of two vectors – differentiation of product of two vectors – differentiation of product of a scalar and a vector.

### UNIT - II

Gradient—Divergence and Curl - Theorems and Problems.

### UNIT - III

Solenoidal and irrotational of a vector.

### UNIT - IV

Vector integration—Line integrals—Surface integrals.

### UNIT - V

Green’s theorem, Gauss Divergence Theorem (statement only) Simple problems from Green’s theorem and Gauss Divergence theorem only.

### TEXT BOOK:

Analytical Geometry 3D and Vector Calculus by Arumugamand Issac

(New Gamma Publications – January 2014)

Unit I: Sec 5.1, 5.2 (page number 5.1 to 5.5)

Unit II and III: Sec 5.3, 5.4 (page number 5.6 to 5.28)

Unit IV: Sec 7.1, 7.2 (page number L and S INT 1 to L and S INT 10)

Unit V: Sec 7.3 (page number L and S INT 11 to L and S INT 27)

### Mapping of CO with PSO

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	M					
CO2		S				
CO3			S			
CO4				S		
CO5					M	

S- STRONG,

M-MEDIUM,

L-LOW



# SOURASHTRA COLLEGE, MADURAI- 625004

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**B.Sc. MATHEMATICS – SYLLABUS (Under CBCS based on OBE)**

**(with effect from 2021-22)**

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<b>ALLIED - 2</b>	<b>ANCILLARY MATHEMATICS-II</b>	<b>SUBJECT CODE: 21UMSA21</b>
<b>SEMESTER - II</b>	<b>6 HOURS/WEEK</b>	<b>CREDITS : 5</b>

## OBJECTIVE:

To enable the students to acquire the knowledge of LPP and solving the LPP using various methods and to find the optimal solution of transportation and assignment problems.

## COURSE OUTCOMES (COs):

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

<b>No.</b>	<b>Course Outcome</b>	<b>Knowledge Level (According to Bloom's Taxonomy)</b>
CO -1	formulate a linear programming problem mathematically and write it in standard form.	K1, K2
CO-2	acquire the knowledge of various types of solutions of LPP.	K1,K2, K3
CO-3	discuss various methods of solving a LPP.	K1, K3
CO-4	compute the initial basic feasible solution of a transportation problem using various methods and solving a transportation problem.	K1, K3
CO-5	know about assignment problems and find the optimal solution by Hungarian method.	K1, K3

**K1- KNOWLEDGE (REMEMBERING), K2-UNDERSTANDING, K3-APPLICATION**



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## ANCILLARY MATHEMATICS-II

### UNIT – I

Introduction – Definition of a LPP--Formulation of LPP—Mathematical formulation of LPP(simple problems only)—Slack and surplus variables—Definition of a standard linear programming problem.

### UNIT - II

Solutions of an LPP—Definition of basic solution—Basic feasible solution—Optimal solution—Optimum basic feasible solution—Degenerate solution of an LPP(Theorems not included)—Graphical solutions of a LPP.

### UNIT – III

Simplex method (Simple problems only)—Big-M method(Method of penalties)(simple problems only)—two phase method(Simple problems only).

### UNIT - IV

Transportation problem—Finding IBFS by North West Corner Method and Vogel's Approximation method—Solving by MODI method.(Only minimization cases)

### UNIT – V

Assignment problem—Solving Assignment Problem by Hungarian method.

### TEXT BOOK:

Topics in Operations Research by Arumugam and Issac

**Unit 1:** Chapter 3 : Sections 3.1,3.2(Theorems not included)

(Pages 3-1 to 3-8,3-31 to 3-41)

**Unit 2:** Chapter 3 : Sections 3.3(Theorems not included),3.4(problems only)

(pages 3-42 to 3-47,3-68 to 3-81)

**Unit 3:** Chapter 3 : Sections 3.5,3.6

(Pages 3-86 to 3-101, 3-107 to 3-111, 3-116 to 3-144,3-149 to 3-159)

**Unit 4:** Chapter : Sections 4.0,4.1(Pages 4-1 to 4-27, 4-38 to 4-49)

**Unit 5:** Chapter 5 : Sections 5.0,5.1,5.2(Pages 5-1 to -5-6, 5-8 to 5-24)

### Mapping of CO with PSO

CO/PSO	PSO				
	1	2	3	4	5
CO1	M				
CO2		S			
CO3			M		
CO4				S	
CO5					M

S- STRONG,

M-MEDIUM,

L-LOW