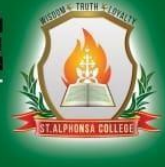


தரமாய் கற்று வளமாய் வாழ..!



# ST ALPHONSA COLLEGE OF ARTS AND SCIENCE



An Institution run by the Syro Malabar Catholic Diocese of Thuckalay

(Affiliated to Manonmaniam Sundaranar University, Tirunelveli)

Soosaipuram, Karinkal, Kanyakumari District, Tamilnadu - 629 157

Website: [www.stalphonsa.edu.in](http://www.stalphonsa.edu.in)

Email: [stalphons2014@gmail.com](mailto:stalphons2014@gmail.com)

Ph: 04651 - 255540

Mob: 94449 68233

**DEPARTMENT  
OF  
MATHEMATICS  
M.SC. PROGRAM  
&  
COURSE OUTCOME  
ACADEMIC YEAR 2024 - 2025**

தரமாய் கற்று வளமாய் வாழ..!



# ST ALPHONSA COLLEGE OF ARTS AND SCIENCE

An Institution run by the Syro Malabar Catholic Diocese of Thuckalay  
(Affiliated to Manonmaniam Sundaranar University, Tirunelveli)  
Soosaipuram, Karinkal, Kanyakumari District, Tamilnadu - 629 157

Website: [www.stalphonsa.edu.in](http://www.stalphonsa.edu.in) | Email: [stalphons2014@gmail.com](mailto:stalphons2014@gmail.com) | Ph: 04651 - 255540 | Mob: 94449 68233

## M.Sc. MATHEMATICS

### PROGRAMME OUTCOMES (POs)

**PO1: Problem Solving Skill:** Apply knowledge of Management theories and Human Resource practices to solve business problems through research in Global context.

**PO2: Decision Making Skill:** Foster analytical and critical thinking abilities for data-based decision-making.

**PO3: Ethical Value:** Ability to incorporate quality, ethical and legal value-based perspectives to all organizational activities.

**PO4: Communication Skill:** Ability to develop communication, managerial and interpersonal skills.

**PO5: Individual and Team Leadership Skill:** Capability to lead themselves and the team to achieve organizational goals.

**PO6: Employability Skill:** Inculcate contemporary business practices to enhance employability skills in the competitive environment.


**PO7: Entrepreneurial Skill:** Equip with skills and competencies to become an entrepreneur.

**PO8: Contribution to Society:** Succeed in career endeavours and contribute significantly to society.

**PO9: Multicultural competence:** Possess knowledge of the values and beliefs of multiple cultures and a global perspective.

**PO10: Moral and ethical awareness/reasoning:** Ability to embrace moral/ethical values in conducting one's life.


தரமாய் கற்று வளமாய் வாழ..!



# ST ALPHONSA COLLEGE

## OF ARTS AND SCIENCE

An Institution run by the Syro Malabar Catholic Diocese of Thuckalay  
(Affiliated to Manonmaniam Sundaranar University, Tirunelveli)  
Soosaipuram, Karinkal, Kanyakumari District, Tamilnadu - 629 157



Website: [www.stalphonsa.edu.in](http://www.stalphonsa.edu.in) | Email: [stalphons2014@gmail.com](mailto:stalphons2014@gmail.com) | Ph: 04651 - 255540 | Mob: 94449 68233

### I M.SC MATHEMATICS

Sem	Semester-I	Subject Code	Credit	Hours per week
<b>I</b>	1.1. <b>CC-I</b> : Group Theory	VMAC 11	5	6
	1.2. <b>CC-II</b> : Real Analysis - I	VMAC 12	5	6
	1.3. <b>CC-III</b> : Ordinary Differential Equations	VMAC 13	4	6
	1.4. <b>Elective - I</b> 1.4.1. Graph Theory and Applications	VMAE 11	3	6
	1.5. <b>Elective - II</b> 1.5.1. Analytic Number Theory	VMAE 15	3	6


**Subject Code: VMAC11**

**Subject: Group Theory**

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

SL.No	Course Outcome	Code
1.	Recall basic counting principle, characterization of normal subgroups, group homomorphism and application.	MMGT 01
2.	Define Solvable groups, automorphisms and Cayley's Theorem.	MMGT 02
3.	Explain Permutation Groups and Another Counting Principle.	MMGT 03
4.	Explain Sylow's Theorems and Apply the Theorem to find number of Sylow subgroups.	MMGT 04
5.	Define direct products, examine the properties of finite abelian groups.	MMGT 05

தரமாய் கற்று வளமாய் வாழ..!



# ST ALPHONSA COLLEGE

## OF ARTS AND SCIENCE

An Institution run by the Syro Malabar Catholic Diocese of Thuckalay  
(Affiliated to Manonmaniam Sundaranar University, Tirunelveli)  
Soosaipuram, Karinkal, Kanyakumari District, Tamilnadu - 629 157



Website: [www.stalphonsa.edu.in](http://www.stalphonsa.edu.in) | Email: [stalphons2014@gmail.com](mailto:stalphons2014@gmail.com) | Ph: 04651 - 255540 | Mob: 94449 68233

**Subject Code: VMAC12**

**Subject: Real Analysis 1**

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

SL.No	Course Outcome	Code
1.	Analyze and evaluate functions of bounded variation and Rectifiable Curves	MMRA 01
2.	Describe the concept of Riemann-Stieltjes integral and its properties	MMRA02
3.	Demonstrate the concept of step function, upper function, Lebesgue function and their integrals	MMRA 03
4.	Construct various mathematical proofs using the properties of Lebesgue integrals and establish the Levi monotone convergence theorem	MMRA 04
5.	Formulate the concept and properties of inner products, norms and measurable functions	MMRA 05

**Subject code: VMAC13**

**Subject: Ordinary Differential Equations**

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

Sl.No.	Course outcome	Code
1	Establish the qualitative behaviour of solutions of systems of differential equations	MMODE-01
2	Recognize the physical phenomena modelled by differential equations and dynamical systems	MMODE-02
3	Analyze solutions using appropriate methods and give examples	MMODE-03
4	Formulate Green's function for boundary value problems	MMODE-04
5	Understand and use various theoretical ideas and results that underlie the mathematics in this course	MMODE-05

தரமாய் கற்று வளமாய் வாழ..!



# ST ALPHONSA COLLEGE

## OF ARTS AND SCIENCE

An Institution run by the Syro Malabar Catholic Diocese of Thuckalay  
(Affiliated to Manonmaniam Sundaranar University, Tirunelveli)  
Soosaipuram, Karinkal, Kanyakumari District, Tamilnadu - 629 157



Website: [www.stalphonsa.edu.in](http://www.stalphonsa.edu.in) | Email: [stalphons2014@gmail.com](mailto:stalphons2014@gmail.com) | Ph: 04651 - 255540 | Mob: 94449 68233

**Subject Code: VMAE11**

**Subject: Graph Theory and Applications**

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

SL.No	Course Outcome	Code
1.	Demonstrate the concept of different structures and types about graphs and its applications.	MMGTA 01
2.	Determine the properties of trees and its applications in network and study the concepts of connections in graphs.	MMGTA 02
3.	Acquire the knowledge about Euler Tours, Hamilton cycles and matchings in graphs.	MMGTA 03
4.	Analyze the concept of edge colouring, independent sets and cliques in graphs.	MMGTA 04
5.	Explain the concept of vertex colorings	MMGTA 05

**Subject Code: VMAE15**

**Subject: Analytical Number theory**

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

SL.No	Course Outcome	Code
1.	Study the basic concepts of elementary number theory	MMANT 01
2.	Explain several arithmetical functions and construct their relationships	MMANT 02
3.	Apply algebraic structure in arithmetical functions	MMANT 03
4.	Demonstrate various identities satisfied by arithmetical functions	MMANT 04
5.	Determine the application to $\mu(n)$ & $\Lambda(n)$ and several equivalent form of prime number theorem	MMANT 05

தரமாய் கற்று வளமாய் வாழ..!



# ST ALPHONSA COLLEGE OF ARTS AND SCIENCE



An Institution run by the Syro Malabar Catholic Diocese of Thuckalay

(Affiliated to Manonmaniam Sundaranar University, Tirunelveli)

Soosaipuram, Karinkal, Kanyakumari District, Tamilnadu - 629 157

Website: [www.stalphonsa.edu.in](http://www.stalphonsa.edu.in)

Email: [stalphons2014@gmail.com](mailto:stalphons2014@gmail.com)

Ph: 04651 - 255540

Mob: 94449 68233

## II M.Sc MATHEMATICS

Sem	Course	Subject Name	Course Code
III	Core VII	Complex Analysis	WMAM31
	Core VIII	Probability Theory	WMAM32
	Core IX	Topology	WMAM33
	Core X	Calculus of Variations and Integral Equations	WMAE34
	Elective - V	Research Methodology	WMAE35


**Subject: Complex analysis**

**Subject code: WMAM 31**

Students will be able to

Sl.No	Course Outcome	Code
1	Explain analytic functions and power Series	MMCA 01
2	Explain index of a point, integral formula, higher derivatives and removable singularities	MMCA 02
3	Demonstrate the concept of the general form of Cauchy's theorem	MMCA 03
4	Describe the concept of definite integral and harmonic functions.	MMCA 04
5	Develop Taylor and Laurent series.	MMCA 05

தரமாய் கற்று வளமாய் வாழ..!




# ST ALPHONSA COLLEGE

## OF ARTS AND SCIENCE

An Institution run by the Syro Malabar Catholic Diocese of Thuckalay  
(Affiliated to Manonmaniam Sundaranar University, Tirunelveli)

Soosaipuram, Karinkal, Kanyakumari District, Tamilnadu - 629 157



Website: [www.stalphonsa.edu.in](http://www.stalphonsa.edu.in) | Email: [stalphons2014@gmail.com](mailto:stalphons2014@gmail.com) | Ph: 04651 - 255540 | Mob: 94449 68233

**Subject Code: WMAM32**

**Subject: Probability Theory**

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

SL.No	Course Outcome	Code
1.	To define random events, random variables to describe probability to apply Bayes, to define distribution function, to find joint distribution function, to define marginal distribution function and conditional distribution function, to solve functions on random variables.	MMPT 01
2.	To define expectation, moments and Chebychev inequality, to solve the regression of first and second types.	MMPT 02
3.	To define characteristic functions, to define distribution function, to define probability generating functions, to solve problems applying characteristic functions	MMPT 03
4.	To define one point, two point, binomial distributions, to solve problems of hypergeometric and Poisson distributions, to define uniform, beta, gamma distributions, to solve problems on Cauchy and Laplace distributions	MMPT 04
5.	To discuss Stochastic Convergence, Bernoulli Law of large numbers, to elaborate the convergence of sequence of distribution functions, de-Moivre Laplace theorem, to explain Poisson, Chebychev, Khintchine Weak Law of large numbers.	MMPT 05

**Subject Code: WMAM33**

**Subject: Topology**

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

SL.No	Course Outcome	Code
1.	Define and illustrate the concept of topological spaces and the basic definitions of open sets, neighbourhood, interior, exterior, closure and their axioms for defining topological space	MMT 01
2.	Understand continuous functions, the product topology and metric topology	MMT 02
3.	Understand Connected spaces, Components and Local Connectedness	MMT 03
4.	Understand Compact spaces, Limit Point Compactness and Local Compactness	MMT 04
5.	Develop qualitative tools to characterize connectedness and compactness	MMT 05

தரமாய் கற்று வளமாய் வாழ..!



# ST ALPHONSA COLLEGE

## OF ARTS AND SCIENCE

An Institution run by the Syro Malabar Catholic Diocese of Thuckalay  
(Affiliated to Manonmaniam Sundaranar University, Tirunelveli)  
Soosaipuram, Karinkal, Kanyakumari District, Tamilnadu - 629 157



Website: [www.stalphonsa.edu.in](http://www.stalphonsa.edu.in) | Email: [stalphons2014@gmail.com](mailto:stalphons2014@gmail.com) | Ph: 04651 - 255540 | Mob: 94449 68233

**Subject code : WMAE14**

**Subject : Research Methodology**

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

Sl.No.	Course outcome	Code
1	Discuss to know about writing style	MMRM-01
2	Discuss the tips and strategies	MMRM-02
3	To know about the research project	MMRM-03
4	Discuss the different components of Research Project	MMRM-04
5	To learn the publication and presentation of research articles and Tool kits	MMRM-05

**Subject Code: WMAE34**

**Subject:** Calculus of variation and Integral Equations

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

SL.No	Course Outcome	Code
1.	Understand the Calculus of variation and applications	MMCV 01
2.	Understand the constraints and Lagrange multipliers	MMCV 02
3.	Integral equations	MMCV 03
4.	Explain the cause and effect of Linear equations	MMCV 04
5.	Explain the Hilbert Schmidt theory	MMCV 05