MANONMANIAM SUNDARANAR UNIVERISTY,
TIRUNELVELI-12

SYLLABUS

UG - COURSES – AFFILIATED COLLEGES

Course Structure for B. Sc. Mathematics
(Choice Based Credit System)
(with effect from the academic year 2023-2024 onwards)

Semester-III				
Part	**Subject Status**	**Subject Title**	**Subject Code**	**Credit**
I	LANGUAGE	TAMIL/MALAYALAM/HINDI	E1TL31/ E1MY31/ E1HD31	3
II	ENGLISH	ENGLISH	E2EN31	3
III	CORE V	VECTOR CALCULUS AND APPLICATIONS	EMMA31	4
III	CORE VI	DIFFERENTIAL EQUATIONS AND APPLICATIONS	EMMA32	4
III	ELECTIVE 3	STATISTICS I	EEST31	4
IV	SEC 4	COMPUTATIONAL MATHEMATICS	ESMA31	2
IV	EVS	ENVIRONMENTAL STUDIES	EEVS31	2
		NAAN MUTHALVAN (Substitute Course: Mathematics for Competitive Examination IV)		2

Total Marks: 100 Internal Exam: 25 marks + External Exam: 75 marks

A. **Scheme for internal Assessment**:
Maximum marks for written test: **20 marks**
3 internal tests, each of **I hour** duration shall be conducted every semester.
To the average of the **best two** written examinations must be added the marks scored in. The **assignment** for 5 marks.

The break up for internal assessment shall be:
Written test- 20 marks; Assignment -5 marks Total - 25 marks

B. Scheme of External Examination
3 hrs. examination at the end of the semester
A – Part : 1 mark question two - from each unit
B – Part : 5 marks question one - from each unit
C – Part : 8 marks question one - from each unit

- **Conversion of Marks into Grade Points and Letter Grades**

S.No	Marks	Letter Grade	Grade point (GP)	Performance
1	90-100	O	10	Outstanding
2	80-89	A+	9	Excellent
3	70-79	A	8	Very Good
4	60-69	B+	7	Good
5	50-59	B	6	Above Average
6	40-49	C	5	Pass
7	0-39	RA	-	Reappear
8	0	AA	-	Absent

- **Cumulative Grade Point Average (CGPA)**

$$\mathbf{CGPA} = \frac{\mathbf{\Sigma\,(GP \times C)}}{\mathbf{\Sigma C}}$$

- **GP** = Grade point, **C** = Credit
- CGPA is calculated only for Part-III courses
- CGPA for a semester is awarded on cumulative basis

- **Classification**
  a) First Class with Distinction : CGPA $\geq$ 7.5*****
  b) First Class : CGPA $\geq$ 6.0
  c) Second Class : CGPA $\geq$ 5.0 and $<$ 6.0
  d) Third Class : CGPA$<$ 5.0

Part I TAMIL
தமிழக வரலாறும் பண்பாடும்

அலகு 1

தொழில் பழங்கால வரலாறும் சங்ககால வரலாறும்

1. தொழில் தமிழர்
2. பழைய கற்காலம்
3. புதிய கற்காலம்
4. உலோகக் காலம்
5. அகழ்வாராய்ச்சியில் தமிழும் தமிழரும் (கீழடி வரை)
6. திணை வாழ்வியல் (களவு வாழ்க்கை, கற்பு வாழ்க்கை, உணவு, அணிகலன்கள், வாணிகம், விளையாட்டுகள்)
7. கல்வியும் கலைகளும்
8. தமிழ் வளர்த்த சங்கம்
9. சங்க கால ஆட்சி முறை
10. அயல்நாட்டுத் தொடர்புகள்

அலகு 2

ஆட்சியர் வரலாறு

1. மூவேந்தர் வரலாறு
2. பல்லவர் வரலாறு
3. நாயக்கர் ஆட்சி
4. முகம்மதியர் ஆட்சி
5. மராட்டியர் ஆட்சி

அலகு 3

ஐரோப்பியர் கால வரலாறு

1. போர்த்துகீசியர்
2. டச்சுக்காரர்கள்
3. டேனிஸ்கரர்கள்
4. பிரெஞ்சுக்காரர்கள்
5. ஆங்கிலேயர்கள்
6. பாளையக்காரர்கள்
7. இந்தியா விடுதலை போராட்டத்தில் தமிழ்நாடு

அலகு 4

விடுதலைக்கிபின் தமிழ்நாட்டு வரலாறு

1. மொழிபோராட்டம்

2. சமூக மறுமலர்ச்சி
3. தொழில்நுட்ப வளர்ச்சி

அலகு 5

மொழிப்பயிற்சி

1. நிறுத்தக் குறிகள்
2. கலைச்சொற்கள்
3. மொழிபெயர்ப்பு

Text Books

- தமிழக வரலாறும் பண்பாடும் - கே. கே. பிள்ளை, உலகத் தமிழாராய்ச்சி நிறுவனம் , சென்னை
- தமிழர் நாகரீகம் பண்பாடும் - அ. தட்சிணாமூர்த்தி, யாழ் வெளியீடு, சென்னை
- தமிழக வரலாறும் பண்பாடும்-வே.தி.செல்லம், மணிவாசகர் பதிப்பகம், சென்னை

Reference Books

1. தமிழக சமூதாயா பண்பாட்டு கலை வரலாறு - கு சேதுராமன் , என்,சி,பி.எச், சென்னை
2. தமிழர் கலையும் பண்பாடும்-அ .கா.பெருமாள், என்,சி,பி.எச், சென்னை
3. ஒரு பண்பாட்டின் பயணம்: சிந்து முதல் வைகை வரை - ஆர். பாலகிருஷ்ணன், ரோஜா முத்தையா ஆராய்ச்சி நூலகம், சென்னை.

MALAYALAM - POETRY

UNIT I

This unit focus on significance of Malayalam Poetry and trends.

To familiarize the early stages of Malayalam poetry- Folklore heritage-Pattu-Bhakthi movement-Cherussery-Ezhutachan- Kunjan Nambiar-

Detailed study:

Jaritha Vilapam (Mahabharatam kilippattu) Ezhutachan

UNIT II

Romanticism –Asan- Ulloor – Vallathol

Detailed study :

1. Veena Poovu (First 7 slokas only)- Asan
2. Aa poomala- Changampuzha

UNIT III

Modernity in Malayalam poetry- First phase

Post Independent India and Modernization of Nation in Malayalam poetry

Detailed study

1. Yuga Parivarthanam- Vailoppilli Sreedhara Menon
2. Gandhiyum Godseyum- N .V.Krishna Warrier

UNIT IV

Modernity in Malayalam poetry- second phase

Detailed Study

1. Gajendra moksham _ Sugathakumari
2. Kozhi – Kadammanitta
3. Megharoopan – Aattoor Ravi Varma
4. Budhanum Attin kuttiyum – A. Ayyappan

UNIT V

This unit introduces the nature of samakalika kavitha It also evaluates s a m a k a l i k a kavitha,- the contemporary poetry originated after modern poetry- women, Dalit, environment and cyber issues.

Detailed study

1.Pattanbipuzhamanalil – P P Ramachandran
2.Malayalakavithakku oru Kathu- S. Joseph
3.Thoramazha – Rafeek Ahammad
4.Muttamadikkumbol – Anitha Thampi
5.Survey of India-B.M.Manoj

Recommended Text

Puthukavitha Ed by Dr.O.K.Santhosh.Madras University Publication (5 poems only)

(a) pattambipuzhamanalil,
(b) Malayala kavithakku oru kathu,
(c) Muttamadikkumbol,
(d) Thoramazha,
(e) Survey of India

Reading List (Print and Online)

1. Aadhunika Malayala Sahithya Charithram prasthanangaliloode – Dr. K.M.George (Ed.)
2. Kairaliyute Kadha – N.Krishnapillai
3. Kavitha Sahitya Charithram – M.Leelavathi
4. Adrushyathayute Akhyanangal- Rajesh Chirapadu
5. Adhunikananthara Malayala Kavitha –C.R.Prasad
6. Pen kavitha malayalathil-Sheeba Divakaran,kerala bhasha institute.Thiruvananthapuram
7. Samakalika Malayala kavitha-M.B.Manoj,Samayam Classics. Kannoor
8. Varnnaraji Dr.M.Leelavathi

HINDI - Patra Lekhan aur Paribhashik Shabdavali

Unit I

Niji Patra Lekhan

- Niji Patra – Arth aur Bhed
- Pitaji/Mataji ke naam patra
- Mitra, Bhai aadi ke naam patra
- Paribhashik Shabdawali – 20 words

Unit II

Samajik Patra Lekhan

- Samajik Patra – Arth aur Bhed
- Aavedan Patra – Noukri, Chutti aadi
- Dak Adhikari ke naam patra
- Paribhashik shabdawali – 20 words

Unit III

Vyavasayik Patra Lekhan

- Vyavasayik Patra – Arth aur Bhed
- Prakashak ke naam patra
- Shikayathi
- Paribhashik shabdavali – 20 words

Unit IV

- Samanya Parichay
- Sarkari Patra
- Ardh-Sarkari Patra
- Gyapan, Paripatra
- Anusmarak
- Paribhashik Shabdavali – 20 words

Unit V

- Precis Writing And Applied Grammar (Ling, Vachan and Karak)

Reference Books

1. Viyavaharik Hindi, Hindi Prachar press, T.Nagar, Madras-600 017
2. Alekhan aur Tippan – Prof. Viraj
3. Alekhan - Kichlu

Related Online Contents (MOOCs, SWAYAM, NPTEL, YouTube, Websites, etc.)

1. https://youtu.be/-kUPGG0B4tU
2. https://www.youtube.com/watch?v=xk14MNb1r7k

GENERAL ENGLISH

Unit I ACTIVE LISTENING

Short Story

1.1 In a Grove – Akutagawa Ryunosuke Translated from Japanese by Takashi Kojima

1.2 The Gift of the Magi – O' Henry

Prose

1.3 Listening – Robin Sharma

1.4 Nobel Prize Acceptance Speech – WangariMaathai

Unit II INTERPERSONAL RELATIONSHIPS

Prose

2.1 Telephone Conversation – Wole Soyinka

2.2 Of Friendship – Francis Bacon Song on (Motivational/ Narrative)

2.3 Ulysses – Alfred Lord Tennyson

2.4 And Still I Rise – Maya Angelou

Unit III COPING WITH STRESS

Poem

3.1 Leisure – W.H. Davies

3.2 Anxiety Monster – RhonaMcFerran

Readers Theatre

3.3 The Forty Fortunes: A Tale of Iran

3.4 Where there is a Will – Mahesh Dattani

Unit IV Grammar

4.1 Phrasal Verbs & Idioms

4.2 Modals and Auxiliaries

4.3 Verb Phrases – Gerund, Participle, Infinitive

Unit V Composition/ Writing Skills

5.1 Official Correspondence – Leave Letter, Letter of Application, Permission Letter

5.2 Drafting Invitations

5.3 Brochures for Programmes and Events

Text Books (Latest Editions)

1. Wangari Maathai – Nobel Lecture. Nobel Prize Outreach AB 2023. Jul 2023.
2. Mahesh Dattani, Where there is a Will. Penguin, 2013.
3. Martin Hewings, Advanced English Grammar, Cambridge University Press, 2000
4. Essential English Grammar by Raymond Murphy

Web Resources

1. WangariMaathai – Nobel Lecture. Nobel Prize Outreach AB 2023. Mon. 17 Jul 2023. https://www.nobelprize.org/prizes/peace/2004/maathai/lecture/
2. Telephone Conversation - Wole Soyinka https://www.k-state.edu/english/westmank/spring_00/SOYINKA.html
3. Anxiety Monster-RhonaMcFerran www.poetrysoup.com

VECTOR CALCULUS AND ITS APPLICATIONS

Objectives of the Course

- Knowledge about differentiation of vectors and on differential operators. Knowledge about derivatives of vector functions.
- Skills in evaluating line, surface and volume integrals.
- The ability to analyze the physical applications of derivatives of vectors.

UNIT I

Vector point function - Scalar point function - Derivative of a vector and derivative of a sum of vectors - Derivative of a product of a scalar and a vector point function - Derivative of a scalar product and vector product. (Chapter 1:Sections -1.1to1.5)

UNIT II

The vector operator „del", The gradient of a scalar point function - Divergence of a vector - Curl of a vector - solenoidal and irrotational vectors – simple applications. (Chapter 2:Sections -2.1to2.7)

UNIT III

Laplacian operator, Vector identities-Line integral- simple problems. (Chapter 2:Section -2.8and Chapter3:Sections - 3.1 to 3.4)

UNIT IV

Surface integral-Volume integral – Applications. (Chapter 3:Sections - 3.5,3.6)

UNIT V

Gauss Divergence Theorem, Stoke"s Theorem, Green"s Theorem in two dimensions – Applications to real life situations. (Chapter 4:Sections - 4.1to4.5)

Recommended Text

1. P.Duraipandian and LaxmiDuraipandian, Vector Analysis, Emerald Publishers, 2005.

Reference Books

1. J.C.Susan,VectorCalculus,(4thEdition)PearsonEducation, Boston, 2012.
2. A.Gorguis,VectorCalculusforCollegeStudents,XilbiusCorporation, 2014.
3. J.E.MarsdenandA.Tromba,VectorCalculus,(5thEdition),W.H.Freeman,NewYork,1988.

Website and e-Learning Source

1. https://nptel.ac.in

DIFFERENTIAL EQUATIONS AND APPLICATIONS

Objectives of the Course

- Knowledge about the methods of solving Ordinary and Partial Differential Equations.
- The understanding of how Differential Equations can be used as a powerful tool in solving problems in science.

UNIT I

Ordinary Differential Equations: Variable separable – Homogeneous Equation–Non-Homogeneous Equations of first degree in two variables – Linear Equation – Bernoulli‟s Equation– Exact differential equations. (Chapter 2:Sections - 1to6)

UNIT II

Equation of first order butof higher degree: Equation solvable for dy/dx - Equation solvable for y–Equation solvable for x– Clairaut‟sform– Linear Equations with constant coefficients: Definition – The operator D – Complete solution – Particular integrals of algebraic, exponential, trigonometric functions and their products. (Chapter 4:Sections -1 to 3andChapter 5: Sections - 1to4)

UNIT III

Linear equations of second order: Complete solution in terms of a known integral – Reduction to normal form – Change of independent variable - Applications of first order equations: Flow of water from an orifice – Falling bodies and other rate problems, Free fall under gravity – The Brachistochrone – Fermat and Bernoulli – Simple electric circuits. (Chapter 8: Sections - 1 to 3 and Chapter 3: Sections - 2 to 6)

UNIT IV

Partial differential equation: Formation of PDE by Eliminating arbitrary constants and arbitrary functions–Complete integral – Singular integral – General integral – Lagrange‟s Linear Equations.(Chapter 12: Sections - 1 to 4)

UNIT V

Special methods – Standard forms. (Chapter 12: Sections-5.1 to 5.5)

Recommended Text

1. S.Narayanan and T.K. Manicavachagom Pillay, Differential equations and its application, S. Viswananthan Printers Pvt. Ltd., 2012.

Reference Books

1. Shepley L. Ross, Differential Equations, 3rd Edition, John Wiley and Sons, 1984.

2. I.Sneddon, Elements of Partial Differential Equations, McGraw- Hill, International Edition, 1967.
3. G.F.Simmons, Differential equations with applications and historical notes, 2ndEd, Tata McGraw Hill Publications, 1991.
4. H.T. H.Piaggio, Elementary Treaties on Differential Equations and their applications, C.B.S Publisher & Distributors, Delhi,1985.
5. Horst R. Beyer, Calculus andAnalysis,Wiley,2010.
6. M.Braun, Differential Equations and their Applications. (3rdEdition), Springer-Verlag, New York, 1983.
7. S.Arumugam, A. Thangapandi Isaac and A. Somasundarua, Differential Equations and Applications, Yes Dee Publishing, 2020.
8. V.Sundrapandian, Ordinary and Partial Differential Equations, Tata Mc Graw Hill Education Pvt. Ltd. NewDelhi, 2013.

Website and e-Learning Source

1. https://nptel.ac.in

STATISTICS I

Objectives of the Course

- To Acquire the knowledge of Statistical terms like Dispersion, Moments, Skewness, Correlation, Regression, Attributes and Index Numbers

UNIT I

Dispersion – Measures of Dispersion – Coefficients of Dispersion – Moments – Skewness – Kurtosis. (Book 1 - Chapter 2: Sections - 2.12 to 2.17)

UNIT II

Correlation – Scatter Diagram – Karl Pearson‟s coefficient of correlation –Probable error of Correlation Coefficient – Rank Correlation. (Book 1 - Chapter 10: Sections - 10.2 to 10.4, 10.6, 10.7)

UNIT III

Curve Fitting and Regression: Linear Regression – Curve linear Regression – Regression Curve. (Book 1 - Chapter 11: Sections - 11.2 to 11.4)

UNIT IV

Theory of Attributes: Notations and Terminology – Classes and Class Frequency – Consistency of Data – Independence of Attributes – Association of Attributes. (Book 1 - Chapter 13: Sections - 13.2 to 13.6)

UNIT V

Index Numbers – Consumer Price Index Numbers – Conversion of Chain Base Index Number into Fixed Base Index and conversely. (Book 2 - Chapter 9: Sections - 9.1 to 9.3)

Recommended Text

1. S.G. Gupta and V. K. Kapoor, Fundamentals of Mathematical Statistics, 12th Edition, Sultan Chand& Sons, New Delhi, 2021.
2. S. Arumugam and A. Thangapandi Isaac, Statistics, New Gamma Publishing House, 2016.

Reference Books

1. P.R. Vittal, Mathematical Statistics, Margham Publications, 2004.
2. D.C. Sachetiand V. K. Kapoor, Statistics, Sultan Chand & Sons, New Delhi, 2017.

Website and e-Learning Source

1. https://nptel.ac.in

COMPUTATIONAL MATHEMATICS

Objectives of the Course

- Understand and apply different Numerical Methods.

UNIT I

Algebraic and Transcendental Equations: Errors in Numerical Computation – Iteration method – Regula Falsie method. (Chapter 3: Sections - 3.1, 3.2, 3.4)

UNIT II

Algebraic and Transcendental Equations: Bisection method – Newton-Raphson method – Horner‟s method. (Chapter 3: Sections - 3.3, 3.5, 3.6)

UNIT III

Simultaneous Equations: Simultaneous equations – Back substitution – Gauss Elimination method – Gauss-Jordan Elimination method – Calculation of inverse of a matrix. (Chapter 4: Sections - 4.1 to 4.5)

UNIT IV

Simultaneous equations: Iterative Methods – Gauss Jacobi iteration method – Gauss-Seidel Iteration method – Relaxation method – Newton-Raphson method for simultaneous equations. (Chapter 4: Sections - 4.7 to 4.10)

UNITV

Numerical Solutions of Partial Differential Equations: Classification of partial differential equations of second order – Finite Difference Approximations to Derivatives – Laplace equation – Poisson‟s equation. (Chapter 11: Sections - 11.0 to 11.4)

Recommended Text

1. S.Arumugam, A. Thangapandi Isaac and A. Somasundaram, Numerical Methods, Scitech, 2017.

Reference Books

1. S.S. Sastry, Introductory Methods of Numerical Analysis, Fourth Edition, PHI Learning Private Limited, New Delhi-1, 2009.
2. PallabGhosh,NumericalMethodswithComputerProgramsin C++, Prentice Hall India Pvt. Ltd., New Delhi, 2009.
3. T.Veerarajan and T. Ramachandran, Numerical Methods with Programs in C, Second Edition, McGraw Hill Education Pvt. Ltd, New Delhi, 2006.

Website and e-Learning Source

1. https://nptel.ac.in

ENVIRONMENTAL STUDIES

Course Objectives:

The main objectives of this course are:

- Enable the students to be aware of our natural resources, ecosystems and their linkages to society, livelihood, environment and conservation.

Unit I

Multidisciplinary Nature of Environmental Studies and Natural Resources:

Concept of Renewable and non-renewable resource, Natural resources and associated problems: Forest resources: Deforestation, Timber extraction, mining, dams and their effects. Water resources: Over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Land resources: Land degradation, man induced landslides, soil erosion and desertification.

UNIT II

Ecosystem: Concept of an Ecosystem, Structure and Functions of Ecosystem, Energy flow in the Ecosystem; Ecological Succession, Food Chains, Food webs and Ecological Pyramids, Characteristic Features of the following Ecosystem: Forest Ecosystem, Grassland Ecosystem and Desert Ecosystem, Aquatic Ecosystem (Ponds, Streams, Lakes, Rivers and Ocean Estuaries)

UNIT III

Biodiversity and its Conservation: Definition, levels and values of biodiversity; Threats to biodiversity- habitat loss, poaching of wildlife, man-wildlife conflicts, IUCN categories of threat; Terrestrial and marine hotspots of biodiversity in India; Conservation of Biodiversity - In-situ and Ex-situ conservation; Conservation schemes :Gir lion sanctuary project, Project tiger, Project elephant, Conservation of sea turtles in India. Ecotourism

UNIT IV

Environment Pollution: Types, causes, effects, and control - Air, Water, Soil and Noise pollution. Nuclear hazards and human health risks. Solid waste management: Control measure of urban and industrial waste. Climate change global warming, ozone layer depletion, acid rain, and impacts on human communities and agriculture

UNIT V

Social Issues and the Environment: Sustainable Development, Water Conservation, Resettlement and rehabilitation of people. Disaster Management: Floods, earthquake, cyclone and landslides. Consumerism and waste products; Environment Protection Act; Air and water (Prevention and control of Pollution) Act; Wild life protection Act; Forest conservation Act; Environmental movements (Chipko, Silent valley, Bishnois of Rajasthan). Environmental ethics. Environmental communication and public awareness.

Reading list

1. Erach Bharucha, 2021, Textbook of Environmental Studies for Undergraduate Courses, Third Edition, Orient blackswan Pvt. Ltd., Hyderabad.
2. V.K. Ahluwalia, Environmental Studies (Second Edition), Ane books India, T-Nagar, Chennai.
3. Y.K. Singh, 2006, Environmental science, New Age International (P) Ltd., Publishers, New Delhi.
4. S. P. Misra, 2023, Essential Environmental Studies, 4th Edn, Ane Books Pvt. Ltd., New Delhi.
5. G.S. Vijayalakshmi, A.G.Murugesan and N.Sukumaran, 2006, Basics of Environmental Science, Manonmaniam Sundaranar University Publications, Tirunelveli.

Recommended texts

1. N.Arumugam and V. Kumaresan, 2014, Environmental studies, 4th edition, Saras Publication, Nagercoil, TamilNadu.
2. M.Basu, and S. Xavier, 2016, Fundamentals of Environmental Studies, Cambridge University Press.
3. A.K. Mitra and R. Chakraborty, 2016, Introduction to Environmental Studies, Book Syndicate.
4. J.S. Singh, S.P.Singh, and S.R. Gupta, 2014, Ecology, Environmental Science and Conservation. S. Chand Publishing, New Delhi.