

J.J. College of Arts and Science(Autonomous)

J.J.Nagar, Sivapuram Post, Pudukkottai - 622 422

UG - Programme - **B.Sc. MATHEMATICS - Under Choice Based Credit System**

For the candidates admitted from the academic year 2022-2025 onwards

Sem.	Part	Course Code	Course Title	Hrs/ Week	Credit	Exam Hrs.	Marks		Total Marks
							Int.	Ext.	
I	I	U1R2TL1	Language Course – I	6	3	3	25	75	100
	II	U1R2EL1	English Language Course – I	6	3	3	25	75	100
	III	U1R2MACC1	Calculus – I	8	5	3	25	75	100
		U1R2STAC1	Mathematical Statistics – I	7	3	3	25	75	100
		*	R - Programming – Practical	3	-	-	-	-	-
Total				30	14	-	-	-	400
II	I	U2R2TL2	Language Course – II	5	3	3	25	75	100
	II	U2R2EL2	English Language Course – II	5	3	3	25	75	100
	III	U2R2MACC2	Calculus – II	5	5	3	25	75	100
		U2R2MACC3	Probability & Statistics	5	5	3	25	75	100
		U2R2STAC2P	R - Programming – Practical	3	3	3	40	60	100
		U2R2STAC3	Mathematical Statistics – II	5	3	3	25	75	100
	IV	U2R2AECC1	Ability Enhancement Compulsory Course - I(Environmental Studies)	2	2	3	25	75	100
Total				30	24	-	-	-	700
III	I	U3R2TL3	Language Course – III	5	3	3	25	75	100
	II	U3R2EL3	English Language Course – III	5	3	3	25	75	100
	III	U3R2MACC4	Number Theory	5	5	3	25	75	100
		U3R2MACC5	Analytical Geometry(3D)and Trigonometry	6	5	3	25	75	100
		U3R2PHAC4	Allied Physics – I	4	3	3	25	75	100
		*	Allied Physics – II Practical	3	-	-	-	-	-
IV	U3R2AECC2	Ability Enhancement Compulsory Course – II(Value Education)	2	2	3	25	75	100	
Total				30	21	-	-	-	600
IV	I	U4R2TL4	Language Course – IV	5	3	3	25	75	100
	II	U4R2EL4	English Course – IV	5	3	3	25	75	100
	III	U4R2MACC6	Fourier Series and Laplace Transforms	5	5	3	25	75	100
		U4R2MACC7	Differential Equations	5	5	3	25	75	100
		U4R2PHAC5P	Allied Physics – II– Practical	3	3	3	40	60	100
		U4R2PHAC6	Allied Physics – III	4	3	3	25	75	100
	IV	U4R2MASEC1	Skill Enhancement Course – I	3	2	3	25	75	100
Total				30	24	-	-	-	700

Sem.	Part	Course Code	Course Title	Hrs/ Week	Credit	Exam Hrs.	Marks		Total Marks
							Int.	Ext.	
V	III	U5R2MACC8	Mechanics	5	5	3	25	75	100
		U5R2MACC9	Abstract Algebra	5	5	3	25	75	100
		U5R2MACC10	Real Analysis	4	4	3	25	75	100
		U5R2MACC11	Operations Research	4	4	3	25	75	100
		U5R2MACC12	Numerical Methods	4	4	3	25	75	100
		U5R2MADSE1	Discipline Specific Elective Course– I #	4	4#	3#	25#	75#	100#
	IV	U5R2MASEC2	Skill Enhancement Course – II	2	2	3	25	75	100
		U5R2MAGEC1	Generic Elective Course – I	2	2	3	25	75	100
Total				30	30	-	-	-	800
VI	III	U6R2MACC13P	Numerical Methods with MATLAB	4	3	3	40	60	100
		U6R2MACC14	Linear Algebra	5	5	3	25	75	100
		U6R2MACC15	Complex Analysis	5	5	3	25	75	100
		U6R2MADSE2	Discipline Specific Elective Course- II	5	4	3	25	75	100
		U6R2MADSE3	Discipline Specific Elective Course-III	5	4	3	25	75	100
	IV	U6R2MASEC3	Skill Enhancement Course- III	3	2	3	25	75	100
		U6R2MAGEC2	Generic Elective Course – II	2	2	3	25	75	100
	V	U6R2AECC3	Ability Enhancement Compulsory Course – III(Gender Studies)	1	1	3	25	75	100
			Online Courses[MOOCs, SWAYAM]	-	-	-	-	-	-
			Extension Activities	-	1	-	-	-	-
Total				30	27	-	-	-	800
Grand Total				140					4000

* Carried over Paper

Choose Internship (40+60)

Discipline Specific Elective Courses Semester V DSE1:1- Object Oriented Programming with C++-Internship DSE1:2 –Mathematical Modeling DSE1:3- Sequences and Series Semester VI DSE2:1 - Astronomy DSE2:2 -Formal Languages and Automata Theory DSE2:3 – Combinatorial Mathematics DSE3:1 - Graph Theory DSE3:2 - Fuzzy Mathematics DSE3:3 - Logics and Boolean Algebra Generic Elective Courses(offered to other Dept.) GEC1:1- Quantitative Aptitude-I GEC1:2 Basic Mathematics GEC2:1 – Quantitative Aptitude-II GEC2:2 - Bio-Statistics	Skill Enhancement Courses Semester IV SEC1:1- A Primer on Divisibility and Number Sequences SEC1:2-Sagemath Semester V SEC2:1- Quantitative Aptitude SEC2:2 -Theory of Games and Decision Theory Semester VI SEC3:1- Soft Skill Development SEC3:2- Mathematics for Competitive Examination Ability Enhancement Compulsory Course, AECC1- Environmental Studies AECC2- Value Education AECC3- Gender Studies
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ஜெ. ஜெ. கலைஅறிவியல்கல்லூரி (தன்னாட்சி)
சிவபுரம்,புதுக்கோட்டை
2022 –2023ஆம் கல்வியாண்டுமுதல் சேர்க்கப்பட்ட இளநிலைபட்டமாணவர்களுக்குரியது

தலைப்பு : இக்கால இலக்கியம் - இலக்கணம் வரிசைஎண்: ௨1
பருவம் : மூன்றாம் பருவம் தாள் குறியீடு: U1R2TL1
பிரிவு : பகுதி I தமிழ் மதிப்புப் புள்ளி: 5
மதிப்பெண் : CIA -25, EA -75 கற்றல் நேரம் : 6 மணி

நோக்கம்

1. தற்காலதமிழ் இலக்கியத்தின் நவீனத்தன்மையை அறிந்து கொள்ளல்
2. வசனகவிதையின் அமைப்புமுறையைப் புரிந்துகொள்ளல்
3. புதுக்கவிதைக்கும் மரபுக்கவிதைக்கும் உள்ள வேறுபாட்டுத் தன்மையைப் பிரித்துக் காட்டுதல்
4. உரைநடை வாசிப்பின் மூலம் நாநெகிழ்ப் பயிற்சி அளித்தல்
5. சமூகமாற்றத்திற்குச் சிறந்தஊடகம் கதை இலக்கியம் என்பதை ஆய்ந்தறியத் தூண்டுதல்

கூறு: 1 இக்கால இலக்கிய வரலாறு, இலக்கணம் (15hrs)

இக்கால இலக்கியவரலாறு—உரைநடை,சிறுகதை,புதினம், கவிதை,நாட்டுப்புற இலக்கியம் - இலக்கணம் - ஆகுபெயர்கள்

கூறு: 2 வசனகவிதை (15hrs)

பாரதியார் - கண்ணன் பாட்டு - கண்ணன் என் சேவகன், பாரதிதாசன் - வாளினை எடுடா, கவிமணி தேசிக விநாயகம் பிள்ளை - மலரும் மாலையும் - பாரதியும் பட்டிக்காட்டனும், வாணிதாசன் - புதிய ஆத்திசூடி, நாட்டுப்புறப்பாட்டு - நாற்றுநடும் பாட்டு, கதைப்பாடல் - 1980 வைகைவெள்ளத்துயர்

கூறு: 3 புதுக்கவிதை (15hrs)

அப்துல்ரகுமான் - ஆலாபனை - ஆறா(து)அறிவு, மீரா - ஊசிகள் - நான் அவன் நண்பன், மு.மேத்தா - ஆகாயத்திற்கு அடுத்தவீடு, வெ.இறையன்பு - பூபாளத்திற்கு ஒரு புல்லாங்குழல்- நிறவெறிக்குகறுப்பு, சி.சு.செல்லப்பா - தேன்கிண்ணம் - புழுதிக்காட்டுப் புலம்பல், ஆங்கரைப் பைரவி - விரல் தொட்டவானம் - புத்தகம்

கூறு: 4 உரைநடை (15hrs)

பாரதியார் - கொள்கைக்கும் செயலுக்குமுள்ள தூரம்,நா.சஞ்சீவி - மொழிவழிப் பொழுது போக்குகள், மு.வரதராசன் - தங்கைக்கு, பூ.ஆலாலசுந்தரம் - பழந்தமிழர் பண்பு, ரா.பி.சேதுபிள்ளை - கலையும் கற்பனையும், பால் வளன் அரசு - தமிழகக் கோவில்கள், எஸ். வையாபுரிப்பிள்ளை - கம்பனும் தமிழும் (12hrs)

கூறு: 5 சிறுகதை

செம்பைமணவாளன் - தவம், அண்டனூர் சுரா - மிடற்றுத் தாகம்,சுரேஷ் மான்யா - உயிர் நிலம், சோலச்சி - கதையல்ல, ந.சோலையப்பன் - பூமராங், புதுகைசஞ்சீவி - திருமதிதலைவர், மிடுமுருகதாஸ் - தூக்குக் கூடை

இலக்கிய வரலாறு	-	துறை வெளியீடு
செய்யுள் திரட்டு	-	துறை வெளியீடு
நிறப்பிரிகை(சிறுகதைத் தொகுதி)	-	துறை வெளியீடு
உரைமாலை (உரைநடைத் தொகுதி)	-	துறை வெளியீடு

Sl.No	Course Outcomes	Knowledge Level
CO1	காலந்தோறும் தமிழ் இலக்கியம் கடந்துவந்த காலச்சுவடுகளை அறிந்து கொள்வர்	K2
CO2	கவிதையில் கையாளப்பட்டுள்ளச் சொல்லாடலைக் கண்டுணர்வர்	K2
CO3	புதுக்கவிதையின் வரலாற்றுக்குரியக் கருப்பொருளை மதிப்பிடுவர்	K5
CO ³	உரைநடை வாசிப்புத் திறனில் மேன்மை அடைவர்	K2
CO5	சிறுகதைப் படைப்பதில் உள்ள நுணுக்கங்களை வரையறை செய்வர்	K4

இக்கால இலக்கியம், இலக்கணம்						U1R2TL1					
Course Out comes	Programme Outcomes (POs)					Programme Specific Outcomes(PSOs)					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	3	3	3	2	2	3	3	3	2	2.7
CO2	3	2	3	3	2	2	3	2	3	2	2.5
CO3	3	2	3	3	3	2	3	3	3	2	2.7
CO4	3	2	2	3	2	2	3	2	3	2	2.4
CO5	3	3	3	3	2	3	3	3	3	2	2.8
Mean Overall Score											2.6
Result											High

PART-II ENGLISH
(B.A,B.Sc,B.BA,B.CA&B.Com)
SEMESTER I

For candidates admitted from the academic year 2022-2023

Title of the Course : PROSE AND ENGLISH FOR COMMUNICATION
Category of the Course : PART-II ENGLISH
Course Code : U1R2EL1
Nature of the Skill : Communicative Skill
Marks : CIA : 25 +Ext: 75 = 100 **Hrs / Week : 06**
Credits : 03 **Total Inst. Hrs : 72**

OBJECTIVES:

1	To expose the learner to modern English prose.
2	To extend learners communication skills through suitable tasks.
3	To expand the learners passive and active vocabulary and repertoire of structures.
4	To develop the ability in independent writing.
5	To provide enough practice for real life applications of language (English)

UNIT – 1 **(Inst. Hrs: 09)**

A.P.J Abdul Kalam	My vision for India
Jim Corbett	A Deed of Bravery
Bertrand Russell	Has Man A Future?

UNIT – II **(Inst. Hrs:12)**

Swami Vivekananda	The Secret of Work
C.E.M. Joad	Our Civilization
Nirad C. Chaudhuri	The Great City
Rabindranath Tagore	The Auspicious Vision

UNIT – III **(Inst. Hrs: 17)**

Synonyms - Antonyms - Homonyms - One Word Substitutes - Idioms and Phrases-Use of Articles, Prepositions, Analysis of Simple Sentences into SVOCA, Tag Questions, Framing questions to suit responses - short form responses both positive and negative to questions.

UNIT - IV **(Inst. Hrs: 17)**

Comprehension Exercises oral and written - 12 passages (multiple choice & Questions and Answers supplemented by listening exercises to be given by the teacher)

(Inst. Hrs:17)

Units III, IV and V from workbook appended to the textbook

<https://rufusonline.blogspot.com/2011/10/my-visions-for-india-drapjabdul-kalam.html>
<https://mastanappa.blogspot.com/2016/03/our-civilization-c-e-m-joad-additional.html>
<http://xylemofenglish.blogspot.com/2016/05/the-secret-of-work-by-swami-vivekananda.html?m=1>
<https://peacenews.info/node/5147/bertrand-russell-has-man-future>
<http://sittingbee.com/the-auspicious-vision-rabindranath-tagore/>

Course Name - Prose and English for Communication	Course Code - U1R2EL1	Knowledge Level
On completion of the course, students will be able to		
CO1	discover and respond to aspects of language like diction, syntax, and style.	K3
CO2	perceive features like tense and time reference, polysemy, ambiguity and paraphrase.	K5
CO3	formulate ordinary dialogues and conversations in real life.	K6
CO4	appraise communicative acts like narrating an incident, describing a process, etc.	K5
CO5	develop skills in speaking and writing.	K6

Title of the Course : Prose and English for Communication						Course code : U1R2EL1					
Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)					Mean Score of COs
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	
CO – 1	3	2	1	3	2	2	2	3	3	1	2.2
CO – 2	2	3	2	2	3	3	2	2	3	3	2.5
CO – 3	3	2	2	3	3	3	3	2	3	2	2.6
CO – 4	2	3	3	2	1	3	2	3	2	2	2.3
CO – 5	3	3	2	2	3	1	2	2	3	1	2.2
	Mean Overall Score										2.36
	Result										HIGH

SEM: I
Credit:5
Hours/Week:8
Total Hours:96
Objectives:

B.Sc. MATHEMATICS
Calculus- I
CODE: U1R2MACC1
Employability

CORE COURSE:1
Int.Marks:25
Ext.Marks:75
Max.Marks:100

- *To extend student experience with functions*
- *To study the fundamental concepts of calculus*
- *To review and extend knowledge of trigonometry*
- *To develop and strengthen the student problem- solving skills*
- *To apply the tools of calculus to variety of problem situations*

Unit I Differentiation and Meaning of the Derivative (19 hours)

Successive Differentiation – the n^{th} derivative – Standard Results – Trigonometrical transformations- Formation of equations involving derivatives- Leibnitz's formula for the n^{th} derivative of a product- Geometrical interpretation – Meaning of the sign of the differential coefficient.

Unit II Curvature (19 hours)

Curvature- Circle, radius and centre of curvature- Cartesian formula for the radius of the Curvature- The co-ordinate of the centre of curvature- Evolute and Involute- Radius of curvature when the curve is given in polar co-ordinates- P-R equations: Pedal equations of curve.

Unit III Partial Differentiation (19 hours)

Successive Partial derivatives, functions of function rule, Total differential coefficients- A special case- implicit Functions- homogeneous functions- Euler's theorem- Partial derivatives of a functions of two functions- Maxima and minima of functions two variables.

Unit IV Vector differentiation and Integration (19 hours)

Vector function – Limit and Continuity of a vector function- Derivative of a vector function with respect to a scalar – Curves in space – Velocity and Acceleration – Integration of Vector functions. Partial derivatives of vectors – The vector differential operator ∇ - Gradient of a scalar field – Definition – Level Surfaces – Directional derivative of a scalar point function – Tangent plane and normal to a level surface – Divergence of a vector point function-Curl of a vector point function

Unit V Green's, Gauss's and Stoke's Theorem (20 hours)

Line Integrals – Surface Integrals – Volume Integrals – Green's theorem in the plane – The divergence theorem in the plane- The divergence theorem of the Gauss – Green's Theorem – Stoke's theorem (without proof) – Related problems.

Text Books:

- [1] "Calculus vol I", T.K Manichavasagampillai and others S.V Publications 2011.
[2] "Vector Calculus" by J. N. Sharma and A.R. Vasishtha published by Krishna Prakashan Mandir(1984) Co., 9th Edition.

Unit I :Chapter 3, sec 1.2 to 2.1 and chapter 4, sec 2., 2.2 [1]

Unit II:Chapter 10, sec 2.1 to 2.8 [1]

Unit III: Chapter 8, sec 1.2 to 1.7 and sec 4 [1]

Unit IV: Chapter I- All sections, Chapter II- Sec 1 to 8 [2]

Unit V: Chapter III – Sec 2 to 9 [2]

Reference Books:

- 1) “Differential Calculus”, Shanti Narayan, S. Chand & company ltd Reprint 1994.
- 2) Calculus vol.I, S.Arumugam and Issac, New Gamma Publications.
- 3) “Vector Algebra and Analysis”, T.K. ManicavachagomPillay and S. Narayanan, S.V. Publications
- 4) “Allied Mathematics” - S.G.Venkatachalapathy - Margham Publications
- 5) “Mathematics – III” - A.Singaravelu

e-Resources:

1. https://www.youtube.com/watch?v=27_2DmQ0ZSU&feature=youtu.be
2. https://www.whitman.edu/mathematics/calculus_online/chapter15.html
3. https://www.whitman.edu/mathematics/calculus_online/chapter16.html
4. <http://www.mecmath.net/calc3book.pdf>

Outcomes:

The learners would have the ability to,

- | | | |
|-----|---|----|
| CO1 | Solve problems on successive differentiation and Leibnitz theorem. | K5 |
| CO2 | Find partial derivative of a function of two functions and realize the maxima and minima of function of two variables | K2 |
| CO3 | Understand and apply the concepts on envelopes Cartesian formula for radius of curvature | K2 |
| CO4 | Using the vector identities, directional derivatives and divergence of a vector point function are evaluated easily. | K3 |
| CO5 | Identify areas in Mathematics and other fields where Calculus is useful. | K2 |

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	1	3	3	3	2	3
CO2	3	3	3	2	3	3	3	2	3	3
CO3	3	3	3	3	2	3	3	2	3	3
CO4	3	2	3	1	3	3	3	1	2	3
CO5	3	3	3	1	3	3	3	3	1	3

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is **2.66** which is **HIGH**

SEM: I
Credit:3
Hours/Week:7
Total Hours:84

B.Sc. MATHEMATICS
Mathematical Statistics – I
CODE: U1R2STAC1
Employability

ALLIED COURSE:1
Int.Marks:25
Ext.Marks:75
Max.Marks:100

Objectives:

- To Provide some basic statistical tools, statistical decision theory and statistical inference, useful for the future research
- The student will see the Central Limit Theorem (CLT) arise from experimental data
- To specify and test the fit of multiple time series model specifications for the same data
- To forecast the future values of the time series
- To identify the nature of the phenomenon represented by sequence of observation

Unit I – Statistics- Introduction and Presentation of Data (17 hours)

Definition of statistics - importance and scope of statistics - limitations of statistics - statistical data - primary and secondary data - frequency distribution - discrete and continuous frequency distribution - histogram - frequency polygon.

Unit II - Measures of Averages and Dispersion (17 hours)

Definition - requisites - Arithmetic Mean - Geometric Mean - Harmonic Mean -Median - Mode. (definition, merits & demerits, graphical location, problems based on raw, discrete and continuous frequency distribution)

Measures of Dispersion : Definition - range - Quartile Deviation - Mean Deviation - Standard Deviation and Coefficient of Variation (Definition, Merits and Demerits, problems based on Raw, Discrete and Continuous Frequency Distribution)-Concept of Skewness and Kurtosis.

Unit III – Law of Large Numbers and Central Limit Theorem (17 hours)

Tchebycher's inequality - convergence in probability - weak law of large numbers - Bernoulli's, Markoff's Khinchin's Theorem (Statement only) – Borel Cantelli lemma without proof. Central limit theorem - De-Moivre's Laplace theorem - Lindeberg - Levy theorem - Liapounoff's central limit theorem - relation between central limit theorem and weak law of large numbers - applications of central limit theorem-Cramer's Theorem.

Unit IV - Time series (17 hours)

Concept - components of a time series - trend - periodic changes - irregular component - analysis of time series - additive and multiplicative models - uses of times series - measurement of trend - graphical method - semi average - methods of curve fitting by principles of least squares - growth curves and fitting - moving averages - measurement of seasonal fluctuations - simple averages - ratio to trend - ratio to moving average - link relative methods - related problems.

Unit V - Correlation and Regression (16 hours)

Correlation : scatter diagram - correlation coefficient - Karl Pearson - limits for correlation coefficients - probable error - properties of correlation - Rank correlation - limits for rank correlation coefficient spearman rank correlation coefficient (Related Problems).

Regression : Lines of regression - regression curves - regression coefficients - properties of regression coefficients (Related Problems).

Text Books:

- [1] "Fundamentals of Mathematical Statistics" - S.C.Gupta, V.K.Kapoor - Sultan Chand & sons - New Delhi,1994.
- [2] "Fundamentals of Applied Statistics" - S.C.Gupta, V.K.Kapoor - Sultan Chand & Sons - New Delhi,2007.

Unit I : Chapter 1 : Sec. 1.2 , 1.4 and 1.5 [1]& Chapter 2 : Sec. 2.1 and 2.2 [1]
Unit II : Chapter 2 : Sec. 2.3 - 2.9 [1]& Chapter 3 : Sec. 3.1 – 3.7, 3.8.1, 3.13 - 3.14 [1]
Unit III : Chapter 6 : Sec. 6.13 - 6.16 [1]& Chapter 8 : Sec. 8.10 [1]
Unit IV : Chapter 2 : Sec. 2.1 - 2.5.4. [2]
Unit V : Chapter 3 : Sec. 3.1 - 3.4, 3.6, 3.9, 3.10 [2]

Reference Books:

[1] “ Fundamentals of Mathematical Statistics” by S.C Gupta and V.K Kapoor.
[2] “Fundamentals of Applied Mathematical Statistics” by S.C. Gupta and V.K. Kapoor.

e-Resources:

1. <https://www.youtube.com/watch?v=nE67uQPfRbI&feature=youtu.be>
2. <https://libguides.reading.ac.uk/mathematics/e-resources>

Outcomes:

The learners would have the ability to,

CO1	Calculate and apply measures of location and measures of dispersion for grouped & ungrouped data.	K5
CO2	Calculate and apply the measures of Averages and Dispersion.	K5, K3
CO3	Compute Correlation coefficients and to estimate Regression Analysis.	K5
CO4	Deals with consistency of data and independence of Attributes.	K2
CO5	Use the variation in Time series.	K3

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	1	3	3	2	3	3
CO2	3	2	2	2	3	3	3	2	2	3
CO3	3	3	3	3	2	3	2	2	3	2
CO4	2	2	3	1	3	3	3	2	3	3
CO5	3	3	3	1	3	3	3	3	3	2

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is **2.6** which is **HIGH**

**ஜெ.ஜெ.கலைஅறிவியல் கல்லூரி (தன்னாட்சி)
சிவபுரம்,புதுக்கோட்டை
(2022-2023 முதல் சேர்க்கைபெற்றவர்களுக்குஉரியது)**

தலைப்பு : இடைக்கால இலக்கியம், இலக்கணம் வரிசைஎண்: உ2
பருவம் : இரண்டாம் பருவம் தாள் குறியீடு : U1R2TL2
பிரிவு : பகுதி I தமிழ் மதிப்புப் புள்ளி: 3
மதிப்பெண் : CIA -25, EA -75 கற்றல் நேரம் : 5 மணி

நோக்கம் :

1. இடைக்கால இலக்கியம் கூறும் தத்துவங்களை மீட்டறியச் செய்தல்
2. சமயக்கல்வி மூலம் ஏற்படும் நல்லிணக்க நெறிகளைப் புரிந்து கொள்ளச் செய்தல்
3. வைணவ இலக்கியத்தை வாழ்வியலோடு ஒப்பிட்டு அறிய தூண்டுதல்
4. சிற்றிலக்கியத்திலுள்ள இலக்கியச் சுவையை எதார்த்த வாழ்வியலோடு பொருத்திப் பார்க்கச் செய்தல்
5. புதினம் உணர்த்தும் மனித உளவியல் கூறுகளை மதிப்பீடு செய்தல்

கூறு : 1 இலக்கியவரலாறு, இலக்கணம்

(13hrs)

பக்தி இலக்கியங்கள் - பன்னிரு திருமுறைகள், நாலாயிர திவ்ய பிரபந்தம், சிற்றிலக்கியங்கள், இலக்கணம் - வழு, வழாநிலை, வழுவமைதி, இரட்டைக்கிளவி.

கூறு : 2 சைவ இலக்கியம்

(13hrs)

திருஞானசம்பந்தர் தேவாரம் - திருச்சாயக்காடு பதிகம் (பாடல் : 100 -110), திருநாவுக்கரசர் - திருமழப்பாடி பதிகம் (பாடல் : 2567 - 2576), திருவாசகம் - அன்னைப்பத்து

கூறு : 3 வைணவ இலக்கியம்

(12hrs)

திருமங்கை ஆழ்வார் - பெரிய திருமொழி – பெரிய திருமந்திரத்தின் மகிமை ,(பாடல் :948 – 957) நாச்சியார் திருமொழி – குயிற்பத்து (பாடல் 545 -556) பூதத்தாழ்வார் - இரண்டாம் திருவந்தாதி (பாடல்: 2182 - 2191)

கூறு : 4 சிற்றிலக்கியங்கள், சித்தர் இலக்கியம்

(12hrs)

முத்துக்குமாரசாமி பிள்ளைத் தமிழ் - முத்தப்பருவம் (4ஆவது பாடல்), வருகைப்பருவம் (2ஆவது பாடல்) திரிகூடராசப்பக் கவிராயர் - குறவஞ்சி வசந்தவள்ளி பந்தாடியது (முதல் நான்கு பாடல்கள்), தமிழ் விடுதாது – (151-160) கண்ணிகள், பட்டினத்தார் பாடல்கள் - நெஞ்சொடு புலம்பல் (1 – 10 பாடல்கள்)

கூறு : 5 நாவல்

(10hrs)

பனையடி-ஆசிரியர் இரா.செல்வம்

பாடநூல்கள் :

பக்தி இலக்கிய வரலாறு	-	துறை வெளியீடு
பனையடி (நாவல்)	-	இரா.செல்வம் NCBH சென்னை.

இப்பாடத்தினைக் கற்பதின் மூலம் மாணவர்கள் பெறும் பயன்கள்

Sl.No	Course Outcomes	Knowledge Level
CO1	பக்தி இலக்கியத் தோற்றத்தின் அவசியத்தை மீட்டுணர்வர்	K2
CO2	சைவ இலக்கியங்களில் காணலாகும் உயிர்ப்பரவல் உயிர் தோற்றம் போன்றவற்றை அறிவியல் கருத்துகளோடு பொருத்தி காண்பர்	K4
CO3	வைணவம் கூறும் மனிதத்தைப் போற்றி பின்பற்றுவர்	K3
CO4	சிறநிலக்கியச் சுவையறிந்து செய்யுள் நலம் பாராட்டுவர்	K6
CO5	புதினம் காட்டும் புனிதத்தை உணர்ந்து பாத்திரப் பண்புகளைத் திறனாய்வுச் செய்வர்	K4

இடைக்கால இலக்கியம், இலக்கணம்						U1R2TL2					
Course Out comes	Programme Outcomes (POs)					Programme Specific Outcomes(PSOs)					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	2	3	2	2	3	2	3	1	2.3
CO2	3	3	3	1	2	3	3	3	2	2	2.4
CO3	2	2	2	1	2	2	2	2	1	1	1.7
CO4	3	2	2	3	2	3	3	2	3	2	2.5
CO5	3	3	3	3	2	3	3	2	3	2	2.7
Mean Overall Score											2.3
Result											Medium

SEMESTER II
(For the candidates admitted from the academic year 2022-2023)

Title of the Course : POETRY AND ENGLISH FOR COMMUNICATION
Category of the Course : PART-II ENGLISH
Course Code :U2R2EL2
Nature of the Skill :Reading and Study Skill
Marks : CIA : 25 +Ext: 75 = 100 **Hrs / Week : 05**
Credits : 03 **Total Inst. Hrs :60**

OBJECTIVES

1	To give the learner a feel of poetry
2	To promote a perception of the aesthetic use of language
3	To revise a few aspects of grammar from a communicative angle
4	To provide reading and writing practice
5	To give practice in free writing.

UNIT - I **(Inst. Hrs :13)**

Shakespeare : All the World's a Stage...(lines 139-166)
(The seven stages of Man)
As You Like It(Act II Scene VII)
Henry Wordsworth Longfellow : A Psalm Of Life
Oliver Goldsmith : The Village Schoolmaster
Rabindranath Tagore : Where the mind is without Fear
John Masefield Laugh and Be Merry

UNIT – II **(Inst. Hrs :12)**

Rupert Brooke The Soldier
P.B. Shelley Ozymandias
Judith Wright The Company of Lovers
Sarojini Naidu The Queen's Rival

UNIT - III **(Inst. Hrs:15)**

Verbs –Infinitives and Gerunds - Modals - Tenses – Active &Passive - Direct and Indirect -
Clauses – Analysis and Transformation of sentences – Concord and Governance– Word
order.

UNIT - IV **(Inst. Hrs :10)**

Note making – Arguments for and against Issues - Summarizing

UNIT - V

(Inst. Hrs :10)

Developing outlines into paragraphs - Report Writing – Writing Curriculum Vitae

Web Resources

<https://poemanalysis.com/william-shakespeare/all-the-worlds-a-stage/>

<https://poemanalysis.com/henry-wadsworth-longfellow/a-psalm-of->

[life/#:~:text=Henry%20Wadsworth%20Longfellow-](#)

Summary, matter of number and figures

<https://www.toppr.com/guides/english/english-literature/ozymandias-summary/>

<https://www.litcharts.com/poetry/rupe-rt-brooke/the-soldier>

<http://sumanabala.blogspot.com/2012/10/queens-rival-sarojini-naidu.html?m=1>

OUTCOME :

Course Name - Poetry and English for Communication	Course Code - U2R2EL2	Knowledge Level
On completion of the course, students will be able to		
CO1	interpret and appreciate simple poems.	K5
CO2	categorise and respond to aspects of poetic language like deviance, figures of speech, etc.	K4
CO3	perceive features like tense and time reference, polysemy, ambiguity and paraphrase relations.	K5
CO4	construct ordinary dialogues , conversations and group discussions to suit real life situations.	K6
CO5	design communications in writing on ordinary matters like narrating an incident, describing a process, etc.	K6

Relationship Matrix for CO, PO, PSO

Title of the Course : Poetry and English for Communication						Course code : U2R2EL2					
Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)					Mean Score of COs
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	
CO – 1	3	2	2	3	1	3	3	3	2	3	2.5
CO – 2	3	1	1	2	3	3	2	2	3	1	2.1
CO – 3	2	3	1	2	2	3	3	2	3	2	2.3
CO – 4	2	1	3	3	2	2	3	2	3	2	2.3
CO – 5	1	3	2	2	3	3	1	2	3	3	2.3
	Mean Overall Score										2.30
	Result										HIGH

SEM: II
Credit: 5
Hours/Week: 5
Total Hours: 75

B.Sc. MATHEMATICS
Calculus - II
CODE: U2R2MACC2
Employability

CORE COURSE:2
Int. Marks: 25
Ext. Marks: 75
Max. Marks: 100

Objectives:

- To introduce the fundamental principles, concepts and knowledge in the areas of integral calculus
- To gain the working knowledge of definite integrals
- To inculcate the basics of integration and their applications
- To study some applications of definite integrals
- To understand the concepts of Beta, Gamma functions

Unit 1 : Integration

(15 hours)

Integration of $f'(x)/f(x)$, $f'(x)f(x)$, $[(px+q)/\sqrt{ax^2+bx+c}]$, $[\sqrt{(x-a)/(b-x)}]$, $[\sqrt{(x-a)(b-x)}]$, $1/[\sqrt{(x-a)(b-x)}]$, $1/(\cos x + b \sin x + c)$, $1/(\cos^2 x + b \sin^2 x + c)$, Integration by parts-Bernoulli's Formula- Definite integral - Properties of Definite integral.

Unit II : Evaluation of Reduction Formulae

(15 hours)

Reduction formulae for i) $\int x^n e^{ax} dx$ ii) $\int x^n \cos ax dx$ iii) $\int \sin^n x$ (or $\cos^n x$) dx iv) $\int \tan^n x dx$ v) $\int \sin^m x \cos^n x dx$

Unit III : Multiple integrals

(15 hours)

Definition of double integrals- Evaluation of double and triple integrals- Change of order of integration - applications of multiple integrals- triple integrals – Simple problems only.

Unit IV : Change of variables in double and triple variables

(15 hours)

Change of variables- Jacobians- Change of variables in double and triple variables - Transformation from Cartesian to polar co-ordinates and Spherical co-ordinates.

Unit V: Beta and Gamma Functions

(15 hours)

Beta functions - Definition - properties of Beta function - Gamma function - Definition - properties of Gamma function - relations between Beta and Gamma functions-Improper integrals.

Text Books.

[1] T.K. Manickavasagam Pillai & others, “Integral calculus” S.V. Publications, 2011.

Unit I : Chapter 1: Pg. No. 43-77, 99-100 [1]

Unit II : Chapter 1, Sec 13 fully [1]

Unit III : Chapter 5, Sec. 2.1 to 2.2, 3-6 [1]

Unit IV : Chapter 6 fully

Unit V : Chapter 7, Sec. 2.1 to 5 of [1]

Reference Books:

- 1) Shanti Narayan, “Differential & Integral Calculus” S. Chand & company ltd Reprint 1994.

e-Resources:

1. https://youtu.be/ksS_yOK1vtk
2. https://www.youtube.com/watch?v=9_m36W3cK74

Outcomes:**The learners would have the ability to,**

CO1	Apply the fundamental concepts and integrate the given function	K3
CO2	Calculate the arc length, Area, Volume by using integrals	K5
CO3	Formulate net signed area	K6
CO4	Determine the mass of a function	K5
CO5	Check the convergence of a definite integral	K4

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create**Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes**

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	1	1	3	2	2	3	2
CO2	3	3	3	2	3	3	3	2	1	2
CO3	1	3	1	3	2	3	3	2	3	3
CO4	3	2	1	1	3	3	3	2	2	1
CO5	1	3	3	1	3	3	3	2	2	1

3-Strong; 2-Medium; 1-LowMean Overall Relationship is 2.3 which is **HIGH**

SEM: II
Credit:5
Hours/Week:5
Total Hours:75

B.Sc. MATHEMATICS
Probability and Statistics
CODE: U2R2MACC3
Employability

CORE COURSE:3
Int.Marks:25
Ext.Marks:75
Max.Marks:100

Objectives:

- *To create and analyze the elementary Probability models*
- *Students should have understood the concepts of Random variable with its properties*
- *To review the basic concepts and knowledge in Mathematical expectation and Generating functions*
- *To know the limitations of Discrete distributions*
- *To create confidence in solutions of the Index number*

Unit I - Theory of Probability (15 hours)

Concept of probability - definition of various terms - classical probability - empirical probability - Axiomatic Probability - Definition of probability sample space - Probability of an event - Addition theorem - Multiplication theorem - Conditional probability - Independence of events - Baye's theorem (related problems).

Unit II - Random Variables (15 hours)

Introduction of random variables - Distribution function and its properties - Discrete random variables - Probability mass function - Discrete distribution function - Continuous random variables - Probability density function - Joint probability law - Joint probability mass function - Joint probability distribution function - Marginal distribution function - Joint probability density function - Conditional distribution function - Conditional probability density function (Related Problems).

Unit III - Mathematical Expectation and Generating Function (15 hours)

Mathematical expectation : Expectation of a function of a random variable - Addition and Multiplication theorem of expectation - Expectation of a linear combination of random variables - Variance - Variance of linear combination of random variables – covariance. Generating Functions: - Moment generating function - Theorems on moment generating function (Simple Problems).

Unit IV - Discrete Distributions (15 hours)

Binomial Distribution : Moments - Recurrence relation - Mean deviation about mean - Mode - Moment generating function - Additive property - Characteristic function - Recurrence relation for cumulants - Fitting of binomial.

Poisson Distribution : Moments - Mode - Recurrence relation - Moment generating function - Characteristic function - Additive property - Fitting of poisson.

Unit V: Index numbers (15 hours)

Concept - construction of index numbers - calculation of index number - simple and weighted (Kelly's and Wall's are excluded) - quantity index number, value index number, chain indices - criteria of good index number (unit, time, factor reversal test) - classification of index number - cost of living index number (construction and uses) - uses of index number - limitation of index number.

Text Books:

- [1] "Fundamental of Mathematical Statistics"- S.C.Gupta and V.K.Kapoor - Sultan Chand & Sons - New Delhi(2002)
- [2] "Business Mathematics and Statistics", PA. Navanitham, Jai Publishers (2014)

Unit I : Chapter 3, Sec. 3.1, 3.3-3.5, 3.8.5, 3.9-3.12, [1]&Chapter 4, Sec. 4.2 [1]

Unit II : Chapter 5, Sec. 5.1 - 5.5.5 [1]

Unit III: Chapter 6, Sec. 6.1 – 6.6.1. [1]

Unit IV: Chapter 8, Sec. 8.4 - 8.4.12, 8.5-8.5.9 [1]

Unit V : Chapter 10, Pg. 444 – 471, P.g 486 [2]

Reference Books:

- 1) “Mathematical Statistics” - J.N. Kapur, H.C.Saxena - S.Chand& Company Ltd - New Delhi(2011)
- 2) “ Statistical and Numerical Methods”, by P.R. Vittal and V. Malini, Margham Publications

e-Resources:

1. <https://youtu.be/ZmCBF5JXOPM>
2. <https://youtu.be/OTVv28caCw>

Outcomes:

The learners would have the ability to,

CO1	Appreciate the importance of probability and statistics in computing.	K3
CO2	Use appropriate statistical methods in Random variables.	K3
CO3	Calculate mathematical expectation and derive the Moment Generating Function.	K5
CO4	Derive mathematical expectation, binomial, poisson distribution.	K6
CO5	Use continuous distribution develop the Normal distribution and Exponential distribution.	K3

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	1	3	2	3	3	3
CO2	3	3	3	2	3	3	3	2	3	1
CO3	2	3	3	3	2	2	3	2	1	3
CO4	3	2	1	1	3	3	3	2	3	2
CO5	2	3	3	1	3	3	2	3	3	3

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is 2.52 which is **HIGH**

SEM: II
Credit:3
Hours/Week:5
Total Hours:75

B.Sc. MATHEMATICS
R- Programming
CODE: U2R2STAC2P
Employability

ALLIED COURSE:2
Int.Marks:40
Ext.Marks:60
Max.Marks:100

Objectives

- *To learn the open source platform*
- *To be familiar with the workspace in R*
- *To understand the Arithmetic and Logarithms concepts*
- *To interact with Vectors*
- *To work with matrices in R-programming*

List of Topics:

Diagrammatic and Graphical Representation:

1. Simple Bar Diagram
2. Multiple Bar Diagram
3. Line Diagram
4. Pie Diagram
5. Histogram and Frequency Curve
6. Box Plot
7. Scatter Diagram

Measures of Central Tendency:

8. Arithmetic Mean
9. Median
10. Mode
11. Geometric Mean
12. Harmonic Mean

Measures of Dispersion:

13. Range
14. Quartile Deviation
15. Mean Deviation
16. Standard Deviation

Reference Books:

[1] **“The Book of R - A First Course in Programming and Statistics”**, Tilman M. Davies, William Pollock publisher 2016.

Reference Books:

[2] **“R Fundamentals and Programming Techniques”**, Thomas Lumley, R Core Development Team and UW Dept of Biostatistics, 2006.

[3] **“Hands-On Programming with R”**, Garrett Golemund, O'Reilly Media publication, 2014.

e-Resources:

1. <https://youtu.be/mqaffQZ-U3M>
2. https://cran.r-project.org/doc/contrib/Paradis-rdebuts_en.pdf

Outcomes:

The learners would have the ability to,

CO1	Understand the basics in R-Programming	K2
CO2	Handle big data analysis using R- Programming	K3
CO3	Apply R- Programming for vectors	K3
CO4	Appreciate the statistical perspective in R- Programming	K4
CO5	Create the R- Programming documentations	K6

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	2	3	1	3	3	3	2	3
CO2	3	3	3	2	3	1	3	2	3	3
CO3	3	1	3	3	2	3	1	2	3	1
CO4	3	2	3	1	3	3	3	1	2	3
CO5	3	3	2	1	1	3	3	3	1	2

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is 2.4 which is **HIGH**

SEM: II
Credit:3
Hours/Week:5
Total Hours:75

B.Sc. MATHEMATICS
Mathematical Statistics – II
CODE: U2R2STAC3
Employability

ALLIED COURSE:3
Int.Marks:25
Ext.Marks:75
Max.Marks:100

Objectives

- To Update and expand the basic knowledge of mathematical statistics
- To review the basic concepts and knowledge in Continuous distribution
- To Learn about theory of estimation
- To study about the Test of significance using t- test and chi-square test.
- To apply the techniques of ANOVA

Unit I - Continuous distributions

(15 hours)

Normal distribution : A limiting form of binomial - Characteristics of normal - Mode - Median - Moment generating function - Cumulants generating function - Moments - Linear combination of independent normal variate is also a normal variate - Points of inflexion of normal curve - Mean deviation from mean - Fitting of normal

Rectangular distribution : Moments - Moment generating function - Characteristic function

Exponential distribution : Moment generating function - Moments lack of memory property.

Unit II – Continuous and Sampling distribution

(15 hours)

Gamma distribution : Moment generating function - Moments - Cumulants generating function - Additive property

Beta distribution: 1st kind and 2nd kind - Constants.

Chi-square distribution : Chi-square variate - Derivation - Moment generating function –

Cumulants generating function - Characteristic function - Additive property.

Student's t- distribution : Derivation – Constants.

F distribution: F-statistic-derivation of Snedecor's F-distribution- Constants- Mode.

Unit III – Theory of Estimation

(15 hours)

Concepts - characteristics of estimator - Consistency - Unbiasedness - Efficiency - sufficiency - Invariance property of consistent estimators - Methods of estimation - Maximum likelihood estimator - Moments - Properties of these estimators based on these two methods.

Unit IV - Test of Significance

(15 hours)

Concept of testing of hypothesis - Statistical hypothesis - Test of a statistical hypothesis - Population - Sample - Parameter - Statistic - Sampling distribution - Standard error - Null and Alternative hypothesis (concept only) - Types of error - Level of significance - power of the test - One tail and Two tail test - Test of significance based on normal and students t-distribution for mean, proportion and correlation.

Test of significance: Chi-square test : Goodness of fit, independence of attributes

Unit V – Analysis of Variance

(15 hours)

F-test -Variance Introduction - Analysis of variance – One way classification – Two way classification.

Text Books :

[1] “Fundamentals of Mathematical statistics” - S.C.Gupta, V.K.Kapoor - Sultan Chand & Sons - New Delhi(2002).

[2] “ Fundamentals of Applied Statistics” - S.C.Gupta, V.K.Kapoor - Sultan Chand & Sons - New Delhi(2007).

Unit I : Chapter 9, Sec. 9.2 – 9.3.4, 9.8 – 9.8.1 [1]

Unit II :Chapter9, Sec. 9.5 – 9.7 , Chapter 15, Sec. 15.1 – 15.3.5 [1]&

Chapter 16, Sec. 16.2, 16.2.1, 16.2.4, 16.3.1 - 16.3.4, 16.5 – 16.5.3 [1]
Unit III :Chapter 17, Sec. 17.1 - 17.2.4, 17.6 - 17.6.3. [1]
Unit IV :Chapter 18, Sec. 18.2 - 18.2.7 & Chapter 14, sec 14.3- 14.8.4 [1]
Unit V : Chapter 5, 5.1 – 5.2.3, 5.3 – 5.3.3 [2]

Reference Books:

- [1] “Mathematical statistics” - J.N.Kapur, H.C.Sazena - S.Chand& Company Ltd. - New Delhi.
 [2]“Introduction to Biostatistics” – Sokal and Rohlf – Toppan Co. Japan
 [3]. “Primer of Biostatistics” – Stanton A. Clantz – The McGraw Hill Inc. Newyork.

e-Resources:

1. <https://youtu.be/cjTgyRUaD1s>
2. <http://dcpehvpm.org/E-Content/Stat/FUNDAMENTAL%20OF%20MATHEMATICAL%20STATISTICS-S%20C%20GUPTA%20&%20V%20K%20KAPOOR.pdf>

Outcomes:

The learners would have the ability to,

CO1	Acquire the knowledge of index numbers.	K3
CO2	Identify the characteristics of continuous distribution.	K2
CO3	Develop the skills pertinent to practice Theory of estimation.	K5
CO4	Understand the concepts of testing of hypothesis.	K2
CO5	Collect and analyze data using ANOVA.	K6

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	3	3	1	3	2	3	2	2
CO2	3	3	3	2	3	2	3	2	3	3
CO3	2	1	3	3	2	3	2	2	3	2
CO4	3	2	3	1	3	3	2	1	2	2
CO5	2	3	3	1	3	2	2	3	1	2

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is 2.38 which is **HIGH**

Environmental Studies

Semester – II	
Title of The Course : Environmental Studies	Category of The Course : Ability Enhancement Compulsory Course(AECC)
Course Code : U2R2AECC1	Nature of The Skill : Skill Development
Marks : CIA : 25 + Ext: 75 = 100	Hrs / Week : 02
Credits : 2	Total Inst. Hrs : 24

COURSE OBJECTIVES

- To impart basic knowledge of various natural resources
- To understand the importance of ecosystem and biodiversity in Earth
- To be effective in Pollution & waste water management of our nation.
- To acquire knowledge on environmental issues & social issues.
- To gain the knowledge about population management.

UNIT I

Inst. Hrs: 5

The Multidisciplinary nature of environmental studies: Definition, scope and importance - Need of public awareness. **Natural Resources:** Renewable and non-renewable resource, Natural resources and associated problems.

- a) Forest resources: Use and over-exploitation, Deforestation, Case studies. Timber extraction, mining, Dams and their effects on forests and tribal people.
- b) Water resources: use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams - benefits of and related problems.
- c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- d) Food resources: World food problems, changes caused by agriculture and overgrazing, Effects of modern agriculture, fertilizer and pesticide problems, Water logging, salinity, case studies.
- e) Energy resources: Growing energy needs, Renewable and non-renewable energy resources, use of alternate energy sources, case studies

- f) Land resources: land as a resource, land degradation, man induced landslides, soil erosion desertification.
- Role of an individual in conservation of natural resources.
 - Equitable use of resources for sustainable lifestyle.

UNIT – II

Inst. Hrs: 5

Ecosystem: Concept of an ecosystem - Structure and functions of an ecosystem – Producers, Consumers and Decomposers - Energy flow in the ecosystem - Ecological succession - food chains, food webs and ecological pyramids. Types, characteristic feature, structure and functions of the following ecosystem: Forest ecosystems, Grassland ecosystems, Desert ecosystems and Aquatic ecosystems (Ponds, streams, lakes, rivers, oceans, estuaries).

Biodiversity:

Introduction - Definition: Genetic, species and ecosystem diversity. Biogeographical classification of India, Value of biodiversity: Consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, national and local levels, India as a mega-diversity nation, Hot-spots of biodiversity, Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India, Conservation of biodiversity: *In-situ* conservation and *ex-situ* conservation.

UNIT - III

Inst. Hours: 5

Environmental pollution:

Definition, causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Radioactive pollution.

Solid waste management:

Causes, effects and control measures of urban and industrial waste, Role of an individual in the prevention of pollution - pollution case studies - disaster management: floods, earthquakes, cyclones, landslides.

Effects of Fireworks:

Firework and celebrations, Health Hazards, Types of Fire, Firework and safety.

UNIT - IV

Inst. Hrs: 5

Social issues and Environment:

From unsustainable to sustainable development, urban problems related to energy, water conservation, rainwater harvesting, watershed management. Resettlement and rehabilitation of people: Its problems and concerns - case studies, Environment ethics; issues and possible solutions. Climate change, Global Warming, Acid Rain, Ozone Layer Depletion, Nuclear Accidents and Holocaust - Case studies.

Wasteland reclamation, Consumerism and waste products, Environment Protection Act - Air (prevention and control of pollution) Act, Water (prevention and control of pollution) Act - Wildlife Protection Act, Forest Conservation Act, Issues involved in the enforcement of environmental legislation. Public awareness.

UNIT - V

Inst. Hrs: 5

Human Population and the Environment:

Population growth, variation among nations

Population explosion - Family Welfare Programmes;

Environment and human health

Human Rights and Value Education;

HIV/AIDS, Women and Child Welfare;

Role of Information Technology in Environment and Human Health;

Case Studies

Field work:

- Visit to a local area to document environmental assets: river / forest / grasslands/ hill / mountain.
- Visit to a local polluted site-Urban/Rural/Industrial/Agricultural
- Study of common plants, insects, birds.
- Study of simple ecosystems-pond, river, hill slopes, etc.

REFERENCE:

- Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
- Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013, India, Email:mapin@icenet.net (R)
- Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
- Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p

- Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
- Manigandan G . 2020 Environmental Studies, PoGo publications, Trichy ISBN: 978-93-83069-36-1

Relationship matrix for CO,PO and PSO

Course Outcome	Programme Outcome (PO)					Programme Specific Outcome (PSO)					
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO5	Mean
CO-1	3	2	2	2	2	3	3	2	2	3	2.4
CO-2	2	3	3	2	2	2	2	2	2	2	2.2
CO-3	2	3	3	1	3	2	3	3	3	3	2.6
CO-4	3	2	3	1	2	2	2	2	2	2	2.1
CO-5	2	2	2	3	3	3	1	3	3	2	2.4
Mean Overall Score											2.34
Result											High

COURSE OUTCOMES

Environmental Studies Course Code : U2R2AECC1		
S. No.	Course Outcome	Knowledge Level
Upon completion of course, the students will be able to		
CO - 1	Understand the resources of environment and its importance in detail.	K2
CO - 2	Get an in-depth knowledge about the nature of biodiversity.	K3
CO - 3	Apply their knowledge about solid waste management.	K3
CO - 4	Analyze various social issues & determining the solution from this.	K4
CO - 5	acquire knowledge on Human Population from case studies	K6

ஜெ.ஜெ. கலைஅறிவியல் கல்லூரி (தன்னாட்சி)
சிவபுரம், புதுக்கோட்டை

2022 - 2023ஆம் கல்வியாண்டு முதல் சேர்க்கைப்பெற்ற மாணவர்களுக்குரியது

தலைப்பு	: காப்பிய இலக்கியம், இலக்கணம்	வரிசைஎண்	: ௨3
பருவம்	: மூன்றாம் பருவம்	தாள் குறியீடு	: U1R2TL3
பிரிவு	: பகுதி I தமிழ்	மதிப்புப் புள்ளி:	3
மதிப்பெண்	: CIA -25, EA -75	கற்றல் நேரம்	: 5 மணி

நோக்கம்

1. தமிழில் காப்பியங்களை அறிமுகப் படுத்துதல்.
2. காப்பியங்கள் கூறும் வாழ்வியல் அறங்களை உயர்த்துதல் .
3. புராணங்கள் வழி வாழ்வியல் தத்துவத்தை மதிப்பீடு செய்தல்.
4. சமயக் காப்பியத்தின் மூலம் வாழ்வின் பன்முகத் தன்மையை வரையறுத்துக் கூறுதல்.
5. காப்பிய, நாடக இலக்கியங்களுக்கு இடையிலான ஒற்றுமை வேற்றுமைகளைப் பகுப்பாய்ச் செய்தல்.

கூறு : 1 இலக்கிய வரலாறு, இலக்கணம் (12hrs)

இலக்கிய வரலாறு - ஐம்பெருங்காப்பியங்கள், ஐஞ்சிறுகாப்பியங்கள் - பிறகாப்பியங்கள்
நாடகத்தின் தோற்றமும் வளர்ச்சியும், இன்றைய நிலை. இலக்கணம் - மூவிடப் பெயர்கள்
தன்மை, முன்னிலை, படர்க்கை

கூறு : 2காப்பியங்கள் (12hrs)

சிலப்பதிகாரம் - கனாத்திறம் உரைத்தகாதை, மணிமேகலை - கந்திற்பாவை வருவது உரைத்த
காதை, சீவகசிந்தாமணி - சுரமஞ்சரியார் இலம்பகம் - 42 பாடல்கள் (1-7, 14, 17 - 36, 44 -
47,57 - 62, 64 - 68).

கூறு :3 இதிகாசம்,புராணம் (12hrs)

கம்பராமாயணம் - குகப்படலம் (1 - 23 பாடல்கள்) பெரிபுராணம் - சண்டேசுவர நாயனார் புராணம்
(1, 8 - 12, 30 - 42, 51 - 59) வில்லிபாரதம் - உலாகன் தூது சருக்கம் (1 - 21 பாடல்கள்)

கூறு : 4 பிறகாப்பியங்கள் (12hrs)

இராவணக் காவியம் - விந்தக்காண்டம் - தசரதப்படலம் (1-27 பாடல்கள்).
சீறாப்புராணம் - ஈத்தங்குலை வரவழைத்தப் படலம் (1-17 பாடல்கள்), தேம்பாவணி - நீர்வரம்
அடைந்தபடலம் (1-19 பாடல்கள்)

கூறு : 5 நாடகம் (12hrs)

பதினெட்டாம் போர் (கூவாகத்தில் கொலுவிருக்கும் அரவான் புகழ் கூறும் நாடகம்),
ஆசிரியர் முத்துவேலழகன்.

பாடநூல்கள் :

சிலப்பதிகாரம் மூலமும் உரையும்	-	ச.வே.சுப்பிரமணியன், கங்கைபுத்தகநிலையம்
மணிமேகலை மூலமும் உரையும்	-	ஸ்ரீசந்திரன், வர்த்தமானன்பதிப்பகம், சென்னை
சீவகசிந்தாமணி மூலமும் உரையும்	-	ஞா.மாணிக்கவாசகம், மாணிக்கவாசகர் பதிப்பகம்,
இராவணகாவியம்	-	புலவர் குழந்தை, வேலாபதிப்பகம், ஈரோடு
பதினெட்டாம் போர்	-	முத்துவேலழகன், சீதைபதிப்பகம், சென்னை

இப்பாடத்தினைக் கற்பதின் மூலம் மாணவர்கள் பெறும் பயன்கள்

Sl.No	Course Outcomes	Knowledge Level
CO1	காப்பிய இலக்கியத்தின் தலைமைப் பண்புகளை அறிவர்	K2
CO2	காப்பியக் கதைகள் வழி அறச்சிந்தனைகளை உணர்வர்	K2
CO3	பல்வேறு வகையான காப்பிய வடிவங்களில் இடம்பெறும் பொருண்மையைப் பாகுபடுத்தி அறிவர்	K3
CO4	சமூக வளர்ச்சிக்குச் சமயக் காப்பியங்களின் பங்களிப்பை மதிப்பீடு செய்வர்.	K5
CO5	தமிழ்ச் சமூக வளர்ச்சியோடு நாடகக்கலை தொடர்ந்து வரும் காலச்சூழலை ஆராய்ந்துணர்வர்	K6

காப்பிய இலக்கியம், இலக்கணம்						U1R2TL3					
Course Out comes	Programme Outcomes (POs)					Programme Specific Outcomes(PSOs)					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	2	3	3	3	3	3	3	3	2	2.7
CO2	3	3	3	2	2	3	3	2	2	1	2.4
CO3	3	2	3	2	3	2	3	3	3	1	2.5
CO4	3	3	3	2	3	3	3	3	2	1	2.6
CO5	3	2	3	3	2	3	3	2	2	1	2.4
Mean Overall Score											2.52
Result											High

SEMESTER III

(For the candidates admitted from the academic year 2022-2023)

Title of the Course	: DRAMA AND ENGLISH FOR COMPETITIVE EXAMINATIONS		
Category of the Course	: PART-II ENGLISH		
Course Code	: U3R2EL3		
Nature of the Skill	: Comprehension and Appreciation		
Marks	: CIA : 25 +Ext: 75 = 100	Hrs / Week	: 05
Credits	: 03	Total Inst. Hrs	:60

OBJECTIVES:

1	To introduce the learner to living language in dramatic situations
2	To enable the student to see the special features of dramatic language
3	To give the class practice in proper reading with correct stress and intonation
4	To enable the learner to perceive the structure of paragraphs and passages
5	To promote skills in dialogue writing and precise writing and make them see the elements of sentence and paragraph structure

UNIT I

(Inst. Hrs :15)

Shakespeare

- 1.Trial for a Pound of Flesh
(The Merchant of Venice)
2. Forum scene (Julius Caesar)
His Majesty Masquerades

Edith M Barling

UNIT II

(Inst. Hrs :15)

Fritz Karinthy
Anton Chekov
Ella Adkins

The Refund
The Bear
The Expected

UNIT III

(Inst. Hrs :14)

Note making - Precis Writing – Rhetorical features – The dynamics of communication – Field – Mode – Interpersonal context – Greetings, Partings, Fillers and Tonal variations

UNIT IV

(Inst. Hrs :06)

Dialogue Writing - Writing Interviews -Group Discussions

UNIT V

(Inst. Hrs :10)

Writing Speeches – Welcome – Introductory and thanks giving – Constructing arguments for and against propositions for debates.

<https://www.literaturewise.in/mdl/mod/page/view.php?id=269>
<https://www.sparknotes.com/shakespeare/juliuscaesar/section7/>
<http://sujarithasaravanan.blogspot.com/2019/10/refund-fritz-karinty-summary.html?m=1>
<https://educationallodge.com/2021/01/the-bear-by-anton-chekhov-summary-characters-questions-answers.html>.

Course Name – Drama and English for Competitive Examinations	Course Code - U3R2EL3	Knowledge Level
On completion of the course, students will be able to		
CO1	analyse the force of dramatic language, improve their histrionic abilities and pronunciation skills.	K5
CO2	perceive subtle differences in language use and their tonal implications.	K5
CO3	develop skills of logical reasoning and become capable of identifying markers of coherence and concord.	K6
CO4	construct ordinary dialogues and conversations in real life.	K6
CO5	estimate ideas and situations and ways of expressions to construct written messages.	K5

Title of the Course : DRAMA AND ENGLISH FOR COMPETITIVE EXAMINATIONS						Course code : U3R2EL3					
Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)					Mean Score of COs
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	
CO – 1	3	2	1	3	3	2	3	3	3	2	2.5
CO – 2	2	3	1	2	2	2	3	1	2	3	2.1
CO – 3	2	3	1	2	3	3	3	2	3	3	2.5
CO – 4	2	3	3	1	2	3	2	3	3	2	2.4
CO – 5	2	3	2	3	3	2	3	2	2	3	2.5
	Mean Overall Score										2.30
	Result										HIGH

SEM: III
Credit:5
Hours/Week:5
Total Hours:75

B.Sc. MATHEMATICS
Number Theory
CODE: U3R2MACC4
Skill Development

CORE COURSE:4
Int.Marks:25
Ext.Marks:75
Max.Marks:100

Objectives

- *To impart knowledge in the basic concepts of number theory*
- *To Study and apply various properties of and relating to the integers including the Well-Ordering Principle and greatest common divisors*
- *To Identify certain number theoretic functions and their properties*
- *To Understand the concept of congruence and use various results related to congruences*
- *To Identify how number theory is related to and used in cryptography.*

Unit I: Mathematical Induction (15 hours)

Introduction - Well ordering principle - Mathematical induction - Binomial coefficient - Pascal's triangle - Basis representation theorem

Unit II: Divisibility Theory (15 hours)

Divisibility - Division algorithm - Greatest common divisor - Euclidean algorithm - least common multiple - Fibonacci sequence - Lamé's theorem - Kronecker's theorem - The linear Diophantine equation.

Unit III: Primes and their Distribution (15 hours)

Introduction - Prime number - Fundamental theorem of arithmetic - Sieve of Eratosthenes - The Goldbach conjecture

Unit IV: Theory of Congruence (15 hours)

Congruence - Basic properties of congruence - Residue system - Tests of divisibility - Linear congruence - Solvability condition of a system of linear congruence.

Unit V: Fermat's Theorem (15 hours)

Introduction - Fermat's factorization method - Fermat's little theorem - Wilson's theorem - Euler's factorization method.

Text Book:

[1]. "ELEMENTARY NUMBER THEORY" David M. Burton , TATA Mc Graw – Hill Edition

Unit I: Chapter: 1 Section: 1.1 to 1.2

Unit II: Chapter: 2 Sections: 2.1 to 2.5

Unit III: Chapter: 3 Sections: 3.1 to 3.3

Unit IV: Chapter: 4 Sections: 4.1 to 4.4

Unit V: Chapter: 5 Sections: 5.1 to 5.5 Chapter: 7 Sections 7.2 to 7.4

Reference Books:

- 1) "Number Theory", Hari Kishan, Krishna's Publications, 12th edition 2017.

- 2) “An Introduction to the theory of Numbers”, Ivan Niven and H. Zuckerman.
- 3) “Elements of Number Theory”,
Kumaravelu. Sand Susheela Kumaravelu, Nagarcoil, 2002.
- 4) “Beginning Number Theory”, Neville Robinns, 2nd Ed., Narosa Publishing House Pvt. Ltd., Delhi, 2007.

e-Resources:

1. <https://nptel.ac.in/courses/111/103/111103020/>
2. <https://nptel.ac.in/courses/111/101/111101137/>

Outcomes:

The learners would have the ability to,

- | | | |
|-----|--|----|
| CO1 | Prove results involving divisibility and greatest common divisors | K2 |
| CO2 | Find integral solutions to specified linear Diophantine Equations | K5 |
| CO3 | Determine whether the integer is prime or composite by using the Sieve of Eratosthenes | K3 |
| CO4 | Solve systems of linear congruence's | K2 |
| CO5 | Apply Euler-Fermat's Theorem to prove relations involving prime numbers | K5 |

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	3	3	1	1	3	3	2	3
CO2	3	3	3	2	3	3	3	2	3	2
CO3	2	3	1	3	2	3	1	2	3	3
CO4	3	2	3	1	1	2	3	1	2	1
CO5	1	3	3	1	3	3	3	3	1	2

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is 2.3 which is **HIGH**

SEM: III
Credit:5
Hours/Week:6
Total Hours:90

B.Sc. MATHEMATICS
Analytical Geometry (3D) and Trigonometry
CODE: U3R2MACC5
Skill Development

CORE COURSE:5
Int.Marks:25
Ext.Marks:75
Max.Marks:100

Objectives:

- To understand fundamental aspects of Two and Three Dimensional Analytical Geometry
- To develop logical and systematic computational skills
- To understand and apply the concepts cone and cylinder
- To find the expansions of exponential functions, logarithmic functions, trigonometric functions, and hyperbolic trigonometric functions
- To Apply the formulas for derivatives and integrals of the hyperbolic functions

Unit I: Plane (18 hours)

Standard equation of a plane - intercept form - normal form - plane passing through given points - angle between planes - plane through the line of intersection of two planes - equation of the straight line - shortest distance between two skew lines - equation of the line of shortest distance.

Unit II: Sphere (18 hours)

Sphere - Standard equation - length of a tangent from any point - sphere passing through a given circle- intersection of two spheres - Tangent plane.

Unit III: Cone and Cylinder (18 hours)

Equation of surface- Right circular cone- Intersection of Straight line and a quadratic cone-Tangent plane and normal- Conditions for the plane to touch the Quadric cone- Equation of cylinder- Equation of right circular cylinder.

Unit- IV: Trigonometrical Expansions (18 hours)

Expansion: Power of $\sin\theta$, $\cos\theta$ and $\tan\theta$ in terms of powers of θ - Expansion of $\sin^n\theta, \cos^n\theta, \sin^n\theta\cos^m\theta$ - Expansions of $\sin\theta$, $\cos\theta$ in a series of ascending power of θ .

Unit- V Hyperbolic Functions (18 hours)

Definition of Hyperbolic functions- formulae involving Hyperbolic functions- Relations between hyperbolic & circular functions- Expansion of $\sinh x$, $\cosh x$, $\tanh x$ in powers of x - Expansion of inverse hyperbolic functions $\sinh^{-1} x$, $\cosh^{-1} x$, $\tanh^{-1} x$.

Text Books:

- [1] T.K. Manickavasagam Pillai & Others, "Analytical Geometry" S.V. Publications - 2013 Revised Edition.
[2] T.K. Manichavasagam Pillai and others "Trigonometry" S.V Publications 2011.

Unit I :Chapter 2, Sec. 1 to 9 & Chapter 3, Sec. 1 to 8 [1]

Unit II :Chapter 4, Sec. 1 to 8 [1]

Unit III:Chapter 5, Sec 1 to 5, 8 [1]

Unit IV: Chapter 3 Sec 4 & 5 [2]

Unit V : Chapter 4 full [2]

Reference Books:

- 1) Duraipandian and Chatterjee, "Analytical Geometry" S.Chand & Co, June 1997.

- 2) Trigonometry, S.Arumugam and Issac, New Gamma Publications.
- 3) Trigonometry, P.R.Vittal, Margham Publications.

e- Resources:

1. <https://www.khanacademy.org/math/geometry-home/analytic-geometry-topic>
2. https://csumec.merlot.org/teacher_resources/trigresources.htm

Outcomes:

The learners would have the ability to,

CO1	Apply the fundamental concepts of two and three dimensional	K3
CO2	Identify and realize the maxima and minima of function of two variables.	K2
CO3	Understand and apply the concepts on Cone and Cylinder.	K2
CO4	Expand $\cos^n \theta, \sin^n \theta, \cos^m \theta, \sin^m \theta$ for different values of n and m	K5
CO5	Expand $\sin x, \cos x, \tan x$ in terms of x and form equations with trigonometric roots.	K5

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	1	3	1	3	2	3	2	3
CO2	3	3	3	2	3	3	3	2	3	2
CO3	1	3	1	3	2	3	2	2	3	3
CO4	3	2	3	1	3	3	3	1	2	2
CO5	1	3	3	1	3	3	3	3	1	3

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is **2.42** which is **HIGH**

SEM:III
Credit:3

B.Sc. MATHEMATICS
ALLIED PHYSICS -I

Allied Course :4
Int.Marks:25

Hours/Week:5
Total Hours:80

CODE: U3R2PHAC4
SKILL DEVELOPMENT

Ext.Marks:75
Max.Marks:100

Objectives:

- To understand the concepts of strength of materials
- To have a Knowledge in the field of Viscosity.
- To learn about the basic concepts of heat transformation
- To study the basic concepts of Thermodynamics
- To study the principle of Optics.

UNIT- I: Properties of Matter

Young's modulus–Rigidity modulus – Bulk modulus – Poisson's ratio(definition alone)–Bending of beams–Expression for bending moment–determination of young's modulus–uniform and non-uniform bending Expression for Couple per unit twist – work done in twisting a wire – Torsional oscillations of a body– Rigidity modulus of a wire and M.I. of a disc by torsion pendulum.

UNIT-II Viscosity

Viscosity–Viscous force–Co-efficient of viscosity–units and dimensions–Poiseuille's formula for co-efficient of viscosity of a liquid – determination of co-efficient of viscosity using burette and comparison of Viscosities–Bernoulli's theorem– Statement and proof–Venturimeter–Pitot tube.

UNIT-III: Conduction, Convection and Radiation

Newton's law of cooling–Specific heat capacity of a liquid by cooling – thermal conduction–coefficient of thermal conductivity by Lee's disc method. Convection process – Lapse rate – green house effect – Black body radiation –Planck's radiation law – Rayleigh Jean's law, Wien's displacement law –Stefan's law of radiation.(No derivations).

UNIT-IV: Thermodynamics

Zeroth and I Law of thermodynamics–II law of thermodynamics – Carnot's engine and Carnot's cycle – Efficiency of a Carnot's engine – Entropy – Change in entropy in reversible and irreversible process – change in entropy of a perfect gas–change in entropy when ice is converted into steam.

UNIT-V: Optics

Electro magnetic Spectrum –Spectral response 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

BOOKS FOR STUDY:

1. Properties of matter – Brijlal and Subramanyam – Eurasia Publishing Co., New Delhi, III Edition 1983
2. Elements of properties of matter – D.S. Mathur – S. Chand & Company Ltd, New Delhi, 10th Edition 1976
3. Heat and Thermodynamics – Brijlal & Subramanyam, S. Chand & Co, 16th Edition 2005

BOOKS FOR REFERENCE:

1. Heat and Thermodynamics – D.S. Mathur, Sultan Chand & Sons, 5th Edition 2014.
2. Optics and Spectroscopy – R. Murugesan, S. Chand and co., New Delhi, 6th Edition 2008.
3. A text book of Optics – Subramanyam and Brijlal, S. Chand and co., New Delhi, 22nd Edition 2004.
4. Optics – Sathyaprakash, Ratan Prakashan Mandhir, New Delhi, VIIth Edition 1990.

ONLINE RESOURCE

1. https://books.google.co.in/books/about/Modern_Physics.html?id=0Z9WzAEACAAJ&redir_esc=
2. <https://www.google.com/search?q=electricity+and+magnetism+ppt&oeq=&aqs=cchrome.0.69i59i450l8.4739569j0j15&sourceid=chrome&ie=UTF-8>

COURSE OUTCOMES

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

- | | |
|--|----|
| CO-1. Acquire the knowledge in Properties of Matter. | K1 |
| CO-2. Understand the Concepts in Viscosity. | K2 |
| CO-3. Use Conduction Properties to study about Newton Law of cooling. | K3 |
| CO-4. Understand Basic concepts of Thermodynamics. | K2 |
| CO-5. Outline the various Phenomenons like Interference and diffraction. | K3 |

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	3	1	3	3	2	2	1
CO2	3	3	3	2	2	3	2	3	2	3
CO3	3	3	2	3	2	3	3	2	3	2
CO4	3	2	3	3	3	3	3	2	2	3
CO5	3	3	2	2	3	3	2	3	3	3

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is 2.34 which is HIGH

Ability Enhancement Compulsory Course- 2(AECC-2)

மதிப்புக்கல்வி (Value Education)

பாடத்திட்டம் (U3R2AECC2)

ஒரு வாரத்திற்குரிய பாட மணி நேரம் : 2

தாளின் மதிப்பு : 2

அலகு I-வாழ்வியல் தத்துவம்

வாழ்க்கை (ப.2; , குறள் -629) –வாழ்வின் நோக்கம் (ப.61 ,குறள்-46) –
வாழ்க்கைத் தத்துவம் (ப.61-69 , குறள் 131, 226) – இயற்கை நியதி (ப.123-125, குறள்
374) –பிற உயிர் பேணல் (ப.137, 138 குறள் – 322, 327) - இயற்கை வளம் காத்தல் (நூல் :
குணநலப்பேறும் , சமுதாயநலனும் ப.109 – 112, குறள் – 16 , 20 ,1038)

அலகு II- தனிமனிதப்பண்புகள்

பண்பாடு (ப.132-136, குறள் – 72, 431) எண்ணம் ஆராய்தல் (ப.70-77, 666, 282, 467) –
ஆசை சீரமைத்தல் (ப.79-86, குறள் – 158,305,306,314) –கவலை ஒழித்தல் (ப.99-108,
குறள் 629) –வாழ்த்தும் பயனும் - (ப.109-114 குறள் - 3) –நட்புநலம் (ப.115-117 குறள் 786)
அன்பும் கருணையும் (ப.131, குறள் - 76) தனி மனித அமைதி (ப.118, குறள் 318)

அலகு III-சமுதாயமதிப்புகள் (குணநலப்பேறும்இ சமுதாயநலனும்)

குடும்பம் (ப.87, குறள் 45) –குடும்ப அமைதி (ப.87-90, குறள் - 1025) –சமுதாயம்
(ப.93, குறள் -446) –வாழ்க்கை முறை (ப.101-103, குறள் - 952) –சகோதரத்துவம் (ப.103-
106, குறள் - 807) பெண்ணின் பெருமை (ப.99-100, குறள் 56) ஐவகைக் கடமைகள்
(தான் குடும்பம் , சுற்றம் , ஊர் , உலகம்) (ப.93-96 குறள் – 43, 981) பொருளாதாரம்
(ப.122-123 குறள் - 754) –சுகாதாரம் (ப.123, குறள் 298) –கல்வி (ப.113, 123, 127, 128 குறள்
400) –அரசியல் (ப.124, குறள் 691) மக்களின் பொறுப்பு (ப.125, குறள் 37) உலக
அமைதி (ப.103-106 குறள் - 572)

அலகு IV-மனவளமேம்பாடு

மனவளம் (ப.46, குறள் - 457) –உயிரும் , மனமும் (ப.23) உயிரின்
இயக்கமையம் (ப.26) வான் காந்தம் (இறைஞானமும் , முழமைப்பேறும் (ப . 34-39)
சீவகாந்தம் (ப. 26) –கருமையம் (ப. 27, 126,130) மனிதன் செயல் (ப.47) – சுரக்கிப்
பதிவுசெய்தல் (ப.47) விரித்துக்காட்டல் (ப.48) –மனஅலைச் சுழல் (ப.49) –மன
இயக்கப்படி நிலைகள் (ப. 51-53) தியானம் (ப. 55- 60, குறள் 261 , 266, 270)
ஆன்மீகமதிப்பு (ப.44, 45 குறள் 423)

அலகு V-உடல் நலம் பேணல்

உடலமைப்பு (ப. 5-7) , உடலின் மூவகை இயக்கநிலைகள் (ப. 8-10)
உடலுக்கும் , உயிருக்குமுள்ள உறவு (ப. 7-8) நோய்க்கான இயற்கைக்
காரணங்கள் – செயற்கைக் காரணங்கள் (ப. 11-14 குறள் 941) நோய் நீக்கும்
முறைகள் (ப. 14,15 குறள் - 948 , 949) ஐந்தில் அளவுமுறை (ப. 15-19) , எளியமுறை
உடற்பயிற்சி (ப 20 – 22)

பார்வை நூல்கள்(References)

1. * மனவளக்கலையோகா , உலகசமுதாயசேவாசங்கம் ,
வேதாத்திரிபதிப்பகம் , 156 காந்திரோடு, ஈரோடு- 635001.
Website:www.vethathiri.org. முதற்பதிப்பு 2008 விலைரூ. 70:-
 2. ** குணநலப்பேறும் , சமுதாயநலனும் , உலகசமுதாய சேவாசங்கம் ,
வேதாத்திரிபதிப்பகம், 56 காந்திரோடு, ஈரோடு- 635001. Website:www.vethathiri.org
இரண்டாம் பதிப்பு ஆகஸ்ட் 2008.
 3. இறைஞானமும், முழமைப்பேறும் - அலகு- 4 (வான்காந்தம் (34)) சீவகாந்தம்
(67) கருமையம் (77)
- * அலகு 1,2,4,5 ஆகியவற்றிற்கானபாடத்தட்டம் அமைந்துள்ளபக்கங்களும் ,குறள்
எண்ணும் அடைப்புக்குறிக்கள் கொடுக்கப்பட்டுள்ளன.
- ** அலகு 3க்கான பாடத்தி;ட்டம் அமைந்துள்ளபக்கங்களும், குறள் எண்ணும்
அடைப்புக்குறிக்கள் கொடுக்கப்பட்டுள்ளன.

**ஜெ. ஜெ. கலை அறிவியல் கல்லூரி (தன்னாட்சி)
சிவபுரம், புதுக்கோட்டை**

2022 – 2023ஆம் கல்வியாண்டு முதல் சேர்க்கப்பட்ட இளநிலைபட்ட மாணவர்களுக்குரியது

தலைப்பு : சங்க இலக்கியம், இலக்கணம், அறிவியல் தமிழ்	வரிசைஎண் : உ ³
பருவம் : நான்காம் பருவம்	தாள் குறியீடு : U1R2TL ³⁴
பிரிவு : பகுதி I தமிழ்	மதிப்புப் புள்ளி: 3
மதிப்பெண் : CIA -25, EA -75	கற்றல் நேரம் : 5 மணி

நோக்கம்

1. சங்க இலக்கியங்களின் பின்னணிச் சூழலை அறியச் செய்தல்
2. தமிழர்களின் வாழ்வியல் கூறுகளைப் புரிந்துகொள்ளல்
3. அகவாழ்வியலில் கடைபிடிக்க வேண்டிய நெறிமுறைகளை வகுத்துக் கொள்ளல்
4. தமிழ் இலக்கியத்தோடு அறிவியல் தமிழை ஒப்பிட்டு வேறுபடுத்தியும் பார்க்கும் திறன் வளர்த்தல்
5. ஆக்கத்திறனைக் கண்டறியும் வழிமுறைகளை உருவாக்குதல்

கூறு: 1 இலக்கியவரலாறு, இலக்கணம்

சங்க இலக்கிய வரலாறு – பதினெண் மேற்கணக்கு நூல்கள் - செம்மொழி இலக்கிய வரலாறு – செம்மொழிப் பண்புகள், செம்மொழி நூல்கள் இலக்கணம் - வழு, வழுவமைதி, வழாநிலை

கூறு: 2 அகஇலக்கியம்

குறுந்தொகை—ஐந்துபாடல்கள் – (பாடல்-38,54,68,74,82)

நற்றிணை - இரண்டுபாடல்கள் (பாடல் 156, 228)

ஐங்குறுநூறு - இளவேனிற்பத்து

அகநானூறு- இரண்டுபாடல்கள் (23,31) பாலைத்திணைதலைவிக் கூற்று

கலித்தொகை— இரண்டுபாடல்கள்(126,132) தோழிக்கூற்று

கூறு: 3 புறமும் பாட்டும்

பத்துப்பாட்டு—மதுரைக்காஞ்சி58வரிகள் (பாடல் 725 – 782)

புறநானூறு - 10 பாடல்கள் 201, 202,236,237,247,308,373,382,386,400

கூறு: 4 அறிவியல் தமிழ் - செயல்முறை

அறிவியல் தமிழ் - கலைச்சொல்லாக்கம் - ஒலிபெயர்ப்பு-சீர்மையாக்கம் - துரப்படுத்தம்

கூறு: 5 அறிவியல் தமிழ் - பயன்முறை

அறிவியல் கட்டுரைகள் - துறைச் சார்ந்தக் கருத்துகளைத் தமிழில் (கலைச்சொற்களுடன்) உருவாக்கப் பயிற்சி அளித்தல்

பாடநூல்கள் :

சங்கத்தமிழ்	-	தஞ்சைதமிழ்ப்பல்கலைக்கழகவெளியீடு
அறிவியல் தமிழ் கலைச்சொல்லாக்கம்	-	முனைவர் இராதாசெல்லப்பன்

Sl.No	Course Outcomes	Knowledge Level
C01	இலக்கியங்களின் மூலம் வாழ்வியல் நெறிமுறைகளை அறிவர்	K2
C02	ஐந்திணையின் பாகுபாட்டுத் தன்மையை இனங்காண்பர்	K2
C03	னிமனித ஒழுக்கம் பண்பாட்டு நெறிமுறைகளை வளர்த்துக் கொள்வர்	K3
C04	அறிவியல் தமிழின் அவசியத்தை உய்த்துணரும் ஆற்றல் பெறுவர்	K3
C05	படைப்பாளனுக்குரியத் தகுதியை வளர்த்துக் கொள்வதற்கானப் பயிற்சிகளை மேற்கொள்வர்	K6

சங்க இலக்கியம், இலக்கணம், அறிவியல் தமிழ்						U1R2TL4					
Course Out comes	Programme Outcomes (POs)					Programme Specific Outcomes(PSOs)					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO³	PSO5	
CO1	2	2	3	3	3	3	3	2	3	1	2.5
CO2	3	2	2	3	3	2	3	3	3	1	2.5
CO3	3	2	3	1	3	2	3	3	2	1	2.3
CO4	2	1	2	3	3	3	3	3	3	3	2.6
CO5	3	2	2	3	2	3	3	2	3	3	2.6
Mean Overall Score											2.5
Result											High

SEMESTER IV
(For the candidates admitted from the academic year 2022-2023)

Title of the Course	: SHORT STORIES AND ENGLISH FOR COMPETITIVE EXAMINATIONS		
Category of the Course	: PART-II ENGLISH		
Course Code	: U4R2EL4		
Nature of the Skill	: Reading and Analytical Skills		
Marks	: CIA : 25 +Ext: 75 = 100	Hrs / Week	: 05
Credits	: 03	Total Inst. Hrs	: 60

OBJECTIVES

1	To enable the learner to respond to short fiction.
2	To sensitize the learner to identify the elements of fiction.
3	To enable the learner to write short reviews paragraph and essays.
4	To give them practice in contextualized letter writing, making presentations and writing reports.
5	To enable them to identify error zones and correct sentences.

UNIT – I **(Inst. Hrs :10)**

Tagore	Suba
R.K. Narayan	An Astrologer's Day
Anita Desai	A Devoted Son

UNIT - II **(Inst. Hrs :10)**

O' Henry	A Retrieved Reformation
Arthur Conan Doyle	The Blue Carbuncle
Maupassant	Simon's Pa

UNIT - III **(Inst. Hrs :10)**

Paragraph Writing - General Essay, Book review , Film review

UNIT – IV **(Inst. Hrs :15)**

Replying to Letters - Letter Chains - Presentations –Visuals and their interpretations - Reports

UNIT - V **(Inst. Hrs :15)**

Error Zone Identification - Correction of Sentences ,Speech Writing – Expository Argumentative, Descriptive and Narrative – Fallacies and their avoidance.

<https://bookishloom.wordpress.com/2018/10/01/subha-by-rabindranath-tagore-my-read/#:~:text=Tagore%20portrayed%20the%20everyday%20agonies,central%20character%2C%20%27Subha%27>
<https://smartenglishnotes.com/2019/05/31/the-white-flower-by-r-k-narayan-summary-explanations-and-question-solutions/>
<https://digestablewords.wordpress.com/short-story-a-devoted-son-by-anita-desai/>
<https://www.toppr.com/guides/english/english-literature/ozymandias-summary/>
<https://americanliterature.com/author/guy-de-maupassant/short-story/simons-papa>

Course Name- Fiction and English for Competitive Examinations.	Course Code - U4R2EL4	Knowledge Level
On completion of the course, students will be able to		
CO1	adapt study habits to face competitive examinations with confidence.	K6
CO2	appraise the themes and structure of fiction through independent reading .	K5
CO3	justify their perceptions on characters ,themes and aspects of fiction.	K5
CO4	categorize and correct errors in usage.	K4
CO5	design the style of communication as needed.	K6

Title of the Course : Fiction and English for Competitive Examinations.						Course code : U4R2EL4					
Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)					Mean Score of COs
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	
CO – 1	2	3	3	2	1	2	3	3	3	2	2.4
CO – 2	3	2	1	3	2	3	2	3	2	2	2.3
CO – 3	1	2	2	1	3	3	3	2	3	3	2.3
CO – 4	2	3	3	2	3	2	3	2	2	2	2.4
CO – 5	2	3	3	2	3	2	2	3	2	1	2.3
	Mean Overall Score										2.34
	Result										HIGH

SEM: IV
Credit:5
Hours/Week:5
Total Hours:75

B.Sc. MATHEMATICS
Fourier Series and Laplace Transforms
CODE: U4R2MACC6
Employability

CORE COURSE:6
Int.Marks:25
Ext.Marks:75
Max.Marks:100

Objectives:

- To give a systematic study of Fourier Series
- To understand the basic concepts of half range Fourier series
- To solve differential equations by applying Laplace Transform
- To differentiate between Laplace transforms and Fourier transforms
- To learn the techniques of inverse Laplace transforms

Unit I: Fourier series (15 hours)

Definition - To determine the value of a_0 , a_n , and b_n , Fourier Series expansion of periodic functions with period 2π , Fourier series- Even and Odd Functions – Properties of Odd and Even functions.

Unit II: Fourier series - Half range (15 hours)

Definition - Development in Cosine Series - Development in Sine series - Formulas problems of Half range Fourier Sine series and Half range Cosine series - Change of interval.

UNIT III: Fourier Transform (15 hours)

Complex form of a Fourier integral formula- Theorems- Fourier Integral theorem- Properties of Fourier transforms- Fourier Cosine and Sine transforms- Properties

UNIT IV: Laplace Transform (15 hours)

Definition – sufficient conditions for the existence of the Laplace transform – Laplace transform of periodic function- some general theorem – evaluating certain integrals.

UNIT V: Inverse Laplace Transform (15 hours)

The inverse transforms– solving ODE using Laplace transform – solving system of Differential equations using Laplace transform with constant coefficients and variable coefficients

Text Books:

[1] “Calculus Vol III” by T.K. Manicavachagom Pillay and S. Narayanan, S.V Publications(2011)

Unit I: Chapter 6 – Sec 1, 2, 3, 3.1, 3.2

Unit II : Chapter 6 - Sec 4, 5.1,5.2, 6, 6.1

Unit III: Chapter 6- Sec 9, 9.1-9.3, 10, 11.1-11.2, 12

Unit IV: Chapter 5- Sec 1, 1.1, 1.2, 2,3,4,5

Unit V: Chapter 5- Sec 6, 7,8, 9,10,11

Reference Books:

- 1) M.L.Khanna, “ Differential Calculus”, Jaiprakashnath and Co., Meerut – 2004.
- 2) M.K. Venkataraman, “ Engineering Mathematics”, S.V. Publication, 1985, Revised Edition.
- 3) James Ward Brown & Ruel V. Churchill(2011). *Fourier Series and Boundary Value Problems*. McGraw-Hill Education.

4) Charles K. Chui (1992). *An Introduction to Wavelets*. Academic Press.

e- Resources:

1. <https://ocw.mit.edu/courses/18-03sc-differential-equations-fall-2011/pages/unit-iii-fourier-series-and-laplace-transform/>
2. <https://www.khanacademy.org/math/integral-calculus/ic-diff-eq>

CO1	Learn Fourier series, Bessel's inequality, term by term differentiation and integration of Fourier series	K2
CO2	Know about applications of Fourier transforms to boundary value problems.	K3
CO3	Familiarize with Fourier transforms of functions	K4
CO4	Know about piecewise continuous functions, Dirac delta function, Laplace transforms and its properties	K3
CO5	Solve ordinary differential equations using Laplace transforms.	K5

Outcomes:

The learners would have the ability to,

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	3	3	1	2	3	3	2	3
CO2	3	3	1	2	3	3	3	2	3	3
CO3	3	3	3	3	2	3	2	2	3	3
CO4	3	2	3	1	3	3	3	1	2	3
CO5	3	2	2	1	3	1	3	3	1	3

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is 2.46 which is **HIGH**

SEM: IV
Credit:5
Hours/Week:5
Total Hours:75

B.Sc. MATHEMATICS
Differential Equations
CODE: U4R2MACC7
Entrepreneurship

CORE COURSE:7
Int.Marks:25
Ext.Marks:75
Max.Marks:100

Objectives

- *To study the methods used to solve differential equation of first order and second order*
- *To provide the standard methods for solving differential equations as well as methods based on the use of Laplace transforms*
- *To develop numerical methods for solving differential equations*
- *To identify the correct tools and techniques to deal with unknown situations*
- *To Demonstrate the ability to integrate knowledge and ideas of Partial differential equations*

UNIT I: ODE –First Order

(15 hours)

Type F: Exact differential equations – Sufficient condition – practical rule for solving an exact differential equation – equations solvable for dy/dx – equations solvable for y – equations solvable for x – Clairaut's form – equations that do not contain x explicitly – equations that do not contain y explicitly – equations homogeneous in x and y .

UNITII: ODE – Second Order

(15 hours)

Definition – the operator D – complementary function of a linear equation with constant coefficients – particular integral – general method of finding P.I – special methods for finding P.I.

UNIT III: Applications of First Order

(15 hours)

Growth, Decay and Chemical Reactions- Flow of Water from an Orifice- Falling bodies and other Rate problems-the Brachistochrone – Fermat's and Bernoulli- Simple Elective circuits

UNIT IV: PDE First Order

(15 hours)

Classification of integrals - derivation of PDE – by elimination of constants – by elimination of an arbitrary function – Lagrange's method –special method: standard form – Clairaut's form – equations reducible to the standard form – Charpit's method.

UNIT V : PDE Second Order

(15 hours)

Some useful results – linear differential equations with constant coefficients- auxiliary equation – working rule for finding C.F. –Example of Type- I.

TEXT BOOKS

[1] M.D. Raisinghania, Ordinary& Partial Differential Equations. S. Chand& Co.,

[2] S. Narayanan, "Differential Equations", S. Viswanathan Publishers, 2011.

Unit I: Chapter II Sections 6.1 -6.4 and Chapter IV: Sections 1-4 [2]

Unit II: Chapter V Sections 1-4 [2]

Unit III: Chapter IIISections 1-6. [2]

Unit IV: Chapter XII All sections. [2]

Unit V: Chapter IV Sections 4.1-4.5[1].

Reference Books:

1. Kandasamy.P.andK.Thilagavathi,MathematicsforB.Sc.,VolIII
S.ChandandCo.,NewDelhi.

–2004–

2. ArumugamandIssac-
DifferentialEquationsandApplications,NewGammaPublishingHouse,2014.

3. M.L.Khanna, “Differential Calculus”, Jaiprakashnath and Co., Meerut – 2004.

e- Resources:

1. <https://ncert.nic.in/pdf/publication/exemplarproblem/classXII/mathematics/leep209.pdf>
2. <http://www.math.toronto.edu/selick/B44.pdf>

Outcomes:

The learners would have the ability to,

CO1	Understand the genesis of ordinary as well as partial differential equations	K2
CO2	Learn various techniques of getting exact solutions of certain solvable first order differential equations and linear differential equations of second order.	K3
CO3	Learn about solution of first order linear partial differential equations using Lagrange's method	K3
CO4	Know how to solve second order linear partial differential equations with constant coefficients	K2
CO5	Formulate mathematical models in the form of ordinary and partial differential equations on problems arising in physical, chemical and biological disciplines.	K5

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	1	3	3	3	2	3
CO2	3	3	3	1	3	3	3	2	2	1
CO3	3	3	3	3	2	2	3	2	3	3
CO4	3	2	3	1	3	2	3	1	2	3
CO5	3	3	3	1	3	1	3	3	1	2

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is 2.48 which is **HIGH**

SEM:IV
Credit:3

B.Sc. MATHEMATICS
ALLIED PHYSICS -II

Allied Course :5
Int.Marks:40

Hours/Week:3
Total Hours:96

CODE: U4R2PHAC5P
SKILL DEVELOPMENT

Ext.Marks:60
Max.Marks:100

Objectives:

- To understand the concepts of strength of materials
- To have a Knowledge in the field of Viscosity.
- To learn about the basic concepts of heat transformation
- To study the principle of Optics.
- To study the basic concepts of analog and digital electronics

List of Experiments (Any 12 Experiments)

1. Non uniform bending–Pin and Microscope Method
2. Surface Tension and Inter facial Tension–Drop Weight Method
3. Coefficient of Viscosity of Liquid using graduated burette.
4. Specific heat capacity of liquid by Cooling Method.
5. Lee's Disc –Thermal Conductivity of Bad Conductor.
6. Spectrometer–Grating–Normal incidence method.
7. Spectrometer–Refractive index of Solid Prism(A,D and μ)
8. Newton's Rings–Radius of curvature of a convex lens
9. Sonometer –Verification of Three laws.
10. Carey Foster's Bridge–Specific Resistance.
11. Carey Foster's Bridge–Temperature Coefficient
12. EMF of thermocouple–Direct Deflection method
13. Characteristics of a junction diode
14. Construction of a full wave rectifier.
15. Meter Bridge –Determination of Specific Resistance.
16. AND, OR and NOT logic gates–verification of truth table using Discrete components.
17. De Morgan's theorem and Boolean Algebra
18. Air Wedge – Thickness of Insulation

REFERENCE BOOKS:

1. A text book of practical Physics–M.N. Srinivasan and others–Sultan Chand & Sons, New Delhi.
2. Practical Physics, S. Somasundaram, V. Balachandran, S. Padmanathan, Apsara Publications, Tiruchirapalli.

3. Practical Physics – A.DhanaLakshmi and K.R. Paramasivam – Apsara Publication, Tiruchirapalli.

Online Resource:

1. https://www.google.com/search?q=physics+practical+book+linked+list&rlz=1C1VDKB_enIN954IN954&oq=Physics+practical+book+link&aqs=chrome.1.69i57j33i160.17971j0j7&sourceid=chrome&ie=UTF-8

COURSE OUTCOMES:

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

- CO-1.** Acquire the knowledge in Properties of Matter. **K1**
CO-2. Understand the Concepts in Viscosity. **K2**
CO-3. Use Conduction Properties to study about Newton Law of cooling. **K3**
CO-4. Understand Basic concepts of analog and digital electronics **K2**
CO-5. Outline the various Phenomenons like Interference and diffraction. **K3.**

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	3	1	3	3	2	2	1
CO2	3	3	3	2	2	3	2	2	2	3
CO3	3	3	2	3	2	3	3	2	3	2
CO4	3	2	3	1	2	3	3	1	2	3
CO5	3	3	2	1	2	3	2	3	1	3

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is **2.22** which is **HIGH**

SEM:IV
Credit:3

B.Sc. MATHEMATICS
ALLIED PHYSICS –III

Allied Course :6
Int.Marks:25

Hours/Week:3
Total Hours:80

CODE: U4R2PHAC6
SKILL DEVELOPMENT

Ext.Marks:75
Max.Marks:100

Objectives:

- To understands the concept of resistances of materials.
- To studies the basic concepts of electromagnetic effect.
- To learns about the atomic and Nuclear Physics.
- To studies the basic concepts of Transistor, diodes.
- To learns the basic concepts of logic gates.

UNIT I: Current Electricity

(Inst Hrs: 16)

Ohm's law – Law of resistance in series and parallel – Specific resistance – capacitors – capacitors in series and parallel – Kirchhoff's laws – Wheatstone's network – condition for balance (Seminar) – Carey-Foster's bridge – measurement of resistance – measurement of specific resistance – Potentiometer – measurement of Specific resistance – calibration of Voltmeter.

UNIT II: Electromagnetism

(Inst Hrs: 16)

Electromagnetic Induction – Faraday's laws – Lenz law – Self- Inductance – Mutual Inductance – Coefficient of Coupling A.C. Circuits – Mean value – RMS value – Peak value – LCR in series circuit (ICT) – impedance – resonant frequency – sharpness of resonance.

UNIT III: Atomic and Nuclear Physics

(Inst Hrs: 16)

Bohr's atom model – radius energy – Atomic excitation – Ionization potential – Frank and Hertz Method – Nucleus – Nuclear properties – Mass defect – Binding energy. Radio isotopes – Uses of radio isotopes – Nuclear fusion and Nuclear fission – X-rays – Production – properties – Derivation of Bragg's law (Seminar) – uses in industrial and medical fields.

UNIT IV: Analog Electronics

(Inst Hrs: 16)

Semiconductor – PN junction diode – Bridge rectifier – Zener diode – Regulated power supply. Transistor – Working of a transistor – CE Configuration – current gain relationship between β and β – Transistor Characteristics – CE Configuration only (Assignment)

UNIT V: Digital Electronics

(Inst Hrs: 16)

Number system – Decimal – Binary – Octal and Hexadecimal system – Double Dabble method – Binary addition, subtraction and multiplication – conversion of one number system to another number system. Logic gates – OR, AND, NOT, XOR, NAND and NOR gates – truth tables – Half adder and Full adder – Laws and theorems of boolean's algebra – De Morgan's theorems (Assignment)

BOOKS FOR STUDY:

1. Electricity and Magnetism—R. Murugesan, S. Chand & Co, 2001
2. Electricity and Magnetism—Brijlal and Subramaniam, S. Chand & Co

BOOKS FOR REFERENCE

1. Modern Physics—R. Murugesan, S. Chand & Co, 1998.
2. Basic Electronics—B.L. Theraja, S. Chand & Co, 2003.

ONLINE RESOURCES

1. https://books.google.co.in/books/about/Modern_Physics.html?id=0Z9WzAEACA_AJ&redir_esc=
2. <https://www.google.com/search?q=electricity+and+magnetism+ppt&oq=&aqs=chrome.69i59i450l8.4739569j0j15&sourceid=chrome&ie=UTF-8>

COURSE OUTCOMES

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

- | | |
|---|------|
| CO-1. Acquire the knowledge in current electricity. | -K1 |
| CO-2. Understand the Concepts in Electromagnetism. | -K2 |
| CO-3. Use Nuclear Properties to study Nuclear fission | -K3 |
| CO-4. Understand basic concepts of an Analog Electronics | -K2 |
| CO-5. Outline the various number systems and basic logic gates | -K3. |

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	3	1	3	3	2	2	1
CO2	3	3	3	2	2	3	2	2	2	3
CO3	3	3	2	3	2	3	3	2	3	2
CO4	3	2	3	2	2	3	3	2	2	3
CO5	3	3	2	2	2	3	2	3	2	3

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is **2.24** which is **HIGH**

SEM:IV
Credit:2
Hours/Week:3
Total Hours:45

B.Sc. MATHEMATICS
A Prime on Divisibility and Number Sequences
CODE: U4R2MASEC1:I
Skill Development

SE COURSE :1:1
Int.Marks:25
Ext.Marks:75
Max.Marks:100

Objectives

- *To connect number theory to the real world*
- *To examine the solution for the problem*
- *To apply the strategies to solve routine and non- routine problems*
- *To develop problem solving skills and to gain self assess knowledge*
- *To determine which concepts and procedures are needed to complete the problem*

Unit I - Introduction & Congruences (9 hours)

What is Number Theory? - Terms and Symbols - Odd and Even Numbers - The Remainder symbol - other divisors - The congruence symbol - Using congruences - A test for divisibility by 13 - Using negative remainders.

Unit II - Elementary and Remaining Cases (9 hours)

Introduction - Divisibility by 2, 5, 4 - A generalization. Introduction - Divisibility by 9, 11 - More general results - Divisibility by 101 - Divisibility by 7 and 13 - Divisibility by 27 and 37 - Other Divisors - concluding remarks - Divisibility by 7 - Another formulation - searching for new rules - divisibility by 17, 53, 11.

Unit III –The Method of differences (9 hours)

Introduction - what is a pattern? - Number sequences - sequences in mathematics - terms and symbols - polynomial sequences - introduction - a symbolic apparatus.

Unit IV - Exponential Sequences (9 hours)

Sequences of the form $\{a^n\}$ - The sequence $\{(-1)^n\}$ - The sequence $\{z^n\}$ - The sequence $\{2^n\}$ - The sequences $\{3^n\}$ - Mixed sequences - seeking an explanation.

Unit V –Square root (9 hours)

Closeness – Sum of square roots - A Square roots spiral – A random sequence – Worked out problems.

Text Books:

[1] **FIRST STEPS IN NUMBER THEORY** –ShaileshShirali - Universities press.

[2] **A prime on number sequences** –ShaileshShirali - Universities press.

Unit I : Chapter 1 & 2 All sections [1]

Unit II: Chapter 3, 4, 5 All sections [1]

Unit III: Chapter 1, 2, 3 All sections [2]

Unit IV: Chapter 5 All sections [2]

Unit V : Chapter 14 All sections [2]

Reference Books :

[1] “ElementaryNumber theory” – David .M.Burton – Tata McGraw – Hill - Edition

[2] “First steps in number theory – A prime on divisibilityA prime on number sequences” - ShaileshShirali - Universities press.

e-Resources:

1. <https://www.math.upenn.edu/~mlazar/math170/notes04.pdf>
2. <https://www.arvindguptatoys.com/arvindgupta/primenumbers.pdf>

Outcomes:

The learners would have the ability to,

- CO1 Acquire the knowledge of Number theory and Congruence. K3
 CO2 Understand general results of Divisibility's. K2
 CO3 Develop problem solving skills and to gain self assess knowledge of method of differences. K6
 CO4 Know about the knowledge of mixed sequences. K2
 CO5 Understand the concept of square root. K2

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	3	3	2	1	3	1	3	2	3
CO2	3	2	3	2	3	3	3	2	3	2
CO3	1	3	1	3	2	3	3	2	3	3
CO4	3	2	3	1	3	3	3	1	2	3
CO5	2	3	3	1	3	3	3	3	1	3

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is 2.36 which is **HIGH**

SEM: IV
Credit: 2
Hours/Week: 3
Total Hours: 45

B.Sc. MATHEMATICS
Sage Math
CODE: U4R2MASEC1:1
Employability

SE COURSE:1:2
Int. Marks: 25
Ext. Marks: 75
Max. Marks: 100

Objectives :

- *To use the free open source mathematics software system*
- *To build on top of many existing open source packages like Maxima, R etc*
- *To directly access the combined packages via interfaces.*
- *To further develop software that is useful for academicians, industrialists and scientists.*
- *To train the students to become part of the developer community*

Unit I: Installation Procedure

(9 Hours)

Introduction to SageMath- Installation Procedure- Use of SageMath as a Calculator- Numerical and Symbolic computations using mathematical functions such as square root, Trigonometric functions, logarithms, exponentiations etc.

Unit II: Graphical Representation

(9 Hours)

Graphical representations of few functions through plotting in a given interval: Plotting of polynomial- Plotting of trigonometric functions- Functions with asymptotes- Superimposing multiple graphs in one plot like plotting a curve along with a tangent on that curve(if it exists)- Polar plotting of curves.

Unit III: Commands

(9 Hours)

Sage Math commands: Differentiation- Higher order derivatives- Plotting $f(x)$ and $f'(x)$ together- Integrals- Definite Integrals etc

Unit IV: Programming in SageMath

(9 Hours)

Introduction to Programming in SageMath: Relational and Logical Operators- Conditional statements, loops and nested loops- Without using inbuilt functions write programs for: Average of integers- Mean-Median-Mode-Factorial- Checking Primes-Finding GCD, LCM- Finding Convergence of a given sequence.

Unit V: Use of inbuilt Functions

(9 Hours)

Use of inbuilt functions that deal with Matrices- Determinant-Inverse- Solving system of linear equations- Finding roots of a given polynomial- Solving Differential Equations.

Reference Books:

- [1]. "Group Theory: An expedition with SageMath", Ajit Kumar and Vikash Bist, Narosa (2021)
- [2]. "An Introduction to SAGE Programming: With Applications to SAGE Interacts for Numerical Methods" by Razvan A Mezei, Springer
- [3]. "Numerical Analysis using Sage" George A. Anastassiou, Razvan A Mezei, Springer.
- [4]. "A First Course in Linear Algebra" by Robert Beezer available online <http://linear.ups.edu/>
- [5]. "Abstract Algebra: Theory and Applications" by Tom Judson and Robert Beezer (<http://abstract.ups.edu/>)

e -Resources:

1. https://onlinecourses.nptel.ac.in/noc22_ma24/preview
2. <http://www.sagemath.org>

Outcomes:

The learners would have the ability to,

CO1	Handle both complex and simple mathematics program	K1
CO2	Use web interface easily as a free open source software system	K3
CO3	Develop and contribute in the open source eco system	K5
CO4	Do the computations needed for the research	K3
CO5	Focus in combinatorics, representation theory, Root system using Sagemath	K5

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	1	3	3	3	2	3
CO2	1	3	3	2	3	3	3	2	3	2
CO3	3	2	2	3	2	1	3	2	3	3
CO4	1	2	3	1	3	3	3	1	2	3
CO5	3	3	3	1	3	3	2	3	1	2

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is 2.44 which is **HIGH**

SEM: V	B.Sc. MATHEMATICS	CORE COURSE:8
Credit: 5	Mechanics	Int. Marks: 25
Hours/Week: 5	CODE: U5R2MACC8	Ext. Marks: 75
Total Hours: 75	Employability	Max. Marks: 100

Objectives

- *To understand the basic concepts of forces, moments, couple, friction law virtual displacement and work*
- *To develop the skills in formation of suitable mathematical models and problems solving techniques*
- *To describe the relation between mass and inertia*
- *To calculate force and impulse given mass, velocity and time*
- *To develop logical deduction and interpretation of Impulsive force and Impact*

UNIT I: Forces and Equilibrium of a particle under three or more forces (15 hours)

Forces & Equilibrium - Forces – Resultant of two forces – Three forces related to a triangle – Equilibrium of a particle under three or more forces.

UNIT II :Moment, Couples and Equilibrium of three forces acting on a rigid body (15 hours)

Forces on a rigid body - Moment – Equivalent systems of forces- Parallel forces – Varignon's Theorem- Forces along a Triangle – Couples –Equilibrium of a rigid body under three coplanar forces – Reduction of coplanar forces into a force & a couple .

UNIT III :Friction (15 hours)

Friction – Laws of Friction – Coefficient of Friction, Angle & Cone of Friction –Limiting equilibrium of a particle on a rough inclined plane, Tilting of a body - Simple Problems.

UNIT IV:Projectile and Simple Harmonic motion (15 hours)

Simple Harmonic motion – Simple Pendulum – Load suspended by an elastic string – Projectile – Maximum height reached , range , time of flight – Projectile up / down an inclined plane .

UNIT V: Impulsive force and Impact (15 hours)

Impulsive force – conversion of linear momentum – Impact of a sphere & a plane - Direct & Oblique Impact of two smooth spheres –Kinetic energy and Impulse

Text Books:

[1] P.Duraipandiyan, “**Mechanics (Vector Treatment)**”, S.Chand & Co. -June 1997

UNIT I : Chapter 2 & Chapter 3 Section 3.1

UNIT II : Chapter 4 Section 4.1 , 4.3 to 4.9 & Chapter 5 Section 5.1

UNIT III : Chapter 2 Section 2.1 , Chapter 3 Section 3.2 , Chapter 5 Section 5.2

UNIT IV : Chapter 12 sections 12.1 to 12.3 & Chapter 13

UNIT V : Chapter 14

Reference Books:

[1] M.K.Venkataraman, “**Statics**”, Agasthiyar Publications, 2002.

[2] A.V.Dharmapadham, “**Statics**”, S. Viswanathan Publishers Pvt Ltd, 1979.

[3] S.L. Lony, “**Elements of Statics and Dynamics**”, Part-I, A.I.T. Publishers, 1991.

e-Resources:

1. https://onlinecourses.nptel.ac.in/noc22_me31
2. <https://physics.appstate.edu/faculty-staff/labs-and-demonstrations/online-resources>
3. <https://asmedigitalcollection.asme.org/appliedmechanicsreviews/article-abstract/54/2/93/401290/The-Role-of-Friction-in-Mechanical-Joints?redirectedFrom=fulltext>

Outcomes:

The learners would have the ability to,

CO1	Relate force and motion	K3
CO2	Study Simple Harmonic Motion, Projectiles, Impulsive force and Impact.	K1
CO3	Develop mathematical formulation of the physics aspects of the problems	K5
CO4	Determine the properties of a system will be in a condition of impending motion	K4
CO5	Understand the concept of impulse to reduce the force impact	K2

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	2	1	3	1	3	2	2
CO2	3	3	3	2	3	3	2	2	2	3
CO3	1	2	2	3	2	3	3	2	3	3
CO4	3	2	3	1	3	3	2	1	2	1
CO5	3	3	3	1	3	3	3	3	1	3

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is 2.4 which is **HIGH**

SEM: V
Credit:5
Hours/Week:4
Total Hours:60

B.Sc. MATHEMATICS
Abstract Algebra
CODE: U5R2MACC9
Entrepreneurship

CORE COURSE:9
Int.Marks:25
Ext.Marks:75
Max.Marks:100

Objectives:

- *To educate the basic concepts of Modern Algebra*
- *To determine whether a group is cyclic or abelian*
- *To help the student attach meaning to the abstract concept of algebra*
- *To use algebra as a tool for representing and solving a variety of practical problems*
- *To calculate with cosets fluently*

Unit I-Groups (12 hours)

Introduction –Definition and Examples – Elementary Properties of Group – Equivalent definitions of a group – Permutation Groups – Subgroups – Cyclic groups – Order of an element.

Unit II- Normal Subgroups And Homomorphism (12 hours)

Cosets and Lagrange's Theorem – Normal subgroups and Quotient groups – Isomorphism – Homomorphism.

Unit III-Rings (12 hours)

Definition and Examples – Elementary Properties of rings – Isomorphism – Types of rings – Characteristics of a ring – Subrings – Ideals – Quotient rings – Maximal and Prime ideals – Homomorphism of rings.

Unit IV- Field (12 hours)

Field of quotients of an integral domain- Ordered integral domain- Unique factorization domain(U.F.D)- Euclidean domain- Every P.I.D is a U.F.D.- Polynomial Rings- Polynomial Rings over U.F.D.- Polynomials over $\mathbb{Q}$.

Unit V- Lattices (12 hours)

Introduction- Partially ordered sets- Lattices- Distributive Lattices- Modular Lattices-Boolean Algebras.

Text Books

[1] S.Arumugam&A.Thangapandi Isaac, "Modern Algebra", scitech Publication (2003).

- Unit I :** Chapter III sections 3.0 to 3.7
Unit II : Chapter III sections 3.8 to 3.11
Unit III : Chapter IV sections 4.1 to 4.10
Unit IV : Chapter IV sections 4.11 to 4.18
Unit V : Chapter IX sections 9.0 to 9.5

References

- 1) T.K.ManicavasagamPillai, T.Natarajan, K.S.Ganapathy, Algebra, Vol.I, S.Viswanathan Pvt. Limited, Chennai, 2004.
- 2) M.L. Santiago, Modern Algebra, Tata McGraw Hill, 2003.

e-Resources:

1. <https://youtu.be/qpiod2AwtA0>
2. <http://math.hawaii.edu/~jb/math618/Nation-LatticeTheory.pdf>

Outcomes:

The learners would have the ability to,

CO1	Recognize technical terms groups, permutation groups and cyclic groups.	K1
CO2	Acquire the knowledge of normal subgroups	K4
CO3	Understand the elementary properties of rings	K6
CO4	Formulate and develop unique factorization domain	K4
CO5	Describe the properties of Distributive lattices.	K2

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	1	3	3	3	2	3
CO2	3	3	3	2	3	3	3	2	3	3
CO3	3	3	3	3	2	3	3	2	3	3
CO4	3	2	3	1	3	3	3	1	2	3
CO5	3	3	3	1	3	3	3	3	1	3

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is 2.66 which is **HIGH**

SEM: V

B.Sc. MATHEMATICS

CORE COURSE:10

Credit: 4

Real Analysis

Int. Marks: 25

Hours/Week: 5

CODE: U5R2MACC10

Ext. Marks: 75

Total Hours: 75

Entrepreneurship

Max. Marks: 100

Objectives:

- *To familiarize the fundamentals of Real analysis*
- *To understand the basic facts about set theory and the set of real numbers.*
- *To include Axioms of real number system*
- *To develop a deeper and more rigorous understanding of calculus including Defining terms*
- *To prove theorems about functions, sequences, series, limits, counting, derivative, and Riemann integrals*

Unit I : Real Number system

(15 hours)

The field axioms - The order axioms - The rational numbers -The irrational numbers - Upper bounds, maximum elements, least upper bounds (supremum) – The completeness axioms – Some properties of the Supremum – Absolute values and the triangle inequality – The Cauchy-Schwarz inequality – Finite and infinite sets – Countable and uncountable sets – Set algebra – Countable collection of countable sets.

Unit II : Elements of Point Set Topology

(15 hours)

Introduction - Euclidean space $\mathbb{R}^n$ – Open balls and open sets in $\mathbb{R}^n$ – The structure of open sets in $\mathbb{R}^1$ – Closed sets – Adherent points, accumulation points – closed sets and adherent points – The Bolzano – Weierstrass theorem – the Cantor intersection theorem – The Lindelof covering theorem.

Unit III : Continuous functions of Metric spaces

(15 hours)

Metric spaces – Point set Topology in Metric spaces – Compact subset of a Metric spaces – Boundary of a set – Convergence Sequence in a Metric Space - Cauchy Sequences – Complete Metric Spaces – Continuous Function – examples of Continuous function – Continuity and inverse images of open or closed set – Function Continuous on compact set – connectedness – Components of Metric space – Arcwise connectedness – Uniform Continuity – Discontinuity of a real valued functions.

Unit IV: Derivatives

(15 hours)

Introduction – Definition of Derivative – Derivatives and Continuity – Algebra of Derivatives - Rolle's Theorem – Mean Value theorem for Derivative – Intermediate Value Theorem – Taylor's Formula with remainder.

Unit V: Riemann Integrability

(15 hours)

Riemann Integration – Definition – Darboux's Theorem - Necessary and sufficient condition for Integrability – Integrability of Continuous and Monotonic functions – Integral Function – Properties of Integral function – Continuity and Derivability of Integral Function – Fundamental theorem of Calculus – First Mean Value Theorem – Second Mean Value Theorem.

Text Books:

[1] “**Mathematical Analysis**”, Tom. M. Apostol, Nirosha Publishing house Pvt. Ltd, 2002

Edition.

[2] “A course of Mathematical Analysis”, Shanthi Narayan, S.Chand Co., 2014.

Unit I : Chapter 1 : 1.2, 1.3, 1.8 - 1.12, 1.18, 1.19.

Chapter 2 : 2.11 – 2.15.

Unit II : Chapter 3 : 3.1 – 3.10.

Unit III: Chapter 3: 3.13 – 3.16.

Chapter 4: 4.1 – 4.4, 4.8, 4.11 – 4.13, 4.16 - 4.19, 4.22.

Unit IV: Chapter 5: 5.1 – 5.5, 5.9 – 5.12

Unit V: Chapter 6: 6.1 – 6.9 [2]

Reference Books:

1. “Methods of Analysis”, Gold Berge, Richar. R, Oxford and IBHP Publishing co. New Delhi.
2. “ Real Analysis”, H.L. Royden, P.M. Fitzpatrick, PHI Learning Pvt. Ltd, 2010.

e-Resources:

1. <https://youtu.be/C2qIoHkhEuM>
2. <https://tutorial.math.lamar.edu/classes/calci/MeanValueTheorem.aspx>

Outcomes:

The learners would have the ability to,

CO1	Emphasize the proofs development defines the counting of a function and uniform continuity of a function.	K4
CO2	Understand the knowledge of types of discontinuities.	K2
CO3	Acquire the knowledge of Daurboux’s theorem on derivative.	K4
CO4	Use results and techniques involving mean value theorems to solve a variety of problems.	K3
CO5	Understand the concepts of fundamental theorem of integral calculus.	K2

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	3	3	1	3	1	3	2	3
CO2	2	3	3	2	3	1	2	2	3	1
CO3	3	2	2	3	2	2	3	2	3	3
CO4	1	2	3	1	1	2	2	1	2	2
CO5	3	3	1	1	3	3	3	3	1	2

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is 2.2 which is **HIGH**

SEM:V
Credit:4
Hours/Week:4
Total Hours:60

B.Sc. MATHEMATICS
Operations Research
CODE: U5R2MACC11
Employability

CORE COURSE :11
Int.Marks:25
Ext.Marks:75
Max.Marks:100

Objectives

- *To introduce Operation Research, Linear programming formation and role of Computer in OR*
- *To develop computational skill and logical thinking in formulating industry oriented problems as a mathematical problem and finding solutions to these problems*
- *To introduce concepts of slack and surplus variables*
- *To improve the skills of solving very common problems which we come across in various fields like transportation, Sequencing Problems and industries with machines*
- *To introduce Network and to find critical path*
- *To introduces The inventory Decisions and objectives of Scientific inventory control*

UNIT I: Linear Programming Problem (12 hours)

Introduction to OR – An overview of OR – Mathematical Formulation of linear Programming problem – Graphical Solution – Simplex Methods for $<$, $=$, $>$ constraints. Concept of Duality - Primal and Dual Problems-Duality-Dual Simplex Method.

UNIT II: Transportation problem (12 hours)

Introduction - LP Formulation of Transportation problem –Solution of Transportation problem – Finding an initial basic Feasible solution - Test for Optimality – MODI Method - Stepping Stone Method – Unbalanced Transportation problem..

UNIT III :Assignment problem (12 hours)

Introduction – Mathematical Formulation of problem –Solution Methods of Assignment - Unbalanced Assignment problem - Travelling salesman problem.

UNIT IV: Network (12 hours)

Introduction Network: Basic components- Logical sequencing – Rules of Network Construction – Concurrent Activities - Critical Path Analysis – Probability Consideration in PERT- Distinction between PERT and CPM.

UNIT V :Inventory control (12 hours)

Introduction- Types of inventories- Reasons for carrying Inventories - The inventory Decisions- objectives of Scientific inventory control - Cost Associated with Inventories- Factors Affecting inventory control- An inventory control Problem- The concept of EOQ- Deterministic inventory Problems with and without shortages- problems of EOQ with price breaks.

Text Book:

[1] KantiSwarup, Gupta.P.K,&Manmohan,” Operations Research”, Sultan Chand &Co,Sixteenth edition-2012,Reprint 2013.

Unit I: Chapter I Sec:1.1,1.2,1.4 to1.6 ,Chapter II sec: 2.2 , 2.3 ,Chapter III Sec:3.2 to 3.5 and Chapter IV Sec:4.1,4.3,4.4 Chapter V Sec: 5.1 to 5.4, 5.7 and 5.9.

Unit II: Chapter X Sections 10.1 to 10.16 Except (10.11,10.12).

Unit III: Chapter XI Sections 11.1 to 11.4 and11.7.

Unit IV: Chapter XXV Sections 25.1 to 25.8.

Unit V: Chapter IXX Sections 19.1 to 19.12.

Reference Books:

- [1] Hamdy A. Taha, “**Operations Research**” (7th Edn.), Prentice Hall of India, 2002.
[2] Richard Bronson, “**Theory and Problems of Operations Research**”, Tata McGraw Hill Publishing Company Ltd, New Delhi, 1982.
[3] Hadley, G. *Linear Programming*, Narosa Publishing House, New Delhi, 2002.

e-Resources:

1. <https://youtu.be/nLjopro7H7k>
2. [https://mdu.ac.in/UpFiles/UpPdfFiles/2021/Jun/4_06-11-2021_16-06-34_OPERATIONS%20RESEARCH%20TECHNIQUES\(20MAT22C5\).pdf](https://mdu.ac.in/UpFiles/UpPdfFiles/2021/Jun/4_06-11-2021_16-06-34_OPERATIONS%20RESEARCH%20TECHNIQUES(20MAT22C5).pdf)

Outcomes:

The learners would have the ability to,

CO1	Analyze and solve linear programming models of real life situations	K4
CO2	Examine test for optimality to the Transportation problem.	K5
CO3	Learn techniques to assignment problems	K2
CO4	Acquire the knowledge of critical path analysis	K4
CO5	Solve deterministic inventory problems	K5

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	1	1	3	3	2	3
CO2	3	3	1	2	3	3	2	2	3	2
CO3	3	3	3	3	2	2	3	2	3	3
CO4	3	2	2	1	3	3	2	1	2	1
CO5	3	3	3	1	3	3	3	3	1	2

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is 2.42 which is **HIGH**

SEM: V
Credit:4
Hours/Week:4
Total Hours:60

B.Sc. MATHEMATICS
Numerical Methods
CODE: U5R2MACC12
Employability

CORE COURSE:12
Int.Marks:25
Ext.Marks:75
Max.Marks:100

Objectives:

- To make the students to aware of the problems in numerical processing
- To develop appropriate numerical methods to approximate a function
- To perform an error analysis for various numerical methods
- To analyze and evaluate the accuracy of common numerical methods
- To apply numerical methods to obtain approximate solutions to mathematical problems

Unit I - Algebraic & Transcendental equations (12 hours)

Introduction - Bisection Method - Iteration method - Method of False Position - Newton Raphson Method - Solution of simultaneous linear algebraic equations: Gauss Jacobi- Gauss Seidel method.

Unit II –Finite Differences (11 hours)

First and higher order differences - Forward and backward differences - Properties of operator - Differences of a polynomial – Factorial polynomial-Error propagation Operator E and E^{-1} Relation among δ, E, A and D -summation of series.

Unit III – Interpolation (13 hours)

Newton's forward – backward interpolation formula-Gauss forward- backward interpolation formula -Bessel's formula- Divided differences-Newton's divided difference formula-Lagrange's interpolation formula-Inverse interpolation.

Unit IV - Numerical differentiation & Integration (12 hours)

Introduction - Numerical differentiation –Errors in Numerical differentiation – The cubic spline method - Numerical Integration using Trapezoidal rule & Simpson's $1/3^{\text{rd}}$, $3/8^{\text{th}}$ rules - Theory and Problems.

Unit V - Numerical Solution of ODE (12 hours)

Introduction - Solution by Taylor Series Method - Picard's method of successive approximations - Euler's method - Modified Euler's Method – Runge Kutta 2^{nd} and 4^{th} order methods – predictor – Corrector method – Adams Moulton method – Milne's method.

Text Book :

- [1] “Introductory Methods of Numerical Analysis” - S.S.Sastry, Prentice Hall of India Pvt. Limited, 1995.

Unit I : Chapter 2- 2.1 to 2.5, Chapter 6- 6.4

Unit II : Chapter 3-3.3-3.5

Unit III :Chapter 3- 3.6,3.7.3, 3.11,3.12

Unit IV :Chapter 5-5.1,5.2, 5.4-5.4.1,5.4.2,5.4.3

Unit V : Chapter 7- 7.1-7.6

References:

- 1) “Numerical Analysis” - S.Narayanan& Others S.Viswanathan Publishers, 1994.
- 2) “Numerical Methods” - A.Singaravelu, Meenachi Agency, June 2000.

- 3) Kandasamy, P. K.Thilagavathy,andK.Gunavathy-
"NumericalMethods",S.Chand&CompanyLtd.,Edn.2006.

e-Resources:

1. <https://youtu.be/pUDEeE-ugyc>
2. <https://perhuaman.files.wordpress.com/2014/07/metodos-numericos.pdf>

Outcomes:

The learners would have the ability to,

- | | | |
|-----|---|----|
| CO1 | Obtain numerical solutions of algebraic and transcendental equations. | K5 |
| CO2 | Acquire the knowledge of Finite differences | K3 |
| CO3 | Learnaboutvariousinterpolatingandextrapolatingmethodstofindnumericalsolutions. | K2 |
| CO4 | Use results and techniques involving Simpson's 1/3, 3/8 rules by using Trapezoidal rule | K3 |
| CO5 | Solve the ODE by using Taylor's, Picard's & Euler's Methods. | K5 |

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	2	3	3	3	2	3
CO2	2	3	2	2	3	3	3	2	3	2
CO3	3	2	1	3	2	3	2	2	3	1
CO4	1	2	3	2	3	3	1	1	2	3
CO5	3	3	3	1	3	3	3	3	1	3

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is 2.44 which is **HIGH**

SEM: V
Credit:4
Hours/Week:-
Total Hours:

B.Sc. MATHEMATICS
C++Programming for Mathematics
CODE: U5R2MADSE1PW
Employability

DSE COURSE:1:1
Int.Marks:40
Ext.Marks:60
Max.Marks:100

Objectives:

- *To understand how C++ improves C with object-oriented features*
- *To learn how to write inline functions for efficiency and performance*
- *To learn the syntax and semantics of the C++ programming language*
- *To learn how to design C++ classes for code reuse*
- *To learn how to implement copy constructors and class member functions*

Unit-I: C++Essentials

Fundamentals of programming, Organization of logic flow in stored program model of computation, C++ as a general purpose programming language, Structure of a C++ program, Common compilers and IDE's, Basic data-types, Variables and literals in C++, Operators, Expressions, Evaluation precedence and type compatibility; Outline of program development in C++, Debugging and testing; Applications: Greatest common divisor and random number generation.

Unit-II: Structured Data

Structured data-types in C++, Arrays and manipulating data in arrays; Objects and classes: Information hiding, modularity, constructors and destructors, methods and polymorphism; Applications: Factorization of an integer, Euler's totient, Images in Cartesian geometry using points in two & three dimensions, Pythagorean triples.

Unit-III: Containers and Templates

Containers and Template Libraries: Sets, iterators, multisets, vectors, maps, lists, stacks and queues; Applications: Basic set algebra, modulo arithmetic and congruences, projective plane, permutations, monotone sequences and polynomials.

Unit-IV: Libraries and Packages

Libraries and Packages for arbitrary precision arithmetic and linear algebra; Features of C++ for input/output and visualization: Strings, streams, formatting methods, processing files in a batch, command-line arguments, visualization packages and their uses; Applications: Arbitrary precision arithmetic using GMP, BOOST; Finding nullity, rank, eigen values, eigenvectors, linear transformations, systems of linear equations; Plots.

Unit-V: Odds and Ends

Runtime errors and graceful degradation, Robustness in a program; Exception handling: Try catch and throw; Defining and deploying suitable exception handlers in programs; Compiler options; Conditional compilation; Understanding and defining suitable programs; Applications: Identification and description of install parameters of mathematical libraries, debugging installation, working with multiple libraries simultaneously and maintaining correctness and consistency of data.

References:

1. Nell Dale & Chip Weems (2013). *Programming and Problem Solving with C++* (6th edition). Jones & Bartlett Learning.
2. E. Balagurusamy, 1998, *Programming in ANSI C*, Tata McGraw Hill Publications Co., Ltd., ED. 2.1.
3. Peter Gottschling (2016). *Discovering Modern C++: An Intensive Course for Scientists, Engineers, and Programmers*. Pearson.
4. Nicolai M. Josuttis (2012). *The C++ Standard Library: A Tutorial and Reference* (2nd edition). Addison-Wesley, Pearson.
5. Donald E. Knuth (1968). *The Art of Computer Programming*. Addison-Wesley.

e-Resources:

1. https://www.tutorialspoint.com/cplusplus/cpp_tutorial.pdf
2. <http://www.lmpt.univ-tours.fr/~volkov/C++.pdf>

Outcomes:

The learners would have the ability to,

CO1	Understand and apply the programming concepts of C++ which is important for mathematical investigation and problem solving	K2
CO2	Use mathematical libraries for computational objectives	K3
CO3	Represent the output of programs visually in terms of well formatted text and plots.	K5
CO4	Find nullity, rank, eigen values, eigenvectors, linear transformations using C++	K5
CO5	Debugging installation and maintaining the corrections of data	K6

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	3	1	3	2	3	2	3
CO2	3	3	2	2	3	3	3	1	3	2
CO3	3	3	2	3	2	1	2	1	3	2
CO4	3	2	2	1	3	2	2	1	2	2
CO5	3	3	3	1	3	2	3	3	1	3

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is 2.34 which is **HIGH**

SEM: V

B.Sc. MATHEMATICS

DSE COURSE :1:2

Credit:4

Hours/Week:4

Total Hours:60

Mathematical Modeling

CODE: U5R2MADSE1

Employability

Int.Marks:25

Ext.Marks:75

Max.Marks:100

Objectives

- *To understand the notion of linear independence and the notion of a fundamental set of solutions*
- *To use the method of reduction of order to find a second linearly independent solution of a second order, linear homogeneous equation when one solution is given*
- *To use the method of variation of parameters to find particular solutions of second order, linear homogeneous equations*
- *To appreciate the fundamental principles and to understand the different concepts and methods in Mathematical modeling*
- *To utilize them in solving problems*

Unit I : Mathematical modeling Through ODE of first Order (12 hours)

Mathematical Modeling Through Differential Equation - Linear Growth and Decay Models, Compartment Models - Mathematical modeling in Dynamics Through ODE of first order.

Unit II : Mathematical modeling Through Systems ODE of first Order (12 hours)

Mathematical Modeling in Population Dynamics – Mathematical Modeling of Epidemics Through Systems of ODE of First - Compartment Model Through ODE - Mathematical modeling Economics Through System ODE of first order.

Unit III : Mathematical Modeling Through ODE of Second Order (12 hours)

Mathematical modeling of Planetary Motions - Mathematical modeling of Circular Motion and Motion of Satellites - Mathematical modeling Through Linear Differential Equation of Second order.

Unit IV: Mathematical modeling Through Linear Differential Equations (12 hours)

The Need for Mathematical modeling Through Linear Differential Equations: Some Simple Models – Basic Theory For Linear Differential Equation with Constant Coefficients - Mathematical Modeling Through Linear Differential Equations in Economics and Finance - Mathematical Modeling Through Linear Differential Equations in Dynamics and Genetics.

Unit V: Mathematical modeling Through Graphs (12 hours)

Situations that can be Modeled through Graphs - Mathematical Modeling in terms of Directed Graphs - Mathematical Modeling in terms of signed Graphs - Mathematical Modeling in terms of Weighted Digraphs.

Text Book

[1] Mathematical modeling – J. N. Kapur, Wiley Eastern Limited, Third print

Unit I: Chapter 2. Sec 2.1, 2.2, 2.4, 2.5 [1]

Unit II: Chapter 3. Sec 3.1-3.5 [1]

Unit III: Chapter 4. Sec 4.1- 4.3[1]

Unit IV: Chapter 5. Sec 5.1-.5.4 [1]

Unit V: Chapter 7. Sec 7.1- 7.4 [1]

Reference Books:

[1] Mathematical Modeling By Meerschaert. Mark M., Academic Press. New York, 1993.

[2] Concepts of Mathematical Modeling. Meyer W. McGraw Hill, New York, 1994.

e-Resources:

1. <https://youtu.be/ORTNjFdSbzY>
2. <https://repository.ung.ac.id/get/kms/16993/Referensi-Mata-Kuliah-An-Introduction-to-Mathematical-Modelling.pdf>

Outcomes:

The learners would have the ability to,

CO1	Use the method of variation of parameters to find particular solutions of second order, linear homogeneous equations.	K3
CO2	Appreciate the fundamental principles and to understand the different concepts and methods in Mathematical modeling.	K2
CO3	Utilize them in solving problems.	K5
CO4	Understand the applications of mathematical modelling.	K2
CO5	Acquire the knowledge of Situations can be Modeled through Graphs	K3

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	1	3	1	3	3	3	2	3
CO2	3	2	3	2	3	2	1	1	3	2
CO3	3	3	2	3	2	2	3	2	3	2
CO4	3	2	3	1	1	3	2	1	2	3
CO5	3	3	2	1	3	3	3	3	1	1

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is 2.32 which is **HIGH**

SEM: V
Credit:4
Hours/Week:4
Total Hours:60

B.Sc. MATHEMATICS
Sequences And Series
CODE: U5R2MADSE1:3
Skill Development

DSE COURSE:1:3
Int.Marks:25
Ext.Marks:75
Max.Marks:100

Objectives

- To understand the concept of convergence and divergence in sequence and series
- To use the method of proof by mathematical induction
- To appreciate that some of the standard series are valid for all real values of x , while others are valid only for specific range of x
- To remember the necessary condition for test of convergence of series
- To generate the recurring series

Unit I: Sequences

(12 hours)

Sets, Sequences – Limit of a Sequence – Aggregate – Upper and lower bound Dedikind's theorem – upper and lower bound of an aggregate – Bounded sequences – The upper and lower limits of a sequence – Cauchy's general principle of convergence – Monotonic sequence – a monotonic sequence always tend to a limit – Finite or Infinite.

Unit II: Test for convergency of Series

(12 hours)

Convergence of infinite series, Geometric series – some general theorems concerning infinite series – series of positive terms – Comparison tests – Convergent of the given series – D'Alembert's Ratio test.

Unit III: Cauchy's test

(12 hours)

Cauchy's root test – Raabe's test – Absolutely convergent series - Absolutely convergent series and conditional convergent series – Series whose terms are alternately positive and negative.

Unit IV: Binomial, Exponential and Logarithmic series

(12 hours)

Binomial theorem for a Rational index – some important particular cases of Binomial expansion – sign of terms in Binomial expansion – Application of Binomial expansion to the summation of series - Exponential theorem - summation - Logarithmic series which can be summed up by the Logarithmic series, modification of logarithmic series, Euler's constant.

Unit V - Summation of Series

(12 hours)

Application of Partial Fractions - Summation of series whose general term is given – Sum to n terms of the given series - Summation by difference series - Successive difference Series - Recurring series - The generating functions - sum to n terms of a given recurring series.

Text Books:

[1] T.K.Manicavachagam Pillai, T.Natarajan, K.S.Ganapthy, "Algebra Vol.I", S.Viswanathan Pvt. Limited, Chennai, 2004.

Unit I : Chapter 2 Sec: 4 to 7[1]

Unit II : Chapter 2 Sec: 8 to 16 [1]

Unit III : Chapter 2 Sec: 17 to 24 [1]

Unit IV : Chapter 3 Sec: 1 to 7, 10, 13 & Chapter 4 Sec. 2, 3, 5 to 9 [1]

Unit V : Chapter 5 Sec: 2 to 7 [1]

Reference Books :

- 1) M.K.Singal & Asha Rani Singal, "A first course in Real Analysis", R.Chand & Co., 1999.
- 2) 'A guide to Mathematics', L.R.Dhanda, Kalyani Publishers.

3) Dr. S.Arumugam “Sequences & Series”, New Gamma Publishers.

e-Resources:

1. <https://ncert.nic.in/pdf/publication/exemplarproblem/classXI/mathematics/keep209.pdf>
2. https://www.whitman.edu/mathematics/calculus/calculus_11_Sequences_and_Series.pdf

Outcomes:

The learners would have the ability to,

CO1	Know the properties of convergent and divergent sequence.	K2
CO2	Understand and apply test for convergency of series.	K2,K3
CO3	Understand and to apply the method of difference to sum the finite series and to extend its use to infinite series.	K2,K3
CO4	Know how to use Binomial, Exponential and Logarithmic series.	K5
CO5	Acquire the knowledge of the generating function.	K3

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	1	3	3	3	2	3
CO2	3	3	3	2	3	3	3	2	3	3
CO3	3	1	3	3	2	3	1	2	3	3
CO4	3	2	3	1	3	3	3	1	2	3
CO5	3	3	3	1	3	3	3	3	1	3

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is 2.58 which is **HIGH**

SEM: V

B.Sc. MATHEMATICS

SECOURSE :2:1

Credit:2

Hours/Week:2

Total Hours:30

Quantitative Aptitude

CODE: U5R2MASEC2:1

Employability

Int.Marks:25

Ext.Marks:75

Max.Marks:100

Objectives

- *To introduce the concept of Mathematics with emphasis on analytical ability*
- *To educate the students in computational skill*
- *To make the students prepare for competitive examinations*
- *To be better equipped in a relative sense as for as preparation for entrance examinations involving placement opportunities*
- *To educate the knowledge of Quantitative Aptitude*

Unit I –Square Roots, Cube Roots, Surds & Indices

(6 hours)

Introduction – important formula - the square roots and cube roots of the numbers – formulae for indices and surds –laws of indices and surds.

Unit II - Percentage, Profit and Loss

(6 hours)

Basic concepts - important formula - profit and loss - short cut methods - simple problems.

Unit III - Ratio and Proportion

(6 hours)

Introduction - Definition of ratio - compounding of ratio - comparison of ratio - properties of ratio - equal ratio - proportion - continued proportion - fourth proportional - Third proportional - mean proportional - direct proportion - inverse proportion - use of proportion in geometry.

Unit IV– Partnership

(6 hours)

Introduction - simple partnership - compound partnership - working partner - sleeping partner - monthly equivalent investments.

Unit V - Simple and Compound Interest

(6 hours)

Introduction - formula for simple interest - relation between amount and price - simple problems on simple interest - compound interest - some important rule - simple problems based on compound interest.

Text Book:

[1] “Quantitative Aptitude for Competitive Examination” – R.S.Aggarwal – S. Chand & Sons – New Delhi –Seventh edition – 2006.

Unit – I : Chapter 5 & 9

Unit – II : Chapter 10 & 11

Unit – III : Chapter 12

Unit – IV : Chapter 13

Unit – V : Chapter 21 & 22

Reference Books:

[1] ‘Quantitative Aptitude for Competitive Examinations’ by R.S.Aggarwal – S.Chand& sons, New Delhi 2006.

[2]‘Quantitative methods’ by D.C. Sonchati, S.Chnad& sons Delhi.

e-Resources.

1. <https://testbook.com/objective-questions/mcq-on-quantitative-aptitude--5eea6a1039140f30f369e7e7>
2. <https://www.non-engineer.com/post/quant-formulas-cat>

Outcomes:

The learners would have the ability to,

CO1	Analyze real life problems and find solutions	K4
CO2	Prepare for Competitive & Entrance Examinations for better job opportunity	K2
CO3	Know the application of ratio and proposition.	K2
CO4	Develop the business thinking	K6
CO5	Enrich the knowledge and problem solving technique	K5

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	1	3	3	3	3	3
CO2	3	2	3	3	2	3	3	1	3	3
CO3	3	2	3	3	2	3	3	2	3	1
CO4	3	1	3	3	3	3	3	3	3	2
CO5	3	3	3	3	3	3	3	3	3	2

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is 2.7 which is **HIGH**

SEM:V

Credit:2

Hours/Week:2

Total Hours:30

B.Sc. MATHEMATICS

Theory of Games and Decision theory

CODE: U5R2MASEC2:2

Employability

SE ELECTIVE:2:2

Int.Marks:25

Ext.Marks:75

Max.Marks:100

Objectives:

- To solve two-person zero sum game
- To understand the concepts of Dominance property
- To analyze the applications of Linear programming
- To learn about decision theory
- To apply the Roll back techniques in the real situations

Unit I: Game Theory

(6 hours)

Two –Person – zero – Sum Game, Payoff matrix, Saddle point, Value of the Game- Problems. Methods for solving game without Saddle point – Problems, Algebraic method of solve a 3×3 game.

Unit II : Graphical method

(6 hours)

Graphical method to solved a $2 \times n$ (or) $n \times 2$ game – Problems – Dominance property – Modified dominance property – Problems.

Unit III: Linear Programming

(6 hours)

Applications to solve a game – Simple problems – Solving the game using the method of Approximation problems.

Unit IV: Decision Theory

(6 hours)

Decision criteria- The maximum or Minimum criteria – Problems. The expected value / Laplace Criteria the minimum regret / Savage criterion – The Hurwitz Criterion – Problems.

Unit V: Decision under Risk

(6 hours)

The Expected Monetary value (EMV) criterion and the Expected Opportunity Loss (EOL) criterion- Expected Value of Perfect Information (EVP)- Problems, Decision trees – Roll-back Technique.

Text Book:

[1] “Operations Research methods and Applications”, P. Mariyappan, New Century Book House Pvt. Ltd. Chennai, 2002.

Unit I: Chapter 11, Sections: 11.1 to 11.3.

Unit II: Chapter 11, Sections: 11.4 to 11.5.

Unit III: Chapter 11, Sections: 11.6.

Unit IV: Chapter 11, Sections: 11.7.

Unit V: Chapter 11, Sections: 11.8 to 11.9.

Reference Books:

[1] “Operations Research”, V.K. Kapoor, Sultan Chand & sons Ltd.

[2] “Operations Research”, Hamdy A. Taha, Prentice Hall of India, 2002.

e-Resources:

1. <https://docs.ufpr.br/~volmir/Math486.pdf>
2. <https://kanchiuniv.ac.in/coursematerials/Game%20theory.pdf>

Outcomes:**The learners would have the ability to,**

CO1	Understand the Methods for solving game with and without Saddle point	K2
CO2	Acquire the knowledge of Graphical methods.	K3
CO3	Know about the applications of game theory by using the method of Approximation.	K2
CO4	Gain knowledge in Decision Analysis	K5
CO5	Understand the concept of EMV	K2

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create**Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes**

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	3	3	3	3	3	1	2	3
CO2	3	2	2	3	1	3	3	3	3	3
CO3	3	1	2	3	2	3	2	3	3	1
CO4	3	3	3	3	1	3	3	3	3	3
CO5	3	3	3	3	3	1	3	2	3	2

3-Strong; 2-Medium; 1-LowMean Overall Relationship is 2.56 which is **HIGH**.

SEMESTER V

For the candidates admitted from the academic year 2022-2023

Title of the Course : FUNCTIONAL ENGLISH

Category of the Course : GENERIC ELECTIVE COURSE-I

Course Code : U5R2MAGEC1

Nature of the Skill : Communication and Employability

Marks : CIA : 25 +Ext: 75 = 100

Hrs / Week : 02

Credits : 02

Total Inst.Hrs : 24

OBJECTIVES:

1	To motivate self learning
2	To make students communicate in English
3	To enable them to manage communication tasks (based on situational teaching)
4	To promote free writing skills
5	To improve learners structural competence and enable them to become effective users of the language in real life situations

Unit- I (Inst. Hrs:04)

Analysis of simple sentences – SVOCA- The five basic sentence patterns, Phrases- their structure

Unit- II (Inst. Hrs:05)

Analysis of complex and compound sentences clause structure

Unit- II (Inst. Hrs:05)

Types of sentences – Assertive, interrogative, exclamatory, imperative- their articulation and conversion-Auxillaries and Modals- Question tags

Unit- IV (Inst. Hrs:05)

Loud reading of passages/Dialogues– tone groups, stress, intonation

Unit- V (Inst. Hrs:05)

Practical work, covering Units 1- IV (work -book to be prepared by the department)

Note : For evaluation there will be a written paper carrying 60 marks and CIA- 40 marks (including assignments , tests, and viva- voce based on the work book)

Books for reference

Systems and structures of English – Brendan J Carroll

Contemporary English Grammar Structures and Composition- David Green.

<https://grammar.yourdictionary.com/grammar/sentences/types-of-sentences.html>
<https://www.britannica.com/topic/intonation>
<https://youtu.be/745WT5bcFwA>
<https://youtu.be/m9Avsw-kK-s>

Course Name: FUNCTIONAL ENGLISH	Course Code: U5R2XXGEC1	Knowledge Level
On completion of the course, students will be able to		
1	distinguish among structural patterns.	K4
2	articulate English sounds with reasonable acceptability.	K5
3	manage stress and intonation patterns.	K4
4	get trained in inter- personal communication.	K6
5	undertake self study of communication by referring web sources.	K5

Title of the Course : FUNCTIONAL ENGLISH						Course code : U5R2XXGEC1					
Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)					Mean Score of COs
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	
CO – 1	2	3	3	2	2	2	3	2	2	1	2.2
CO – 2	3	2	3	3	3	1	2	2	2	3	2.4
CO – 3	2	3	2	2	3	2	3	3	2	3	2.5
CO – 4	3	2	3	3	3	2	3	2	2	3	2.6
CO – 5	2	3	2	2	2	3	3	2	3	3	2.5
	Mean Overall Score										2.44
	Result										HIGH

SEM: VI	B.Sc. MATHEMATICS	CORE COURSE:13P
Credit:3	Numerical Methods with MATLAB	Int.Marks:40
Hours/Week:4	CODE: U6R2MACC13P	Ext.Marks:60
Total Hours:60	Employability	Max.Marks:100

Objectives:

- *To implement numerical methods in Matlab*
- *To apply Computer theory and algorithmic aspects in various situations*
- *To design and debug the programs*
- *To develop program skills independently themselves*
- *To write efficient, well-documented Matlab code and present numerical results in an informative way*

LIST OF TOPICS

1. Linear Interpolation.
2. Linear regression
3. Curve fitting
4. Trapezoidal rule of integration.
5. Simpson's 1/3 rule of integration.
6. Newton – Raphson method for solving equations.
7. Gauss elimination method of solving simultaneous equations.
8. Gauss – Seidal method of solving simultaneous equations.
9. R-K Fourth order method of solving differential equations
10. Lagrange's method of interpolation

Text Books:

[1] “**APPLIED NUMERICAL METHODS USING MATLAB**”, By Won Young Yang, Wenwu Cao, Tae – Sang Chung, John Morris, A John Wiley and sons Inc Publications.

e-Resources:

1. https://youtu.be/i_VKsST3kkQ
2. <http://www.ohiouiversityfaculty.com/youngt/IntNumMeth/book.pdf>

Outcomes:**The learners would have the ability to,**

CO1	Express programming & simulation for engineering problems.	K5
CO2	Find importance of this software for lab experimentation.	K5
CO3	Determine better and more accurate solution.	K5
CO4	Develop program skills for various methods of Numerical Problems.	K6
CO5	Acquire knowledge on MATLAB Software.	K2

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create**Relationship matrix for Course outcomes, Programme outcomes / Programme Specific Outcomes**

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	1	3	3	3	1	2
CO2	3	3	2	2	3	2	3	2	3	3
CO3	3	3	3	3	2	3	2	1	3	3
CO4	2	2	3	1	3	3	3	1	2	3
CO5	3	3	2	1	3	2	3	3	1	2

3-Strong; 2-Medium; 1-LowMean Overall Relationship is 2.46 which is **HIGH**

SEM: VI
Credit:5
Hours/Week:5
Total Hours:75

B.Sc. MATHEMATICS
Linear Algebra
CODE: U6R2MACC14
Employability

CORE COURSE:14
Int.Marks:25
Ext.Marks:75
Max.Marks:100

Objectives

- *To calculate the null space of a matrix*
- *To maintain the structure of a vector space*
- *To help better understand vector spaces of infinite dimension and to add structure to vector space*
- *To preserve lengths of vectors and angle between them*
- *To determination the function of a matrix*

Unit I : Vector Space (15 hours)

Definitions and Examples- Vector Sub spaces- Basis and Dimension of a Vector Space.

Unit II: Linear Transformations (15 hours)

Linear Transformations- Representation of Linear Maps by Matrices- Kernel and Image of Linear Transformations- Linear Isomorphism- Some Special Linear Transformations.

Unit III: Inner Product Spaces (15 hours)

Inner Product Spaces-The Euclidean Plane and the Dot Product- General Inner Product Spaces- Orthogonality- Some Geometric Applications- Orthogonal Projection onto a Line- Orthonormal Basis- Orthogonal Complements and Projections.

Unit IV: Orthogonal Transformations (15 hours)

Linear Functionals and Hyperplanes –Hyperplanes - Orthogonal Transformations- Coordinate Associated with an Orthogonal Basis-Reflection and Orthogonal Maps of the Plane- Reflections- Orthogonal Maps of the Plane.

Unit V: Diagonalization (15 hours)

Rotation of Axes of Conics- Eigen Values and Eigen Vectors – Cayley Hamilton Theorem- Diagonalization of Symmetric Matrices.

Text Book:

[1] “ Linear Algebra”, S. Kumerasan, PHI Learning Pvt. Ltd., 2014.

Unit I: Chapter 2 full

Unit II: Chapter 4 full

Unit III: Chapter 5, Sec 5.1 to 5,6

Unit IV: Chapter 5, Sec 5.7 to 5.9

Unit V: Chapter7 full

Reference Books:

- [1] Linear Algebra, Seymour lipschutz, Ph.D., Marc Lipson, Ph.D., Tata McGraw Hill Education Private Limited New Delhi, Edition 2005.
- [2] Linear Algebra, S.K. Jain, A.D. Gunawardena, Thomson Asia Pte Ltd.,
- [3] "LINEAR ALGEBRA", Surjeetsingh, vikas publishing house pvt ltd, new edition 2015.

e-Resources:

1. <https://youtu.be/wgD50fKbcJ8>
2. <https://www.math.pku.edu.cn/teachers/anjp/textbook.pdf>

Outcomes:

The learners would have the ability to,

CO1	Define the range of a matrix.	K2
CO2	Interpret existence of uniqueness of solutions.	K3
CO3	Apply core concepts in Inner product space	K3
CO4	Analyze the problems and apply the appropriate concept of Orthogonal	K4
CO5	Acquire the knowledge of determine identify the rotation and diagonalization of a linear transform..	K5

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	1	3	3	3	2	3
CO2	3	3	1	2	3	3	2	2	2	2
CO3	1	3	1	3	2	2	3	2	3	2
CO4	3	2	1	1	3	1	3	1	2	2
CO5	3	3	3	1	3	3	3	3	1	3

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is 2.34 which is **HIGH**

SEM: VI
Credit:5
Hours/Week:5
Total Hours:75

B.Sc. MATHEMATICS
Complex Analysis
CODE: U6R2MACC15
Skill Development

CORE COURSE:15
Int.Marks:25
Ext.Marks:75
Max.Marks:100

Objectives

- *To demonstrate an understanding of the fundamental concepts of complex analysis*
- *To demonstrate an understanding of the application of the theory both to other mathematical areas and to physics and engineering*
- *To prove the basic results relating to analytic and harmonic functions*
- *To apply the theory learnt in the course to solve a variety of problems at an appropriate level of difficulty*
- *To develop clear thinking and analyzing capacity of students for research work*

Unit I: Analytic Functions (15 hours)

Introduction- Functions of a complex variable- Limits- Theorems on Limits- Continuous functions- Differentiability- The Cauchy- Riemann equations- Analytic functions- Harmonic functions.

Unit II: Bilinear Transformations and power series (15 hours)

Introduction- Elementary transformations- Bilinear transformations- Cross ratio- Fixed points of Bilinear transformations- Power series- Elementary Functions.

Unit III: Complex Integration (15 hours)

Introduction - Definite integral – Cauchy's Theorem- Cauchy's integral formula- Higher Derivatives.

Unit IV: Series Expansions (15 hours)

Introduction- Taylor's series- Laurent's series – Zeroes of Analytic functions- Singularities.

Unit V: Calculus of Residues (15 hours)

Introduction – Residues- Cauchy's Residue Theorem- Evaluation of Definite integrals.

Text Book:

[1] "Complex Analysis", S. Arumugam, A. Thangapandi Issac and A. Somasundaram, SCITECH Publications, Reprint 2014.

Unit I: Chapter 2: sec 2.0 to 2.8

Unit II: Chapter 3: sec 3.0 to 3.4 and Chapter 4: sec 4.3 and 4.4.

Unit III: Chapter 6, full

Unit IV: Chapter 7 full

Unit V: Chapter 8 Full

Reference Books:

[1] "Complex Analysis", T.K. Manichavasagam Pillai and others, S.V Publications

[2] "Functions of a complex variable", J.N. Sharma, Krishna Prakasan Media Ltd, 13 th edition.

e-Resources:

1. https://www.oulu.fi/sites/default/files/151/complex_book.pdf
2. https://www.fing.edu.uy/~cerminar/Complex_Analysis.pdf

Outcomes:

The learners would have the ability to,

- CO1 Give an account of the concepts of Analytic functions and Harmonic functions with the role of the C-R equations K2
- CO2 Learn about elementary transformations concepts in complex variables. K2
- CO3 Acquire the knowledge of Cauchy's theorems on Derivatives. K3
- CO4 Represent the functions as Taylor's and Laurent Power series method. K5
- CO5 Understand the singularity concepts and Residues, Solving definite integrals using the Residue concepts. K2

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	3	1	3	3	3	2	2
CO2	3	3	2	2	3	3	3	2	3	3
CO3	3	3	3	3	1	1	1	2	3	2
CO4	3	2	1	1	3	1	1	1	2	3
CO5	3	3	3	1	3	3	3	3	1	3

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is 2.36 which is **HIGH**

SEM: VI
Credit:4
Hours/Week:5
Total Hours:75

B.Sc. MATHEMATICS
Astronomy
CODE: U6R2MADSE2:1
Employability

DSE COURSE :2:1
Int.Marks:25
Ext.Marks:75
Max.Marks:100

Objectives

- *To provide working knowledge about the universe*
- *To increase the scientific awareness among the students on Astronomy*
- *To promote widespread access to the universal knowledge through the excitement of astronomy and sky – observing experiences*
- *To empower astronomical communities in developing Countries*
- *To educate the student in the field of advanced science and technology*

UNIT I - Spherical Trigonometry - Celestial Sphere (15 hours)

Relevant properties of a sphere & relevant formulae for spherical trigonometry (All without proof) - Celestial sphere - Diurnal motion, Cardinal points, Sidereal Time, Latitude of a place, relation between them.

UNIT II –Earth (15 hours)

Dip of the horizon - Effects of Dip - Twilight - Duration of Twilight - Astronomical refraction - Law's of refraction - Tangent & cosine's formula - properties & simple problems applying them.

UNIT III - Kepler's Law & Time (15 hours)

Kepler's Law of Planetary motion (statement only) - Verification of laws in the case of earth - Newton's deductions from them - Three anomalies of the Earth and relation between them - Time - Equation of time - mean time, true time, effects of equation of time seasons.

UNIT IV - Years and Calendar (15 hours)

Different kinds of Years and Calendar - Conversion of time, relation between them - Geocentric Parallax - Aberration of light - simple problems in the above.

UNIT V –Moon (15 hours)

Sidereal month, Synodic month phases of moon, age of the moon, summer and winter, full moon - motions of planet (assuming that orbits are circular) - eclipses.

Text Books:

[1] S.Kumaravelu and Prof.SusheelaKumaravelu, "Astronomy", SKV Publications, 2004.

Unit I :Chapter 1 & 2

Unit II :Chapter 3, Sec. 5, 6 & Chapter 4

Unit III :Chapter 6 and Chapter 7, Sec. 1 & 2

Unit IV :Chapter 7, Sec. 3, 4 , Chapter 5 & Chapter 9

Unit V : Chapter 12 and Chapter 13.

Reference Book:

[1] "An introduction to Astrophysics" by BidynathBasu, PragathiPrakasam (1981).
G.V. Ramachandran "Astronomy"

e-Resources:

1. <https://d3bxy9euw4e147.cloudfront.net/oscms-qa/media/documents/Astronomy-LR.pdf>
2. <http://staff.ustc.edu.cn/~xuey/IAC/000 Introduction to Astronomy and Cosmology.pdf>

Outcomes:

The learners would have the ability to,

CO1	Understand the basic terms used in Astronomy.	K2
CO2	Study the different position on Earth.	K4
CO3	Apply the Knowledge of Kepler's Laws and Equations of Time.	K3
CO4	Understand the concepts different kinds of Years and Calendar	K2
CO5	Acquire the Knowledge about Eclipses and Phases of moon.	K3

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	1	3	3	3	2	3
CO2	1	3	3	2	3	3	3	2	3	1
CO3	3	3	1	3	2	3	1	2	3	3
CO4	3	2	3	1	3	3	3	1	2	3
CO5	3	3	3	1	3	3	3	3	1	3

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is 2.5 which is **HIGH**

SEM: VI
Credit:4

B.Sc. MATHEMATICS
Formal Languages and Automata
Theory

DSE COURSE :2:2
Int.Marks:25

Hours/Week:5
Total Hours:75

CODE: U6R2MADSE2:2
Employability

Ext.Marks:75
Max.Marks:100

Objectives:

- *To construct finite state machines and the equivalent regular expressions*
- *To provide the equivalence of languages described by finite state machines and regular expression.*
- *To construct pushdown automata and the equivalent contenttree grammars*
- *To construct model for regular languages*
- *To study finite automata and regular expressions*

Unit I: Mathematical Background and Languages (15 Hours)

Sets – Relations – Graphs – proofs – Formalization of languages – Expressions and grammars: Expressions – grammars.

Unit II: Automata (15 Hours)

Conceptualization of automata – Transducers – computability – Exercise.

Unit III: Regular Languages (15 Hours)

Regular Expressions – Finite Automata: Basic Definitions – Elimination of ϵ -moves.

Unit IV: Models for Regular Languages (15 Hours)

Determinism – simplification- Minimization.

Unit V: Finite Automata and regular expressions (15 Hours)

From regular expressions to finite automata: Conversion of regular expressions to finite automata – Scanning.

Text Book:

[1] “Automata and Languages – Theory and Applications”, Alexander Meduna, Springer international Edition, 2005.

Unit I : Part I sec 0.1 to 0.4 and Chapter 1 sec 1.1, 1.2: 1.2.1 and 1.2.2 only

Unit II : Chapter 2 sec 2.1 to 2.3

Unit III : Chapter 3 sec 3.1, 3.2: 3.2.1 and 3.2.2 only

Unit IV : Chapter 3 sec 3.2: 3.2.3 to 3.2.5

Unit V : Chapter 3 sec 3.3: 3.3.1 – 3.3.1.1 and 3.3.1.2

Reference Book:

[1] “Introduction to Automata Theory, Languages and Computation”, John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, Pearson publications, 3rd Edition.

[2] RaniSironmoney, Formal Languages, CLS publications

[3] Venkatraman M.K., Sridharan. N. & N. Chandrasekaran, - Discrete Mathematics, National Publishing & Co., (2000).

e-Resources:

1. https://www.tutorialspoint.com/automata_theory/automata_theory_tutorial.pdf
2. https://www.vssut.ac.in/lecture_notes/lecture1423726104.pdf

Outcomes:

The learners would have the ability to,

CO1	Apply Automata concepts and techniques in designing systems that address real world problems	K3
CO2	Understand the connection between language and computation	K2
CO3	Analyze the computational strengths and weakness of these machines	K4
CO4	Demonstrate an in-depth understanding of theories, concepts and techniques in automata and their link to computation	K5
CO5	Acquire the knowledge of conversion of regular expression to finite automata – scanning	K3

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	3	3	1	3	3	3	2	3
CO2	3	3	3	2	3	3	3	2	3	3
CO3	1	3	3	3	2	3	1	2	3	1
CO4	3	2	3	1	3	3	3	1	2	3
CO5	3	3	3	1	1	3	3	3	1	3

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is 2.46 which is **HIGH**

SEM –VI
Credit : 4
Hours/Week: 5
Total Hours: 75
Objectives:

B.Sc. MATHEMATICS
Combinatorial Mathematics
CODE:U6R2MADSE2:3
Entrepreneurship

DSE COURSE:2:3
Int. Marks: 25
Ext. Marks: 75
Max. Marks: 100

- To learn core ideas in combinatorial mathematics
- To learn about countable sets combinations
- To become familiar with fundamental combinatorial structures
- To be familiar with convolution and counting technique
- To find n^{th} order relations

Unit I: Principles of Counting – I

(15 Hours)

The Rules of sum and product- The sum Rule, The product rule- Permutations- Combinations- Binomial and Multinomial Theorems- Combinations with Repetitions.

Unit II: Principle of Counting - II

(15 Hours)

Catalan Numbers, Problem of Catalan Numbers - Ramsey Numbers; Introduction , theorem on Ramsey Number with Examples- Strilling Numbers; Introduction- Strilling Numbers of First kind and second kind- Bell Numbers.

Unit III: Principles of Counting - III

(15 Hours)

The Pigeonhole principle; Generalization theorem –Principle of inclusion- Exclusion: Principle of inclusion for n sets; Generalization theorem- Problems.

Unit IV: Generating Functions

(15 Hours)

Ordinary generation function; Generating functions, Properties and Problems of ordinary generating function- Convolution of sequences-summation using convolution, problems of convolution of sequences- A counting Technique: Problems of a counting Technique- Partitions of integer.

Unit V: Recurrence Relations

(15 Hours)

First- order Relations: Problems of first order Relations- Second –order linear Homogeneous Relations - Problems of Second-order Linear Homogenous Relations - Third and higher-order Linear Homogeneous Relations and Problems.

Text Books:

[1] “Graph Theory and Combinatorics” by Dr.D.S.Chandrasekharaiah – Bangalore prism books, 2005.

Unit I: Chapter 5 – sec 5.1,5.2,5.3(5.3.1,5.3.2)

Unit II: Chapter 5– sec 5.4-5.6

Unit III: Chapter 6 – sec 6.1,6.2

Unit IV: Chapter 7 – sec 7.1(7.1.1,7.1.2,7.1.3)

Unit V: Chapter 8 – sec 8.1-8.3

Reference Books:

[1] “Graph Theory ” – Harray . F – Addison - Wesley - 1969.

[2]“Graph Theory with Applications to Engineering and Computer” – NarasingaDeo – Prientice Hall of India Pvt. Ltd. – New Delhi - 2000.

e-Resources:

1. https://onlinecourses.nptel.ac.in/noc22_ma01/preview
2. <https://www.cs.uleh.ca/~morris/Combinatorics/Combinatorics.pdf>

Outcomes:**The learners would have the ability to,**

CO1	Understand the ideas of Combinatorics	K2
CO2	Apply Ramsey numbers and strilling numbers	K3
CO3	Study about pigeonhole principle	K5
CO4	Acquire the knowledge of generating function and counting technique	K3
CO5	Use recurrence relations to solve problems of first, second and higher order linear homogeneous relations	K3

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create**Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes**

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	3	3	1	3	3	3	2	3
CO2	3	3	3	2	3	2	3	2	3	3
CO3	1	3	1	3	2	3	1	2	3	3
CO4	3	2	3	1	3	3	3	1	2	3
CO5	3	3	3	1	3	3	3	3	1	3

3-Strong; 2-Medium; 1-LowMean Overall Relationship is 2.48 which is **HIGH**

SEM:VI
Credit:4
Hours/Week:5
Total Hours:75

B.Sc. MATHEMATICS
Graph Theory
CODE: U6R2MADSE3:1
Employability

DSE COURSE :3:1
Int.Marks:25
Ext.Marks:75
Max.Marks:100

Objectives:

- *To determine a mathematical graph, identifying the vertices and edges*
- *To characterize which graphs have Euler circuits*
- *To able to represent real life situation with mathematical graphs*
- *To recognize patterns that arise in various graph problems*
- *To introduce students to study advanced methods from structural graph theory*

Unit I - Graphs - Paths and Circuits (15 hours)

Definition of a graph – Application of graphs finite & infinite graphs - incidence, degree, isolated & pendent vertices – Null graph - isomorphism - sub graphs - walks, paths & circuits - connected & disconnected graphs - components - Euler graphs - Operations on Graphs - More on Euler graphs - Hamiltonian paths & circuits.

Unit II - Trees and Fundamental Circuits (15 hours)

Trees - properties of trees - pendent vertices in a tree - distances & centres in a tree - Rooted & binary trees - Spanning trees - fundamental circuits - finding all spanning trees of a graph - spanning trees in a weighted graph.

Unit III - Cut-sets & Cut-vertices (15 hours)

Cut sets – Some properties of a cut set - all cut set in a graph - fundamental circuits & cut sets - connectivity & separability - Edge connectivity, vertex connectivity, separable graph.

Unit IV - Matrix Representation of Graphs (15 hours)

Incidence matrix – Sub matrices - Circuit Matrix - Fundamental Circuit Matrix and rank of the circuit matrix - cut set matrix - adjacency matrix

Unit V –Coloring and Partition (15 hours)

Chromatic Number - Chromatic partitioning - Chromatic polynomial.

Text Book:

[1]“Graph Theory with applications to Engineering and Computer Science”, NarsinghDeo, Prentice Hall of India, New Delhi, 1997.

Unit I : Chapter 1, Sec. 1.1 to 1.5 & Chapter 2, Sec. 2.1, 2.2, 2.4 to 2.9.

Unit II : Chapter 3, Sec. 3.1 - 3.5, 3.7 - 3.10.

Unit III: Chapter 4, Sec. 4.1 to 4.5.

Unit IV: Chapter 7, Sec. 7.1 to 7.4, 7.6, 7.9.

Unit V :Chapter 8, Sec. 8.1 to 8.3.

Reference Books:

- [1] “Basic Graph Theory” - K.R.Parthasarathy, Tat McGraw Hill Publishing Company, New Delhi, 1994.
- [2] “Invitation to Graph theory” – Dr.S. Arumugam and Dr. S. Ramachandran – Scitech publications.
- [3] “A first look at Graph theory” – G. T. John clark, Derek Allan Holten – World scientific publishing company, 1995.

e-Resources:

1. <https://youtu.be/egQi4l9SJjc>
2. <https://www.zib.de/groetschel/teaching/WS1314/BondyMurtyGTWA.pdf>

Outcomes:

The learners would have the ability to,

CO1	Acquire the knowledge of graph theory and its applications.	K3
CO2	Understand the techniques of Trees and Fundamental circuits in Graph Theory.	K2
CO3	Study advanced methods from structural graph theory.	K4
CO4	Study the relationship between Fundamental Circuit Matrix and rank of the circuit matrix	K4
CO5	Analyze the concepts of Colorings and Partitioning.	K4

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	3	3	1	3	3	3	2	3
CO2	3	3	3	2	3	1	3	2	3	1
CO3	1	3	1	3	2	3	1	2	3	3
CO4	3	2	3	1	3	3	3	1	2	3
CO5	3	3	3	1	3	3	3	3	1	3

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is 2.42 which is **HIGH**

SEM:VI
Credit:4
Hours/Week:5
Total Hours:75

B.Sc. MATHEMATICS
Fuzzy Mathematics
CODE: U6R2MADSE3: 2
Skill Development

DSE COURSE :3:2
Int.Marks:25
Ext.Marks:75
Max.Marks:100

Objectives

- *To introduce the comparative study of fuzzy and crisp set*
- *To acquire knowledge of fuzzy relations*
- *To provide the knowledge of membership functions*
- *To compare classical logic and fuzzy logics*
- *To learn how to convert fuzzy to crisp*

Unit I: Fuzzy Sets And Classical Sets

(15 hours)

Basic definitions – Classical sets – Representation of a fuzzy set – Fuzzy measures – Cardinality of fuzzy set – Special α -cuts of a fuzzy set – Normalized fuzzy set – Height of a fuzzy set – Basic Theoretic operation of fuzzy sets – Algebraic operations on fuzzy sets – Logical operations on fuzzy sets.

Unit II: Fuzzy Relations And Classical Relations

(15 hours)

Cartesian product – Crisp relation – Operations on crisp relations – Composition operator – Fuzzy Relations – Fuzzy Cartesian product and composition – Equivalence relations – Binary relation on a fuzzy set – Properties of binary relations.

Unit III: Membership Functions

(15 hours)

Features of the membership function – Fuzzification – Membership functions shapes – Assignment of membership function to fuzzy variables – Evaluation of membership function.

Unit IV: Classical Logic And Fuzzy Logic

(15 hours)

Classical predicate logic – logical connectives – Tautologies – Contradictions – Equivalence – Logical proofs – Fuzzy logic – Approximate Reasoning.

Unit V: Fuzzy To Crisp Conversions

(15 hours)

Introduction – Defuzzification techniques – Lambda cuts – Defuzzification method-applications – Comparison and evaluation of defuzzification methods.

Text Book:

[1] ‘Fuzzy Logic and Neural networks’, M.Amirthavalli, Published by Scitech 2004.

Unit I: Chapter 2

Unit II: Chapter 3

Unit III: Chapter 4

Unit IV: Chapter 5

Unit V: Chapter 7

Reference Books:

[1] ‘Fuzzy sets and Fuzzy logic’, George J.Klir and Bo Yuan, Prentice Hall of India, New Delhi, 1995.

[2] ‘Introduction to Fuzzy sets and Fuzzy logic’, M.Ganesh – PHI Private Limited.

e-Resources:

1. <https://www.mdpi.com/books/pdfdownload/book/1028>
2. <https://cours.etsmtl.ca/sys843/REFS/Books/ZimmermannFuzzySetTheory2001.pdf>

Outcomes:

The learners would have the ability to,

CO1	Gain the knowledge of fuzzy sets.	K2
CO2	Discuss the types of operations on fuzzy sets and fuzzy arithmetic.	K2
CO3	Identify fuzzy relations, binary fuzzy relations & fuzzy equivalence relations.	K4
CO4	Apply the fuzzy models to natural science and technical fields.	K3
CO5	Acquire the Knowledge of Comparison and evaluation of defuzzification methods	K3

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	3	3	1	3	3	3	2	3
CO2	3	3	3	2	3	3	3	2	3	3
CO3	1	3	2	3	2	1	1	2	3	1
CO4	3	2	3	1	3	3	3	1	2	3
CO5	3	3	3	1	3	3	3	3	1	3

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is 2.44 which is **HIGH**

SEM: VI
Credit: 4
Hours/Week: 5
Total Hours:75

B.Sc. MATHEMATICS
Logics and Boolean Algebra
CODE: U6R2MADSE3: 3
Skill Development

DSE Course:3:3
Int. Marks: 25
Ext. Marks: 75
Max. Marks: 100

Objectives:

- *To introduce a number of discrete mathematics structure found to be serving as tools in the development of theoretical computer science*
- *To study the basic concepts of algebra*
- *To know the importance discrete structures towards simulation of problems*
- *To solve problems occurred in the development of programming languages*
- *To provide the knowledge of Karnaugh's maps*

UNIT I : Logics

(15 hours)

Introduction – Statement – Types of Statements – Connectives – Conditional statement – Compound statement – Biconditional statement – Equivalence of formulae – Functionally complete set – precedence rule – Predicates – Quantifiers – Arguments and principle of mathematics inductions.

UNIT II : Sets and Relations

(15 hours)

Sets – Operations on sets – Difference of two sets – Computer representation of sets – Relation – Domain and range of a relation – Identity relation – Universal relation - Void relation – Composite relation – Representation of relation – Binary relation – Warshall's algorithm – Equivalence class – Antisymmetric Relation – Hasse – diagrams.

UNIT III : Boolean Algebra

(15 hours)

Introduction – Boolean Algebra – Alternative definition of Boolean Algebra – Properties of Boolean Algebra - Boolean subalgebra – Homomorphism of Boolean algebra- proposition – partial order relation – Order Relations Boolean algebra – Some definitions .

UNIT IV : Boolean Functions

(15 hours)

Boolean functions –Fundamental forms of Boolean functions – Normal forms of Boolean functions – Types of Boolean functions – Disjunctive normal form – Complete Disjunctive normal forms – compliment of Boolean expression in C.N.F- Transformation of a normal form to the each other – Conjunctive normal forms.

UNIT V: Karnaugh's Maps

(15 hours)

Boole's expansion theorem – Representation of a finite Boolean algebra – Stone representation theorem – Working rule – Switching circuit – Many terminal networks – Logic circuit – Logic gates – Karnaugh maps – Symmetric functions – Binomial net – tress.

TEXT BOOKS

1. “Discrete Mathematics “, Hari kishan , Shiva Raj Pundir, A Pragati, Tenth Edition, Meerut, 2015.

Unit I : Chapter1 to 13

Unit II: Chapter 14 to 28

Unit III : Chapter 4, Sec. 4.1- 4.10

Unit IV : Chapter 4, Sec 4.11-4.21

Unit V :Chapter 4, Sec 4.22- 4.33

Reference Books:

1. “Discrete Mathematics “,N. Chandrasekaran, M. Umaparvathi, PHI Learning PVT. LTD., New Delhi, 2010.
2. “Discrete Mathematics Structures with Applications to Computer Science“,Tremly. J. P. and Manohar P., McGraw Hill, 1987.

e – Resources:

1. <https://youtu.be/YcF140RAgLY>
2. <https://vulms.vu.edu.pk/Courses/MTH202/Downloads/2Discrete%20Mathematics%20with%20Applications%20by%20Susanna%20S.%20Epp%20-%204th%20Edition.pdf>

Outcomes:

The learners would have the ability to,

- CO1 Understand the logical arguments K2
CO2 Summarize the concepts of relations and functions K4
CO3 Appreciate the basic principles of Boolean Algebra K6
CO4 Assess the various normal forms K5
CO5 Apply the mathematical ideas for solving the problems by using Karnaugh map K3
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	3	1	3	2	3	2	3
CO2	1	3	3	2	3	1	3	2	3	1
CO3	3	3	1	3	2	3	1	2	3	3
CO4	2	2	3	1	3	2	3	1	2	2
CO5	3	3	2	1	2	3	3	3	1	3

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is 2.32 which is **HIGH**

SEM: VI
Credit: 2
Hours/Week: 3
Total Hours: 45

B.Sc. MATHEMATICS
Soft Skill Development
CODE: U6R2MASEC3:1
Skill Development

SE COURSE:3:1
Int. Marks: 25
Ext. Marks: 75
Max. Marks: 100

Objectives:

- *To develop workbook that enhance skills for employment*
- *To develop reading skill, communication skill and speaking skill*
- *To formulate problem solving skill*
- *To create a desire to fulfil individual goal*
- *To educate about unproductive things, self defecting behaviours*

UNIT I: Speaking Skills (9 hours)

Formal and Informal conversation in the work place – Interviews – Public speech – Lectures.

UNIT II :Listening Skill (9 hours)

Comprehending – Retaining – Responding – Tactics – Barriers to Listening -Overcoming listening barriers – Misconception about listening.

UNIT III :Reading Skill (9 hours)

Acquiring reading – Reading Development – Methods teaching – Reading Difficulties

UNIT IV: Writing Skill (9 hours)

Note making – CV's – Report writing, copy writing, Agenda – minute – Circular - Essay writing on any current issues – Paragraph – Essay writing , Writing Research paper – Dissertation

UNIT V :Business Correspondence (9 hours)

Meaning of Business correspondence-importance of Business Correspondence essential qualities of a business letters. Different types of business letters –cover letter, thank you letters, message through email and Fax, Acceptance letters, rejection letters, and withdrawal letters.

Text Books :

1. Minippally, Methukutty. M.2001.Business Communication Strategies.11th Reprint.Tata McGraw-Hill. New Delhi.
2. SasiKumar. V and P.V. Dharmija. 1993. Spoken English:A Self-Learning Guide ConversationPractice.34 reprint. Tata McGraw-Hill. New York.
3. Swets, Paul.W. 1983. The Art of Talking So that People will Listen: Getting Through to Family, Friends and Business Associates, Prentice Hall Press. New York.

Reference Books:

1. John, seely The Oxford guide to writing and speaking. Oxford U P, 1998, Delhi.
2. The process of Writing: Planning and Research, Writing, Drafting and Revising.

e – Resources:

1. https://onlinecourses.nptel.ac.in/noc22_hs08
2. https://sites.nationalacademies.org/cs/groups/dbassesite/documents/webpage/dbasse_071757.pdf

Outcomes:

The learners would have the ability to,

- CO1 Effectively communicate through verbal / oral communication and improve the listening skills K4
- CO2 Write precise briefs or report and technical documents K1
- CO3 Actively participate in group discussion / meeting / interviews K3
- CO4 Become more effective individual taught goal / target setting, self motivation and practicing creative thinking K4
- CO5 Function effectively in multidisciplinary team work K6

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	1	2	3	3	3	3
CO2	3	3	3	3	2	3	3	1	3	2
CO3	1	1	2	3	1	1	3	1	3	2
CO4	2	2	2	3	2	2	3	3	3	1
CO5	3	3	1	3	1	3	3	3	3	3

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is 2.4 which is **HIGH**

SEM:VI
Credit:2
Hours/Week:3
Total Hours:45

B.Sc. MATHEMATICS
Mathematics For Competitive Examination
CODE: U6R2MASEC3:2

SE Course :3:2
Int.Marks:25
Ext.Marks:75
Max.Marks:100

Objectives:

- *To develop the aptitude of Reasoning*
- *To understand the Time and work*
- *To calculate area and volume of the shapes*
- *To Study about the Numbers.*
- *To know about the Discount in Bank.*

Unit – I : Problems on Numbers and Ages

(9 hours)

Problems on Numbers – Consecutive Numbers – Fraction of Numbers – worked out Problems on Ages.

Unit – II : Time & Work, Time & Distance

(9 hours)

Relation between time and work – Problems – Formulae - Relation between time and Distance – Worked out problems.

Unit – III : Area

(9 hours)

Definition – Formulae – Results on Quadrilateral – Area on Square, Rectangle, Triangle, Rhombus, Parallelogram – Applications.

Unit – IV : Volume and Surface Area

(9 hours)

Definitions – Formulae – Problems on cuboid, cube, cylinder, cone, sphere & Hemisphere – simple Applications only.

Unit – V : True Discount & Banker's Discount

(9 hours)

Important concepts – Formulae – Problems – Definitions – Banker's Discount – Problems.

Text Book:

[1] “Quantitative Aptitude for Competitive Examination” – R.S.Aggarwal – S. Chand & Sons – New Delhi –Seventh edition – 2006.

Unit – I : Chapter 7 & 8
Unit – II : Chapter 15 & 17
Unit – III : Chapter 24
Unit – IV : Chapter 25
Unit – V : Chapter 32 & 33

Reference Books:

- [1] “Quantitative Aptitude and Reasoning” – R.V.Praveen –Phi – Second Edition - 2012.
[2] “Quantitative Methods” – D.C. Sanchati – S. Chand & Sons – New Delhi .
[3] Quantitative Aptitude - Naresh Sharma, Anjali Kaushik - variety book publishers distributors.

e-Resources:

1. <https://fightexam.com/arun-sharma-quantitative-aptitude-pdf/>
2. <https://sarkaribook.in/rakesh-yadav-7300-pdf/>

Outcomes:

The learners would have the ability to,

CO1	Guess & Check the Problems quickly	K2
CO2	Prepare for Competitive & Entrance Examinations in various fields.	K3
CO3	Know the application of Volume and Surface Area.	K4
CO4	Analyze real life problems and find solutions	K4
CO5	Understand the true and banker's discount.	K2

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Course Outcome (CO)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				
CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	3	1	3	3	3	3	3	1
CO2	3	3	3	2	1	2	3	2	3	3
CO3	3	2	3	3	2	3	3	2	3	1
CO4	3	3	2	1	2	3	1	1	3	2
CO5	2	3	3	1	2	3	3	3	2	3

3-Strong; 2-Medium; 1-Low

Mean Overall Relationship is 2.8 which is **HIGH**

SEMESTER VI

For the candidates admitted from the academic year 2022-2023

Title of the Course : EXECUTIVE ENGLISH

Category of the Course : GENERIC ELECTIVE COURSE-II

Course Code : U6R2MA GEC2

Nature of the Skill : Professional Communication, Public Relations

Marks : CIA : 25 +Ext: 75 = 100

Hrs / Week : 02

Credits : 02

Total Inst.Hrs : 24

OBJECTIVES :

1	To train executives in the skills of language
2	To help them to cultivate a neutral accent through practice
3	To enable them to comprehend discourse in both American and British English
4	To sensitize them official etiquette
5	To give them practice in drafting correspondence, memoranda, speeches etc.

UNIT I

(Inst. Hrs:04)

A Quick revision of reading and writing skills with passages for exercise (Developing Communication Skills by Tickoo Etal)

UNIT II

(Inst. Hrs:05)

Listening practice in the lab followed by Comprehension Exercises (suitable CD'S from the lab, recorded cassettes etc.)

UNIT III

(Inst. Hrs:05)

Distinction between American and British Usage – (The chapter on American English in A.C. Baugh and suitable passages to be chosen from journals and newspapers)

UNIT IV

(Inst. Hrs:05)

The sections on Soft Skills and Presentation Skills in Managerial Communication by Alex Any corporate manual on Behavioral Skills - To cultivate manners in behavior – gait, voice modulation, fillers, attitude, eye contact, etc. - Simulated dialogues, conversations, GD's , interviews and other channels of interaction among peers, bodies and superiors etc.

UNIT V

(Inst. Hrs:05)

The sections on Letter Writing, Report Writing, Note Taking, Precis Writing in “English for Competitive Examinations” by Ayothi and Vedavalli.

Rajendra Pal and Korlahalli Essentials of Business Communications

<https://byjus.com/english/formal-letter-writing-in-english/>
https://www.brainkart.com/article/Report-Writing_35377/
<https://www.thebalancecareers.com/what-are-soft-skills-2060852>
<https://www.google.com/url?sa=t&source=web&rct=j&url=https://m.youtube.com/watch%3Fv%3DbEB8-SWMyhI&ved=2ahUKEwikh5nuxLv3AhWiTWwGHbQnBcEQwqsBegQICBAF&usg=AOvVaw09FhtOHdOEXDTHIpdRj> 8

Course Name: EXECUTIVE ENGLISH	Course Code: U6R2XXGEC2	Knowledge Level
On completion of the course, students will be able to		
1	develop a neutral acceptable accent	K6
2	adapt speech and writing to situation	K6
3	evaluate discourse for clarity, precision and understandability	K5
4	assume right patterns of etiquette in social behavior	K4
5	compose communication of various kinds	K6

Title of the Course : EXECUTIVE ENGLISH						Course code : U6R2XXGEC2					
Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)					Mean Score of COs
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	
CO – 1	3	2	3	3	3	3	2	3	2	2	2.6
CO – 2	2	1	2	2	3	2	2	3	2	2	2.1
CO – 3	2	3	3	3	3	2	3	3	2	3	2.7
CO – 4	1	2	3	3	2	2	2	3	3	3	2.4
CO – 5	3	2	2	2	3	3	2	3	3	2	2.5
	Mean Overall Score										2.46
	Result										HIGH

SEMESTER VI

For candidates admitted from the academic year 2022-2023

Title of the Course : GENDER STUDIES

Category of the Course : Ability Enhancement Compulsory Course - III

Course Code : U6R2AECC3

Nature of the Skill : Reading and Study Skill

Marks : CIA : 25 +Ext: 75 = 100

Hrs / Week : 02

Credits : 01

Total Inst. Hrs : 24

OBJECTIVES:

1	To help learners to see their strength and weakness in gender relations.
2	To develop sensitivity to gender-issues in order to lead an ethically enriched life.
3	To enable the learners to realize the discrimination existing in society based on gender, class, caste, and religion.
4	To help learners to re-examine and analyze the gender bias in the society, in the family and in everyday activities.
5	To promote attitudinal change to assure in a gender balanced ambience and women empowerment.

UNIT I

(Inst. Hrs:05)

Concept of Gender: Sex Gender – Biological Determinism – Patriarchy – Feminism – Gender Discrimination – Gender Division of Labour – Gender Stereotyping – Gender sensitivity Gender Equality – Gender mainstreaming – empowerment.

UNIT II

(Inst. Hrs:04)

Women's studies Vs Gender studies: UGC's Guidelines – VIII to XI Plans, Gender studies Beijing Conference and CEDAW – Exclusiveness and inclusiveness.

UNIT III

(Inst. Hrs:05)

Areas of Gender discrimination: Family, Sex ratio, literacy, Health, Governance, religion, Work Vs employment – Market, Media, Politics, Law, Domestic violence, Sexual Harassment, State politics and planning.

UNIT IV

(Inst. Hrs:04)

Women development and gender empowerment: initiatives, International Women's decade, International women's year, National policy for Empowerment of women, Women Empowerment year 2011, Mainstreaming global policies.

UNIT V

(Inst. Hrs:06)

Women's Movements: In India National / State Commission for Women (NCW), all women police station, Family court, Domestic violence Act, Prevention of Sexual Harassment at work place - Supreme Court

Title of the Course : Gender Studies						Course code : U6R2AECC3					
Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)					Mean Score of COs
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	
CO – 1	3	2	2	3	1	3	3	3	2	3	2.5
CO – 2	3	1	1	2	3	3	2	2	3	1	2.1
CO – 3	2	3	1	2	2	3	3	2	3	2	2.3
CO – 4	2	1	3	3	2	2	3	2	3	2	2.3
CO – 5	1	3	2	2	3	3	1	2	3	3	2.3
	Mean Overall Score										2.30
	Result										HIGH