CHOICE BASED CREDIT SYSTEM - LEARNING OUTCOMES-BASED CURRICULUM FRAMEWORK

B.Sc Mathematics

Those who have joined in the Academic year 2023-24 onwards

Programme Outcomes:

PO1: Disciplinary Knowledge: Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate programme of study.

PO2: Critical Thinking: Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theories by following scientific approach to knowledge development.

PO3: Problem Solving: Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply one's earning to real life situations.

PO4: Analytical Reasoning: Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples and addressing opposing viewpoints.

PO5: Scientific Reasoning: Ability to analyse, interpret and draw conclusions from quantitative / qualitative data; and critically evaluate ideas, evidence, and experiences from an open minded and reasoned perspective.

PO6: Self-directed & Lifelong Learning: Ability to work independently, identify and manage a project. Ability to acquire knowledge and skills, including "learning how to learn", through self-placed and self-directed learning aimed at personal development, meeting economic, social and cultural objectives.

Programme Specific Outcomes:

PSO1: Acquire good knowledge and understanding, to solve specific theoretical & applied problems in different area of mathematics & statistics.

PSO2: Understand, formulate, develop mathematical arguments, logically and use quantitative models to address issues arising in social sciences, business and other context /fields.

PSO3: To prepare the students who will demonstrate respectful engagement with other's ideas, behaviors, beliefs and apply diverse frames of references to decisions and actions. To create effective entrepreneurs by enhancing their critical thinking, problem solving, decision making and leadership skill that will facilitate startups and high potential organizations.

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)can be carried out accordingly, assigning the appropriate level in the grids:

CHOICE BASED CREDIT SYSTEM - LEARNING OUTCOMES-BASED CURRICULUM FRAMEWORK

B.Sc Mathematics

Those who have joined in the Academic year 2023-24 onwards

Part	Courses	Subject	Code	Cr.	Hrs
		SEMESTER I			
I	Lang. – I	பொதுத்தமிழ் - **I**	230103101	3	6
II	Lang. - II	General English	231003101	3	4
III	CC – 1	Algebra and Trigonometry	232003101	4	4
	CC – 2	Differential Calculus	232003102	3	4
	EC – I (Theory)	Allied Physics - I	232103121	3	4
	EC –I (Practical)	Allied Physics Practicals - I	232103122	1	2
IV	SEC –I (NME)	Mathematics for Competitive Examinations – I	234603120	2	2
IV	FC	Bridge Mathematics	234403120	2	2
	AECC - 1	Soft Skill - I	236003101	2	2
	Total			**23**	**30**
		SEMESTER II			
I	Lang. -I	பொதுத்தமிழ் - **II**	230103201	3	6
II	Lang. -II	General English	231003201	3	4
III	CC – 3	Analytical Geometry(Two & Three Dimensions)	232003201	4	4
	CC - 4	Integral Calculus	232003202	3	4
	EC – II(Theory)	Allied Physics Paper – II	232103221	3	4
	EC – II (Practical)	Allied Physics Practicals - I	232103222	1	2
IV	SEC –II (NME)	Mathematics for Competitive Examinations - II	234603220	2	2
	SEC - III	Computing skill (Office Automation)	234403220	2	2
	AECC –II	Soft Skill - 2	236003201	2	2
				23	**30**
		SEMESTER III			
I	Lang. -I	பொதுத்தமிழ் - **III**	230103301	3	6
II	Lang. -II	General English	231003301	3	4
III	CC – 5	Vector Calculus and Applications	232003301	4	5
	CC - 6	Differential Equations and Applications	232003302	4	5
	EC –3	Numerical Methods with Applications	232003303	3	4
IV	SEC –IV	LATEX	234403320	1	1
	SEC – V	Mathematics for Competitive Examinations	238203320	2	2
	AECC – III	Soft Skill - 3	236003301	2	2
	EVS	Environmental Studies	234103301	1	1
				23	**30**

Part	Courses		Code	Cr.	Hrs
SEMESTER IV					
I	Lang. – I	பொதுத்தமிழ் - **IV**	230103101	3	6
II	Lang. - II	General English	231003101	3	4
III	CC – 7	Industrial Statistics	232003401	4	4
	CC - 8	Elements of Mathematical Analysis	232003402	4	5
	EC – IV	Discrete Mathematics	232003403	3	4
IV	SEC –VI	Statistics with Excel	234403420	2	2
	SEC –VII	Data Analaysis using Geogebra	238203420	2	2
	AECC – 4	Soft Skill - 4	236003401	2	2
	EVS	Environmental Studies	234103401	1	1
	Total			**24**	**30**
SEMESTER V					
III	CC – 9	Abstract Algebra	232003501	4	5
	CC - 10	Real Analysis	232003502	4	5
	CC - 11	Mechanics	232003503	4	5
	Core 12	Project with Viva Voce	232003504	4	4
	EC – V	Programming in C with Practical	232003505	3	5
	EC – VI	Optimization Techniques	232003506	3	5
IV		Value Education	234303501	1	1
		Internship/Industrial Training(carried out in II year summer vacation)30 hrs	232003507	2	
				25	**30**
SEMESTER VI					
III	CC – 13	Linear Algebra	232003601	4	5
	CC – 14	Complex Analysis	232003602	4	5
	CC – 15	Transform Techniques	232003603	4	5
	EC –7	Programming Language C++ with Practical	232003604	3	5
	EC - 8	Graph Theory and Applications	232003605	3	5
IV	Processional competency skill enhancement course	Mathematics for Real life	234403620	2	4
		Value Education	234303601	1	1
V		Extension Activity (outside college hrs)	232003606	1	
				22	**30**

ALLIED – MATHEMATICS FOR PHYSICS and CHEMISTRY					
Sem	**Title of the Paper**	**SUB CODE**	**Hrs.**	**Cr.**	**Generic/Discipline Specifit**
I	Allied Mathematics – I	232003121	6	4	
II	Allied Mathematics - II	232003221	6	4	

ALLIED – MATHEMATICS FOR COMPUTER SCIENCE					
Sem	**Title of the Paper**	**SUB CODE**	**Hrs.**	**Cr.**	**Generic/Discipline Specifi**
I	Numerical methods	232003122	4	3	
II	Graph theory and its applications	232003222	4	3	
III	Discrete Mathematical Structures	232003322	4	3	
IV	Industrial Statistics	232003422	4	3	

Title of the Course		**VECTOR CALCULUS AND APPLICATIONS**						
PART		**III**						
Category	CC 5	**Year**	II	**Credits**	4	**Course Code**	**232003301**	
		Semester	III					
Instructional Hours per week		**Lecture**	**Tutorial**	**Lab Practice**	**Total**	**CIA**	**External**	**Total**
		5	-	--	5	25	75	100

Learning Objectives

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

UNIT	**Details**	**No. of Periods for the Unit**
I	Vector point function - Scalar point function - Derivative of a vector and derivative of a sum of vectors - Derivative of a product of a scalar and a vector point function - Derivative of a scalar product and vector product. **Chapter 1: section 1.7,1.8 ; Chapter 2: Section 2.2**	**15**
II	The vector operator 'del', The gradient of a scalar point function - Divergence of a vector - Curl of a vector - solenoidal and irrotational vectors – simple applications. **Chapter 2: Section 2.3; Chapter 4: Section 4.6**	**15**
III	Laplacian operator, Vector identities - Line integral - simple problems. **Chapter 3: Section 3.1; Chapter 4: Section 4.1**	**15**
IV	Surface integral - Volume integral – Applications. **Chapter 3: Section 3.5, 3.6; Chapter 4: Section 4.2**	**15**
V	Gauss divergence Theorem, Stoke's Theorem, Green's Theorem in two dimensions – Applications to real life situations. **Chapter 4: Section 4.3, 4.4, 4.5**	**15**

Course Outcomes

Course Outcomes	Students will be able to
CO1	Find the derivative of vector and sum of vectors, product of scalar and vector point function and to Determine derivatives of scalar and vector products
CO2	Applications of the operator 'del' and to Explain soleonidal and ir-rotational vectors
CO3	Solve simple line integrals
CO4	Solve surface integrals and volume integrals
CO5	Verify the theorems of Gauss, Stoke's and Green's(Two Dimension)

Text Book (Latest Edition)

A. Gorguis, Vector Calculus for College Students, Xilbius Corporation, 2014.

Reference Books	
1.	J.C. Susan ,Vector Calculus, , (4th Edn.) Pearson Education, Boston, 2012.
2.	J.E. Marsden and A. Tromba ,Vector Calculus, , (5^{th}edn.) W.H. Freeman, New York, 1988.
3.	Dr.M.K. Venkataraman, Mrs.Monorama Sridhar, Vector Calculus and Fourier Series, The National publishing company, 2002.
4	P. Duraipandian, Laxmi Duraipandian, Vector Analysis, Emorlad Publishers, 2003.
5	Dipak Chatteriee, Vector Analysis, Prentice Hall of India, New Delhi, 2003.
6	Dr. S. Arumugam, Prof A. Thangapandi Isaac. Analytical Geometry 3D and Vector Calculus, New Gamma Publishing house, 2017.
Web Resources	
1.	https://nptel.ac.in
2	http://www.meemath.net

Mapping with Programme Outcomes:

	POs						**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**
CO 1	3	2	3	1	-	-	3	2	1
CO 2	3	2	3	1	2	-	3	2	1
CO 3	3	3	3	3	-	-	3	3	1
CO 4	3	3	3	3	-	-	3	3	1
CO 5	3	3	3	3	2	-	3	3	1

S-Strong M-Medium L-Low

Title of the Course		**DIFFERENTIAL EQUATIONS AND APPLICATIONS**						
PART		**III**						
Category	CC 6	**Year**	II	**Credits**	4	**Course Code**	**232003302**	
		Semester	III					
Instructional Hours per week		**Lecture**	**Tutorial**	**Lab Practice**	**Total**	**CIA**	**External**	**Total**
		5	-	--	5	25	75	100

Learning Objectives

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

UNIT	**Details**	**No. of Periods for the Unit**
I	Ordinary Differential Equations: Variable separable - Homogeneous Equation-Non-Homogeneous Equations of first degree in two variables -Linear Equation - Bernoulli's Equation-Exact differential equations. **Chapter 2: Section 1 to 6**	**15**
II	Equation of first order but not of higher degree: Equation solvable for dy/dx- Equation solvable for y-Equation solvable for x- Clairauts' form - Linear Equations with constant coefficients-Particular integrals of algebraic, exponential, trigonometric functions and their products. **Chapter 4: Section 1 to 3; Chapter 5: Section 1 to 4**	**15**
III	Simultaneous linear differential equations- Linear Equations of the Second Order -Complete solution in terms of a known integrals-Reduction to the Normal form-Change of the Independent Variable-Method of Variation of Parameters. **Chapter 6: Section 1 to 6; Chapter 8: Section 1 to 4**	**15**
IV	Partial differential equation: Formation of PDE by Eliminating arbitrary constants and arbitrary functions – complete integral – singular integral-General integral-Lagrange's Linear Equations – Simple Applications. **Chapter 12: Section 1 to 4**	**15**
V	Special methods – Standard forms - Charpit's Methods – Simple Applications **Chapter 3 Section 1 to 3; Chapter 12: Section 6**	**15**

Course Outcomes

Course Outcomes	Students will be able to
CO1	Determine solutions of homogeneous equations, non-homogeneous equations of degree one in two variables, solve Bernoulli's equations and exact differential equations
CO2	Find the solutions of equations of first order but not of higher degree and to Determine particular integrals of algebraic, exponential, trigonometric functions and their products
CO3	Find solutions of simultaneous linear differential equations, linear equations of second order and to find solutions using the method of variations of parameters

CO4	Form a PDE by eliminating arbitrary constants and arbitrary functions, find complete, singular and general integrals, to solve Lagrange's equations
CO5	Explain standard forms and Solve Differential equations using Charpit's method

Text Book (Latest Edition)	
1.	S. Narayanan, T.K. Manikavachagam Pillai, Differential Equation and its Applications, S, Viswanathan (Printers & Publishers) PVt Ltd., 2012.
Reference Books	
1.	Shepley L. Ross, Differential Equations, 3rd Ed., John Wiley and Sons, 1984.
2.	I. Sneddon, Elements of Partial Differential Equations, McGraw-Hill, International Edition, 1967.
3.	G.F. Simmons, Differential equations with applications and historical notes, 2nd Ed, Tata Mcgraw Hill Publications, 1991.
4.	D.A. Murray, Introductory course in Differential Equations, Orient and Longman
5.	H.T. H. Piaggio, Elementary Treaties on Differential Equations and their applications, C.B.S Publisher & Distributors, Delhi,1985.
6.	Horst R. Beyer, Calculus and Analysis, Wiley, 2010.
7.	Braun, M. Differential Equations and their Applications. (3rd Edn.), Springer- Verlag, New York. 1983.
8.	Tyn Myint-U and Lognath Debnath. Linear Partial Differential Equations for Scientists and Engineers. (4th Edn.) Birhauser, Berlin. 2007.
9.	Boyce, W.E. and R.C.DiPrima. Elementary Differential Equations and Boundary Value Problems. (7th Edn.) John Wiley and Sons, Inc., New York. 2001.
10.	Sundrapandian, V. Ordinary and Partial Differential Equations, Tata McGraw Hill Education Pvt.Ltd. New Delhi, 2013
Web Resources	
https://nptel.ac.in	

Mapping with Programme Outcomes:

	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CLO1	3	1	3	2	1	-	3	2	1
CLO2	3	1	3	2	1	-	3	2	1
CLO3	3	1	3	2	1	-	3	3	1
CLO4	3	1	3	2	2	1	3	3	1
CLO5	3	1	3	2	2	1	3	3	1

S-Strong M-Medium L-Low

Title of the Course		**NUMERICAL METHODS WITH APPLICATIONS**						
PART		**III**						
Category	EC – 3	**Year**	II	**Credits**	3	**Course Code**	**232003303**	
		Semester	IIII					
Instructional Hours per week		**Lecture**	**Tutorial**	**Lab Practice**	**Total**	**CIA**	**External**	**Total**
		4	-	--	4	25	75	100

Learning Objectives

- ✍ To introduce numerical methods for solving equations.
- ✍ To motivate the students to apply the iteration process in numerical methods.
- ✍ To enable students to interpolate an unknown value from a given data.

UNIT	**Details**	**No. of Periods for the Unit**
I	Solving Algebraic and Transcendental equations: Introduction - Errors in Numerical Computation - Iteration method – Bisection method – Regula Falsi method – Newton Raphson method. **(Chapter :1 – Sections 1.1 to 1.4)**	**12**
II	Simultaneous equations: Introduction - Simultaneous equations - Back Substitution - Gauss elimination method – Gauss Jordon method – Calculation of inverse of a matrix - Iterative methods - Gauss Jacobi iteration method - Gauss Seidal iteration method. **(Chapter : 2)**	**12**
III	Interpolation: Introduction- Newton's interpolation formulae – Central difference interpolation formulae – Lagrange's interpolation formula. **(Chapter : 4; Chapter 5 - Sections 5.1 to 5.4;** **Chapter 6: Section 6.7)**	**12**
IV	Numerical Differentiation: Introduction - Derivatives using Newton's forward and backward difference formula. Numerical Integration: Newton –Cote's quadrature formula - Trapezoidal rule – Simpson's one third and three eighth rule. ***[Omitting** Stirling's formula and Maxima minima for differentiation - Weddle's rule, Boole's rule and Romberg's method for integration**]*** **(Chapter : 7 - Sections 7.1 to 7.3, 7.7 to 7.9 & 7.13 , 7.14)**	**12**
V	Numerical solutions of ordinary Differential equations: Introduction - Taylor's series method – Euler's method - Runge - Kutta methods. ***[Omitting** Picard's method**]*** **(Chapter : 9- Sections 9.1, 9.5, 9.7, 9.10 & 9.11)**	**12**

Course Outcomes	
Course Outcomes	Students will be able to
CO1	Solve Algebraic and Transcendental equations using various methods.
CO2	Apply direct and indirect methods to solve system of equations.
CO3	Estimate the missing data using forward, backward and central difference interpolation formulae .

CO4	Study some methods for numerical differentiation and integration.
CO5	Find numerical solutions of ordinary differential equations

Text Books (Latest Editions)	
1.	Kandasamy P., Thilagavathi K., and Gunavathy K., Numerical Methods, S. Chand and Company Ltd, New Delhi, 12th Edition, 2012.
Reference Books	
1.	Arumugam S., Thanga pandi Issac A., Somasundaram A., Numerical Methods, 2nd Edition, Scitech publications Pvt. Ltd., Chennai,Reprint 2017.
2.	Jain M.K., Iyengar SRK., Jain K., Numerical Methods for scientific and engineering computation, New age international publishers Ltd,6thEdition, New Delhi, 2016.
3.	Veerarajan T.,Ramachandran T., Numerical Methods, Tata McGraw-Hill Publishing Company Ltd, New Delhi,2019.
Web Resources	
1	http://sites.iiserpune.ac.in/~bhasbapat/phy221_files/curvefitting.pdf
2	https://perhuaman.files.wordpress.com/2014/07/metodos-numericos.pdf
3	https://www.cs.tau.ac.il/~dcor/Graphics/adv-slides/Solving.pdf
4	https://fmipa.umri.ac.id/wp-content/uploads/2016/03/Dahlquist_G._Bjoerck_A._Vol.1._Numerical_methodBookZZ.org_.pdf
5	https://www.academia.edu/34595604/Numerical_Methods_for_Computational_Science_and_Engineering_Always_under_construction
6	https://www.math.hkust.edu.hk/~machas/numerical-methods.pdf

Mapping with Programme Outcomes:

	POs						PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**
CLO1	2	1	1	3	3	3	3	2	3
CLO2	2	1	2	3	3	3	3	2	3
CLO3	2	1	2	3	3	3	3	3	3
CLO4	2	1	1	3	2	3	3	3	3
CLO5	2	1	1	3	2	3	3	3	3

S-Strong M-Medium L-Low

Title of the Course		**LATEX**						
PART		**IV**						
Category	SEC – IV	**Year**	II	**Credits**	1	**Course Code**	**234403320**	
		Semester	III					
Instructional Hours per week		**Lecture**	**Tutorial**	**Lab Practice**	**Total**	**CIA**	**External**	**Total**
		1	-	--	1	25	75	100

Learning Objectives
✍ To impart knowledge and understanding about the LaTeX system
✍ Getting familiarized with the features of LaTeX.
✍ To Provide a comprehensive theoretical foundation for LaTeX

UNIT	**Details**	**No. of Periods for the Unit**
I	**Text formatting:** TEX and its offspring **–** Basics of LATEX file – TEX processing procedure. **Chapter I ; Sections : 1.3, 1.5, 1.6 (Pages : 6 - 10 & 11 - 16)**	**3**
II	**Text, Symbols, and Commands** : Command names and arguments – Environments–Declarations–Lengths - Special characters – Fine – tuning text. **Chapter II ; Sections 2.1 to 2.5, 2.7 (Pages : 17 - 27 & 28 - 34)**	**3**
III	**Document Layout and Organization** : Document class – Page style – Parts of the document. **Chapter III ; Sections 3.1 to 3.3 (Pages : 37 - 58)**	**3**
IV	**Displayed Text**: Changing fonts – Centering and indenting - Lists – Theorem – like declarations. **Chapter IV ; Sections 4.1 to 4.3, 4.5 (Pages : 61 - 74 & 80, 81)**	**3**
V	**Mathematical formulae:** Mathematical Environments – Main elements of math mode – Mathematical Symbols. **Chapter V ; Sections 5.1 to 5.3 (Pages : 119 - 130)**	**3**

Course Outcomes	
Course Outcomes	After completion of this course successfully, the students will be able to
CO1	understand LaTeX, a document preparation system for high-quality typesetting.
CO2	know how commands are distinguished from text that is to be printed and how they function.
CO3	use the preamble of LaTeX file to define document class and layout options.
CO4	display or emphasize the text, changing font style or font size, centering, indentation, producing formatted lists.
CO5	typesetting of complex mathematical formulae using LaTeX

Text Books (Latest Editions)	
1.	H.Kopka and P.W.Daly,,A Guide to LATEX, 4th Edition, Addision-Wesley, 1999.
Reference books	
1	Bindner, Donald & Erickson, Martin. (2011). *A Student's Guide to the Study, Practice, and Tools of Modern Mathematics*.CRC Press, Taylor & Francis Group, LLC..
2	Lamport, Leslie (1994). *LaTeX*: *A Document Preparation System*, User's Guide and Reference Manual (2nd ed.). Pearson Education.Indian Reprint
3	Learning LaTeX by David F. Griffiths and Desmond J. Higgham, SIAM

Web Resources	
1	http://mathforum.org,
2	http://ocw.mit.edu/ocwweb/Mathematics,
3	http://www.opensource.org

Mapping with Programme Outcomes:

	POs						PSOs	
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**
CLO1	3	2	2	1	1	3	3	1
CLO2	3	3	2	2	3	3	3	3
CLO3	3	3	1	2	2	3	3	2
CLO4	3	3	1	2	2	3	3	2
CLO5	3	3	2	2	3	3	3	3

S-Strong M-Medium L-Low

Title of the Course		**MATHEMATICS FOR COMPETITIVE EXAMINATIONS**						
PART		**III**						
Category	SEC – V	**Year**	II	**Credits**	2	**Course Code**	**238203320**	
		Semester	III					
Instructional Hours per week		**Lecture**	**Tutorial**	**Lab Practice**	**Total**	**CIA**	**External**	**Total**
		2	-	--	2	25	75	100

Learning Objectives

- ✍ To make the students think logically and objectively.
- ✍ To expose the technique of problem solving on quantitative aptitude.
- ✍ To prepare students for further study in order to equip themselves to attend competitive examinations.
- ✍ To sensitize students with the gamut of skills which facilitate them to enhance their employability quotient.

UNIT	**Details**	**No. of Periods for the Unit**
I	Problems on ages – Pipes and Cisterns **Chapter 8 (Pages : 264 -277)** **Chapter 16 (Pages : 510 - 525)**	**6**
II	Time and Work **Chapter 17 (Pages : 526 – 561)**	**6**
III	Time and Distance **Chapter 18 (Pages : 562 – 599)**	**6**
IV	Boats and Streams – Problems on Trains **Chapter 19 (Pages 600 - 611)** **Chapter 20 (Pages 612 – 632)**	**6**
V	Alligation or Mixture – Stocks and Shares **Chapter 21 (Pages : 633 - 640)** **Chapter 29 (Pages : 834 - 840)**	**6**

Course Outcomes	Students will be able to
CO1	establish a framework to acquire knowledge and expertise in necessary concepts needed to solve age related problems and problems like time taken to empty or fill the reservoir. .
CO2	solve the tricky questions based on time and work; lay foundation to various other concepts including data interpretation, and data sufficiency.
CO3	understand the types of formula used to measure time and distance; able to calculate time and distance while an object that moves in uniform motion which involve objects moving in same direction, opposite directions, or round trips.
CO4	interpret the key concepts of still water, upstream, downstream, stream in real-time under different circumstances and evaluate the speed, distance covered, time taken by a train under various conditions.
CO5	find the ratio in which two or more ingredients at the given price must be mixed to produce a mixture of desired price and grasp how to build portfolio and investment decision in appropriate manner.

Text Books (Latest Editions)	
1.	Aggarwal R.S., Quantitative Aptitude, S.Chand & company Ltd, New Delhi, Revised Edition (Reprint 2022).
Reference Books	
1.	Ranganath G.K, Sampangiram C.S, and Rajaram.Y, Text books of business Mathematics, Himalaya Publishing House, New Delhi, Reprint 2006.
2.	Ponnien Selvi.M, & Sri Devi.N, Business Mathematics, Yoga Publishing House, Virudhunagar, 2007.
3.	Abhijit Guha, Quantitative Aptitude for all Competitive Examinations, Mc Graw Hill Education, 6th edition, 2016.
Web Resources	
1	https://youtu.be/KE7tQf9spPg
2	https://youtu.be/7DJ-lzPnv8I
3	https://youtu.be/vsBpWgNYjtQ
4	https://www.javatpoint.com/aptitude/quantitative
5	https://testbook.com/learn/maths-time-and-work/
6	http://www.practiceaptitudetests.com/

Mapping with Programme Outcomes:

	POs						PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**
CLO1	3	3	3	3	3	3	3	3	
CLO2	3	3	3	3	3	3	3	3	
CLO3	3	3	3	3	3	3	3	3	
CLO4	3	3	3	3	3	3	3	3	
CLO5	3	3	3	3	3	3	3	3	

S-Strong M-Medium L-Low

Title of the Course		**INDUSTRIAL STATISTICS**						
PART		**III**						
Category	CC 7	**Year**	II	**Credits**	4	**Course Code**	**232003401**	
		Semester	IV					
Instructional Hours per week		**Lecture**	**Tutorial**	**Lab Practice**	**Total**	**CIA**	**External**	**Total**
		4	-	--	4	25	75	100

Learning Objectives

- ✍ To bridge the gap between industry academia interface – to apply the theory learnt to industrial applications

UNIT	Details	No. of Periods for the Unit
I	Random Variables and Distribution Functions : Random Variables - Distribution Function - Discrete Random Variable - Continuous Random Variable - Joint Probability Mass Function and Marginal and Conditional Probability Function - Joint Probability Distribution Function - Joint Density Function, Marginal Density Function - Independent Random Variables - The Conditional Distribution Function and Conditional Probability Density Function. **(Chapter 5 : Sections - 5.1 to 5.4, 5.5.1 to 5.5.5)**	**12**
II	Mathematical Expectation and Generating Functions : Mathematical Expectation - Addition Theorem of Expectation - Multiplication Theorem of Expectation - Co-variance - Expectation of Linear Combination of Random Variables - Variance of a Linear Combination of Random Variables - Expectation of a Continuous Random Variable - Conditional Expectation & Conditional Variance - Moment Generating Function - Cumulants. **(Chapter 6 : Sections - 6.1 to 6.10)**	**12**
III	Theoretical Discrete Distributions : Binomial Distribution - Poisson Distribution. Theoretical Discrete Distribution : Normal Distribution. **(Chapter 7 : Sections - 7.2, 7.2.1 to 7.2.6, 7.3.1 to 7.3.5)** **(Chapter 8 : Sections - 8.2, 8.2.1 to 8.2.7)**	**12**
IV	Correlation and Regression : Bivariate Distribution, Correlation - Scatter Diagram - Karl Pearson Coefficient of Correlation - Rank Correlation - Regression - Lines of Regression - Regression Curves - Regression Coefficients - Properties of Regression Coefficients. **(Chapter 10 : Sections - 10.1 to 10.3, 10.6, 10.7, 10.7.1 to 10.7.4)**	**12**
V	Theory of Attributes : Introduction - Notations - Dichotomy - Classes and Class Frequencies - Class Symbols as Operators - Consistence of Data - Independence of Attributes - Association of Attributes. **(Chapter 11 : Sections - 11.1 to 11.8)**	**12**

Course Outcomes	Students will be able to
CO1	Explain the Random Variables and Distribution Functions.
CO2	Discuss about the Mathematical Expectation and Generating Functions.
CO3	Analyze the Theoretical Discrete Distributions and Continuous Distribution.
CO4	Explain the Correlation and Regression.
CO5	Interpret the Theory of Attributes.

Text Books (Latest Editions)	
1.	S.C.Gupta, V.K.Kapoor, Elements of Mathematical Statistics, Sultan Chand & Sons, Third Revised Edition, 2015.
Reference Books	
1.	Dr.S.Arumugam, Prof. A.Thangapandi Isaac, Statistics, New Gamma Publishing House, 2011.
2.	Sancheti D.C., Kapoor V.K, Statistics, Sultan Chand & Sons, 7th Edition, 2017.
3	E.Narayanan Nadar, Statistics, PHI Learning Pvt. Ltd., Second Edition, 2015.
4	Gupta S.C., Fundamentals of Mathematical Statistics, Sultan Chand & Sons, 7th Edition, 2018.
Web Resources	
https://nptel.ac.in	

Mapping with Programme Outcomes:

	POs						PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**
CLO1	2	1	1	3	3	3	3	2	3
CLO2	2	1	2	3	3	3	3	2	3
CLO3	2	1	2	3	3	3	3	3	3
CLO4	2	1	1	3	2	3	3	3	3
CLO5	2	1	1	3	2	3	3	3	3

S-Strong M-Medium L-Low

Title of the Course		**ELEMENTS OF MATHEMATICAL ANALYSIS**						
PART		**IV**						
Category	CC – 8	**Year**	II	**Credits**	4	**Course Code**	**232003402**	
		Semester	IV					
Instructional Hours per week		**Lecture**	**Tutorial**	**Lab Practice**	**Total**	**CIA**	**External**	**Total**
		5	-	--	5	25	75	100

Learning Objectives

- ✍ Identify and characterize sets and functions and Understand, test and analyze the convergence and divergence of sequences, series.
- ✍ Understand metric spaces with suitable examples

UNIT	**Details**	**No. of Periods for the Unit**
I	Sets and Functions: Sets and elements- Operations on sets- functions- real valued functions- equivalence-countability- real numbers- least upper bounds. **Chapter :1**	**15**
II	Sequences of Real Numbers: Definition of a sequence and subsequence-limit of a sequence – convergent sequences–divergent sequences- bounded sequences-monotone sequences. **Chapter 2: Section 2.1 to 2.6**	**15**
III	Operations on convergent sequences – operations on divergent sequences – limit superior and limit inferior-Cauchy sequences. **Chapter 2: Section 2.7 to 2.10**	**15**
IV	Series of Real Numbers: Convergence and divergence – series with non –negative terms-alternating series-conditional convergence and absolute convergence- tests for absolute convergence. **Chapter 3: Section 3.1 to 3.4, 3.6**	**15**
V	Limits and Metric Spaces: Limit of a function on a real line - Metric spaces - Limits in metric spaces – Continuous Functions on Metric Spaces: Function continuous at a point on the real line-Function continuous on a metric space. **Chapter 4; Chapter 5: Section 5.1, 5.3**	**15**

Course Outcomes	Students will be able to
CO1	Explain in detail about sets and functions, equivalence and countability and the LUB axiom
CO2	Explain Sequence and Subsequence of real numbers and to find the limit of sequence to test for convergent, divergent, bounded and monotone sequences
CO3	Explain the operations on convergent and divergent sequences and to Explain the concepts of limit superior and limit inferior and the notion of Cauchy sequences
CO4	Classify the series of real numbers and the alternating series and their convergence and divergence, the conditional convergence and absolute convergence and solve problems on convergence of the sequences
CO5	Explain about the metric spaces and functions continuous on a Metric space

Text Books (Latest Editions)	
1.	Richard R. Goldberg, Methods of Real Analysis: Oxford and IBH Publishing, (1 January 2020).
Reference Books	
1.	Ethan D. Bloch, The Real Numbers and Real Analysis, Springer, 2011.
2	G.M. The fundamentals of Mathematical Analysis, vol I. Pergamon Press, New York, 1965.
3	Dr. S. Arumugam, Mr. A. Thangapandi Isaac, Sequences and Series, New Gamma Publishing House, Palayamkottai, 2014.
4	T. M. Apostol, Calculus (Vol. I), John Wiley and Sons (Asia) P. Ltd., 2002.
5.	R.G. Bartle and D. R Sherbert, Introduction to Real Analysis, John Wiley and Sons (Asia) P. Ltd., 2000.
6.	E. Fischer, Intermediate Real Analysis, Springer Verlag, 1983.
7.	K.A. Ross, Elementary Analysis- The Theory of Calculus Series- Undergraduate Texts in Mathematics, Springer Verlag, 2003.
8	Richard R. Goldberg, Methods of Real Analysis: Oxford and IBH Publishing, (1 January 2020).
9	Ethan D. Bloch, The Real Numbers and Real Analysis, Springer, 2011.
Web Resources	
1. https://nptel.ac.in 2. https://www.vedantu.com/jee-main/maths-sequence-and-series 3. https://www.cuemath.com/numbers/sequence-and-series/	

Mapping with Programme Outcomes:

	POs						PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**
CLO1	3	3	2	3	2	-	3	2	1
CLO2	3	3	2	3	2	-	3	2	1
CLO3	3	3	3	3	2	-	3	2	1
CLO4	3	3	3	3	2	-	3	2	1
CLO5	3	3	2	3	2	-	3	2	1

S-Strong M-Medium L-Low

Title of the Course		**DISCRETE MATHEMATICS**						
Part		**III**						
Category	EC - IV	**Year**	II	**Credits**	3	**Course Code**	**232003403**	
		Semester	IV					
Instructional Hours per week		**Lecture**	**Tutorial**	**Lab Practice**	**Total**	**CIA**	**External**	**Total**
		4	-	-	4	25	75	100

Learning Objectives

- ✍ ***To introduce the essence of mathematical logics and its ramifications.***
- ✍ ***To introduce the formulae and estimates which are used in computer algorithms.***

UNIT	Details	No. of Periods for the Unit
I	T.F – statements – connectives – atomic and compound statements. Well – formed (statement) formulae – parsing trees – the truth table of a formula – Tautology. **Book 2: Chapter 9: sections 9.1 to 9.7 (pages 9.1 to 9.27)**	**12**
II	Tautological implications and equivalence of formulae, Replacement process – Functionally complete sets of connectives and duality law. Normal forms – Principal normal forms. **Book 2: Chapter 9: Sections 9.8 to 9.12 (pages 9.30 to 9.55)**	**12**
III	Lattices and Boolean Algebra-Lattices – Hasse Diagram-Some Properties of Lattices-Duality Principle-Boolean Algebras**.** **Book 2: (Chapter 10: Sections 10.1,10.2,10.5 (pages 10.1 to 10.12 and 10.34 to 10.41)**	**12**
IV	Counting – The basics of counting–The Pigeonhole Principle – Permutations and Combinations – Binomial coefficients. **Book 1: Chapter 5, sections 5.1 to 5.4 (pages 335 to 369)**	**12**
V	Advanced counting techniques – Recurrence relations–solving linear recurrence relations – Generating functions – Inclusion-Exclusion. **Book 1: Chapter 6: Sections 6.1, 6.2, 6.4 and 6.5 (pages 391 to 414,424 to 445)**	**12**

Course Outcomes	
Course Outcomes	On completion of this course, students will be able;
CO1	identify statements with truth tables.
CO2	write an argument using logical notation and determine if the argument is valid or not.
CO3	Understand lattices and Boolean algebra as algebraic structures.
CO4	demonstrate effectively the addition and multiplication principles and use it for counting.
CO5	use generating function to solve combinatorial problems.

Text Books (Latest Editions)	
1	Kenneth H Rosen, Discrete Mathematics and its applications with combinatorics and graph theory, 7th edition, McGraw Hill Education (India) – Private Limited, 2017.
2	Discrete Mathematics, Dr. M.K. Venkataraman, Dr. N. Sridharan, Dr. N. Chandrasekaran, the National Publishing company,September 2007.
References Books (Latest editions, and the style as given below must be strictly adhered to)	
1	Ralph P. Grimaldi, Ramana B. V., Discrete and Combinatorial Mathematics, 5th Edition, Pearson publications, 2007.
2	Discrete Mathematics, Schaum's outline, Seymour Lipschutz, Marc Lars Lipson, Mcgraw-Hill Publishing company Ltd., Revised 3rd Edition, 2013.
3	Discrete Mathematics, with graph theory and combimatorics, T. Veerarajan, Mc Graw Hill Education (India) Pvt.Ltd., 2013.
4	Vasudev C., Theory and problems of combinatorics, New age publishers, 1st edition, 2008.
5	Ramaswamy, Discrete Mathematical Structures with Applications to Combinatorics, Univesities Press (India) Pvt., Ltd., 2008.

Web Resources

1. https://math.libretexts.org/Bookshelves/Combinatorics_and_Discrete_Mathematics/A_Spiral_Workbook_for_Discrete_Mathematics_(Kwong)/02%3A_Logic/2.01%3A_Propositions
2. https://study.com/academy/lesson/propositions-truth-values-and-truth-tables.html
3. https://www.geeksforgeeks.org/normal-and-principle-forms/
4. https://www.tutorialspoint.com/discrete_mathematics/rules_of_inference.htm
5. https://www.geeksforgeeks.org/mathematical-logic-rules-inference/
6. https://math.mit.edu/~fgotti/docs/Courses/Combinatorial%20Analysis/2.%20Mathematical%20Induction/Mathematical%20Induction.pdf
7. https://brilliant.org/wiki/principle-of-inclusion-and-exclusion-pie/
8. https://math.berkeley.edu/~shiyu/s15math53/generating_functions.pdf
9. https://www.edudose.com/maths/permutation-combination-formulas-tricks/
10. https://www.whitman.edu/mathematics/cgt_online/book/section03.03.html

Mapping with Programme Outcomes:

	POs						PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**
CLO1	3	2	3	2	1	1	3	1	2
CLO2	2	2	2	1	3	3	3	2	3
CLO3	3	3	2	2	2	2	2	2	1
CLO4	2	2	3	2	3	3	2	3	2
CLO5	3	2	2	3	3	2	1	2	3

3 – Strong, 2 – Medium , 1 - Low

Title of the Course		**STATISTICS WITH EXCEL**						
Part		**IV**						
Category	SEC – VI	**Year**	II	**Credits**	2	**Course Code**	**234403420**	
		Semester	IV					
Instructional Hours per week		**Lecture**	**Tutorial**	**Lab Practice**	**Total**	**CIA**	**External**	**Total**
		2	-	--	2	25	75	100

Learning Objectives

- ✍ Understand the basic concepts of collection, classification and tabulation of data.
- ✍ Find the measures of averages and dispersion for given data.
- ✍ Represent the various measures using MS Excel.

UNIT	**Details**	**No. of Periods for the Unit**
I	**DIAGRAMMATIC REPRESENTATION OF DATA** Types of data– Time Series Data – Line Graph– Simple bar diagram, multiple bar diagram, sub-divided bar diagram– Percentage bar diagram. **(Chapter 2 sections 2.1 to 2.3.5, pages 13 to 36)**	**6**
II	**DIAGRAMMATIC REPRESENTATION OF DATA** Pie diagram – Histogram – Frequency Polygon – Scatter Plot **(Chapter 2 sections 2.3.6 to 2.3.10, pages 36 to 51)**	**6**
III	**MEASURES OF CENTRAL TENDANCIES and MEASURES OF DISPERSION** Mean – Median – Mode – Range – Standard deviation – Coefficient of Variation. **(Chapter 2 section 2.4,pages 52 to 58)**	**6**
IV	**MEASURES OF SHAPES** Skewness – Kurtosis **(Chapter 2 section 2.5,pages 58 to 75)**	**6**
V	**RANDOM VARIABLE AND PROBABILITY DISTRIBUTIONS** Random variable – probability distribution of a discrete random variable – Binomial probability distribution – Poisson probability distribution – Normal probability distribution. **(Chapter 4,sections 4.2 to 4.6,pages 93 to 120)**	**6**

Course Outcomes	
Course Outcomes	On completion of this course, students will be able;
CO1	Represent data using Bar diagrams and pie diagrams in Excel spreadsheet.
CO2	Compute various measures of average for discrete data using Excel.
CO3	Calculate Median, Mode and Range for discrete data using Excel.
CO4	Find various measures of dispersion for discrete data using Excel.
CO5	Determine the probability using binomial ,poisson and normal distribution

Text Books (Latest Editions)	
01.	A.N. Sah, Statistics for management using MS Excel, I. K International Publishing House Pvt.Ltd, New Delhi(2013).
References Books (Latest editions, and the style as given below must be strictly adhered to)	
1	P.R. Vittal, Mathematical Statistics, Margham Publications
2	S.P. Gupta Statistical methods, Sultan Chand & Sons publications.
3	Narasimhan, Veeraraghavan, Ramachandran, Ramana, K. C. S Desikan and Co., Business Mathematics and Business Statistics.
Web Resources	
1	http://www.mathforum.org
2	http://www.opensource.org
3	http://www.khanacademy.org
4	http://in.ixl.com
5	http://www.learningwave.com

Mapping with Programme Outcomes: Mapping with Programme Specific Outcomes:

	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CLO1	2	2	3	1	2	2	2	1	3
CLO2	3	2	3	1	3	2	3	3	2
CLO3	1	3	2	3	2	3	2	3	1
CLO4	2	2	3	1	2	3	2	2	2
CLO5	3	2	3	3	3	2	2	2	3

3 – Strong, 2 – Medium , 1 - Low

Title of the Course		**DATA ANALYSIS USING GEOGEBRA**						
Part		**IV**						
Category	SEC - VII	**Year**	II	**Credits**	2	**Course Code**	**238203420**	
		Semester	IV					
Instructional Hours per week		**Lecture**	**Tutorial**	**Lab Practice**	**Total**	**CIA**	**External**	**Total**
		2	-	--	2	25	75	100

Learning Objectives

- ✍ To introduce GeoGebra View, Objects and Comments.
- ✍ To motivate the students to apply mathematical concepts in GeoGebra.

UNIT	**Details**	**No. of Periods for the Unit**
I	How to Get started with GeoGebra - Introduction to the GeoGebra 4.0 interface - Getting to know The Graphics View - GeoGebra's Object Properties - Some Useful Shortcuts. Algebra Things -1 : Like a Graphing Calculator - Enhancing the Random Line - Creating a Dynamic Worksheet. **(Pages - From 3 to 19)**	**6**
II	Algebra Things 2 : Changing Parameters Using Sliders - Parameters of a Linear equation - Exploring Parameters of a Quadratic polynomial using Sliders – Graphing a polynomial using Roots - Creating a Factoring Pratice Applet - The Sequence command - Library of Algebraic Functions - Graphing Trig functions - Solving Equations with CAS. **(Pages - From 24 to 35)**	**6**
III	Geometry Things-1 : Plotting a graph of two variables - The Construction protocol - Polygons and Pi - Transformation by Matrices - Transformations Using Images - Resizing, Reflecting and Distorting a Picture - Translating Images - Rotating images using a Slider - Dilating Images using a Slider - Exploring Conditional Hide and Show - Conditional Coloring. **(Pages - From 36 to 50)**	**6**
IV	Geometry Things-2 : Creating Custom Tools - Pre-Calculus and Calculus Things - Piecewise Functions - Working with Vectors - Complex numbers - Quadratic Julia Set - Polar Graphing-Plotting Polar Points – Graphing polar functions - Introducing Derivatives - The slope function - Exploring Polynomials. **(Pages - From 51 to 66)**	**6**
V	Spreadsheet View and Basic Statistics Concepts: Introduction to GeoGebra's Spreadsheet View - Record to Spreadsheet Feature - Relative Copy and Linear Equations - Investigating Number Patterns - Scatter plot and Best Fit Line - Create a Histogram - Determine Mean, Median and Mode. **(Pages - From 115 to 127)**	**6**

Course Outcomes	
Course Outcomes	On completion of this course, students will be able;
CO1	Describe the GeoGebra Software and Algebra concepts.
CO2	Express the Algebra concepts in GeoGebra.
CO3	Study some basic Geometric conceptss in GeoGebra.
CO4	Construct the Geometric ideas in GeoGebra.
CO5	Analyze the Spreadsheet View and Basic Statistics Concepts.

Text Books (Latest Editions)	
1	An Introduction to GeoGebra - Steve Phelps, GeoGebra Institute of Ohio, University of Cincinnati. (GeoGebra Manual), 2013.
References Books (Latest editions, and the style as given below must be strictly adhered to)	
1	Introduction to GeoGebra Version 4.4 Manual - Judith & Markus Hohenwarter, (GeoGebra Team Members), Johannes Kepler University, Linz, Austria, 2013.
2	GeoGebra Handbook for Senior Secondary Mathematics Teachers - Regional Institute of Education, Mysuru, 2016.
3	GeoGebra Manual (The Official Manual of GeoGebra), Pedia Press, 2011.
4	GeoGebra Statistics and Probability, Project Development Team, 2013.
Web Resources	
1	http://code.pediapress.com/
2	www.projectmaths.ie
3	www.GeoGebra.org
4	https://www.math.utah.edu/~emina/teaching/5270s13/Intro_to_Geogebra.pdf
5	https://research.shu.ac.uk/geogebra/GIS_Guides/Official%20GeoGebra%20Manual.pdf
6	https://research.shu.ac.uk/geogebra/GIS_Guides/Introduction%20to%20GeoGebra.pdf

Mapping with Programme Outcomes:. Mapping with Programme Specific Outcomes:

	POs						PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**
CLO1	3	2	1	2	1	1	3	2	1
CLO2	3	1	2	2	2	2	3	1	2
CLO3	3	2	1	2	2	1	3	2	1
CLO4	3	2	2	1	1	2	3	2	1
CLO5	3	1	1	2	2	2	3	2	1

3 – Strong, 2 – Medium , 1 – Low

Title of the Course		**DISCRETE MATHEMATICAL STRUCTURES (for Computer Science Students)**						
Part		**III**						
Category	EC - 3	**Year**	II	**Credits**	3	**Course Code**	**232003322**	
		Semester	III					
Instructional Hours Per week		**Lecture**	**Tutorial**	**Lab Practice**	**Total**	**CIA**	**External**	**Total**
		4	-	--	4	25	75	100

Learning Objectives

✍ To understand the mathematical concepts like set theory, logics, number theory, combinatory and relations.

UNIT	Details	No. of Periods for the Unit
I	SET THEORY Introduction- set and Its Element – Set Description (Roster, Set Builder and cardinal number method) Types of Sets- Set Operations and Laws of set Theory. Partition of sets. Minsets-Countable and un Countable set. Algebra of sets and Duality **Book 2: chapter 1 – Section 1.1 to 1.4, 1.6 & 1.9 to 1.12.**	**12**
II	MATHEMATICAL LOGIC Basic Logic and Proof, logical operations – Logic Propositional equivalence, Predicates and Quantities, Tautology-Contradiction-Methods of proofs (Direct and Indirect)- Function- Definition-Notation- Types of Function- Composition of Functions. **Book 1: Chapter 1 – Section 1.1, 1.2, 1.3** **Book 2: Chapter 4 – Section 4.2, 4.3, 4.5**	**12**
III	NUMBER THEORY The Integers and Division, Integers and Algorithms, (Multiplication, Addition and Division -Sequences and Summations, Recursive algorithms, Program correctness. **Book 1: Chapter 2 – Section 2.5; Chapter 3 – Section 3.4, 3.6; Chapter 4 – Section 4.4**	**12**
IV	COMBINATORICS: The basics of counting, the pigeonhole principle, Permutations and Combinations, Binomial coefficients, Generalized permutations and combinations. **Book 1: Chapter 5: Section 5.1 to 5.5**	**12**
V	RELATIONS Relations – Relations and their properties, Representing Relations, Closures of relations, Equivalence relations, Partial orderings-Recurrence Relations Binary Relations. **Book1 : Chapter 6: Section 6.1; Chapter 7: Section 7.1, 7.3 to 7.6**	**12**

Course Outcomes	
Course Outcomes	On completion of this course, students will;
CO1	To gain knowledge on set theory
CO2	Able to understand different mathematical logics and functions
CO3	To get an idea on Permutations and Combinations
CO4	Understanding the different form of number theory
CO5	Able to understand Relations and its applications

Text Books (Latest Editions)	
1	Rosen K.H. Discrete Mathematics and its Applications, 5th edition, Tata McGraw – Hills, 2003.
2	J.K Sharma "DISCRETE MATHEMATICS" 3 rd Edition Macmillan Reprint 2011
References Books (Latest editions, and the style as given below must be strictly adhered to)	
1	Johnson Baugh R, and Carman R, Discrete mathematics, 5th edition, Person Education, 2003.
2	Kolman B, Busoy R.C, and Ross S.C, Discrete Mathematical Structures, 5th edition, Pretitice – Hall, 2004.
3	Mott J.L, Kandel A, and Bake T.P, Discrete Mathematics for Computer Scientists & Mathematicians, 2nd edition, Prentice-Hall of India, 2002.
Web Resources	
	Web resources from NDL Library, E-content from open-source libraries

Mapping with Programme Outcomes: Mapping with Programme Specific Outcomes:

	POs						PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**
CLO1	3	2	1	2	1	1	3	2	1
CLO2	3	1	2	2	2	2	3	1	2
CLO3	3	2	1	2	2	1	3	2	1
CLO4	3	2	2	1	1	2	3	2	1
CLO5	3	1	1	2	2	2	3	2	1

3 – Strong, 2 – Medium , 1 – Low

Title of the Course		**INDUSTRIAL STATISTICS (for Computer Science Students)**						
Part		**III**						
Category	EC - 3	**Year**	II	**Credits**	3	**Course Code**	**232003422**	
		Semester	IV					
Instructional Hours Per week		**Lecture**	**Tutorial**	**Lab Practice**	**Total**	**CIA**	**External**	**Total**
		4	-	--	4	25	75	100

Learning Objectives

- ✍ ***To introduce the essence of mathematical logics and its ramifications.***
- ✍ ***To introduce the formulae and estimates which are used in computer algorithms.***

UNIT	**Details**	**No. of Periods for the Unit**
I	**CENTRAL TENDENCIES:** Introduction-Arithmetic mean-Partition values (Median, Quartiles, Deciles and Percentiles)-Mode –Geometric mean and Harmonic mean –Measures of Dispersion **(Chapter-2: Sec 2.0 TO 2.4 and Chapter -3: Sec3.1 Page- 11-58 and 60-80)**	**12**
II	**CURVE FITTING:** Introduction –Principles of least squares-fitting a Straight line and Second degree parabola -Fitting the curves of the form $Y = bx^a$, $Y = ae^{bx}$, $Y = ab^x$, $Y = ax^b$, $Y = Ka^{bx}$. **(Chapter :5-Sec 5.0 to 5.1 Page-93-105)**	**12**
III	**CORRELATION AND REGRESSION:** Correlation –Rank correlation-Regression **(Chapter -6: Sec 6.0 to 6.3 Page -106-144)**	**12**
IV	**THEORY OF ATTRIBUTES:** Attributes–consistency of data –Independence and association of data **(Chapter-8: 8.0 TO 8.3 Page -196-228)**	**12**
V	**PROBABILITY:** Introduction-Probability –Conditional Probability –Boole's inequality –Baye's Theorem -Problems **(Chapter-11: Sec11.0 to 11.2 Page-274-303)**	**12**

Course Outcomes

Course Outcomes	On completion of this course, students will;
CO1	analyze statistical data using measures of central tendency/dispersion..
CO2	fit the appropriate curve using the method of least squares.
CO3	compute correlation and rank correlation. analyse a regression
CO4	check the consistency of the data and measure the association of data
CO5	Find the probability and apply the theorems on conditional probability.

Text Books (Latest Editions)	
1	Dr.S.Arumugam and Mr.A.Thangapandi Issac .,STATISTICS , New Gamma Publising House ,2015
References Books **(Latest editions, and the style as given below must be strictly adhered to)**	
1	Kapur J.N., Saxena H.C., Mathematical statistics, 2003.
2	Gupta S.P., Kapoor V.K., Fundamentals of Statistics Gupta S.C., Fundamentals of statistics, 2008.
Web Resources	
1	https://www.cuemath.com/data/statistics/
2	https://stat.ethz.ch/~geer/mathstat.pdf
3	https://ocw.mit.edu/courses/18-655-mathematical-statistics- spring-2016/

Mapping with Programme Outcomes: Mapping with Programme Specific Outcomes:

	POs						PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**
CLO1	3	2	1	2	1	1	3	2	1
CLO2	3	1	2	2	2	2	3	1	2
CLO3	3	2	1	2	2	1	3	2	1
CLO4	3	2	2	1	1	2	3	2	1
CLO5	3	1	1	2	2	2	3	2	1

3 – Strong, 2 – Medium, 1 – Low