

Coimbatore - 641 046, Tamil Nadu, India

Program Educational Objectives (PEOs)

The **B. Sc. Mathematics** program describe accomplishments that graduates are expected to attain within five to seven years after graduation

PEO1	Acquire knowledge in functional areas of Mathematics and apply in all the fields of learning.
PEO2	Recognise the need for life long learning and demonstrate the ability to explore some mathematical content independently.
PEO3	Employ mathematical ideas encompassing logical reasoning ,analytical, numerical ability , theoretical skills to model real-world problems and solve them.
PEO4	Develop critical thinking ,creative thinking, self confidence for eventual success in career.
PEO5	Analyze, interpret solutions and to enhance their Entrepreneurial skills, Managerial skill and leadership
PEO6	To prepare the students to communicate mathematical ideas effectively and develop their ability to collaborate both intellectually and creatively in diverse contexts.
PEO7	Rewarding careers in Education, Industry, Banks, MNCs and pursue higher studies



Program	Program Specific Outcomes (PSOs)					
After the	After the successful completion of B. Sc. Mathematics program, the students are expected					
to						
	Maintain a core of mathematical and technical knowledge that is adaptable to					
PSO1	changing technologies and provides a solid foundation for extended learning.					
PSO2	Identify the applications of Mathematics in other disciplines and society.					
	Develop an in-depth knowledge in Mathematics appreciating the connections					
PSO3	between theory and its applications.					
	Demonstrate their mathematical modeling ability, problem solving skills, creative					
PS04	talent and power of communication necessary for various kinds of employment.					
PSO5	Develop mathematical aptitude and the ability to think abstractly.					
PSO6	Learn independently and improve ones performance.					
PSO7	Students are equipped to appear competitive examinations.					



Program	Outcomes (POs)					
On succe	On successful completion of the B. Sc. Mathematics program					
PO1	Students are empowered with analytical and logical skills-to formulate results					
101	and construct mathematical argument.					
PO2	Ability to organize, analyze and interpret data accurately in both academic and					
102	non -academic context.					
	Demonstrate effective communication of mathematical ideas and creative					
PO3	thinking skills to facilitate solving real world problems as a team and					
	independently.					
PO4	Appreciate and identify the connections between Mathematics and other					
104	disciplines.					
PO5	Competency to obtain employment in education, public and private sectors					
PO6	Identify the area of interest for extended learning from the understanding gained					
100	from the domain and allied areas of Mathematics.					
PO7	Develop mathematical aptitude and make critical observations.					
PO8	Garner innovative ideas to face global challenges.					
PO9	Instill a sense of responsibility in tackling professional and social issues					
	ethically.					
PO10	Trigger their passion for research in unexplored areas of Mathematics.					



BHARATHIAR UNIVERSITY: COIMBATORE 641 046

B. Sc. Mathematics Curriculum (Affiliated Colleges) (CBCS PATTERN)

(For the students admitted from the academic year 2023-2024 and onwards)

			E				
		TT (s.	Ma	ximum		
Part	Title of the Course	Hours/ Week	Duratio in Hour	CIA	CEE	Total	Credits
	Semester I						
Ι	Language - I	6	3	25	75	100	4
II	English - I	6	3	25	75	100	4
III	Core Paper I - Classical Algebra	4	3	25	75	100	4
III	Core Paper II-Calculus	5	3	25	75	100	4
III	Allied A : Paper I Chosen by the college	7	3	25	75	100	4
IV	Environmental Studies*	్లం ⁸ 25ి ట్రెడ్క	3	-	50	50	2
	Total	30	C C C C C C C C C C C C C C C C C C C	125	425	550	22
	Semester II						
Ι	Language – II	6	-3	25	75	100	4
II	English – II	4	3	25	25	50 ^{@@}	2
Π	Effective English :Language Proficiency for Employability <u>http://kb.naanmudhalvan.in/Special</u> :Filepath/Cambridge_Course_Detai <u>ls.pdf</u>	2 THIAR UNI Coimbatore	un set control	25	25	50##	2
III	Core Paper III - Analytical Geometry	4	3	25	75	100	4
III	Core Paper IV-Trigonometry, Vector Calculus and Fourier Series	5	3	25	75	100	4
III	Allied A: Paper II Chosen by the College	7	3	25	75	100	4
IV	Value Education – Human Rights*	2	3	-	50	50	2
	Total	30		150	400	550	22
	Semester III			-			
Ι	Language – III	6	3	25	75	100	4
II	English – III	6	3	25	75	100	4
III	Core Paper V- Differential Equations and Laplace Transforms.	3	3	25	75	100	4

Scheme of Examination

III	Core Paper VI- Statics	3	3	25	75	100	4	
III	Allied B : Paper I – Chosen by the	7	3	20	55	75	2	
	college	/		20	55	/5	3	
IV	Skill based Subject - Operations	2	2	25	25	50 @@	2	
	Research -I	3	3	25	25	20 ^{@@@}	2	
IV	Tamil** / Advanced Tamil* (OR)							
	Non-major elective - I (Yoga for						-	
	Human Excellence)* / Women's	2	3	-	50	50	2	
	Rights*							
	Total	30		145	430	575	23	
	Semester IV							
I	Language – IV	5	3	25	75	100	4	
I	English _ IV	5	3	25	75	100	4	
	Core Deper VII Dynamics	2	3	25	75	100	4	
		3	3	23	75	75	4	
	Core Paper VIII- Programming	2	3	20	55	/5	3	
111			2	10	1.5			
	Core Paper VIII -Programming in	1	3	10	15	25	1	
	C Practical							
	Allied B - Paper II	5	3	20	55	75	3	
	Chosen by the college							
III	Allied B - Paper II			• •	• •			
	Chosen by the college (For	ைக்கழக	3	20	30	50	2	
	Practical Paper)							
IV	Skill based Subject - Operations	3	3	25	25	50 ^{@@}	2	
	Research – Paper II			20	20	20	-	
IV	Office Fundamentals :Digital		GA GA					
	Skills for Employability	See and	- E (**					
	http://kb.naanmudhalvan.in/Specia	2	12	25	25	50##	2	
	I:Filepath/Microsoft Course Details		EF 2	7				
	<u>.xlsx</u>	HIAR UN	O'SER S	/				
IV	Tamil**/Advanced Tamil* (OR)	Combatore	in the last					
	Non-major elective -II (General	த்தப்பானர உ பெரதாகாக	3	-	50	50	2	
	Awareness*)							
	Total	30		195	480	675	27	
	Semester V							
III	Core Paper IX-Real Analysis-I	5	3	25	75	100	4	
III	Core Paper X- Complex	6	3	25	75	100	4	
	Analysis-I	6				100	4	
III	Core Paper XI- Modern Algebra-	-	3	25	75	4.6.5		
	I	6	-	20	10	100	4	
III	Core Paper XII- Discrete		3	25	75			
111	Mathematics	5	5	23	15	100	4	
Ш	Flactive I	5	2	20	55	75	2	
	Skill bagad Systematican	5	3	20	55	13	3	
1 V	Bessere Dener III	a Subject - Operations 3 3				50@@	2	
	Kesearch - Paper III	20		1.4.7	200	525	1	
	lotal	- 30	[145	380	525	21	

	Semester VI						
III	Core Paper XIII - Real Analysis-	5	r	25	75	100	Λ
	П	5	3	25	/5	100	4
III	Core Paper XIV - Complex	5	2	25	75	100	1
	Analysis-II	5	3	23	/3	100	4
III	Core Paper XV -Modern	5	3	25	75	100	Δ
	Algebra-II	5	5	23	15	100	т
III	Elective II	5	3	20	55	75	3
III	Elective III	5	3	25	75	100	4
IV	Skill Based Subject - Operations	3	3	25	25	50 ^{@@}	2
	Research- Paper IV	5	5			20	-
IV	Project Based learning 2- Advanced						
	Platform Technology -(Govt(auto)						
	& Govt (Non-Auto)) /						
				25	25	5 0##	2
	Data Analytics & Visualization -	2	-	25	25	50""	2
	Aided (Non-auto) & SF(Non-Auto)						
	http://kh noonmudhalvan in/Pharath						
	iar University (BU)						
V	Extension Activities ** / Swachh						
v	Bharath @			50		50	2
	Total	30	0	220	405	625	25
	Grand Total	180		980	2520	3500	140
# All co	mputer papers have theory and prac	tical exan	15	200	2020	0000	110
	Theory		i G	20	55	75	100
	Practicals	And will -		10	15	25	100
Note		and the	18 1				
## Naan	Mudhalvan – Courses- external 25 marks	s will be as	sessed by In	dustry	and int	ernal will b	be offered
by respe	ective course teacher.	Coimbatore	Balat				
* No	Continuous Internal Assessment (CIA).	Only Univ	ersity Exami	nation	5		
** No U	Jniversity Examinations. Only Continuo	us Internal	Assessment	(CIA).			
[@] Swach	h Bharath Internship Scheme (SBIS) is	to be added	l for 2 credit	s in the	e extens	sion	
acti	activities.						
@@ University semester examination will be conducted for 50 marks (As per existing pattern of							
@@ Univ	versity semester examination will be con	ducted for	50 marks (A	s per e	xisting	pattern of	
@@ Univ Examina	versity semester examination will be con ation) and it will be converted for 25 ma	ducted for rks.	50 marks (A	s per e	xisting	pattern of	
@@ Univ Examina	versity semester examination will be con ation) and it will be converted for 25 ma Allied Subjects(Colleg	ducted for rks. es can cho	50 marks (A ose any two	s per e s subj e	xisting e cts)	pattern of	
@@ Univ Examina 1.Physi	versity semester examination will be con ation) and it will be converted for 25 ma Allied Subjects(Colleg cs 2. Chemistry 3.Accountancy 4	ducted for rks. es can cho 4.Statistics	50 marks (A ose any two	s per e subj	xisting e cts)	pattern of	
@@ Univ Examina 1.Physi	versity semester examination will be con ation) and it will be converted for 25 ma Allied Subjects(Colleg cs 2. Chemistry 3.Accountancy	ducted for rks. es can cho I.Statistics	50 marks (A ose any two	s per e o subj o	xisting e cts)	pattern of	
@@ Univ Examina 1.Physi	versity semester examination will be con ation) and it will be converted for 25 ma Allied Subjects(Colleg cs 2. Chemistry 3.Accountancy 4 List of	ducted for rks. es can cho I.Statistics Elective p	50 marks (A ose any two a. apers	s per e	ects)	pattern of	
@@ Univ Examina 1.Physi	versity semester examination will be con ation) and it will be converted for 25 ma Allied Subjects(Colleg cs 2. Chemistry 3.Accountancy 4 List of (Colleges can choose a	ducted for rks. es can cho I.Statistics Elective p any one of	50 marks (A ose any two apers the paper as	s per e subje electiv	xisting ects) //es)	pattern of	
@@ Univ Examina 1.Physi	versity semester examination will be con ation) and it will be converted for 25 ma Allied Subjects(Colleg cs 2. Chemistry 3.Accountancy 4 List of (Colleges can choose a	ducted for rks. es can cho I.Statistics Elective p any one of r A	50 marks (A ose any two apers the paper as Astronom	s per e o subj o electiv	xisting ects) res)	pattern of	
@@ Univ Examina 1.Physi Elective	versity semester examination will be con ation) and it will be converted for 25 ma Allied Subjects(Colleg cs 2. Chemistry 3.Accountancy 4 List of (Colleges can choose a e – I	ducted for rks. es can cho 4.Statistics Elective p any one of A B	50 marks (A ose any two apers the paper as Astronon Numerica	s per e o subje electiv ny- I nl -Met	xisting ects) /es) hods-I	pattern of	
@@ Univ Examina 1.Physi Elective	versity semester examination will be con ation) and it will be converted for 25 ma Allied Subjects(Colleg cs 2. Chemistry 3.Accountancy 4 List of (Colleges can choose a e – I	ducted for rks. es can cho I.Statistics Elective p any one of A B A	50 marks (A ose any two a. apers the paper as Astronom Numerica Astronom	s per e o subjo electiv ny- I nyII	xisting ects) /es) hods-I	pattern of	

	Α	Graph Theory
	В	Automata Theory & Formal Languages
Elective – III	С	Programming in C++ #
	D	Number Theory
	Ε	Introduction to Industry 4.0





Cou	rse code		CLASSICAL ALGEBRA	L		Т	Р	С
Core	/Elective/S	Supportive	Core Paper – I	4		-	-	4
Pre	Pre-requisite Knowledge of Limits Syllabus Version							
Cou	rse Object	tives:						
1.To	enable the	e students to	elearn Binomial ,Exponential , Logarithmic series an	d their				
application to summation of series.								
2.To	study inte	ensively the	convergence and divergence of different types of ser	ies.				
3. To	o demonstr	rate the star	ndard methods to solve both polynomial and transcen	dental				
type	equations.							
Fun	antad Can	waa Quitaam	2054					
Exp	the succes	sful comple	nes: ation of the course, student will be able to:					
	Vrous the		f Dinamial Exponential Legenithmic series and the			Г	V1	
1	NIOW UIG	e concept o	a Binomial, Exponential, Logarithmic series and the	ll'			N I	
	applicatio	Sh to summ	ation of series.					
2	Acquire a	a clear knov	vledge regarding methods to find an approximate roo	ts of the			K2	
	equations	5.						
3	Apply the	e appropriat	te tests to find the convergence or divergence of an i	nfinite			K3	
	series.							
4	ApplyDe	scartes's rul	e of signs to find the number of positive and negativ	e roots			K3	
	if any in	a polynom	ial equation .			L		
5	Analyze	the relation	between roots and coefficients of the polynomial ec	luations.	•		K4	
IZ1	D		denter d. K2 Archy K4 Archiver K5 Evolution	V(C				
	- Kemenn	ber; KZ - UI	iderstand, K3 - Appry, K4 - Anaryze, K5 - Evaluate,	K0 - CI	rea			
Uni	.4.1	Summ	ation Of Sovies Using Binomial And Exponential		1	2	hou	
UII	11.1	Summa	Theorem		1	. 4	nou	15
Bino	mial, expo	onential the	prems-their statements only- their immediate applicat	tion to				
sum	nation and	l approxima	tion only.					
Uni	it:2	Logarith	mic Series, Convergence And Divergence Of Series		1	2	hou	rs
Loga	arithmic se	ries theorer	n-statement and proof-Immediate application to sum	nation a	nc	l		
appr	oximation	only. Conv	ergency and divergency of series –definitions, eleme	ntary				
resul	ts- compai	rison tests-l	Je -Alembert's and Cauchy's tests.					
Uni	it·3		Absolute Convergence Of Series		1	2	hou	rs
Abso	olute conve	ergence-ser	ies of positive terms-Cauchy's condensation test-Raa	be's test			nou	15
11050					•			
Uni	it:4		Theory Of Equations		1	2	hou	rs
Root	s of an e	equation- R	elations connecting the roots and coefficients- tran	nsformat	tio	ns		
of e	quations-c	haracter an	d position of roots-Descarte's rule of signs-symm	etric fun	ct	ioi	n	
of ro	ots-Recipt	ocal equation	ons.					

Uı	nit:5	Multiple Roots	12 hours					
Mu app	Multiple roots-Rolle's theorem - position of real roots of $f(x) = 0$ – Newton's method of approximation to a root – Horner's method.							
			(0.)					
		I otal Lecture hours	60 hours					
Te	ext Book(s)							
1	Algebra-T (S.Viswar	K. Manicavachasam Pillai, T.Natarajan& K.S Ganapathy, atham Printers & Publishers Private Ltd-2006)						
Re	eference B	ooks						
1	Mathemat K.Thilaga New Delh	ics for B.Sc. Branch I -Vol. I- P. Kandasamy and vathy (For B.Sc-I semester) (S. Chand and Company Ltd, i, 2004.)						
2	Algebra -	N.P.Bali(Publisher: Laxmi Publications-New Delhi Edition 201	0).					
Re	elated Onli	ne Contents [MOOC, SWAY <mark>AM, NPTEL, Websites etc.]</mark>						
1	https://ww	<pre>/w.brainkart.com/article/Introduction-to-Binomial,-Exponential-and-</pre>	Logarithmic-					
	<u>series_351</u>							
2	http://ww	w.jjernigan.com/172/ConvergenceDivergenceNotes.pdf						
3	http://ho	me.iitk.ac.in/~psraj/mth101/lecture_notes/Lecture11-13.pdf						
	https://maths4uem.files.wordpress.com/2015/09/1028-infinite-series.pdf							
	https://ocw.mit.edu/high-school/mathematics/exam-prep/concept-of-series/series-convergence- divergence/							
		2 MIHAR UNINE						
		Coimbatore						
Co	ourse Desig	ned By: 1.Dr.T.Narppasalai Arasu						
		2.Dr.M.Anandhi						

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	М	М	S	S	S	S	М	S	S
CO2	S	М	М	М	S	S	S	М	М	S
CO3	S	М	S	S	S	S	S	S	S	S
CO4	S	М	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

Cou	rse code		CALCULUS	L T P C					
Core	e/Elective/S	upportive	Core Paper – II	5	-	4			
Pre-requisite			Higher Secondary Level Mathematics.	Syllabu Versior	Syllabus Version		23 - 024		
Cou	rse Objec	tives:							
То	orient the	students to	get an idea of curvatures, Integration of different type	s of func	tior	ıs,			
its g	geometrica	al applicatio	ns, double, triple and improper integrals.						
Exp	ected Cou	rse Outcon	nes:						
On	the succes	stul comple	etion of the course, student will be able to:						
1	Identify a	areas in Ma	thematics and other fields where Calculus is useful.			K	.1		
2	Understa and evol	nd the co utes.	ncepts of Evolutes and Envelopes, methods to find	curvatur	e	K	2		
3	Apply the	e concept of	f change of variables in double and triple integrals.			Κ	.3		
4	Apply do	ouble, triple	e integral to find the area and volume respectively.			K	.3		
5	Apply the	e Beta and	gamma function to solve the multiple integrals.			K	4		
K1	- Rememb	oer; K2 - U1	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - Cre	eate				
Un	it:1		Curvature			15 h	ours		
Curv	vature-radi	us of curvat	ure in Cartesian and polar forms-evolutes and envelo	bes-Ped	al				
equa	tions- tota	l differentia	tion- Euler's theorem on homogeneous functions.						
Un	it:2		Integration			15 h	ours		
Integ	gration of f	f'(x)/f(x), f	$(x)\sqrt{f(x)}, [(px+q)/\sqrt{(ax^2+bx+c)}], [\sqrt{(x-a)/(b-x)}], [(x-a)/$	-a)(b-x)],1/[[√(x	-a)(b-		
x),1/	(acosx+bs	inx+c), 1/(acos ² x+bsin ² x+c),Integration by parts-Bernoulli's Fo	rmula.					
		1	Ta AATHIAR INIVERS						
Un	it:3	Eva	aluation Of Double And Triple Integrals			15 h	ours		
Rec	luction for	mulae- pro	blems- evaluation of double and triple integrals- appli	cations t	0				
cale	culations o	f areas and	volumes-areas in polar coordinates.						
Un	it:4	Change C	of Variables In Double And Triple Integrals			15 h	ours		
Cha	ange of ord	ler of integr	ation in double integral- Jacobians- Change of variable	s in doul	ole a	and	triple		
inte	egrals.								
Unit:5 Beta And Gamma Functions 15							ours		
Beta integ	and Gami grals using	na integrals Beta and G	amma functions - Improper Integrals.	f multip	e				
			Total Lecture hours			/5 h	ours		
Tey	xt Book(s)	- 4 -							
1	Calculus V	/ol 1 - S. N	arayanan and T.K.M. Pillai. (Viswanathan Publishers	2008)					
2	Calculus	Vol 2- S. N	arayanan and T.K.M. Pillai.(Viswanathan Publishers	2008)					

R	eference Books
1	Mathematics for BSc – Vol I and. II - P. Kandasamy &K.Thilagarathy(S.Chand and Co-2004)
2	A Text book of calculus- Shanthi Narayanan &J.N.Kapoor(S.Chand& Co.2014)
R	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	https://ocw.mit.edu/resources/res-18-006-calculus-revisited-single-variable-calculus-fall-2010/study- materials/
	https://www.whitman.edu/mathematics/calculus_online/chapter15.html
2	https://www.khanacademy.org/math/calculus-home
3	https://www.sac.edu/FacultyStaff/HomePages/MajidKashi/PDF/MATH_150/Bus_Calculus.pdf
4	http://nptel.ac.in/courses/111104085/29
5	http://www.math.odu.edu/~jhh/Volume-1.PDF
	http://www.math.odu.edu/~jhh/Volume-2.PDF
	https://www.math.cmu.edu/~wn0g/2ch6a.pdf
6	https://nptel.ac.in/courses/111/105/111105122/http://www.staff.ttu.ee/~Ipallas/multipleintegrals.pdf
	is the second
Co	ourse Designed By: 1.Dr.C.Janaki
	2.Dr.M.Anandhi

					52					
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	М	S	S	SAR V	S	S	S	S	S
CO2	S	М	S	S Sig	S	S	S	М	S	S
CO3	S	S	S	S		T 2-S	S	S	S	S
CO4	S	М	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S



Cou	rse code		ANALYTICAL GEOMETRY	L T P C						
Core	/Elective/S	Supportive	Core Paper – III	4	-	-	4			
Pre	e-requisite)	Basic Knowledge In Trigonometry &Vector Algebra.	Syllabu Version	.S 1	202 - 202	23 24			
Cou	rse Objec	tives:								
Emp geon	hasis to er netrical as	hance stude pects of thre	ent knowledge in three dimensional analytical geometree dimensional figs, viz, sphere, cone and cylinder.	ry and	the	2				
Fyn	acted Cou	rea Autean	2051							
On	the succes	sful comple	tion of the course, student will be able to:							
1	Gain kno	wledge abo	ut the regular geometrical figures and their properties.			K	[]			
2	Describe	the geome	tric concents			K	2			
3	Find equ	ation to tang	zent, normal at a point on a conic			K	3			
4 Analyze condition of tangency and find the tangent plane to the central conicoid K						(4				
5 Analyze conics to explain natural phenomenon					K	4				
K1	- Rememb	per; K2 - Ur	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - Cre	eate	;				
Un	it:1		Straight Lines		12	hou	irs			
Anal equa	ytical Geo tion of S.I	ometry 3D- D between ty	Straight lines-coplanarity of straight line-shortest di wo lines-simple problems.	stance ([S.]	D) a	.nd			
Un	:+.7		Sabara		12	hai	1 14 6			
Sphe	ere: standa	rd equation	of sphere-results based on the properties of a sphere-ta	angent	14	ΠΟΙ	115			
plan	e to a sphe	re- equation	n of a circle.							
		1	Second Commission Commission							
Un	it:3		System Of Spheres		12	hou	irs			
Tang	gency of sp	oheres- coax	tial system of spheres- radical planes- Orthogonal sph	eres.						
Un	it•4		Cone And Cylinder		12	hor	irs			
Cone	e whose ve	ertex is at th	e origin- envelope cone of a sphere-right circular cone	e-equatic	n n	not	11.5			
ofa	cylinder-ri	ght circular	cylinder.	I						
		1								
Un	Unit:5 Conicoid 12 hours					irs				
Natu cond	re of a contraction of the second s	onicoid- sta angency –di	indard equation of central conicoid –enveloping con rector Sphere- director plane .	ne- tange	ent	plaı	1e-			
			Total Lecture hours		60	hou	irs			
Tey	kt Book(s)									
1	Analytical	Geometry	- P. Durai Pandian & others (Emerald Publishers 1998	8).						
2	Solid Geo	ometry- N.P	. Balı(Laxmi Publications (P) Ltd,2015)							

R	Reference Books								
1	Solid Geometry- M.L. Khanna(Jainath& Co Publishers, Meerut)								
R	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]								
1	http://www.brainkart.com/article/Three-Dimensional-Analytical-Geometry_6453/								
2	http://egyankosh.ac.in/bitstream/123456789/11990/1/Unit-2.pdf								
Co	Course Designed By: 1.Dr.C.Janaki								
	2.Dr.M.Anandhi								

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	S	S	М	S	S	S	S	S
CO2	S	Μ	S	S	S	S	S	М	S	S
CO3	S	Μ	S	М	М	М	S	S	S	S
CO4	S	Μ	S	S	Μ	S	М	S	S	S
CO5	S	S	S	S	லிக்கு	₽®∠ <mark>S</mark>	S	S	S	S



Cou	rsa cada		TRIGONOMETRY, VECTOR CALCULUS	T	т	р	C
Cou			AND FOURIER SERIES			1	
Core	e/Elective/S	upportive	Core Paper – IV	5	-	-	4
Pre	e-requisite	:	Knowledge In Vector Algebra, Differentiation, Integration	Syllabu Version	S 1	202 - 202	!3 24
Cou	rse Object	tives:					
To e	nable the st or calculus	tudents to le and the exp	arn about the expansion of trigonometric, hyperbolic fur ansions of Fourier series	ictions,			
veet							
Exp	ected Cou	rse Outcor	nes:				
On	the succes	sful comple	etion of the course, student will be able to:				
1	Know the	e expansion	of trigonometric functions and hyperbolic functions	•		K	.1
2 Acquire the basic knowledge of vector differentiation and vector integration. K2							.2
3	3 Determine and apply the important quantities associated with vector fields such as the K3 divergence, curl and scalar potential						
4	4 Understand and find Fourier series of a given periodic function. K3						
5 Examine line integral, surface integral, volume integral and inter-relations among K							4
	them .						
K1	- Rememb	ber; K2 - U1	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - Cre	ate	;	
			in the state of th				
Un	it:1		Expansion In Series		15	hou	Irs
Expa	ansion in S	eries – Exp	ansion of cos • 0 , sin • 0 in a series of cosines and sines	of multip	ple	s of	θ
– Ex of si	pansions on θ , cos θ a	of $\cos\theta$, $\sin\theta$ and $\tan\theta$ in	powers of θ – hyperbolic functions and inverse hyper	ıts – Exp bolic fur	an: Icti	sion ons.	
Un	it:2	Logar	ithm Of Complex Quantities And Summation Of Series		15	hou	Irs
Loga	arithm of c	omplex qua	ntities - summation of series - when angles are in arith	metic pr	ogr	essi	on
- C ·	+ 1S, method	od of summ	ation – method of differences.				
Un	it·3		Vector Differentiation		15	hou	rs
Scal	ar and vec	tor fields –	Differentiation of vectors – Gradient, Divergence an	d Curl-S	$\frac{10}{0}$	enoid	lal
and	irrotational	l vectors-La	placian Operator.				
		r					
Un	it:4		Vector Integration		15	hou	I rs
Integ	gration of	vectors – li	ne integral – surface integral – Green's theorem in t	the plane	; —	Gau	ISS
theorem	rgence the rems.	orem – St	oke's meorem – (Statements only) - verification (n the at	90V	e sa	ua
Un	it:5		Fourier Series		15	hou	Irs
Per	iodic funct	tions – Four	tier series of periodicity 2π – half range series.				
1							

		Total Lecture hours	75 hours
Te	ext Book		
1	Mathemat P.Kandasa	tics for B.Sc. Branch I, Volume I, II and IV - my&K.Thilagavathi(S.Chand and Company Ltd, New Delhi, 2	004.)
Re	eference Bo	ooks	
1	Vector A Emerald	Analysis -P. Duraipandian, Laxmiduraipandian (Revised Ed Publishers)	lition-Reprint 2005
2	Trigonome and Printe	etry -T.K. Manichavasagam Pillai and S.Narayanan(Viswanath rs Pvt. Ltd 2009.)	han Publishers
Re	elated Onlin	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	http://www	v.math.odu.edu/~jhh/Volume-2.PDF	
	http://www	w-math.mit.edu/~djk/18_01/chapter20/section03.html	
	https://ww	w.whitman.edu/mathematics/calculus_online/chapter16.html	
	http://www	w.mecmath.net/calc3book.pdf	
2	http://ww	vw.nptelvideos.in/2012/11/mathematics-iii.html	
3	https://np	otel.ac.in/courses/111107108/1	
		AND ON BRALD	
Co	ourse Design	ned By 1.Dr.C.Janaki 2. Ms. S.Sobia	

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	M	S	Sites	М	М	S	S
CO2	S	Μ	S	S			Μ	S	М	S
CO3	S	Μ	S	S	М	М	Μ	S	S	S
CO4	S	S	S	S	S	S	S	S	S	М
CO5	S	S	S	S	М	S	S	S	S	S



Cou	rse code		DIFFERENTI LAPLAC	AL EQUATIONS AND E TRANSFORMS	L	Т	P	С
Core	/Elective/S	Supportive	Core Paper – V		3	-	-	4
Dre	roquisita		Knowledge of Ordi	nary and Partial	Syllabu	IS	202	3-
110	-requisite		Derivatives		Versio	1	202	24
Cou	rse Objec	tives:						
To in	npart knov	wledge on t	e method of solving o	rdinary differential Equations	of First	Orc	ler a	nd
Seco	nd Order,	Partial Dif	rential equations, La	place Transforms, its inverse	and appl	ıca	tion	of
Lapi	ace Irans	form to so	e the first and seco	ond Order Differential Equat	ions with	C	onsta	int
coer	ncients.							
Exn	ected Cou	rse Outcor	·C•					
On	the succes	sful comple	on of the course, stud	lent will be able to:				
1	Acquire	knowledge	solve Differential ar	d Partial Differential Equation	ıs.		K	.1
2	Solve hig	gher order li	ear differential equat	ons.			K	2
3	3 Expose differential equation as a powerful tool in solving problems in Physical and K3							3
	Social sciences.							
4	Demonstrate competency to solve linear PDE by Lagrange's method K3							3
5	5 Analyze the concepts of Laplace transform and inverse Laplace K4						4	
	transfor	ms to solve	DE with constant co	efficients.				
KI	- Rememb	ber; $\mathbf{K2}$ - U	erstand; K3 - Apply;	K4 - Analyze; K5 - Evaluate	; K6 - Cre	eate	e	
TT	. 1	D:664	E sur a firm				1	
Un Ordi	It:I	Different	Equation of First of East	order and Higher Degree.	then one	<u> </u>	nou Solue	irs
for r	x y - Cl	irant's Equ	ion – Simultaneous I	St Older and Ol Degree Higher	ulali olle	- c	rient	sof
the f	orm	indut 5 Dqu	ion Simulations i	recentur Equations with con		111		5 01
i) f_1	$D_x + g_1(I_x)$	$D)v = \omega_1 (1)$	El cont	and is a final state				
ii) f_2	$(D)x + g_2($	$(D)y = \phi_2 (t)$	where f_1 , g_1 , f_2 and	g ₂ are rational functions of I	D=d/dt wi	th	cons	tant
coef	ficients an	$d \phi_1, \phi_2$ ar	explicit functions of	tatore				
			^{ல் இ} ந்தப்பா	ong e_unipp				
Un	it:2	H	gher Order Linear l	Differential Equation		9	hou	irs
Find	ing the sol	lution of Se	ond and Higher Order	with constant coefficients wi	th Right I	Har	nd Si	de
is of	f the form	Ve ^{ax} whe	e V is a function of	x – Euler's Homogeneous	Linear D	iffe	erent	ial
Equa	ations.							
			D					
	<u>it:3</u>		Partial Differentia	al Equations		9	hou	irs
Parti	al Differe	intial Equat	ons: Formation of ed	uations by eliminating arbit	rary cons	star	its a	na by
direc	t integrati	ion Meth	ds to solve the first	order P.D. Equations in the	standard	iati 1 f.	ons	bу
Lagr	ange's Lir	near Equation	s.	order i.D. Equations in the	stanual	1 10	51115	
Un	it:4		Laplace Trai	nsforms		9	hou	irs
Lapl	ace Transf	forms: Defin	tion – Laplace Trans	forms of standard functions –	Linearity	pro	pert	y –
First	Shifting 7	Theorem – T	ansform of $tf(t)$, , f (t)/t, f'(t), f''(t).				

U	nit:5	Inverse Laplace Transforms	9 hours				
Inve	erse Lapla	ce Transforms – Applications to solutions of First Order	and Second Order				
Dif	ferential Ec	uations with constant coefficients.					
			ſ				
		Total Lecture hours	45 hours				
Te	ext Book						
1	Mathema (S. Chand	tics for B.Sc – Branch – I Volume III- P.Kandasamy & K. and Company Ltd, New Delhi, 2004.)	Thilagavathy				
Re	eference Bo	ooks					
1	1 Calculus Vol III -S. Narayanan and T.K. Manickavasagam Pillay, (S. Viswanathan Printers and Publishers Pvt. Ltd, Chennai 1991)						
2	Differen	ial Equations -N.P. Bali (Laxmi Publication Ltd, New Delhi, 2	004)				
3	Laplace an Publishers	nd Fourier Transforms-Dr. J. K. Goyal and K.P. Gupta (Pragati s, Meerut, 2000)	Prakashan				
Re	elated Onli	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]					
1	https://npte	el.ac.in/courses/111105035/					
2	http://wwv	7.nptelvideos.in/2012/11/mathematics-iii.html					
	https://ww	w.digimat.in/nptel/courses/video/111108081/L02.html					
3	https://ww	w.math.ust.hk/~machas/differential_equations.pdf.					
	https://ww	w.ijsr.net/archive/v2i1/ijsron2013331.pdf					
	nttps://ww	w.wnitman.edu/mathematics/calculus_online/chapter1/.html					
C	urso Docio	nod By: 1 Dr F Pamathaumar					
	uise Desig	2 Mc S Kayunthi Combuter					
		2.1v15.5.1Xav unum					

குதப்பாரை உயா FOUCATE TO ELEVATE

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	S	S	М	S	М	М	S	S
CO2	S	М	S	S	S	S	М	М	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	М	S	S	S	S	М	S	S	S
CO5	S	S	S	S	S	S	S	S	S	М

`Cou	irse code		STATICS	L	Т	Р	С	
Core	e/Elective/S	upportive	Core Paper – VI	3	-		4	
Pr	-roquisito		Basic Knowledge in Vector Algebra &	Syllabu	S .	2023	3-	
110	-i cquisite		Trigonometric Functions	Version		2024	1	
	rse Object	tives:						
1.1	o enable th	e students	to realize the nature of forces and resultant forces who	en more t	nar	1		
2 T	o know ab	out the con	ic. ditions of equilibrium of couples and conlanar forces					
2.1	o know do		anions of equinorium of couples and coplanal forces.					
Exp	ected Cou	rse Outcon	nes:					
On	On the successful completion of the course, student will be able to:							
1	Rememb	er the vario	us laws.			K	.1	
2	Understa	nd the conc	epts of forces and moments.			K	2	
3 Understand the concepts of equilibrium.							2	
4 Apply the concepts of forces and moments.							3	
5 Analyze the basics of coplanar forces, equilibrium of forces acting on a rigid body					K	4		
and solve the problems.								
K1	K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create							
			லிக்கழகப்					
	<u>it:1</u>	· · .	Law of Forces	<u> </u>	<u>9</u>	hou	rs	
Forc	es acting a	it a point –	Parallelogram law-triangle law –Converse of Triang	gle law- F	'01 <u>'</u>	ygor	1	
Law	of Porces-							
Un	it•2		Resolution and Components of Forces		9	hou	rs	
<u>(λ-</u>	μ) theore	m –Resolu	tion of forces- Components of a force- Resultant	of any n	<u> </u>	her	of	
Co	planar forc	es acting at	a point- Conditions of equilibrium.				•1	
	I		Coimbatore & Co					
Un	it:3		Parallel Forces, Moment and Couple		9	hou	rs	
Par	allel Force	s and Mon	nents -Resultant of two parallel forces (Like and unl	ike)-Cond	liti	ons	of	
equ	uilibrium o	f three copla	anar forces- Moment of a force- Geometrical represen	tation- Si	gn	oftl	ne	
mo Equ	ment- Ur	if two coup	ent – Varignon's Theorem on couples-Equilibriun	1 of two	co	uple	:S-	
Eq		or two coup	105.					
Un	it:4		Forces Acting on A Rigid Body		9	hou	rs	
Co	planar forc	es acting or	a rigid body – Theorem on three coplanar forces in a	equilibriu	m.			
		U						
Un	it:5	General C Planar Fo	Conditions of Equilibrium of a System of Co- orces	Co- 9 hours				
Re	duction of	a system of	coplanar forces to a single force and a couple - nece	essary &	suf	ficie	nt	
cor	nditions of	equilibrium	only – Equation to the line of action of the resultant.					
					4-			
			Total Lecture hours		45	hou	rs	

Text Book							
1 Statics -M.K.Venkataraman (Agasthiar Publications, Trichy, 1999.)							
Reference Books							
1 Statics -A.V.Dharmapadam.(S.Viswanathan Printers and Publishing Pvt., Ltd, 1993.)							
2 Mechanics -P.Duraipandian and Laxmi Duraipandian.(S.Chand and Company Ltd, Ram							
Nagar, New Delhi -55, 1985.)							
3 Statics -Dr.P.P.Gupta (Kedal Nath Ram Nath, Meerut, 1983-84)							
·							
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]							
1 <u>https://nptel.ac.in/courses/112/105/112105164/</u>							
2 <u>https://nptel.ac.in/courses/122/102/122102004/</u>							
3 <u>https://www.khanacademy.org/science/ap-physics-1</u>							
Course Designed By: 1.Ms.A.Karpagam							
2.Dr.P.Rajarajeswari							

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	Μ	S	S	М	М	S	S
CO2	S	М	S	SE	M	M	M	М	М	S
CO3	S	Μ	S	S	M	M	σM	S	S	S
CO4	S	S	S	S	S	S	5m	М	S	S
CO5	S	S	S	S	M	S	S	S	S	S

Cou	rse code		Operations Research – Paper I	L	Т	Р	С	
Core	/Elective/S	upportive	Skill Based Subject	3	-	-	2	
Pre	e-requisite		Knowledge in Basic Mathematical Concepts	Syllabu Version	15 2 n 2	023 024	\$- 	
Cou	rse Object	tives:						
To f maki	familiarize ing, model	students v formulatio	vith the basic concepts, models and techniques for n and applications.	effectiv	/e de	ecis	ion	
Exp	ected Cou	rse Outcor	nes:					
On	the succes	sful comple	tion of the course, student will be able to:					
1	Understa	nd the basic	concepts and application of operations research in var	rious fiel	ds.	K	1	
2	Know pri	inciples of o	construction of mathematical models of conflicting sit	uations.		K	2	
3	Analyze	the relation	ship between a linear program and its dual.			K	3	
4 Apply techniques constructively to make effective decisions in business and solve problems in industry.							3	
5 Build and solve transportation problems.							4	
K1	- Rememb	oer; K2 - Ui	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - Cre	eate			
		-						
Uni	it:1	Basics O	f Operations Research and Formulation Of L.P.P		9 ł	nou	rs	
Basi	cs of O.R -	- Definition	of O.R – Characteristics of O.R - Scientific methods in	n O.R −]	Nece	ssa	ry	
01 O limit	.K in Indus	stry – O.K a) R. Linear	nd Decision Making – Scope of O.R in Modern Mana Programming Problem – Formulation of L.P.P.	igement-	–Use	s ar	1d	
111111		J.K .Lincai						
Un	it:2	Linear F	Programming Problem -Simplex method		9 ł	iou	rs	
Grap	hical solut	tions of L.P	.P – Problems. Simplex Method – Problems.					
		-	San Chindrature					
Uni	it:3		Big-M and Two-Phase Method		9 ł	lou	rs	
Char	me's Penal	ty Method	(or) Big – M Method - Two Phase Simplex method –	Problem	is.			
Uni	it•1		Duality In L. P. P.		91	1011	rs	
Dua	ality in L.P	P.P – Conce	pt of duality – Duality and Simplex Method – Probler	ns.	71	ivu	15	
Uni	it:5		Transportation Model		9 ł	iou	rs	
The 1 – un	transportat balanced T	ion Problen `ransportati	ns – Basic feasible solution by L.C.M – NWC- VAM- on problems.	optimum	ı solu	itio	ns	
TT-	-4 Do - 1-		I otal Lecture nours		43 [ivu	15	
1 I EX	Operation	Research	- Kanti Swamin P. K. Gunta Man Mohan (S. Chand	& Song	Educ	atic	n	
1	Publication	ns, New De	lhi, 12th Revised edition-2003)	x 50115]	Luuc	an	/11	

Reference Books

- 1 Operations Research Prem Kumar Gupta D. S. Hira (S. Chand & Company Ltd, Ram Nagar, New Delhi ,2014)
- 2 Operations Research Principles and Problems- S. Dharani Venkata Krishnan(Keerthi publishing house PVT Ltd.1994)

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1 <u>https://nptel.ac.in/courses/111/102/111102012/</u>

2 <u>https://nptel.ac.in/courses/111/104/111104027/</u>

Course Designed By: 1. Dr.T.Narppasalai Arasu

2. Dr.P.Rajarajeswari

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	SS	S	М	М	М	S	S
CO2	S	М	S	S	S	S	S	М	М	S
CO3	S	S	S	S	M	M	S	S	S	S
CO4	S	S	S	S	S	S	S	S	М	S
CO5	S	S	S	STR	S	S	S	М	S	S

இந்தப்பாரை உ EDUCATE TO ELEVA



Cour	se code		DYNAMICS	L	Т	Р	С	
Core/	/Elective/S	upportive	Core Paper-VII	3	-	-	4	
Pre	-requisite		Knowledge in Forces and Vector Algebra	Syllabu Version	S	202. 202	3- 4	
Cour	se Object	tives:						
To noti	impart kn ons of im	owledge al	bout the projectile, Simple Harmonic Motion and n two smooth spheres.	understar	ıdir	ng ti	he	
Expe	cted Cou	rse Outcon	nes:					
Ont	the succes	sful comple	etion of the course, student will be able to:					
1	Rememb	er the basic	kinematics and dynamic concepts.			K	.1	
2	Describe	the differen	ntial equation of Central Orbits.			K	2	
3	Apply th projectile	e concepts	of projectiles to solve problems relating to the mo	otion of	a	K	3	
4	To under two direc	stand &app tions.	bly the concepts of composition of simple harmonic	motion i	n	K	3	
5	Understa	nd impulsiv	ve forces and analyze loss of K.E due to direct an	d obliqu	e	K	4	
K1 -	- Rememb	er: K2 - U1	nderstand: K3 - Apply: K4 - Analyze: K5 - Evaluate:	$\overline{\mathbf{K6} - \mathrm{Cross}}$	eate	е Э		
		,						
Uni	t:1		Projectiles		9	hou	rs	
Path	of a proje	ctile-Greate	st height-time of flight – Range -range on an inclined	plane th	rou	gh		
the p	oint of pro	jection-Ma	ximum range.					
			State of the state					
Uni	t:2		Central Orbits		9	hou	rs	
Rad Diff	al and tra	nsverse con quation of c	nponents of velocity and acceleration – areal velocity entral orbit in polar coordinates only.	of centra	al c	orbit	s -	
T.I	4.2		Simple Haumonia Mation			har		
	lij nlituda n	oriadia tim	simple Harmonic Motion	ong of th	<u> </u>	nou	<u>rs</u>	
neri	od in a str	aight line a	nd in two perpendicular lines	5115 OI U		Samo	-	
pen		aight inte a	na in two perpendicului intes.					
Uni	t:4	Collisio	on of Elastic Bodies-Direct Impact of Spheres		9	hou	rs	
Impu Impa direct	Impulsive force – Newton's experimental law- Principle of conservation of momentum- Direct Impact on a smooth fixed plane -Direct impact of two smooth spheres- loss of kinetic energy during direct impact.							
Uni	t:5		Oblique Impact of Spheres		9	hou	rs	
Obli - Lo	Oblique impact of spheres 9 nours Oblique impact of a smooth sphere on fixed smooth plane – oblique impact of two smooth spheres - Loss of Kinetic energy during oblique impact.							

	Total Lecture hours 45 hours
Te	xt Book
1	Dynamics -M.K.Venkataraman (11th Ed. Agasthiar Publications, Trichy, 1994.)
Re	ference Books
1	Dynamics -A.V.Dharamapadam (S.Viswanathan Printers and Publishers Pvt., Ltd,
	Chennai, 1998)
2	Dynamics -K.Viswanatha Naik and M.S.Kasi (Emerald Publishers, 1992)
3	Dynamics -Naryanamurthi (National Publishers, New Delhi, 1991)
-	
Re	lated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	https://nptel.ac.in/courses/115/106/115106119/
2	https://www.askiitians.com/iit-jee-physics/mechanics/motion-of-projectile.aspx
Co	urse Designed By: 1. Dr.T.Nandhagopal
	2. Mr.M.Balasankar



COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	M	M	S	S	S	S	S
CO2	М	М	М	M	M	S	М	S	S	S
CO3	S	S	S	S	THISR UN	S	S S	S	S	S
CO4	М	М	М	M day	S	Sal Col	S	S	S	S
CO5	S	S	S	S	த்தப்பாரை (^{சந்} ரக் SE TO ELE)	ATE S	S	S	S	М

Course code		PROGRAMMING IN C	L	Т	Р	С			
Core/Elective/Supp	ortive	Core Paper-VIII	2	-	-	3			
Pre-requisite		Higher Secondary Level Mathematics	Syllab Versio	us n	2023 – 2024				
Course Objectives						-			
statements, Arrays, different types of functions and practical problems.									
Expected Course	Expected Course Outcomes:								
On the successful	comple	tion of the course, student will be able to:							
1 Remember th	ie impo	tance of C language and datatypes.			K1				
2 Understand th	he basic	structure, operators and statements of C language.			K2				
3 Understand d	ecision	control statements, loop control statements.			K2				
4 Apply the co arrays, charac	oncepts	of data types, operators, expressions, control s ys and strings to write the C code for a given algorit	tatemen hm.	ts,	K3				
5 Read, underst	and and	trace the execution of programs written in C languag	e.		K4				
K1 - Remember; I	K2 - Ur	derstand; K3 - Apply; K4 - Analyze; K5 - Evaluat	e; K6 –	Cre	ate				
Unit:1		Constants, Variables and Data Types			6 hou	irs			
Introduction – Imp Keywords and iden variables –Defining	oortance tifiers - g symbo	e of C- Basic structure of C programme - Charac - Variables Data types – Declaration of variables – blic constants.	ter set - Assigni	Cor ng v	istants values 1	to			
		Bissiument 2 with			<u> </u>				
Unit:2		Operators and Expressions			6 hou	irs			
Arithmetic operators - Relational operators - logical operators - assignment operators - increment and decrement operators - Conditional operators - Special operators - Arithmetic expressions - Evaluation of expressions - Precedence of arithmetic operators - Some computational problems - Type conversion in expressions - operator precedence and associating mathematical functions.									
	•								
Unit:3Managing Input -Output Operations, Decision Making6 hoursand Branching6									
Reading and Writing character – formatted input and output. Decision making with IF statement – Simple IF statement – The IF ELSE statement - Nesting of IF ELSE statement – The ELSE IF ladder. The Switch statement –The ? Operator –The GOTO statement.									

Ur	nit:4	Decision Making and Looping	6 hours					
Th	e WHILE st	atement - the DO statement - the FOR statement –Jumps in loops						
•	•							
Ur	nt:5	Arrays and Strings	6 hours					
Or	ne, Two din	nensional arrays – initializing two dimensional arrays – Multidi	imensional arrays					
	Declaring an	d initializing string variables – reading strings from terminal – V	Writing strings on					
the	e screen – A	rithmetic operations on characters.						
		Total Lecture hours	30 hours					
Те	ext Book							
1	Programm	ing in ANSI C -E.Balagurusamy (Tata McGraw –Hill Pu	blishing Company					
	limited, No	ew Delhi, Fifth Edition, 2008)						
_		_						
Re	eference Bo	oks						
1	Programm	ing with C (Schaum's outline series)- Byron Gottfried (T	'ata McGraw Hill					
	publishing	company -1998.)						
2	Programm	ing with ANSI and Turbo C - Ashok N Kamthane (Pearson Ed	ucation nublishers					
2	2002)	ing with Artor and Taroo C. Ashok Perkannane (Tearson Ed	deation puonsiters,					
3	The spirit	of 'C' -Henry Mullish and Herbert L cooper (Jaico publisher, 1	996.)					
1	The ANSI	C. Brian W. Kernighan Dannis M. Ritchie (Published by Prentic	- Hall of India					
т	Private Li	nited, M-97, New Delhi- 110001 .Second edition .Ocober 1992)					
5	ANSI C:	With Microsoft C 5.1 and Quick C 2.0 -C.Balasubramanian.(Tata McGraw-Hill					
	Publishing	company limited, New Delhi.)						
6	Programm	ing In C - Kris A.Jamsa (Galgotia Publications Pvt.ltd. 1992)						
I		E THINK B						
Re	elated Onlin	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]						
1	https://nptel.ac.in/courses/106/104/106104128/							
2	https://npt	el.ac.in/courses/106/105/106105171/000000000000000000000000000000000						
Co	ourse Design	ned By: 1. Dr.T.Narppasalai Arasu & 2. Dr.P.Rajarajeswari						

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	S	S	М	М	М	S	S
CO2	S	S	М	М	S	М	М	S	М	S
CO3	S	М	М	Μ	S	S	Μ	S	S	S
CO4	S	S	S	S	S	М	S	S	S	М
CO5	S	S	S	S	S	М	S	S	S	S

Pre-requisite		Knowledge in C	Sylla Versi	bus on	2023- 2024		
Core/Elective/S	Supportive	Core Paper VIII (Practical)	-	-	1	1	
Course code		PROGRAMMING IN C-(PRACTICAL)	L	Т	Р	С	

PRACTICAL LIST

1. Write a C program to generate 'N' Fibonacci number.

- 2. Write a C program to print all possible roots for a given quadratic equation.
- 3. Write a C program to calculate the statistical values of mean, median.
- 4. Write a C program to calculate the statistical values of Standard Deviation and variance of the given data.
- 5. Write a C program to sort a set of numbers.
- 6. Write a C program to sort the given set of names.
- 7. Write a C program to find factorial value of a given number 'N' using recursive function call.
- 8. Write a C program to find the product of two given matrix



Cou	rse code		OPERATIONS RESEARCH – PAPER II	L	Т	Р	С	
Core	/Elective/S	upportive	SKILL BASED SUBJECT	3	-	-	2	
Pre	e-requisite		Knowledge in Basic Mathematical Concepts	Syllabu Versio	ıs n	202. 202	3- 4	
Cou	rse Object	tives:						
To ii	npart knov	vledge in A	ssignment Problems, Game theory, performance mea	asures of	f que	ues	and	
optir	nal use of	Inventory.						
F	4.1.0	0.4						
Exp	the succes	rse Outcon	ies:					
1	Idontify t		and of the course, student will be able to.			V	1	
1	determin	e the optimate	al order quantity for models.	ganizatio	on,	ĸ	.1	
2	Explain t	he various of	costs related to inventory system.			K	2	
3	Apply g	ame theory	concepts to articulate real-world situations by id	dentifyiı	ıg,	K	3	
	analyzing	g and practi	cing strategic decisions.	-	•			
4	Apply an	d extend qu	eueing models to analyze real world systems.			K	4	
5 Build and solve assignment model.								
K1	- Rememb	oer; K2 - U1	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	; K6 – C	reat	e		
			லக்கழக					
Uni	it:1		Assignment Model		9	hou	rs	
The Prob	Assignmer lems.	nt Problems	– Assignment algorithm – optimum solutions – Unba	lanced A	Assig	nme	nt	
Uni	it:2		Game Theory		9	hou	rs	
Gam	e Theory	– Two-pers	on zero sum game – The Maximin – Minimax prin	ciple –	prob	lems	3 -	
Solu	tion of 2 x	2 rectangul	ar Games – Do <mark>mination Pr</mark> operty – (2 x n) and (m x 2) graphi	cal n	neth	od	
-Pro	oblems.		- 25 the Discourse and the state					
		Γ	EDUCATE TO ELEVATE					
Uni	<u>it:3</u>	-	Queueing Model		9	hou	rs	
Que	eueing The	eory – Intro	duction – Queueing system – Characteristics of Qu	eueing s	syste	m –		
Syr	nbols and	Notations –	Classifications of queues – Problems in (M/M/1) : (∞/FIFO)			
Un	it:4		Multi-Channel Queueing Models		9	hou	rs	
Prob	lems in (N	1/M/1):(N/I	TIFO); (M/M/C) : (∞/FIFO); (M/M/C) : (N/FIFO) Mo	odels.				
Uni	it:5		Inventory Models		9	hou	rs	
Inve	ntory cont	rol – Types	of inventories - Inventory costs - EOQ Problem w	vith no s	short	ages	-	
Prod	uction pro	blem with r	o shortages – EOQ with shortages – Production prob	lem with	n sho	ortag	es	
– EC	– EOQ with price breaks.							
			Total Lecture hours		45	hou	rs	
			i otar Dectare nours		тJ	nou	10	

Те	ext Book
1	Operations Research - Kanti Swarup, P. K. Gupta, Man Mohan (S. Chand & Sons
	Education Publications, New Delhi, 12th Revised edition, 2003)
Re	eference Books
1	Operations Research – Prem Kumar Gupta D. S. Hira (S. Chand & Company Ltd, Ram Nagar, New Delhi,2014)
2	Operations Research Principles and Problems- S. Dharani Venkata Krishnan
	(Keerthi publishing house PVT Ltd.1994)
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	https://nptel.ac.in/courses/111/102/111102012/
2	https://youtu.be/zADj0k0waFY
	https://youtu.be/xvDdrswAj8M
	https://www.youtube.com/watch?v=xVPoWkkQTrQ
	https://www.youtube.com/watch?v=7kDtTAnvuww
	https://www.youtube.com/watch?v=IfLsPHKk51w
3	https://nptel.ac.in/courses/109/103/109103021/
4	https://nptel.ac.in/courses/110/105/110105082/
	<u>https://nptel.ac.in/courses/110/106/110106045/</u>
	an Naral Datio
Co	ourse Designed By: 1. Dr.T.Narppasalai Arasu
	2. Dr.P.Rajarajeswari

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	S	S	М	S S S S S S S S S S S S S S S S S S S	M	М	М	S	S
CO2	М	М	М	М	S	S	М	М	М	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	М	S	М	S	М	S	М



Cou	rse code		REAL ANALYSIS - I	L	Т	Р	С
Core/Elective/Supportive		upportive	Core Paper – IX	5	-	-	4
Pre-requisite			Knowledge in the basic properties of real numbers	Syllabus Version	us 2023 - on 2024		
Course Objectives:							
Aimed at exposing the real number systems that underpin the development of real analysis and in understanding various physical phenomena.							
Expe	ected Cou	rse Outcon	ies:				
On	the succes	sful comple	tion of the course, student will be able to:				
1	Remember the basic topological properties of subsets of the real numbers. K1						
2	Understand the fundamental properties of the real numbers and analyze the real K2 number system.						2
3	Learn the concept of limits, sequence, continuity, convergent sequence in metric K2 spaces appreciating the abstract ideas and their applicability.						
4	Have the proficiency in the formulation and construction of proofs of basic results in K3 real analysis.						
5	5 Demonstrate skills in communicating Mathematics and learn basic techniques and K4 examples in analysis to be well prepared for extended learning.						
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create							
			A TONS IS				
Uni	it:1		The Real and Complex Number Systems		15	hou	rs
Introduction -the field axioms, the order axioms –integers –the unique Factorization theorem for integers –Rational numbers –Irrational numbers –Upper bounds, maximum Elements, least upper bound –the completeness axiom –some properties of the supremum –properties of the integers deduced from the completeness axiom- The Archimedean property of the real number system –Rational numbers with finite decimal representation of real numbers –absolute values and the triangle inequality –the Cauchy-Schwarz inequality –plus and minus infinity and the extended real number system.							
	it:2	 	Basic Notions of a Set Theory.	form of the second	<u>15</u>	hou	rs
terminology concerning functions –one–one functions and inverse –composite functions – sequences –similar sets-finite and infinite sets –countable and uncountable sets –uncountability of the real number system –set algebra –countable collection of countable sets.							

Unit:3		Elements of Point Set Topology	15 hours							
El	Elements of point set topology: Euclidean space R ⁿ –open balls and open sets in R ⁿ . The structure									
of open sets in \mathbb{R}^n -closed sets and adherent points –The Bolzano –Weierstrass theorem –the										
Cantor Intersection Theorem										
Uı	nit:4	15 hours								
Cov	vering –Lind	delof covering theoremthe Heine- Borel covering theoremCo	ompactness in R ⁿ							
-M	letric Space	s -point set topology in metric spaces -compact subsets of a metr	ric space – Boundary							
of a	ı set.									
U	nit:5	Limits and Continuity in Metric Spaces	15 hours							
Cor	nvergent seq	uences in a metric space –Cauchy sequences –Completeness see	quences – complete							
met	ric Spaces.	Limit of a function -Continuous functions -continuity of co	mposite functions.							
Cor	ntinuous cor	nplex valued and vector valued functions.								
		Total Lactura hours	75 hours							
T		I otai Lecture nours	75 110018							
16	ext Book		C1 1000 \							
I	Mathemati	ical Analysis-T.M.Apostol (2nd ed., Narosa Publishing Compa	any, Chennai, 1990.)							
	Un	it I : Chapter 1 Sections 1.2, 1.3, 1.6 to 1.16, 1.18 to 1.20								
	Un	it II : Chapter 2 Sections 2.2 to 2.15								
	Un Un	it III : Chapter 3 Sections 3.2 to 3.9								
	UII Un	it \mathbf{V} : Chapter 4 Sections 4.2 to 4.5, 4.8 to 4.10								
	UI	it v : Chapter 4 Sections 4.2 to 4.5, 4.8 to 4.10								
Re	eference Bo	oks								
1	Mathada a	f Pool Analysis P. P. Goldborg (NV, John Wiley, New York 10)76)							
1	Introductio	on to Topology and Modern Analysis G E Simmons (McGraw	Hill New Vork							
2	Introduction to Topology and Modern Analysis- G.F.Simmons. (McGraw – Hill, New York,									
3	A survey of Modern Algebra (3rd Edition) C Dirkhoff and MacI and (Macmillan, New									
5	York 1965)									
4	Real Analysis - LN Sharma and A.R. Vasishtha (Krishna Prakashan Media (P) I td. 1997)									
Polated Online Contents IMOOC SWAVAM NOTEL Websites et al										
1 https://pptel.ac.in/courses/111/105/111105069/#										
2	https://nptel.ac.in/courses/111/101/11101134/									
3	https://www.digimat.in/nptel/courses/video/111105098/									
4	https://nptel.ac.in/courses/111/106/111106053/									
Course Designed By: 1. Dr.S.Palaniammal										
2. Dr.E.Rameshkumar.										
2. DL.E.Kaniesikunai.										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
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CO1	М	М	М	М	М	М	М	М	S	S
CO2	S	S	М	М	М	S	S	М	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	М



Course code		COMPLEX ANALYSIS - I	L	Т	Р	С			
Core/Elective/S	upportive	Core Paper – X	6	-	-	4			
Pre-requisite		Knowledge in Calculus	Syllabu Versior	023 – 024					
Course Object	Course Objectives:								
To equip the st	To equip the students with the understanding of the fundamental concepts of complex functions,								
analyticity ,pov	analyticity ,power series and complex integration.								
Expected Cou	rse Outcom	ies:							
On the succes	sful comple	tion of the course, student will be able to:							
1 Learn te	chniques of	complex analysis effectively to establish mathema	atical res	sults.	K1				
2 Recogni	ze the simp	le and multiple connected domains.			K2				
3 Investig	ate a function	on for its analyticity and find it series development	it.		K3				
4 Examin	e the relatio	nship between conformal mapping and analytic fu	inctions		K4				
5 Comput	5 Compute contour integrals directly and by the fundamental theorem. K4								
K1 - Rememb	er; K2 - Un	derstand; K3 - Apply; K4 - Analyze; K5 - Evalua	ate; K6 -	- Crea	ite				
	-								
Unit:1		Complex Plane		1	8 hou	irs			
Complex number number – Conj Elementary Tra invariance of cr Stereographic p	per system ugation – A ansformatio coss-ratio ur projection.	-Field of Complex numbers – Scalar multiplicated biological solution of a complex number-Inequalities in the solution of a complex number of a complex number of the solution of a complex number of the solution of the solu	tion of terms of points -o ed comp	a con of mo cross- lex p	nplex duli – ratio- lane –				
		e all							
Unit•2		Analytic Functions		1	8 hoi	irs			
Complex Func defined in a differentiability	tions- Limi region –neo –Cauchy-F	t of a function –continuity –differentiability – A cessary conditions for differentiability –sufficient Riemann equation in polar coordinates –Definition	Analytic ent con- of entin	al fun ditior re fun	nction is for ction.				
Unit:3	Po	wer Series and Elementary Functions		1	8 hou	irs			
Absolute convergence –circle of convergence –Analyticity of the sum of power series in the Circle of convergence (term by term differentiation of a series). Elementary functions: Exponential, Logarithmic, Trigonometric and Hyperbolic functions.									
Unit:4	Har	monic Functions and Conformal Manning		1	8 hoi	irs			
Conjugate Har mapping –Con $w = e^{z}$; $w = z^{2}$;	Unit:4Harmonic Functions and Conformal Mapping18 hoursConjugate Harmonic functions: Definition and determination. Conformal Mapping: Isogonal mapping –Conformal Mapping-Mapping $z \rightarrow f(z)$, where f is analytic, particularly the mappings. $w = e^{z}$, $w = z^{2}$; $w = \sin z$; $w = \cos z$; $w = z + 1/z$.								

Uni	t:5	Complex Integration	18 hours
Simp	ly and mul	tiply connected regions in the complex plane. Integration of	f(z) from definition
along	g a curve joi	ning Z_1 and Z_2 . Proof of Cauchy's Theorem (using Goursat's	s lemma for a simply
conn	ected regio	n). Statement of Cauchy's integral formula for higher de	rivatives - Morera's
theor	rem.		
		Total Lactura hours	90 hours
T	(D 1	Total Lecture nours	70 110013
	t Book	Analysis (For Undergraduate Students of Mathematic	a Dhyraica and
1	Engineerir	Analysis (For Undergraduate Students of Mathematic	ishing S Chand
	And Com	pany Limited .Reprint 2020)	noning, 5 chund
	Unit I :	Chapter 1 Sections 1.1 to 1.3, 1.6 to 1.9	
		Chapter 2 Sections 2.1 to 2.2, 2.6 to 2.10,	
		Chapter 7 Section 7.1	
	Unit II :	Chapter 4 Sections 4.1 to 4.10	
	Unit III :	Chapter 6 Sections 6.1 to 6.11	
	Unit IV:	Chapter 6 Sections 6.12 to 6.13	
	** •. **	Chapter 7 Sections7.4,7.6 to 7.10	
	Unit V :	Chapter 8 Sections 8.1 to 8.9	
Ref	erence Boo	ks	
1	Complex '	Variable and Applications -Churchill and Others.(Tata McC	Braw Hill Publishing
1	Company	Ltd, 1974.)	C
2	Theory of	functions of Complex Variable -Shanti Narayan (S.Ch	and and Company,
2	Meerut, 19	295.)	
3	Functions	of Complex Variable -Tyagi B.S(17th Edition, Pragati Pral	kasham Publishing
5	Company	Ltd, Meerut, 1992-93)	
Dal	atad Onlin	a Contonta IMOOC SWAVAM NDTEL Wahaitaa ata l	
1	https://pp	rel ac in/courses/111/103/111103070/	
2	https://np	rel.ac.in/courses/111/107/111107056/	
3	https://np	rel.ac.in/courses/122/103/122103012/	
Cou	Irse Design	ed By 1.Dr.T.Narppasalai Arasu	
		2.Ms.S.Kavunthi	

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COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	М	М	S	S	М	М	М	S	S
CO2	S	М	М	М	М	S	М	S	S	S
CO3	S	S	М	S	S	S	S	S	S	S
CO4	S	S	М	S	М	S	S	S	S	S
CO5	S	S	S	S	M	S	S	S	S	M



Cour	se code		MODERN ALGEBRA - I	L	Т	Р	С		
Core/l	Elective/Su	pportive	Core Paper – XI	6	-	-	4		
Pre-	requisite		Higher Secondary Level Mathematics	Syllab Versio	ous on	202 202	3 - 4		
Cours	se Objecti	ves:							
Focus	es on the o	concepts of	algebraic structures which is one of a pillar of mo	dern M	lathe	mati	cs		
and er	nphasis or	n their prop	erties and applications.						
T		0.1							
Expec	cted Cour	se Outcom							
On th	ne success	ful complet	tion of the course, student will be able to:						
l	Recall th	e propertie	s and extend group structure to finite permutation g	roups.		K	.1		
2	Explain t	he concept	s of homomorphism, isomorphism and automorphis	sm.		K	2		
3	Demonst	rate abstrac	et thinking capacity and ability to prove theorems.			K	.3		
4	Compare	features of	f different algebraic structures.			K	.4		
5	Examine	the proper	ties of algebraic structures and their role in applied	contex	ts.	K	4		
K1 -	Remembe	er; K2 - Un	derstand; K3 - Apply; K4 - Analyze; K5 - Evaluate	; K6 -	Crea	te			
Unit	:1		Groups and its Basic Properties		18	3 ho	urs		
Sets – Defini	mappings itions and	s – Relation Examples -	as and binary operations – Groups: Abelian group, S - Basic properties.	Symme	etric §	group)		
Unit	:2	1. 1	Subgroups and Normal Subgroups		1	<u>8 ho</u>	urs		
Subgr Count	oups – Cy ing Princi	ple - Norm	al Subgroups and Quotient Groups.	mat th	eorer	n - A	L		
Unit	•3		Automorphisms 6 ⁰⁰		10	2 ho	1186		
Hom – Ca	omorphisi yley's theo	ms (Applic prem, perm	ations 1 and 2 are omitted) -Automorphisms – Innutation groups.	er auto	morp	ohisn	1		
Unit	•1		Rings		15	<u>ho</u>	urs		
Defini	• • ition and F	xamples_9	Some Special Classes of Rings – Commutative ring	_ Field	_ Int	eora	1 1		
domai	domain - Homomorphisms of Rings.								
Unit:5 Ideals and Quotient Rings 18 hours									
Ideals Quotio	and Quot ents of an	ient Rings Integral Do	– More Ideals and Quotient Rings – Maximal ideomain.	al - Tl	ne fie	eld o	f		
Total Lecture hours 90 hou							urs		

Tex	at Book
1	Topics in Algebra - I.N. Herstein (John Wiley & Sons, New York, 2003.)
	Unit I : Chapter 1 Sections 1.1 to 1.3,
	Chapter 2 Sections 2.1 to 2.3
	Unit II : Chapter 2 Sections 2.4 to 2.6
	Unit III : Chapter 2 Sections 2.7 to 2.10
	Unit IV : Chapter 3 Sections 3.1 to 3.3
	Unit V : Chapter 3 Sections 3.4 to 3.6.
Ref	ference Books
1	Modern Algebra -Surjeet Singh and Qazi Zameeruddin. (Vikas Publishing house, 1992.)
2	Modern Algebra- A.R.Vasishtha (Krishna Prakashan Mandir, Meerut, 1994 - 95.)
Rel	ated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	https://nptel.ac.in/courses/106/104/106104149/
2	https://nptel.ac.in/courses/111/106/111106113/
3	https://www.classcentral.com/course/swayam-modern-algebra-14201
Cou	urse Designed By: 1.Ms.A.Karpagam
	2 Mr M Balasankar

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	М	М	S ^{UBSI} E	M	LUIS BL	S	М	S	S
CO2	М	М	S	S		ATE	S	S	S	S
CO3	S	М	М	S	S	S	S	S	S	S
CO4	S	М	М	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

Cou	rse code		DISCRETE MATHEMATICS	L	T	P	С		
Core	/Elective/S	upportive	Core paper XII	5	-	-	4		
Pre	-requisite		Higher Secondary Level Mathematics	Syllabu Versior	IS 1	202 202	3- 4		
Cou	rse Object	tives:							
Prep argun Theo	arguments and focuses on the Formal languages, Automata, Lattices, Boolean Algebra and Graph Theory.								
Exp	Expected Course Outcomes:								
On	the succes	sful comple	etion of the course, student will be able to:						
1 Assimilate various graph theoretic concepts and familiarize with their applications. K1									
2	2 Know and understand about partially ordered sets, Boolean algebra, lattices and their K2 types.								
3 Apply Karnaugh map for simplifying the Boolean expression.									
4	Demonst	rate the skil	l to construct simple mathematical proofs and to valid	late.		K	[4		
5	To achiev	ve greater a	ccuracy, clarity of thought and language.			K	4		
K1	- Rememb	oer; K2 - U1	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - Cre	eate	e			
			and the contraction of the contr						
Uni	it:1		Mathematical logic		15	hou	irs		
Coni impl Varia	nectives, ications, I ables. The	well-forme Duality law ory of infer	d formulas, Tautology, Equivalence of formul , Normal forms, Predicates, Variables, Quantifiers, ence for predicate calculus.	as, Tau Free an	ito nd	logic bou	al nd		
Uni	it:2		Relations and Functions		15	hou	irs		
Cor one stru	nposition & & onto fu ctures: Ser	of relations, inctions, Ha mi groups, I	, Composition of functions, Inverse functions, one-to- ashing functions, Permutation function, Growth of f Free semi groups, Monoids.	one, ont unctions	o, o . A	one-1 Algeł	io- ora		
Uni	it:3		Formal Languages and Automata		15	hou	irs		
Reg free	gular expre	essions, Typ tive gramm	es of grammar, Regular grammar and finite state auto ars.	mata, Co	ont	ext			
I.I.e.	4. 1	[Latting and Daslage Alashua		15	han			
Par of H	tial orderin Boolean fu	ng, Poset, 1 nctions(Kai	Lattices, Boolean algebra, Boolean functions, Theorem rnaugh Method only).	ms, Min	im	izati	on		
Uni	it:5		Graph Theory		15	hou	irs		
Dir patl	ected and uns, Hamilto	undirected gonian paths	graphs, Paths, Reachability, Connectedness, Matrix rep , Trees, Binary trees - theorems, and applications.	oresentat	ion	, Eu	ler		
		Total Lecture hours 75 hours							

Т	ext Book
1	Discrete Mathematical Structures with applications to computer science-J.P
	Tremblay and R.P Manohar (Mc.Graw Hill, 1975.)
	Unit I : Chapter 1. Sections - 1-2, 1-2.7. 1-2.9, 1-2.10, 1-2.11, 1-3, 1-5.1, 1-5.2, 1-5.4, 1-6.4
	Unit II : Chapter 2- Sections - 2-3.5, 2-3.7, 2-4.2, 2-4.3, 2-4.6,
	Chapter 3- Sections-3-2, 3-5, 3-5.3,
	Unit III : Chapter 3- Sections 3-3.1, 3-3.2
	Chapter 4- Section 4-6.2
	Unit IV : Chapter 4- Section 4-1.1, 4-2, 4-3, 4-4.2
	Unit V : Chapter 5- Section 5-1.1, 5-1.2, 5-1.3, 5-1.4
R	eference Book
1	Discrete Mathematics-Oscar Levin (3 rd Edition,2016)
R	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	https://nptel.ac.in/courses/106/106/106106094/
2	https://nptel.ac.in/courses/111/107/111107058/
~	and the second sec
Co	burse Designed By: 1. Ms.A.Karpagam
	2. Ms.S.Kavunthi

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	S	S	S ^s lissi	M	S. Col	М	М	S	S
CO2	S	М	S	S		ATE S	S	S	S	S
CO3	S	М	S	S	М	S	М	S	S	S
CO4	S	М	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

Cou	rse code		OPERATIONS RESEARCH – PAPER III	L	Т	Р	С	
Core	e/Elective/S	Supportive	Skill Based Subject	3	-	-	2	
Pre	e-requisite)	Knowledge in Basics of Operations Research	Syllabu Version	S	202 202	3- 4	
Cou	rse Objec	tives:						
Prese Prob	ents applic lems and E	ations and r Dynamic Pro	nethod to solve Integer Programming Problems, Non-l gramming problems.	inear Pro	ogr	amm	ning	
Exp	ected Cou	rse Outcon	nes:					
On	the succes	sful comple	etion of the course, student will be able to:					
1	Know the	e concept of	f simulation and simulate a queueing system			K	.1	
2	Understa	nd the overa	ll approach of dynamic programming.			K	2	
3 Solve nonlinear programming problems using Lagrange multiplier and using Kuhn- Tucker conditions.							2	
4	Apply co	ncepts in o	otimal scheduling			K	3	
5 To formulate a model for solving the intractable problems. K								
K1	K1 - Remember: K2 - Understand: K3 - Apply: K4 - Analyze: K5 - Evaluate: K6 - Create							
Un	it:1		Simulation		9	hou	irs	
Intro	duction-si	mulation m	nodels-Event-Types of simulation- Generation of r	andom	nui	nber	rs-	
Mon	te-Carlo si	imulation- s	imulation of queueing system.					
Un	it:2		Network Scheduling By PERT/CPM		9	hou	irs	
Intro	duction-	Network an	d basic components- Rules of Network construction-	Time ca	ılcı	ılati	on	
in N	etworks-C	PM. Pert Ca	alculations- Cost Analysis- crashing the network- Prob	olems.				
		T	B ATHIAR UNING AS					
Un	it:3		Integer Programming Problem		9	hou	rs	
Integ	ger Program	nming Prob	lem – Gomory's fractional cut Method – Branch and	d Bound	l M	etho	d.	
Un	it:4		Non-linear Programming Problems		9	hou	rs	
Gene	eral NLPP	– Lagrang	e multiplier – Hessian bordered Matrix – Kuhn Tu	cker Co	ndi	tion	_	
Prob	lems.		-					
		-						
Unit:5 Dynamic Programming Problem 9 hou						rs		
Dyn L.P.	amic Prog P by D.P.P	ramming Pr P.	oblem – Recursive equation approach – D.P.P Algorit	thm – So	olu	tion	of	
			Total Lecture hours		45	hou	irs	
Tex	kt Book							
1	1 Operations Research – Kanti Swarup, P. K. Gupta, Man Mohan (S. Chand & Sons							

Re	eference Books
1	Operations Research – Prem Kumar Gupta& D. S. Hira (S. Chand & Company Ltd, Ram Nagar, New Delhi ,2014)
2	Operations Research Principles and Problems- S. Dharani Venkata Krishnan (Keerthi publishing house PVT Ltd ,1994)
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	https://nptel.ac.in/courses/111/107/111107104/
2	https://nptel.ac.in/courses/111/102/111102012/
3	https://nptel.ac.in/courses/111/104/111104027/
4	https://nptel.ac.in/courses/111/105/111105039/
Co	ourse Designed By: 1. Dr.T.Narppasalai Arasu
	2. Dr.P.Rajarajeswari

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	S	S at	S	S	S	S	S	S
CO2	S	М	М	M	M	S	S	М	S	S
CO3	S	М	М	S	М	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	M	S	S	S	S	S	S
*S-Stron	g: M-Me	edium: L	-Low	12 14	The	WER	1 B			



					-	-		
Cou	rse code		REAL ANALYSIS - II	L	T	Р	С	
Core	/Elective/S	upportive	Core Paper – XIII	5	-	-	4	
р	••,		Knowledge in Mappings and Properties of	Syllabu	S	202	3-	
Pre	-requisite		Real Numbers	Version	202	4		
Cou	rse Object	tives:						
To	present a	deeper an	d rigorous understanding of fundamental concep	ts like	co	ntinı	iity,	
conn	ectivity, d	erivative, n	onotonic functions with properties and Riemann - Sti	eltjes int	egi	al.		
Exp	ected Cou	rse Outcon	nes:					
On	the succes	sful comple	etion of the course, student will be able to:			1		
1	Demonst connected	rate the ui dness.	nderstanding of continuity, uniform continuity, con	mpactnes	S S,	K	.1	
2	Understa	nd partition	s and their refinement.			K	2	
3	Determin bounded	e the Rien	nann integrability and the Riemann-Stieltjes integrab	ility of	a	K	2	
4	Examine	the derivat	ives of function.			K	3	
5		1 '11 '			1	K	- <u>΄</u> Δ	
5	Acquire	skills in w	riting and analyze the proofs that arise in the cont	ext of re	eal		. T	
K1	- Rememb	per: K2 - U1	nderstand: K3 - Apply: K4 - Analyze: K5 - Evaluate:	K6 - Cre	eate	<u>)</u>		
Un	it:1		Topological Mappings		15	hou	irs	
Exar	nples of co	ntinuous fu	nctions -continuity and inverse images of open or close	ed sets –	fur	nctio	ns	
cont	inuous on	compact set	ts – Topological mappings – Bolzano's theorem.					
		•						
Uni	it:2		Monotonic Functions		15	hou	irs	
Com	nectedness	-compone	nts of a metric space – Uniform continuity - Unifor	m contii	nui	ty a	nd	
com	pact sets –	fixed point	theorem for contractions –monotonic functions.					
			Addition of the state of the st					
Uni	it:3		Derivatives		15	hou	irs	
Def	inition of	derivative –	Derivative and continuity –Algebra of derivatives – the	ie chain	rul	e –o	ne	
side	ed derivati	ves and inf	inite derivatives –functions with non-zero derivatives	-zero de	eriv	vativ	es	
and	local ext	trema –Ro	lle's theorem – The mean value theorem for deriv	lerivatives – Taylor's				
Iori	nula with	remainder.						
Uni	··· /		Functions of Bounded Variation		15	hou		
Prop	erties of r	nonotonic t	Functions of bounded variation _total Var	riation _	<u>13</u> adu	litiv/	11 S	
nron	erties of to	tal variation	1 on (a, x) as a function of $x - $ functions of bounded variation	iation ex	nr	essed	1	
as th	e differenc	e of increas	sing functions –continuous functions of bounded varia	ition.	.L.,			
			<u> </u>					
Un	it:5		The Riemann-Stieltjes Integral		15	hou	irs	
Intro	duction -	Notation -	The definition of Riemann -Stieltjes integral -lin	iear pro	per	ties	_	
Integ	gration by j	parts –chan	ge of variable in a Riemann –Stieltjes integral –Reduc	tion to a	Ri	ema	nn	
integ	ral.							

	Total Lecture hours	75 hours
Te	ext Book	
1	Mathematical Analysis(2 nd ed)-Tom. M. APOSTOL(Addison-Wisely. Narosa Publicompany, Chennai, 1990.)	ishing
	Unit I : Chapter 4 Sections 4.11 to 4.15	
	Unit II : Chapter 4 Sections 4.16, 4.17, 4.19, 4.20, 4.21, 4.23	
	Unit III : Chapter 5 Sections 5.2 to 5.10 and 5.12	
	Unit IV : Chapter 6 Sections 6.2 to 6.8	
	Unit V : Chapter 7 Sections 7.1 to 7.7	
Re	eference Books	
1	Methods of Real Analysis -R.R.Goldberg (NY, John Wiley, New York 1976.)	
2	Introduction to Topology and Modern Analysis -G.F.Simmons (McGraw – Hi 1963.)	ll, New York,
3	A survey of Modern Algebra -G.Birkhoff and MacLane (3rd Edition, Macmillia 1965.)	an, NewYork,
4	Real Analysis -J.N.Sharma and A.R.Vasistha.(Krishna Prakashan Media (P) L	td, 1997.)
	The second	
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://nptel.ac.in/courses/111/106/111106053/	
2	https://www.math.ucdavis.edu/~emsilvia/math127/chapter7.pdf	
	https://www.whitman.edu/Documents/Academics/Mathematics/grady.pdf	
3	https://nptel.ac.in/courses/122/101/122101003/000 2-00	
Co	ourse Designed By: 1. Dr.S.Palaniammal 2. Dr.E.Rameshkumar	

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	М	S	S	S	М	S	S
CO2	М	М	М	Μ	Μ	S	S	М	S	S
CO3	S	М	М	S	S	S	М	S	S	S
CO4	S	М	М	S	S	S	М	S	S	S
CO5	М	М	S	М	М	S	S	S	S	М

Course code				COMP	PLEX	X ANA	ALYS	SIS -	II		L	T	P	С
Core/Elective/S	Supportive	Cor	re Pap	er – Xl	IV						5	-	-	4
Pro-requisite		Kn	owledg	ge in A	naly	tic Fu	nctio	ons, C	Comple	X	Syllab	us	202	3-
1 I C-I Cquisite	,	Inte	egratio	on.							Versio	n	202	4
Course Objec	tives:													
To familiarize	the stude	ents w	vith sor	me fun	Idame	ental t	theore	ems,	singula	rity, re	esidues	in	com	plex
functions, integ	rations of co	complex	x functi	ions, m	erom	orphic	e func	tions	and the	ir appl	ications.			
Expected Con	waa Quitaan													
On the succes	rse Outcor	letion c	of the c	Politse	stude	ent wi	ll be a	able t	0.					
			$\frac{1}{1}$		² a th						antre of		ν	71
function	and the may	appiy aximun	n modu	ulus nri	s m	leoren le	i, the	me	m-vaiu	e prop	erty of	a	N	-1
2 Demonst	rate unders	standin	ng and a	appreci	iation	n of de	eper	aspec	ts of co	mplex	analysi	s.	K	2
3 Apply re	sidue theore	rem to	compu	ite integ	grals.		1	1		1	5		K	3
$\frac{11}{4}$ Ability t	o think or	rition11x	u hu n	arouina	. mot	thoma	tical	oonic	oturos	and a	stablish	inc	. K	4
theorems	from com	plex ar	y by p nalvsis.		; mai	unema	lical	conje	cluies	and c	staunsn	mg		
5 Classify	the nature of	of sing	mlarity	, noles	and r	residu	es.						K	2
K1 - Rememb	per; K2 - U	Inderst	and; K	3 - Api	ply; F	K4 - A	Analy	ze: K	5 - Eva	luate;	K6 - Cr	eat	e	
	,		,	1	1 57		5	,		,				
Unit:1]	Integra	al Th	heorer	ns					15	5 hou	irs
Results based	on Cauch	hy's tl	heorem	n(I)-Zer	ros-C	Cauchy	y's Iı	nequa	ılity –	Liouv	ville's t	hea	orem	_
Fundamental t	heorem of	algebi	ra –Ma	<mark>axi</mark> mun	n mo	odulus	theo	rem -	-Gauss	mean	value	the	orem	ı —
Gauss mean va	lue theoren	m for a	a harmo	onic fur	nction	on on a	circl	e.						
	1					200	Ğ							
Unit:2		Tay	ylor's	Series :	and]	Laure	ent's	Serie	S			15	5 hou	irs
Results based of	on Cauchy'	's theor	rem(II))-Taylo	or's se	eries -	-Laur	ent's	series.					
			8	"ATH	UAR 1	UNIVE		, S						
Unit:3	··· (D	1	Singul	larities	and	Resid	lues		• 1	· \ T	. • 1	15	5 hou	irs
Isolated singul	arities (Ren	movab	ole Sing	gularity	, pole	le and	essen	itial s	ingular	1ty) -F	(esidues	· —ł	Kes1d	lue
theorem.														
Unit•4			Real	l Defini	ite In	nteorg	le					14	5 hou	irs
Evaluation usin	a the calcul	lus of r	residues	s = Inter	oratic	$\frac{n c g r a}{o n o n f}$	the ur	nit cir	le _Int	eoral y	with $-\infty$	and	$+\infty$	36
lower and uppe	r limits with	h the fc	ollowin	integr	rals:		une un			cgrar v	/1til - ∞ (ind		as
i) $P(x) / Q(x)$ where $P(x) / Q(x)$	here the deg	gree of	O(x) ex	xceeds	that o	of P(x)	at lea	ast 2.						
ii) $(\sin ax).f(x)$	$(\cos ax).f($	(x), wh	nere a>	0 and f	(z) →	> 0 as z	z→∞	and	f(z) do	es not	have a p	oole	e on t	the
real axis.											1			
iii) f(x) where f	(z) has a fin	nite nur	mber of	f poles	on the	ne real	axis.							
Integral of the t	ype $\int_{0}^{\infty} \frac{x^{a-1}}{x^{a-1}}$	dx, 0)< a <1.											
	<u>-</u> 1+x													

Uı	nit:5	Meromorphic Functions	15 hours
Th	eorem on n	umber of zeros minus number of poles –Principle of argument-l	Rouche's theorem –
Th	eorem that	a function which is meromorphic in the extended plane is a rational statement of the statem	onal function.
		Total Lecture hours	75 hours
Те	ext Book		
1	Complex Engineerir And Comp Unit I : Unit II : Unit III : Unit IV : Unit V :	Analysis (For Undergraduate Students of Mathematics, ng) -P.Duraipandian and Kayalal Pachaiyappa (S Chand Publis bany Limited ,Reprint 2020) Chapter 8 Sections 8.10, 8.11 Chapter 9 Sections 9.1 to 9.3, 9.13. Chapter 9 Sections 9.5 to 9.12, 9.13. Chapter 10 Sections 10.1, Chapter 10 Sections 10.3 and 10.4. Chapter 11 Sections 11.1 to 11.3 (Except theorems 11.5 and	Physics and hing, S Chand 10.2 and 10.4. 11.6)
	enit v .	Chapter 11 Sections 11.1 to 11.5 (Except theorems 11.5 and	11.0)
Re	eference Bo	oks	
1	Complex Company I	Variable and Applications -Churchill and Others(Tata Mc-gr Ltd, 1974.)	aw Hill Publishing
2	Theory of 1995)	functions of Complex Variable - Shanti Narayan (S.Chand and	Company ,Meerut,
3	Functions of Ltd, Meeru	of Complex Variable (17 ^h Edition)- Tyagi B.S (Pragati Prakasham I it, 1992-93.)	Publishing Company
		HIAR UNING S	
Re	elated Onlin	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://npt	el.ac.in/courses/111/103/111103070/00 2-40092	
2	https://npt	el.ac.in/courses/111/106/111106094/	
4	https://npt	el.ac.in/courses/122/103/122103012/	
Co	ourse Design	ned By: 1.Dr.T.Narppasalai Arasu 2.Ms.S.Kavunthi	

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	S	М	S	S	М	S	S
CO2	S	S	М	S	М	S	М	М	М	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	М	S	S	М	S	S	S	S	S
CO5	S	М	М	S	М	S	S	S	S	S

Cou	rse code		MODERN ALGEBRA - II	L	T	Р	С			
Core	/Elective/S	upportive	Core Paper – XV	5	-	-	4			
Pre	e-requisite	;	Knowledge in Groups, Rings and Fields	Syllabı Versioi	1S 1	202 202	3- 4			
Cou	rse Object	tives:								
To d	evelop un	derstanding	in the domain of matrix theory, vector spaces, linear	transfor	ma	tion	s as			
well	as the prin	ciples unde	erlying the subject.							
Exp	ected Cou	rse Outcor	nes:							
On	the succes	sful comple	etion of the course, student will be able to:							
1	Commun	icate and u	nderstand mathematical ideas and results with the corr	ect use o	of	K	1			
	mathema	tical definit	ions, terminology and symbols.							
2	Explain t	he concepts	s of base and dimension of Vector space.			K	2			
3	To apply	the Gram-S	Schmidt process to construct an orthonormal set of ve	ctors in	an	K	3			
	inner pro	duct space.	-							
4										
4	Demonst	incor tropped	formation K3							
5	Have an i	insight to a	ormation.							
5		insignt to a	anyze a real file problem and solve it.							
V1	Domomi	or V ? U	adargtandi K2 Apply K4 Apply 701 K5 Evoluator	K6 Cm	ant					
	- Kemenn	ber; KZ - UI	iderstand; K3 - Appry, K4 - Anaryze; K5 - Evaluate;	NO - Cro	ale	;				
Un	i+•1		Matricas		15	hou	re			
Intr	roduction -	- Addition :	and Scalar Multiplication of Matrices – Product of Ma	trices _'	Tra	nspo	IS Se			
ofa	Matrix –	Matrix Inve	erse – Symmetric and Skew - Symmetric Matrices.		114	nspo				
Un	it:2		Special Matrices		15	hou	rs			
Her	mitian and	d Skew-Her	mitian Matrices – Orthogonal and Unitary Matrices –	Rank o	f a	Mat	rix			
-Cl	naracteristi	ic Roots and	d Characteristic Vectors of a Square Matrix.							
		1	acult 10 Frank							
Un	it:3		Vector Spaces		15	hou	rs			
Ele	mentary B	Basic Conce	pts – Subspace of a Vector space - Homomorphism	– Isom	orp	hisn	1 -			
Inte	ernal and E	external dire	ect sums - Linear span - Linear Independence and Bas	es.						
Un	it•1		Dual Spaces		15	hou	re			
Du	al Snaces –	- Annihilato	pr of a subspace - Inner Product Spaces – Norm of a Ve	ector - O	rth	ngor	nal			
Ve	ctors - Orth	logonal Co	mplement of a subspace – Orthonormal set.		1 011	0501	iui			
		0								
Un	it:5		Linear Transformations		15	hou	rs			
Alg	gebra of Li	near Transf	ormations – Regular, Singular Transformations – Ran	ge of T	– R	lank	of			
T -	Characteri	stic Roots -	- Characteristic Vectors – Matrices.							
			Total Lecture hours		75	hou	rs			

Te	ext Books
1	Modern Algebra -R.Balakrishnan and M. Ramabadran.(Vikas Publishing House Pvt. Ltd, New Delhi, Second Revised Edition 1994) (For Units I & II).
	Unit I : Chapter 1 Sections 1.1 to 1.3, 1.5 to 1.7
	Unit II : Chapter 1 Sections 1.8 and 1.9 Chapter 2 Section 2.9 Chapter 3 Section 3.9
2	Topics in Algebra -I.N. Herstein.(John Wiley & Sons, New York, 2003.) (For Units III, IV & V)
	Unit III : Chapter 4 Sections 4.1 and 4.2 Unit IV : Chapter 4 Sections 4.2 and 4.4
	Unit V : Chapter 4 Sections 6.1 6.2 and 6.2
	Unit V : Chapter o Sections 0.1, 0.2 and 0.5
Re	eference Books
1	Modern Algebra -Surjeet Singh and Qazi Zameeruddin (Vikas Publishing house, 1992.)
2	Modern Algebra -A.R.Vasishtha (Krishna Prakashan Mandir, Meerut, 1994 – 95.)
3	Linear Algebra -Seymour Lipschutz and Marc Lipson (3rd Edition, McGraw Hill, 2001.)
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	https://nptel.ac.in/courses/111/106/111106135/
2	https://nptel.ac.in/courses/115/105/115105097/
3	https://nptel.ac.in/courses/111/101/11101115/
4	https://nptel.ac.in/courses/111/108/111108066/
	Combatore
Co	ourse Designed By: 1.Mrs.A.Karpagam
	2. Mr.M.Balasankar
1	

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	М	М	S	S	М	S	S
CO2	М	М	S	S	М	S	М	М	S	S
CO3	S	М	S	S	М	S	Μ	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	М

Cou	rse code		OPERATIONS RESEARCH - PAPER -IV	L	Т	Р	С		
Core	e/Elective/S	upportive	Skill Based Subject	3		-	2		
Pre	e-requisite		Knowledge in Basics of Operations Research	Syllabu Version	IS É	2023 2024	3- 4		
Cou	rse Object	tives:							
To e base	nhance the d on cost o	students' kı ptimization,	nowledge in decision analysis, sequencing of the jobs to replacement policies and analyze the cases according t	o be carrie to their cat	ed or tego	ut ories	•		
Exp	ected Cou	rse Outcon	nes:						
On	the succes	sful comple	tion of the course, student will be able to:						
1	Know the	e principles	and applications of information theory.			K	1		
2	To under	stand seque	ncing, replacement problems.			K	2		
3	Demonst	rate skills to	achieve their objective using sequencing models.			K	3		
4	Apply de	cision maki	ng under different business environments.			K	4		
5	Determin	e a solution	to a rectangular game using simplex method.			K	3		
K1	- Rememb	oer; K2 - U1	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate	; K6 - Cre	eate				
Un	it:1		Decision Analysis		9	hou	rs		
Dee	cision Mak	ting enviror	ment – Decisions under uncertainty – Decision under	er risk – D)eci	sion	ι —		
Ire	e Analysis	•							
Un	it:2		Sequencing Problems		9	hou	rs		
Inti	oduction-p	problem of	sequencing - basic terms used in sequencing- process	sing n-job	s th	irou	gh		
2 n	nachines -	processing	n -jobs through k machines - processing 2 jobs th	hrough k	ma	chin	es		
(Pr	oblems on	y).	B TRATING WINNER B						
Un	:+.2		Donle com ont Duchlouis		0	hou	140		
Inti	n.s.	Replacem	ent of equipment / assets that deteriorates gradual	v - replac	9 cem	nou ent	of		
equ	ipment the	at fails sudd	enly and problems.	y replac		Unit	01		
	•		× 1						
Un	it:4		Information Theory		9	hou	rs		
Inti	oduction-	A measure	e of Information-Axiomatic Approach to Informa	ation- Entropy-The					
exp	ected info	rmation- So	me properties of entropy function-Joint and condition	tional entropies					
Un	it:5		Applications		9	hou	rs		
Ger fail	neral solut ure rates u	ion of (mx sing replace	n) rectangular games using simplex method - Reli ement problems.	ability an	nd s	syste	m		
			T-4-11 - 4 1		45	h = -			
			I otal Lecture nours		43	nou	rs		

Text Book
1 Operations Research - Kanti Swarup, P. K. Gupta , Man Mohan (S.Chand & sons education
publications; New Delhi,2003)
Reference Books
1 Operations Research - P K Gupta & D S Hira (S. Chand and company ltd. Ram Nagar; New
Delhi,2014.)
2 Operations Research principles problems - S Dharani Venkata Krishnan (keerthi publishing
house Pvt. Ltd.1994)
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1 https://nptel.ac.in/courses/117/104/117104129/
2 <u>https://nptel.ac.in/courses/110/105/110105082/</u>
3 <u>https://nptel.ac.in/courses/110/106/110106045/</u>
Course Designed By: 1. Dr.T.Narppasalai Arasu
2. Dr.P.Rajarajeswari

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	S	oo S ^{is} ya	S	S	М	S	S
CO2	S	S	S	S	S	S	S	М	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	М
CO5	S	М	М	S	S	S	S	S	М	S



Cou	rse code		ASTRONOMY – I	L	Т	P	С		
Core	e/Elective/S	Supportive	ELECTIVE I – A	5	-	-	3		
Pre	e-requisite		Knowledge in Physics and Mathematics	Syllabu Version	IS 1	202 202	3- 4		
Cou	rse Objec	tives:							
To e mov	nable the s ements.	tudents to u	nderstand the Astronomical aspects and about the laws	governing	g th	ne pla	anet		
Fyn	acted Cou	rea Autoor	2051						
On	the succes	sful comple	etion of the course, student will be able to:						
1	Define p	roperties of	physical systems that comprise the known universe			K	.1		
2	Understa	nd the Sola	r system, Celestial sphere, Dip-Twilight & Kepler's la	aws.		K	2		
3	Apply th science.	eir physics	and mathematical skills to problems in the areas o	f planeta	ıry	K	3		
4	Demonst conclusio	rate the skil	l to infer valid scientific conclusions and communica r and articulate manner.	te those		K	4		
5 Analyze the astronomical concepts.									
K1	- Rememb	oer; K2 - U1	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - Cre	eate	e			
Un	it:1		Solar system		15	hou	rs		
Gei	neral descr	iption of th	e Solar syst <mark>em. Comets and meteo</mark> rites – Spherical tri	gonomet	ry.				
				I					
Un	it:2		Celestial sphere		15	hou	rs		
Cel	lestial sphe	ere – Celesti	al co – ordi <mark>nates – Diurnal motion</mark> – Variation in leng	gth of the	e da	ıy.			
Um	:4.2		Concentrio neurollar		15	hav			
Un	11:5		Geocentric paranax		15	nou	rs		
Dip	o – Twiligł	nt – Geocen	tric parallax.						
Un	it:4		Refraction		15	hou	irs		
Ret	fraction – T	Fangent for	nula – Cassini's formula.						
Un	it:5		Kepler's law		15	hou	irs		
Kei	pler's laws	– Relation	between true eccentric and mean anomalies.						
			setteen true eccentrie and mean anomanes.						
			Total Lecture Hours		75	hou	irs		

T	Text Book								
1	Astronomy-S.Kumaravelu and Susheela Kumaravelu (TextPublisher: Sivakasi: Janki7 th								
	Edition 1986)								
Co	ourse Designed By: 1. Ms. S.Sobia								

2. Mr.M.Balasankar

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	S	S	S	S	М	S	S
CO2	М	М	М	S	S	S	S	М	S	М
CO3	М	М	М	М	М	S	М	S	S	S
CO4	S	S	М	S	S	S	S	S	S	S
CO5	S	М	М	S	S	S	М	S	М	S



Cou	rse code		NUMERICAL METHODS - I	L	Т	Р	С				
Core	/Elective/S	upportive	ELECTIVE I – B	5	-	-	3				
Pre	-requisite		Knowledge in Higher Secondary Level Mathematics	Syllabu Versior	IS I	202 202	3- 4				
Cou	rse Object	tives:									
It ex trans	poses the cendental c	students to equations, so	o study numerical techniques to find solutions of n plution of simultaneous linear algebraic equations and in	umerical terpolation	, a on.	lgeb	raic				
Expe	ected Cou	rse Outcon	nes:								
On	the succes	sful comple	etion of the course, student will be able to:								
1	Rememb	er the conce	epts of errors and its effect on computation.			K	.1				
2	Obtain nu	umerical so	lutions of algebraic and transcendental equations.			K	2				
3	Apply the	e finite diffe	erence and interpolation concepts.			K	3				
4	Develop the given	skills in des data and di	signing mathematical models for constructing polynom rawing inferences.	nials to		K	4				
5	Analyze	the efficien	cy of iteration methods.			K	4				
K1	- Rememb	oer: K2 - U1	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - Cre	eate	;					
Unit:1The Solution of Numerical Algebraic and Transcendental15 hoursEquations											
Bis – R	ection met aphson me	hod – Iterat ethod - Con	ion Method – Convergence condition – Regula Falsi vergence Criteria – Order of Convergence.	Method	- 1	lewt	on				
	_ 1										
Uni	it:2	Soluti	on of Sim <mark>ultaneous Linear Algeb</mark> raic Equations	-	15	hou	rs				
Gau met	ıss elimina hod – Gau	ation metho Iss Seidel m	d – Gauss Jordan method – Method of Triangularization of the second se	on – Gaı	iss	Jaco	obi				
			Coimbatore & Co								
Uni	it:3		Finite Differences		15	hou	rs				
Dif – Fa	ferences – actorial po	operators – lynomial –	- forward and backward difference tables – Difference Error propagation in difference table.	es of a po	oly	nom	ial				
Uni	t:4		Interpolation (for equal intervals)		15	hou	rs				
Nev	vton's forv	n's forward and backward formulae – equidistant terms with one or more missing values –									
Cer	tral differ	rences and	central difference table - Gauss forward and back	ward fo	rm	ulae	-				
Stir	ling's forn	nula.									
TT 9	4.5				1 =	1.					
	idad differ	ong D	Interpolation (for unequal intervals)	muond 1	15 15	nou	rs				
-N	ewton's di	ivided diffe	rences formula – Lagrange's formula and inverse inter	rpolatior	111¢ 1.	erenc	es				
			Total Lecture hours		75	hou	rs				

Те	ext Books
1	Numerical methods -Kandasamy. P, Thilagavathy. K and Gunavathy. K (S. Chand and
	Company Ltd, New Delhi – Revised Edition 2007.)(Chapters: 3,4,5,6,7 and 8)
2	Introductory Methods of Numerical Analysis-S.S. Sastry (Prentice Hall of India Pvt. Ltd.New
	Delhi-110001Fourth Edition,2006)
Re	eference Books
1	Numerical Methods in Science and Engineering -Venkataraman M. K.(National Publishing
	company V Edition 1999.)
2	Numerical Methods for Scientists and Engineers -Sankara Rao K .(2ndEdition Prentice Hall India
	2004.)
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	http://www.simumath.com/library/book.html?code=Alg_Equations_Examples
2	http://jupiter.math.nctu.edu.tw/~smchang/9602/NA_lecture_note.pdf
	http://www.iosrjournals.org/iosr-jm/papers/Vol6-issue6/J0665862.pdf
3	https://nptel.ac.in/courses/122/102/122102009/
	https://nptel.ac.in/courses/111/107/111107105/
Co	ourse Designed By: 1. Dr.C.Janaki
	2. Dr.P.Rajarajeswari

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	S	S	M	M	S	М	S	S
CO2	S	S	S	М	CHISR UT	S	M	М	М	S
CO3	S	S	S	S ^{elist} e	S	Win Sal- Ga	S	S	S	S
CO4	S	S	S	S	EDUCSE TO ELE	ATE S	S	S	М	S
CO5	S	М	S	S	М	S	М	S	S	S

Cou	rse code		ASTRONOMY II	L	Т	Р	С				
Core	e/Elective/S	Supportive	ELECTIVE II – A	5	I		3				
Pre	e-requisite	;	Knowledge in Physics & Mathematics	Syllabu Version	S	2023 2024	3- 4				
Cou	rse Object	tives:		•							
To e	nable the st	tudents to le	arn about the interesting facts of Moon, Sun Planetary M	Aotion.							
Exp	ected Cou	rse Outcon	nes:								
On	the succes	stul comple	etion of the course, student will be able to:								
1	Underst	and the con	cepts of precession and nutation.			K	.1				
2	Describ	e the eclips	e of the moon.			K	2				
3	Find eq	uation of tir	ne.	K							
4	Demons	strate the ab	ility to analyze the concepts.								
5	Describ	e the proper	ties of stellar system.			K	2				
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create											
Un	it:1		Time	1	15	hou	irs				
Equ	uation of ti	me – Conve	ersion of time – Seasons – Calendar.								
1			തരുക്കും								
Un	it:2		Aberration	1	15	hou	irs				
An	nual Parall	ax – Aberra	ation.								
Un	it:3		Precession	1	15	hou	rs				
Pre	cession – 1	Nutation.	Es ARATHIAR UNIVERSIT SS								
		1	Combatore & Co								
Unit:4 Eclipses 15 hou											
The	e Moon – H	Eclipses.									
TT	:+.5		The Steller System	1	15	har					
	11:5		The Stenar System	_	13	noù	15				
Plan	etary Phen	omenon – 7	The Stellar system.								
			Total Lecture hours	•	75	hou	rs				

Text Book

1 Astronomy-Mr.S.Kumaravelu and Susheela Kumaravelu. (Text *publisher*: Sivakasi: Janki,7th edition,1986)

Course Designed By: 1. Ms. S.Sobia

2. Mr.M.Balasankar

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	М	М	М	М	М	S	S
CO2	М	М	S	М	М	S	М	М	М	S
CO3	М	М	S	S	S	S	М	S	S	S
CO4	S	М	S	S	S	S	М	S	S	S
CO5	S	М	S	S	М	S	М	S	S	S



Cou	rse code		Numerical Methods II	L	Т	P	С		
Core	/Elective/S	upportive	ELECTIVE II-B	5	-	-	3		
Dro	roquisito		Knowledge in Higher Secondary Level	Syllabu	IS	202	3-		
116	-requisite		Mathematics	Versior	1	202	4		
Cou	rse Object	tives:							
1.	To equip t	he learners	with the powerful tool for numerical differentiation, nu μ	merical i	nte	grati	on,		
	uniterence	equation, i							
Exp	ected Cou	rse Outcon	nes:						
On	the succes	sful comple	etion of the course, student will be able to:						
1	Familian ordinary	rize with nu differentia	umerical integration and differentiation, numerical solutions.	olution c	of	K	.1		
2	Distingu methods	ish method to find sol	ls of Taylor series, Euler's, Modified Euler's and Ru utions of differential equations.	nge Kutt	a	K	2		
3	Apply t fields of	he techniqu Engineerir	tes for enormous application in the field of Science ng.	and som	e	K	3		
4	Comput	te the integ	rals and derivatives by using the appropriate techni	ique.		K	4		
5 Find the numerical solution of second order O.D.E by finite difference method.									
K1	- Rememb	oer; K2 - U1	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 – Cr	eat	e			
Uni	it:1		Numerical Differentiation		15	hou	rs		
Nev	vton's forv	vard and ba	ckward formulae to compute the derivatives – Derivati	ve using	Sti	rling	ç's		
Iori	nulae – to	find maxin	ia and minima of the function given the tabular values	5.					
Uni	it•?		Numerical Integration		15	hou	re		
Nev	$\frac{11.2}{\text{vton} - \text{Cot}}$	e's formula	- Trapezoidal rule – Simpson's 1/3 rd and 3/8 th rules		15	nou	15		
1.0				-					
Uni	it:3		Difference Equation		15	hou	rs		
Or	der and de	gree of a dif	ference equation – solving homogeneous and non – ho	omogene	ous	s line	ear		
diff	erence equ	ations.	EDUCATE TO ELEVATE						
		[
Unit:4 Numerical Solution Of O.D.E 15 ho									
Тау	lor series	method – H	Euler's method – improved and modified Euler meth	od - Ru	nge	e Ku	tta		
met	noa (Seco	nd & fourth	order Kunge Kutta method only)						
Uni	it:5		Multi Step Methods		15	hou	rs		
Mil	ne's predie	ctor correct	or formulae – Adam-Bash forth predictor corrector for	ormulae -	- S(oluti	on		
of c	ordinary di	fferential e	quations by finite difference method (for second order	: O.D.E).		- 27.01			
			T-4-11 - 4 1.		75	h			
			I otal Lecture nours		13	nou	rs		

T	avt Rooks
10	
1	Numerical methods - Kandasamy. P, Thilagavathy. K and Gunavathy. K (S. Chand and
	Company Ltd, New Delhi - Revised Edition 2007.)(Chapters: 9,10,11,Appendix and
	Appendix E)
2	Introductory Methods of Numerical Analysis-S.S. Sastry (Prentice Hall of India Pvt.
	Ltd.NewDelhi-110001Fourth Edition,2006)
Re	eference Books
1	Numerical Methods in Science and Engineering -Venkataraman M. K.(National Publishing
	company V Edition 1999.)
2	Numerical Methods for Scientists and Engineers -Sankara Rao K. (Prentice Hall India , 2 nd
	Edition 2004)
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	http://nptel.ac.in/courses/104101002/downloads/lecturenotes/module1/chapter6.pdf
	https://www.britannica.com/science/difference-equation
2	https://nptel.ac.in/courses/122/102/122102009/
3	https://nptel.ac.in/courses/111/107/111107063/
	· · · · · · · · · · · · · · · · · · ·
Co	ourse Designed By: 1. Dr.C.Janaki
	2. Dr.P.Rajarajeswari
	லைக்கழகும்
	38 Carlos Carlos

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	S	S	S	S	S	М	S	S
CO2	М	М	S	S	M	S	М	М	М	S
CO3	S	S	S	S S	THIAR UN	NS	S S	S	S	S
CO4	S	М	S	M	M	S Col	М	S	S	S
CO5	S	М	S	М		ATE S	S	S	S	S

Cou	rse code		GRAPH THEORY	Y	L	Т	Р	С
Core	e/Elective/S	upportive	ELECTIVE III - A		5	-	-	4
Pre	e-requisite	2	Knowledge In Basic Mathematic	cs	Syllabu Version	S	202 202	3- 4
Cou	rse Objec	tives:						
Enal	oles the stu	idents to le	m the basic concepts of Graphs, su	ub-graphs, Euleria	n graphs,	, D	igra	phs,
tourn	naments, co	onnectivity,	aphs, matrix representation of graph	s, trees, planar gra	phs.			
Exp	ected Cou	rse Outcon		1 4				
Un 1	the succes	siul comple	on of the course, student will be at				T	r 1
	Identify t	the propertie	of different types of graph and the	eir application.			K	.1
2	Demonst	rate knowle	ge of basic concepts in graph theor	У			K	.2
3	Understa	nd cut grap	s, cycle spaces				K	2
4	4 Apply principles and concepts of graph theory in practical situations.					K	3	
5 Analyze the concepts of Planar graphs.						K	4	
K1	- Rememb	oer; K2 - U1	lerstand; K3 - Apply; K4 - Analyze	e; K5 - Evaluate;	K6 – Cre	eate	Э	
Un	it:1		Graphs		1	15	hou	irs
Gra	aphs –Sub	graphs – D	gree of a vertex walks, paths and c	cycles in a Graph	s – conn	ect	edne	ess
cut	vertex and	l cut edge.	Soft Car					
		1						
Un	<u>it:2</u>		Euler and Hamiltonian Grap	hs		15	hou	irs
Eul	ler and Hai	nıltonıan G	iphs – Algorithm for Euler circuits	s – Bipartite Grap	hs – Trees	s.		
T I	:4.2		Cut ant man be			15	har	
	II:3 triv ropros	ontation of	graph votor spaces associated	with a graph ov	ala s n aa	12	nou	irs
set	oranhs		graph – vector spaces, associated	with a graph – Cy	cie space	,5 a	inu v	Jui
	Siupiis.		State States and States					
Un	it:4		Planar graphs			15	hou	irs
Pla	nar graphs	– Euler's tl	orem on planar graphs – character	ization of planar g	graphs (n	o p	oroo	fs)
of t	the difficul	t part of the	haracterization.	-	、	-		
Un	it:5		Directed graphs		1	15	hou	irs
Dir	ected grap	hs – Conne	ivity – Euler Digraphs – Tourname	ents.				
		Total Lecture hours 75 hou						irs

Text Book	
1 A First Course in Graph Theory - A. Choudum (Macmillan, 2001) Chapters 1 to 7.	
Reference Books	
1 Graph theory with applications to Engineering and computer science-Narsingh Deo (Prenti	ce
Hall of India1979).	
2 Graph Theory -Frank Harary (Narosa Publishing HQCK 2001).	
3 Introduction to Graph Theory- Dr. M. Murugan.(Muthali Publishing House,2005)	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1 <u>https://nptel.ac.in/courses/111/106/111106102/</u>	
2 https://www.digimat.in/nptel/courses/video/106104170/L19.html	
Course Designed By: 1. Dr.T.Narppasalai Arasu	
2. Dr.C.Janaki	

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	S	S	S	S	М	S	S
CO2	М	М	М	S	S	S	М	М	М	S
CO3	М	М	Μ	S	Μ	S	Μ	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	М	М	S	M	S	Μ	S	S	S
*C Street	NAL MARK	. diama T	Laur	8	Thursday 1	IN	S A			

த்து இந்தப்பாரை உ EDUCATE TO ELEN

Course code	AUTOMATA THEORY AND FORMAL LANGUAGES	L	Т	Р	С
Core/Elective/Supportive	ELECTIVE III - B	5	-	-	4
Pre-requisite	Knowledge in Mathematics	Syllabu Version	is 2 n 2	2023 2024	3- 4
Course Objectives:					
To impart knowledge in grammars, languages, and language classes and their	Finite automata, regular languages, regular gram pushdown automata which play a crucial role to Ident relationship.	mars, co	onte: rent	xt f fori	free mal
Expected Course Outcor	nes:				
On the successful comple	etion of the course, student will be able to:				
1 Acquire a fundament formal languages.	ntal understanding of the core concepts in automata	theory a	nd	K	.1
2 Design grammars an	nd automata for different language classes.			Κ	2
3 Describe the types o	f grammar and derivation tree.			Κ	2
4 To apply context-fre	e languages, push-down automata.			Κ	3
5 Design automata, regular expressions and context-free grammars accepting or generating a certain language.					
K1 - Remember; K2 - U	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 – Cr	eate		
	ைக்கழகும்				
Unit:1	Phrase Structure Languages.		15	hours	
Introduction – phrase stru	ucture languages.				
Unit:2	Closure Operations		15	hou	rs
Closure operations.	Banan Commuter Barbar				
	25 a Bissiumon & With				
Unit:3	Context Free Languages.		15	hou	rs
Context free languages.					
			1 ~ 1		
Unit:4	Finite State Automata		15	nou	rs
Finite state automata.					
Unit:5	Push Down Automata		15	hou	rs
Push down automata	- ush Down Automata.		101	iou	1.13
Total Lecture hours 75 h					rs

Τe	ext Book
1	Formal Languages and Automata- Rani Siromoney. (Revised edition 1984) (Published by the
	Christian Literary Society, Madras-3) Chapters 1 to 6.
Re	eference Books
1	Formal languages and their relation automata-J.E. Hopcroft and D.Ullman (Addison
	Wesley1969)
2	Automata theory: Machines and Languages-Richard .Y.Kain (McGraw Hill1972)
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	https://nptel.ac.in/courses/106/103/106103070/
2	https://www.digimat.in/nptel/courses/video/111103016/L02.html
Co	ourse Designed By: 1. Dr.T.Nandhagopal
	2. Ms.S.Kavunthi

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	М	M	M	М	М	S	S
CO2	S	М	S	S	S	S	М	М	М	S
CO3	М	М	S	S	S	S	М	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S TRA	S	S	S S	S	S	S

த் இந்தப்பாரை உ EDUCATE TO ELENA

Cou	rse code		PROGRAMMING IN C++	L	ſ	ГР	С
Core	/Elective/S	Supportive	ELECTIVE III - C	4	-		3
Pre	-requisite	•	Knowledge in C Programming	Syllabu Versior	1S 1	202 202	3- 4
Cou	rse Objec	tives:					
To e hand	nable the ling.	students to	learn about the class structure, operators, inheritance,	, polymoi	pł	nism,	file
Exp	ected Cou	rse Outcon	nes:				
On	the succes	sful comple	tion of the course, student will be able to:				
1	Know ab and exam	out class st	ructure, member functions & data members, inheritans.	ance type	es	K	[]
2	Understa	nd how C+	+ improves C with object-oriented features.			K	2
3	Develop	programmi	ng skills.			K	.2
4	To make	use of obje	cts and classes for developing programs.			K	3
5	Build C+	+ classes.				K	[4
K1	- Rememb	oer; K2 - U1	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 – Cr	ea	te	
		_		_			
Uni	it:1	Т	okens, Expressions and Control Structures		12	2 hou	irs
iden poin dyn ope thei	ntifiers and nters to co amic initi rator – me r types – s	d constants onstants – alization of emory mana special assig	 basic data types – user-defined data types – cor symbolic constants –type compatibility – declarate variables – reference variables – operators in C++ gement operators – manipulators – type cast operator ment expressions – implicit conversions – operator 	nstant poi ion of va - scope r r – express preceden	int ari res ssio	ers a ables soluti ons a	nd on nd
		1	Combature co				
Uni	it:2		Functions in C++	·	12	<u>2 hou</u>	irs
The - def C++ opera	main funct fault argun streams – ations –ma	nents – cons C++ stream anaging out	on prototyping – call by reference – return by reference t arguments – function overloading. Managing Consc n classes – unformatted console I/O operations – for out with manipulators.	e – Inline ble, I/O O matted co	fu pe ons	ratio	ns: //O
Uni	it:3		Classes and Objects		12	2 hoi	irs
Spec mem objec cons cons cons	ifying a cl ber functi cts –arrays t member f tructors – tructor.	lass – defin ons – priva of objects functions. C multiple c	ing member functions – making an outside function te member functions – arrays within a class – men – objects as function arguments – friend functions – onstructors and Destructors: Introduction – constructor onstructors in a class – constructors with default	inline – nory allo returning ors – para argument	ne: cat ; ol me ts	sting tion bject eteriz – co	of for s – ced

Unit:	4	Operator Overloading	12 hours
Introd	luction –	defining operator overloading - overloading unary operators -	- overloading binary
opera	tors - ov	erloading binary operators using friends – rules for overloading	g operators.
Unit:	5	Inheritance	12 hours
Introd	luction –	defining derived classes - single inheritance - making a private	member inheritable
– mul	tilevel in	heritance – multiple inheritance – hierarchical inheritance – hy	brid inheritance.
		Total Lecture hours	60 hours
Text	Books		
1 OI	bject Ori	ented programming with C++- E.Balagurusamy (McGraw Hill	1 3 rd Edition 2006.)
2 Ol	bject ori	ented programming in Turbo C++-Robert Lafore (Galgotia pu	ublications Pvt.Ltd,
Ne	ew Delh	- 110002,2002)	
3 Tł	ne C++ p	rogramming language- Bjarne Stroustrup (II Edition, Addison	Wesley, 1991.)
Refer	ence Bo	oks	
1 P	Program	ning with C++ - D. Ravi Chandran (Tata McGraw-Hill p	ublishing company
li	imited, N	Jew Delhi 1996)	
2 0	Object O	riented Programming with ANSI and Turbo C++- Ashok N.	Kamthane (Pearson
E	Education	n publishers 2003)	
3 P	Program	ning with C++ - John R.Hubbard (2nd Edition, TMH publisher	rs 2002).
		See Cas	
Relat	ed Onli	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1 <u>h</u>	nttps://npt	el.ac.in/courses/106/105/106105151/	
2 <u>h</u>	nttps://npt	el.ac.in/courses/106/101/106101208/	
3 <u>h</u>	nttps://ww	w.classcentral.com/course/swayam-programming-in-c-6704	
Cours	se Design	ned By: 1. Dr.T.Narppasalai Arasu	
		2.Dr.P.Rajarajeswari	
		EDUCATE TO ELEVATE	

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	S	S	М	S	М	S	S
CO2	М	М	М	М	S	S	S	М	S	S
CO3	S	S	S	S	S	S	М	S	S	S
CO4	S	S	S	М	S	S	S	S	S	S
CO5	S	S	S	М	S	М	S	S	S	М

Pre-requisite	Knowledge in C++	Syll: Vers	abus sion	202 202	3- 4
Core/Elective/Supp	rtive ELECTIVE III - C(Practical)	-	-	1	1
Course code	PROGRAMMING IN C++ (PRACTICAL)	L	Т	Р	С

PRACTICAL LIST

1. Write a function 'power()'to raise a number 'm' to a power 'n'. The function takes a 'double' value for 'm' and 'int' value for 'n', and returns the result correctly. Use a default vale of 2 for 'n' to make the function to calculate squares when this argument is omitted. Write a main() that gets the values of 'm' and 'n' from the user to test the function.

2. Write a program to compute compound interest of a given amount AMT for 'n' years. Use function overloading so that the program gets input of interest rate RATE in any of the data type 'float' or 'int'

3. Create a class which consist of employee detail ENO, ENAME, DEPT, BASIC SALARY. Write a member function to get and display them. Derive a class PAY from the above class and write a member function to calculate DA, HRA and PF depending on the grade and display the pay slip in a neat format using console I/O

4. Define two classes POLAR and RECTANGLE to represent points in the polar and rectangle system. Write a program to convert from one system to another.

5. Create a class FLOAT that contains one float data member. Overload all the four arithmetic operators so that they operate on the objects of FLOAT.



Course code	NUMBER THEORY	THEORY L T I					
Core/Elective/Supportive	ELECTIVE III – D	5	-	-	4		
Pre-requisite	Knowledge in Algebra	Syllabu	s 2	2023	3_		
		Version	<u> </u> 2	2024	1		
Course Objectives							
To impart knowledge in	the basic concepts of number theory, fundamental de	finitions,	theo	oren	ıs.		
	1 .						
Expected Course Outcor	nes:						
1 Understand the son	enon of the course, student will be able to.			V	1		
2 Solve companyones	cepts of divisionity and primes				1 2		
2 Solve congruence.	montal theorem of Arithmotic				2		
3 Describe the fundal	mental theorem of Arthinetic.				2 2		
4 Understand the con	finteers module prime numbers	S.			.) 1		
5 Compute powers of	n dersten de K3 Annly, K4 Anglyze, K5 Evolucio	V6 Cm	aata	N	4		
KI - Kemember, KZ - UI	nderstand; K5 - Appry; K4 - Anaryze; K5 - Evaluate;	$\mathbf{K}0 - \mathbf{C}\mathbf{R}$	eate				
Unit:1	Early Number Theory		151	hou	rs		
	லைக்கழகும்		101	104			
Peano's Axiom - Mathem	natical Indu <mark>ction - The Binomial T</mark> heorem - Early Nu	mber The	ory.				
Unit:2	Divisibility Theory in Integers		15	hou	rs		
Divisibility Theory in Int	egers - The Division Algorithm - The g c.d Euclide	an Algori	thm	- T1	he		
Diophantine Equation ax	+by = c	un rigori			e		
	B THIAR UNIVER						
Unit:3	Primes and their Distributions		15 ł	hou	rs		
Primos and their Distri	hutions The Fundamental Theorem of Arithmet	ia Tha	cio	VO	of		
Eratosthenes - The Gull (Conjecture.	ic - The	510	ve	01		
Unit:4	The Theory of Congruence		15 ł	hou	rs		
		•1 •1•		•			
The Theory of Congruen	ace - Basic Properties of Congruence - Special Divis	1b1l1ty tes	t - L	Line	ar		
Congruence-Prime modulus- Power residues.							
Unit:5	Fermat's Theorem		15 I	hou	rs		
Fermat's Theorem - Ferm	nat's factorization method - The Little theorem - Wils	on's theor	em.				
			75 1				
	I otal Lecture nours		/31	iou	rs		
Text Book							

1 Elementary Number theory -David M. Burton (W.M.C. Brown Publishers, Dubuque, Lawa,							
1989.)							
Reference Books							
1 An Introduction to theory of Numbers -Ivan Niven and H. Zuckerman (5 th edition,Wiley 1991)							
2 Elements of Number Theory - Prof. S.Kumaravelu and Susheela Kumaravelu (Raja Sankar offset Printers, Siva kasi, 2002)							
3 Beginning Number Theory -Neville Robinns (2 nd Ed., Narosa Publishing House Pvt. Ltd., Delhi, 2007)							
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]							
1 <u>https://nptel.ac.in/courses/111/103/111103020/</u>							
https://nptel.ac.in/courses/111/101/111101137/							
Course Designed By: 1.Dr.C.Janaki							
2. Dr.M.Anandhi							

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	M	M	M	М	М	S	S
CO2	S	S	S	M	S	S	S	М	М	S
CO3	М	М	Μ	M	M	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	М	S	S	SR UN	S	M	S	S	S

ப் குழ்தப்பாரை உயர்த்திட் FDUCATE TO ELEVATE

Course code		INTRODUCTION TO INDUSTRY 4.0	L	Т	Р	С	
Core/Elective/S	Supportive	ELECTIVE III – E	5	-	-	4	
Pre-requisite	•	Basic Knowledge of Computer and Internet	yllabu /ersion	S	2023 2024	3- 4	
Course Objec	tives:						
To impart knowledge on Industry 4.0, need for digital transformation and the following Industry 4.0 tools:							
	Artificial li	1D (A 1 (
2.	Big Data ai	nd Data Analytics					
	Internet of	Things					
Expected Cou	rse Outcor	nes:					
On the succes	sful comple	etion of the course, student will be able to:					
1 Know the	e reason for	adopting Industry 4.0 and Artificial Intelligence.			K	.1	
2 Understa	nd the need	for digital transformation.			K	2	
3 Apply th	e industry 4	.0 tools.			K	3	
4 Analyze	the applicat	ions of Big Data			K	[4	
5 Examine	5 Examine the applications and security of IoT Applications. K4						
K1 - Rememb	ber; K2 - Ui	nderstand; K3 - Ap <mark>ply; K4 -</mark> Analyze; K5 - Evaluate;	K6 – (Creat	e		
	1	is the second					
Unit:1		Industry 4.0		15	hou	irs	
Need – Reaso Technologies o - Cyber Secur	on for Ado of Industry 4 ity – Cloud	opting Industry 4.0 - Definition – Goals and De I.0 – Big Data – Artificial Intelligence (AI) – Industrial – Augmented Reality.	esign F	rinci	Iples	_ gs	
Unit:2		Artificial Intelligence		15	hou	irs	
Artificial Intel	ligence: Art	ificial Intelligence (AI) – What & Why? - History o	f AI - F	Counc	latio	ns	
of AI -The A Associated Tec	I -environn chnologies (nent - Societal Influences of AI - Application Dor of AI - Future Prospects of AI - Challenges of AI.	nains a	nd T	lools	; -	
	1	I					
Unit:3		Big Data and IoT	•	15	hou	irs	
Big Data : Evo Big Data in Ind Characteristics Data Domain - Big Data in I -Big Data Rol Introduction to Applications o	dustry 4.0 - - Big Data Stack : Big Databases - es and Skil IoT - Arch f IoT - Secu	Big Data Merits and Advantages - Big Data Defini Big Data Merits and Advantages - Big Data Comp Processing Frameworks - Big Data Applications - Bi Data in Data Science - Big Data in IoT - Big Data in Big Data Use cases Big Data in Social Causes - Big Ils -Big Data Roles - Learning Platforms; Internet nitecture of IoT - Technologies for IoT - Developing I prity in IoT .	g Data Maching Data f of Thi OT Ap	Essei : Bi Tool ne Le for In ngs (plica	g Da g Da s - B carnin idust (IoT) ation:	of ita ig ng ry) : s -	

Unit:4	Unit:4 Applications and Tools of Industry 4.0 15 hours									15 hours
Applica	tions of	ToT – 1	Manufact	uring –	Healthc	are – Ec	lucation	– Aerosp	ace and l	Defense –
Agricul	ture – T	Fransport	ation an	d Logis	tics – Ir	npact of	Industr	y 4.0 on	Society: 1	Impact on
Busines	ss, Gove	rnment, l	People.	Tools for	or Artific	cial Intel	igence,	Big Data	and Data	Analytics,
Virtual	Reality,	Augmen	ted Real	ity, IoT,	Robotic	s.				
TT						•			[15
Unit:5				J	obs 203	0				15 nours
Industry	4.0 – E	ducation	4.0 - Cu	rriculun	14.0 - Fa	aculty 4.0) – Skills	s required	for Future	e - Tools for
Educatio	n – Arti	ficial Int	elligence	Jobs in	2030 -	Jobs 203	0 - Fra	mework f	or aligning	g Education
with Ind	ustry 4.0									
							.			
						Tota	Lectur	e hours		75 hours
Text B	ook									
1 Hig	her Edua	cation for	r Industr	v 4.0 an	d Transf	ormation	to Educ	ation 5.0	(2021) -	P.Kalirai &
тг		Julion 101	i maasa.	, 1.0 ull	a manor	ormation	to Lau		(2021)	i intuintuj ez
1. L										
Delated Online Contents MOOC SWAVAM NOTEL Websites etc.										
Related	1 ()niine	e Conten	IS HVIUJU	C. SW	AYAM.	NPTEL	Websit	es etc.]		
Related	ps://nptel	.ac.in/cou	<u>ts [MOC</u> rses/106/	DC, SW 105/1061	AYAM, 05195/	NPTEL.	Websit	es etc.]		
Related1	ps://nptel	.ac.in/cou	rses/106/	C, SW 105/1061	AYAM, 05195/	NPTEL	Websit	es etc.]		
Related 1 htt Course	ps://nptel	ac.in/cou	rses/106/	OC, SW2	AYAM, 05195/	NPTEL.	, Websit	es etc.]		
Related1httCourse	Designe	ac.in/cou d By: 1.I 2 I	rses/106/ Dr.C.Jana Dr.T.Nan	C, SW 105/1061	AYAM, 05195/	NPTEL	Websit	es etc.]		
Related 1 htt Course	<u>ps://nptel</u> Designe	ac.in/cou d By: 1.I 2 I	rses/106/ Dr.C.Jana Dr.T.Nan	C, SW <u>105/1061</u> 1ki dhagopa	AYAM, 05195/	NPTEL.	Websit	es etc.]		
Related 1 htt Course	Designe	d By: 1.I	rses/106/ Dr.C.Jana Dr.T.Nan	OC, SW 105/1061 Jki dhagopa	AYAM, 05195/	NPTEL.	Websit	es etc.]		

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	S		EVATES	S	М	S	S
CO2	М	М	М	S	S	S	S	М	М	S
CO3	S	S	S	S	S	S	S	S	S	М
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	М	S	М	S	S	S	S	S	S

B. Sc.MATHEMATICS

Syllabus (2022-2023)

Program Code : 22A



DEPARTMENT OF MATHEMATICS (Affiliated Colleges) Bharathiar University (A State University, Accredited with "A" Grade by NAAC and 13th Rank among Indian Universities by MHRD-NIRF)

Coimbatore 641 046, INDIA

Program Educational Objectives (PEOs)

The **B. Sc. Mathematics** program describe accomplishments that graduates are expected to attain within five to seven years after graduation

PEO1	Acquire knowledge in functional areas of Mathematics and apply in all the fields of learning.
PEO2	Recognise the need for life long learning and demonstrate the ability to explore some mathematical content independently.
PEO3	Employ mathematical ideas encompassing logical reasoning ,analytical, numerical ability , theoretical skills to model real-world problems and solve them.
PEO4	Develop critical thinking ,creative thinking, self confidence for eventual success in career.
PEO5	Analyze, interpret solutions and to enhance their Entrepreneurial skills, Managerial skill and leadership
PEO6	To prepare the students to communicate mathematical ideas effectively and develop their ability to collaborate both intellectually and creatively in diverse contexts.
PEO7	Rewarding careers in Education, Industry, Banks, MNCs and pursue higher studies

Program	Program Specific Outcomes (PSOs)						
After the	successful completion of B. Sc. Mathematics program, the students are expected						
to							
	Maintain a core of mathematical and technical knowledge that is adaptable to						
PSO1	changing technologies and provides a solid foundation for extended learning.						
PSO2	Identify the applications of Mathematics in other disciplines and society.						
	Develop an in-depth knowledge in Mathematics appreciating the connections						
PSO3	between theory and its applications .						
	Demonstrate their mathematical modeling ability, problem solving skills, creative						
F304	talent and power of communication necessary for various kinds of employment.						
PSO5	Develop mathematical aptitude and the ability to think abstractly.						
PSO6	Learn independently and improve ones performance.						
PSO7	Students are equipped to appear competitive examinations.						

Program	o Outcomes (POs)
On succe	ssful completion of the B. Sc. Mathematics program
DO1	Students are empowered with analytical and logical skills-to formulate results
POI	and construct mathematical argument.
DOJ	Ability to organize, analyze and interpret data accurately in both academic and
FO2	non -academic context.
	Demonstrate effective communication of mathematical ideas and creative
PO3	thinking skills to facilitate solving real world problems as a team and
	independently.
	Appreciate and identify the connections between Mathematics and other
104	disciplines.
PO5	Competency to obtain employment in education, public and private sectors
DOG	Identify the area of interest for extended learning from the understanding gained
PO0	from the domain and allied areas of Mathematics.
PO7	Develop mathematical aptitude and make critical observations.
PO8	Garner innovative ideas to face global challenges.
PO9	Instill a sense of responsibility in tackling professional and social issues
	ethically.
PO10	Trigger their passion for research in unexplored areas of Mathematics.

BHARATHIAR UNIVERSITY: COIMBATORE 641 046

B. Sc. Mathematics Curriculum (Affiliated Colleges) (CBCS PATTERN)

(For the students admitted from the academic year 2022-2023 and onwards)

Scheme of Examination

			I	Examina	ation		
		/	s	Ma	ximum	Marks	Credits
Part	Title of the Course	Hours/ Week	Duratio in Hour	CIA	CEE	Total	
	Semester I			•			
Ι	Language - I	6	3	50	50	100	4
II	English - I	6	3	50	50	100	4
III	Core Paper I - Classical Algebra	4	3	50	50	100	4
III	Core Paper II-Calculus	5	3	50	50	100	4
III	Allied A : Paper I Chosen by the college	7	3	50	50	100	4
IV	Environmental Studies*	2	3	-	50	50	2
	Total	30		250	300	550	22
	Semester II						
Ι	Language – II	6	3	50	50	100	4
II	English – II	4	3	25	25	50@@	2
II	Effective English :Language Proficiency for Employability <u>http://kb.naanmudhalvan.in/Special</u> :Filepath/Cambridge_Course_Detai <u>ls.pdf</u>	2	-	25	25	50##	2
III	Core Paper III - Analytical Geometry	4	3	50	50	100	4
III	Core Paper IV-Trigonometry, Vector Calculus and Fourier Series	5	3	50	50	100	4
III	Allied A: Paper II Chosen by the College	7	3	50	50	100	4
IV	Value Education – Human Rights*	2	3	-	50	50	2
	Total	30		250	300	550	22
	Semester III						
Ι	Language – III	6	3	50	50	100	4
II	English – III	6	3	50	50	100	4
III	Core Paper V- Differential Equations and Laplace Transforms.	3	3	50	50	100	4
111	Une Paper vi- Statics	3	3	50	50	100	4

III	Allied B : Paper I – Chosen by the college	7	3	30	45	75	3
IV	Skill based Subject - Operations Research -I	3	3	25	25	50 ^{@@}	2
IV	Digital Skills for Employability	_	-	25	75	100	2
IV	Tamil** / Advanced Tamil* (OR) Non-major elective - I (Yoga for Human Excellence)* / Women's Rights*	2	3		50	50	2
	Total	30		280	395	675	25
	Semester IV		T	1			
I	Language – IV	5	3	50	50	100	4
II	English – IV	5	3	50	50	100	4
	Core Paper VII-Dynamics	3	3	50	50	100	4
III	Core Paper VIII- Programming	2	3	30	45	75	3
	in C Core Paper VIII -Programming in C Practical	1	3	10	15	25	1
III	Allied B - Paper II Chosen by the college	5	3	30	45	75	3
III	Allied B - Paper II Chosen by the college (For Practical Paper)	2	3	25	25	50	2
IV	Skill based Subject - Operations Research – Paper II	3	3	25	25	50 ^{@@}	2
IV	Office Fundamentals :Digital Skills for Employability http://kb.naanmudhalvan.in/Specia l:Filepath/Microsoft_Course_Detail s.xlsx	2	-	25	25	50##	2
IV	Tamil**/Advanced Tamil* (OR) Non-major elective -II (General Awareness*)	2	3		50	50	2
	Total	30		295	380	675	27
	Semester V						
III	Core Paper IX-Real Analysis-I	5	3	50	50	100	4
III	Core Paper X- Complex Analysis-I	6	3	50	50	100	4
III	Core Paper XI- Modern Algebra- I	6	3	50	50	100	4
III	Core Paper XII- Discrete Mathematics	5	3	50	50	100	4
III	Elective I	5	3	30	45	75	3
IV	Skill based Subject - Operations Research - Paper III	3	3	25	25	50 ^{@@}	2

IV	Computational Intelligence for	-	-	25	75	100	2				
	Employability	20		200	245	()5	22				
	Lotal Somoston VI	30		280	345	625	23				
III	Core Paper VIII Real Analysis										
111	II	5	3	50	50	100	4				
III	Core Paper XIV - Complex Analysis-II	5	3	50	50	100	4				
III	Core Paper XV -Modern Algebra-II	5	3	50	50	100	4				
III	Elective II	5	3	30	45	75	3				
III	Elective III	5	3	50	50	100	4				
IV	Skill Based Subject - Operations Research- Paper IV	3	3	25	25	50 ^{@@}	2				
IV	Project Based learning 2-Advanced Platform Technology -(Govt(auto) & Govt (Non-Auto)) / Data Analytics & Visualization - Aided (Non-auto) & SF(Non-Auto) <u>http://kb.naanmudhalvan.in/Bharat</u> hiar_University_(BU)	2	-	25	25	50##	2				
V	Extension Activities ** / Swachh										
·	Bharath @			50		50	2				
	Total	30		330	295	625	25				
	Grand Total	180		1685	2015	3700	144				
#All con	nputer papers have theory and prac	ctical exan	ns	1							
	Theory			30	45	75	100				
	Practicals			10	15	25	200				
## Naan by respe * No ** No I	Mudhalvan –Courses- external 25 mark ective course teacher. Continuous Internal Assessment (CIA).	s will be as Only Univ	sessed by Inversity Exam	industry	and int	ernal will b	be offered				
[@] Swach	h Bharath Internship Scheme (SBIS) is	to be added	1 for 2 credit	$\frac{1}{1}$ ts in the	• e extens	sion					
acti	vities.										
^{@@} Univ	ersity semester examination will be con-	ducted for	50 marks (A	ls per e	xisting	pattern of					
Examination) and it will be converted for 25 marks.											
L'Admini	ation) and it will be converted for 25 ma	trks.			oota)	Allied Subjects(Colleges can choose any two subjects)					
1 Dhys:	ation) and it will be converted for 25 ma Allied Subjects(Colleg	ges can cho Statistics	oose any tw	o subj	ects)						
1.Physi	ation) and it will be converted for 25 maAllied Subjects(Collegcs 2. Chemistry3.Accountancy 4.5	ges can cho Statistics.	oose any tw	vo subj	ects)						
1.Physi	ation) and it will be converted for 25 ma Allied Subjects(Colleg cs 2. Chemistry3.Accountancy 4.3 List of	ses can cho Statistics. Elective J	bose any two	vo subj	ects)						
1.Physi	ation) and it will be converted for 25 ma Allied Subjects(Colleg cs 2. Chemistry3.Accountancy 4. List of (Colleges can choose	ses can cho Statistics. Elective J any one of	pose any two papers the paper a	vo subj s electi	ects) ves)						
1.Physi	ation) and it will be converted for 25 ma Allied Subjects(Colleg cs 2. Chemistry3.Accountancy 4.3 List of (Colleges can choose	Statistics. Clective J any one of	bose any two bapers the paper and Astronom	vo subj s electi ny- I	ects) ves)						

	Α	Astronomy—II
Elective – II	В	Numerical Methods-II
	Α	Graph Theory
	В	Automata Theory & Formal Languages
Elective – III	С	Programming in C++ #
	D	Number Theory
	E	Introduction to Industry 4.0





Cou	rse code		CLASSICAL ALGEBRA	L	ſ	P	С				
Core	/Elective/S	Supportive	Core Paper – I	4	-	-	4				
Pre	-requisite	,	Knowledge of Limits	Syllabo Versio	ıs n	202 - 202	22 23				
Cou	rse Objec	tives:									
1.To	enable the	e students to	elearn Binomial, Exponential, Logarithmic series and	d their							
aj	oplication	to summati	on of series.								
2.To	study inte	ensively the	convergence and divergence of different types of series	es.							
3. To	o demonsti	rate the star	ndard methods to solve both polynomial and transcen	dental							
type	equations.	•									
T.		0.4									
Expected Course Outcomes:											
On	On the successful completion of the course, student will be able to:										
1	Know the	e concept o	f Binomial, Exponential, Logarithmic series and the	r		K 1					
	application to summation of series.										
2	Acquire a	a clear knov	vledge regarding methods to find an approximate root	s of the		K2					
	equations	S.	······································								
3	Apply the	e appropriat	te tests to find the convergence or divergence of an i	nfinite		K3					
	series.		6 6								
4	AnnlyDe	scartes's rul	e of signs to find the number of positive and negative	e roots		K3					
	if any in	a polynomi	al equation .	010005		110					
5	Analyze	the relation	between roots and coefficients of the polynomial equilation	uations.		K4					
	2										
K1	- Rememb	per; K2 - Ui	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - Cr	eat	e					
Uni	it:1	Summa	ation Of Series Using Binomial And Exponential		1	2hou	irs				
			Theorem								
Bino	mial, expo	onential the	prems-their statements only- their immediate applicat	ion to							
sumi	mation and	l approxima	tion only.								
TIm	:4.0	Logowith	mis Source Convergence And Divergence Of Source		14	har					
	ll:2	Logariu	nucleon statement and proof Immediate application to sum		14 ad	i nou	rs				
LOga	ovimation	only Conv	ergency and divergency of series definitions eleme	ntary	IU						
resul	ts- compa	rison tests-I	$\Delta = \Delta $ lembert's and Cauchy's tests	iitai y							
TCSUI	us- compa	115011 (CS15-1	Se - Membert's and Cadeny's tests.								
Uni	it:3		Absolute Convergence Of Series		12	hou	rs				
Abso	olute conve	ergence-ser	ies of positive terms-Cauchy's condensation test-Raal	be's test.							
Uni	it:4		Theory Of Equations		12	hou	rs				
Root	s of an e	equation- R	elations connecting the roots and coefficients- trar	sformat	ion	S					
of e	quations-c	haracter an	d position of roots-Descarte's rule of signs-symmetry	etric fun	ctic	on					
of ro	ots-Recipi	ocal equation	ons.								

Uı	nit:5	Multiple Roots	12 hours								
Mu app	ltiple roots- roximation	Rolle's theorem - position of real roots of $f(x) = 0$ – Newton's m to a root – Horner's method.	nethod of								
		Total Lecture hours	60 hours								
Те	ext Book(s)										
1	1 Algebra-T.K .Manicavachasam Pillai, T.Natarajan& K.S Ganapathy , (S.Viswanatham Printers & Publishers Private Ltd-2006)										
D											
K	eierence Bo	OKS									
1	Mathematics for B.Sc. Branch I -Vol. I- P. Kandasamy and K.Thilagavathy (For B.Sc-I semester) (S. Chand and Company Ltd, New Delhi, 2004.)										
2	Algebra -	N.P.Bali(Publisher: Laxmi Publications-New Delhi Edition 201	0).								
D											
	elated Onli	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	1								
1	<u>Nttps://ww</u>	w.brainkart.com/article/introduction-to-Binomial,-Exponential-and- דר/	<u>Logarithmic-</u>								
2	http://www	v.jjernigan.com/172/ConvergenceDivergenceNotes.pdf									
3	http://ho	me.iitk.ac.in/~psrai/mth101/lecture_notes/Lecture11-13.pdf									
C	https://m	aths4uem.files.wordpress.com/2015/09/1028-infinite-series.pdf									
	https://o	w.mit.edu/high-school/mathematics/exam-prep/concept-of-series/	series-convergence-								
	<u>divergenc</u>	<u>e/</u>									
Co	ourse Desig	ned By: 1.Dr.T.Narppasalai Arasu									
		2.Dr.M.Anandhi									

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	Μ	М	S	S	S	S	М	S	S
CO2	S	Μ	Μ	Μ	S	S	S	М	М	S
CO3	S	Μ	S	S	S	S	S	S	S	S
CO4	S	Μ	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

Cou	rse code		CALCULUS	L	Т	Р	С			
Core	/Elective/S	upportive	Core Paper – II	5	-	-	4			
Pre	e-requisite		Higher Secondary Level Mathematics.	Syllabu Versior	IS I	20 20	22 - 023			
Cou	rse Object	tives:								
То	orient the	students to	get an idea of curvatures, Integration of different types	s of func	tion	lS,				
its §	geometrica	al applicatio	ns, double, triple and improper integrals.							
Exp	ected Cou	rse Outcon	nes:							
On	the succes	sful comple	etion of the course, student will be able to:							
1	Identify a	areas in Ma	thematics and other fields where Calculus is useful.			K	1			
2	Understa and evol	nd the co utes.	ncepts of Evolutes and Envelopes, methods to find a	curvatur	e	K	2			
3	Apply the	e concept of	f change of variables in double and triple integrals.			K	3			
4	Apply do	uble, triple	integral to find the area and volume respectively.			K	3			
5	Apply the	e Beta and g	gamma function to solve the multiple integrals.			K	4			
K1	K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create									
Uni	Unit:1 Curvature 15									
Curv	ature-radi	us of curvat	ure in Cartesian and polar forms-evolutes and envelop	pes-Peda	al					
equa	tions- tota	l differentia	tion- Euler's theorem on homogeneous functions.							
•										
Uni	it:2		Integration			15 h	ours			
Integ	gration of f	f'(x)/f(x), f	$(x)\sqrt{f(x)}, [(px+q)/\sqrt{(ax^2+bx+c)}], [\sqrt{(x-a)/(b-x)}], [(x-a)/$	-a)(b-x)],1/[√(x·	-a)(b-			
x),1/	(acosx+bs	inx+c), 1/($acos^2 x+bsin^2 x+c$), Integration by parts-Bernoulli's For	rmula.		. 、				
Uni	it:3	Eva	aluation Of Double And Triple Integrals		1	5 h	ours			
Rec	luction for	mulae- prol	plems- evaluation of double and triple integrals- applie	cations t	0					
calo	culations o	f areas and	volumes-areas in polar coordinates.							
Uni	it:4	Change C	of Variables In Double And Triple Integrals		1	5 h	ours			
Cha	ange of ord	ler of integr	ation in double integral- Jacobians- Change of variable	s in doul	ole a	and t	riple			
inte	grals.									
TT	* . E		Deta And Commercian			151				
Un Roto	Unit:5 Beta And Gamma Functions 15 n									
integ	grals using	Beta and G	amma functions - Improper Integrals.		e					
			Total Lastura hours		,	75 h	ourg			
T			Total Lecture nours			13 11	ours			
	Coloring V		arouanan and T.V.M. Dilloi (Wayyanathan Dublishara	20091						
1	Calculus V	Vol 2- S. N	arayanan and T K M Pillai (Viswanathan Publishers	2008) 2008)						
<i>L</i>	Calculus	v 01 2- 3. N	arayanan anu 1.K.wi. Final. (viswanaulan Publishers	∠000)						

Re	eference Books
1	Mathematics for BSc – Vol I and. II - P. Kandasamy &K.Thilagarathy(S.Chand and Co-2004)
2	A Text book of calculus- Shanthi Narayanan &J.N.Kapoor(S.Chand& Co.2014)
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	https://ocw.mit.edu/resources/res-18-006-calculus-revisited-single-variable-calculus-fall-2010/study-
	materials/
	https://www.whitman.edu/mathematics/calculus_online/chapter15.html
2	https://www.khanacademy.org/math/calculus-home
3	https://www.sac.edu/FacultyStaff/HomePages/MajidKashi/PDF/MATH_150/Bus_Calculus.pdf
4	http://nptel.ac.in/courses/111104085/29
5	http://www.math.odu.edu/~jhh/Volume-1.PDF
	http://www.math.odu.edu/~jhh/Volume-2.PDF
	https://www.math.cmu.edu/~wn0g/2ch6a.pdf
6	https://nptel.ac.in/courses/111/105/111105122/http://www.staff.ttu.ee/~lpallas/multipleintegrals.pdf
	•
Co	ourse Designed By: 1.Dr.C.Janaki
	2.Dr.M.Anandhi

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	М	S	S	S	S	S	S	S	S
CO2	S	М	S	S	S	S	S	М	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	Μ	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

Second Semester



Cou	rse code		ANALYTICAL GEOMETRY	L	T	P	С				
Core	e/Elective/S	upportive	Core Paper – III	4	-	-	4				
Pre	e-requisite		Basic Knowledge In Trigonometry &Vector Algebra.	Syllabi Versio	ıs n	202 - 202	22 23				
Cou	rse Object	tives:									
Emp	hasis to en	hance stude	ent knowledge in three dimensional analytical geomet	ry and	the	e					
geon	netrical asp	pects of three	ee dimensional figs, viz, sphere, cone and cylinder.								
Exp	ected Cou	rse Outcon	nes:								
On	the succes	sful comple	tion of the course, student will be able to:								
1	Gain kno	wledge abo	ut the regular geometrical figures and their properties			K	.1				
2	Describe	the geome	tric concepts.			K	2				
3	Find equa	ation to tang	gent, normal at a point on a conic			K	3				
4	Analyze	condition	of tangency and find the tangent plane to the central of	conicoid		K	4				
5	Analyze	conics to e	xplain natural phenomenon			K	4				
K1	- Rememb	oer; K2 - Ui	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - Cr	eate	e					
Un	Unit:1 Straight Lines 12 hours										
Ana	lytical Geo	ometry 3D-	Straight lines-coplanarity of straight line-shortest d	istance	(S.]	D) a	nd				
equa	uion of S.L) between t	wo intes-simple problems.								
Un	it:2		Sphere		12	hou	irs				
Sphe	ere: standa	d equation	of sphere-results based on the properties of a sphere-t	angent							
plan	e to a sphe	re- equatior	of a circle.								
TT	:4.7		States Of States		10	1					
Un	II:3	horas ooar	System Of Spheres	aaraa	12	nou	irs				
1 4115	gency of sp		tar system of spheres- radicar planes- Orthogonal spi	leies.							
Un	it:4		Cone And Cylinder		12	hou	irs				
Cone	e whose ve	ertex is at th	e origin- envelope cone of a sphere-right circular con	e-equati	on						
of a	cylinder-ri	ght circular	cylinder.								
TT	•4.5				10	1					
Un	$\frac{11:5}{11:5}$	nicoid sta	Conicold	no tono	12	nou	irs				
cond	lition for ta	ingency –di	rector Sphere- director plane .	ne- tang	,em	piai	10-				
			Total Lecture hours		60	hou	irs				
Te	xt Book(s)										
1	1 Analytical Geometry - P. Durai Pandian & others (Emerald Publishers 1998).										
2	2 Solid Geometry- N.P. Bali(Laxmi Publications (P) Ltd,2015)										
Ref	ference Bo	ooks									

1	Solid Geometry- M.L. Khanna(Jainath& Co Publishers, Meerut)									
Re	Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]									
1	http://www.brainkart.com/article/Three-Dimensional-Analytical-Geometry_6453/									
2	http://egyankosh.ac.in/bitstream/123456789/11990/1/Unit-2.pdf									
Co	Course Designed By: 1.Dr.C.Janaki									
	2.Dr.M.Anandhi									

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	S	S	М	S	S	S	S	S
CO2	S	М	S	S	S	S	S	М	S	S
CO3	S	М	S	Μ	М	М	S	S	S	S
CO4	S	М	S	S	М	S	М	S	S	S
CO5	S	S	S	S	М	S	S	S	S	S

Cou	rse code		TRIGONOMETRY, VECTOR CALCULUS AND FOURIER SERIES	L	Т	P	С				
Core	e/Elective/S	upportive	Core Paper – IV	5	-	-	4				
Pre	e-requisite	;	Knowledge In Vector Algebra, Differentiation, Integration	Syllabu Versior	IS 1	2022 - 2023					
Cou	rse Objec	tives:									
To e	nable the st	tudents to le	arn about the expansion of trigonometric, hyperbolic fu	nctions,							
vecto	or calculus	and the exp	ansions of Fourier series .								
Exp	ected Cou	rse Outcon	nes:								
On	the succes	sful comple	etion of the course, student will be able to:								
1	Know the	e expansion	of trigonometric functions and hyperbolic functions	•		K	.1				
2	Acquire t	he basic kno	owledge of vector differentiation and vector integration			K	2				
3	Determin	e and apply	the important quantities associated with vector fields su	ich as the		K	3				
4	divergence Understa	e, curl and s	scalar potential. Fourier series of a given periodic function			ĸ	3				
5	Examine	line integra	I surface integral volume integral and inter-relation	s among		K	1				
5	them .	inte integra	i, surface integral, volume integral and inter relation	is among		13					
K1	K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create										
T Inc	:4.1		Europaion In Casion		15	han					
Evn ⁴	II:I	eries _ Evn	ansion of cos #A sin #Ain a series of cosines and sines	of multi	13 nle	nou s of	A				
-Ex	pansions c	of cosn0.sir	$\mathbf{n}\mathbf{\theta}$ and $\mathbf{tann}\mathbf{\theta}$ in powers of sines , cosines and tange	ents - Ext)an	s or sion	0				
of si	$n \theta$, cos θ a	and $\tan \theta$ in	powers of θ – hyperbolic functions and inverse hype	rbolic fu	ıcti	ons.					
Un	it:2	Logar	ithm Of Complex Quantities And Summation Of Series		15	hou	Irs				
Loga – C	arithm of c + iS, methe	omplex qua od of summ	ntities - summation of series – when angles are in arit ation – method of differences.	hmetic pr	og	ressi	on				
		1									
Un	<u>it:3</u>		Vector Differentiation	10.10	15	hou	irs				
Scal	ar and vec	tor fields –	Differentiation of vectors – Gradient, Divergence as	id Curl-S	ole	enoi	181				
			Present of present								
Un	it:4		Vector Integration		15	hou	Irs				
Integ	gration of	vectors – li	ne integral – surface integral – Green's theorem in	the plane) —	Gaı	155				
theo	rgence the rems.	eorem – St	oke's theorem – (Statements only) - verification	of the at	201	ve sa	110				
TT.											
	ii.3	tions Four	rourier Series		13	nou	ITS				
1 01		10115 - 1'001	The series of periodicity 2π – half range series.								

		Total Lecture hours	75 hours							
Te	xt Book									
1	Mathemat P.Kandasa	tics for B.Sc. Branch I, Volume I, II and IV - my&K.Thilagavathi(S.Chand and Company Ltd, New Delhi, 2	004.)							
_										
Re	Reference Books									
1	Vector Analysis -P. Duraipandian, Laxmiduraipandian (Revised Edition-Reprint 2005 Emerald Publishers)									
2	Trigonometry -T.K. Manichavasagam Pillai and S.Narayanan(Viswanathan Publishers and Printers Pvt. Ltd 2009.)									
Re	elated Onli	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]								
1	http://www	v.math.odu.edu/~jhh/Volume-2.PDF								
	http://www	w-math.mit.edu/~djk/18_01/chapter20/section03.html								
	<u>https://ww</u>	w.whitman.edu/mathematics/calculus_online/chapter16.html								
	http://www	w.mecmath.net/calc3book.pdf								
2	http://wv	vw.nptelvideos.in/2012/11/mathematics-iii.html								
3	https://n	otel.ac.in/courses/111107108/1								
	-									
Co	ourse Desig	ned By 1.Dr.C.Janaki								
	C	2. Ms. S.Sobia								

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	М	S	S	Μ	М	S	S
CO2	S	Μ	S	S	Μ	Μ	Μ	S	М	S
CO3	S	Μ	S	S	Μ	Μ	Μ	S	S	S
CO4	S	S	S	S	S	S	S	S	S	М
CO5	S	S	S	S	Μ	S	S	S	S	S

Third Semester



Cours	se code		DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS	L	r	P	С				
Core/I	Elective/S	Supportive	Core Paper – V	3	-	-	4				
Dno	roquisito		Knowledge of Ordinary and Partial	Syllabu	IS	202	2-				
rre-	requisite		Derivatives	Version	1	202	23				
Cours	se Objec	tives:									
To im	ipart knov	wledge on t	he method of solving ordinary differential Equations	of First ()rc	ler a	nd				
Second Order, Partial Differential equations, Laplace Transforms, its inverse and application of											
Laplace Transform to solve the first and second Order Differential Equations with constant											
coefficients.											
F	-4- J C										
Expec	ctea Cou	rse Outcon	nes:								
			the course, student will be able to.			L	71				
1	Acquire	$\frac{1}{1}$	to solve Differential and Partial Differential Equation	.s.		r T	1				
2 Solve higher order linear differential equations.											
3 Expose differential equation as a powerful tool in solving problems in Physical and Social sciences.											
4	4 Demonstrate competency to solve linear PDE by Lagrange's method										
5 Analyze the concepts of Laplace transform and inverse Laplace K											
transforms to solve ODE with constant coefficients.											
K1 -	Rememb	ber; K2 - Ui	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - Cre	eate	e					
Unit	::1	Different	ial Equation of First Order and Higher Degree.		9) hot	irs				
Ordin	ary Diffe	rential Equa	ations: Equations of First Order and of Degree Higher	than one	- ,	Solva	able				
for p,	x, y– Cla	iraut's Equ	ation – Simultaneous Differential Equations with con	stant coe	ffi	cient	s of				
the for	rm		X								
1) $f_1(L)$	$(1)x + g_1(1)$	$\mathbf{J}\mathbf{y} = \mathbf{\phi}_1 (\mathbf{t}$		1/1/ 1	.1						
11) $I_2(I)$	$D)x + g_2($	$D)y = \varphi_2$ (t) where f_1 , g_1 , f_2 and g_2 are rational functions of L	= d/dt W1	th	cons	tant				
coem	cients and	$\mathfrak{a} \varphi_1 , \varphi_2 \operatorname{ar}$	e explicit functions of t.								
Unit	••?	F	ligher Order Linear Differential Fauation		C) hor	ire				
Findir	ng the sol	ution of Se	cond and Higher Order with constant coefficients with	h Right F	Jar	nd Si	de				
is of	the form	Ve ^{ax} whe	where V is a function of $x - Euler's$ Homogeneous	Linear Di	iffe	erent	ial				
Equat	ions.										
-											
Unit	•.3		Partial Differential Fountions		0	hor	ire				
Partia	1 Differe	ntial Equat	ions: Formation of equations by eliminating arbit	ary cons	<u> </u>	not nts a	nd				
arbitra	arv functi	ions – Solu	tions of P.D Equations – Solutions of Partial Difference	ential Equ	iati	ions	bv				
direct	integrati	ion – Meth	ods to solve the first order P.D. Equations in the	standard	l f	orms	,				
Lagrange's Linear Equations.											
Unit	::4		Laplace Transforms		9	hou	irs				
Lapla	ce Transf	orms: Defin	nition – Laplace Transforms of standard functions – I	_inearity	pro	pert	y –				
First S	Shifting T	Theorem – 7	Fransform of $tf(t)$, $f(t)/t$, $f'(t)$, $f'(t)$.								

U	nit:5	Inverse Laplace Transforms	9 hours									
Inv	erse Lapla	ce Transforms – Applications to solutions of First Order	and Second Order									
Dif	ferential Eq	uations with constant coefficients.										
		Total Lecture hours	45 hours									
Te	ext Book											
1	Mathema	tics for B.Sc - Branch - I Volume III- P.Kandasamy & K.	Thilagavathy									
	(S. Chand	and Company Ltd, New Delhi, 2004.)										
n	Deference Books											
Re	eference Bo	ooks										
1	Calculus V	Vol III -S. Narayanan and T.K. Manickavasagam Pillay, (S.	Viswanathan									
	Printers and Publishers Pvt. Ltd, Chennai 1991)											
2	Differential Equations -N.P. Bali (Laxmi Publication Ltd, New Delhi, 2004)											
3	Laplace and Fourier Transforms-Dr. J. K. Goyal and K.P. Gupta (Pragati Prakashan											
	Publishers	s, Meerut, 2000)										
n												
	elated Onli	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]										
1	http://npte	A.ac.III/courses/111103033/										
2	<u>mup://wwv</u>	/.nptervideos.nl/2012/11/mathematics-m.num										
	https://ww	w.digimat.in/nptel/courses/video/111108081/L02.html										
3	https://ww	w.math.ust.hk/~machas/differential_equations.pdf.										
	https://ww	w.ijsr.net/archive/v2i1/ijsron2013331.pdf										
	https://ww	w.whitman.edu/mathematics/calculus_online/chapter17.html										
~	<u> </u>											
Co	ourse Desig	ned By: 1.Dr.E.Rameshkumar										
		2.NIS.S.Kavunthi										

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	S	S	М	S	М	М	S	S
CO2	S	Μ	S	S	S	S	М	М	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	М	S	S	S	S	М	S	S	S
CO5	S	S	S	S	S	S	S	S	S	М

Course code		STATICS	L	Т	Р	C					
Core/Elective/S	Supportive	Core Paper – VI	3	-		4					
Pre-requisite		Basic Knowledge in Vector Algebra &	Syllabu	IS	2022	2-					
TTC-requisite		Trigonometric Functions	Versio	n	<u>202</u>	3					
Course Objec	tives:			.1							
1.10 enable th	he students	to realize the nature of forces and resultant forces who	en more	thar	1						
2 To know ab	out the con	ic. ditions of equilibrium of couples and coplanar forces									
2.10 KHOW do		unions of equilibrium of couples and coplanar forces.									
Expected Course Outcomes:											
On the successful completion of the course, student will be able to:											
1 Remember the various laws.											
2 Understand the concepts of forces and moments.											
3 Understa	nd the conc	epts of equilibrium.			K	2					
4 Apply the	e concepts o	of forces and moments.			K	3					
5 Analyze	the basics o	f coplanar forces, equilibrium of forces acting on a right	gid body		K	4					
and solve	and solve the problems.										
K1 - Rememb	per; K2 - U1	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - Cre	eate	;						
Unit:1		Law of Forces		<u>9</u>	hou	Irs					
Forces acting a	at a point –	Parallelogram law-triangle law –Converse of Triang	;le law-	Pol	ygor	1					
Law of Forces	- Lamis In										
Unit:2		Resolution and Components of Forces		9	hou	irs					
$(\lambda - \mu)$ theore	m –Resolu	tion of forces- Components of a force- Resultant	of any n	um	ber	of					
Coplanar forc	es acting at	a point- Conditions of equilibrium.	2								
	-										
Unit:3		Parallel Forces, Moment and Couple		9	hou	Irs					
Parallel Force	es and Mon	nents – Resultant of two parallel forces (Like and unli	ke)-Con	diti	ons	of					
equilibrium o	f three copla	anar forces- Moment of a force- Geometrical represen	tation- S	ign	of t	he					
moment- Ur	nt of mom	ent – Varignon's Theorem on couples-Equilibrium	1 of two	co	uple	:S-					
Equivalence	of two coup	les.									
Unit:4		Forces Acting on A Rigid Body		9	hou	irs					
Coplanar forc	es acting or	a rigid body – Theorem on three coplanar forces in e	quilibri	ım							
	0										
Unit:5	General C Planar Fo	Conditions of Equilibrium of a System of Co- orces		9	hou	Irs					
Reduction of	Reduction of a system of coplanar forces to a single force and a couple - necessary & sufficient conditions of equilibrium only. Equation to the line of action of the resultant										
	-quinorium	Sang Equation to the fine of action of the resultant.									

	Total Lecture hours 45 hours										
То	vt Rook										
1	1 Station M IZ Manhatananan (A anglian Dahliantiana Taiaha 1000)										
1	Statics -M.K. Venkataraman (Agasthiar Publications, Trichy, 1999.)										
Re	ference Books										
1	Statics -A.V.Dharmapadam.(S.Viswanathan Printers and Publishing Pvt., Ltd, 1993.)										
2	Mechanics -P.Duraipandian and Laxmi Duraipandian.(S.Chand and Company Ltd, Ram										
	Nagar, New Delhi -55, 1985.)										
3	Statics -Dr.P.P.Gupta (Kedal Nath Ram Nath, Meerut, 1983-84)										
Re	lated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]										
1	https://nptel.ac.in/courses/112/105/112105164/										
2	https://nptel.ac.in/courses/122/102/122102004/										
3	https://www.khanacademy.org/science/ap-physics-1										
Co	urse Designed By: 1.Ms.A.Karpagam										
	2.Dr.P.Rajarajeswari										

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	M	М	S	S	М	М	S	S
CO2	S	М	S	S	Μ	Μ	М	М	М	S
CO3	S	Μ	S	S	Μ	Μ	Μ	S	S	S
CO4	S	S	S	S	S	S	S	Μ	S	S
CO5	S	S	S	S	Μ	S	S	S	S	S

Сот	irse code		Operations Research – Paper I	L	Т	Р	С				
Cor	e/Elective/S	Supportive	Skill Based Subject	3	-	-	2				
Pr	e-requisite	 ,	Knowledge in Basic Mathematical Concepts	Syllabı Versioi	is 1	202 202	2- 3				
Cou	irse Objec	tives:									
To mak	making, model formulation and applications.										
Exp	Expected Course Outcomes:										
On	the succes	sful comple	tion of the course, student will be able to:								
1	Understa	nd the basic	concepts and application of operations research in var	ious fiel	ds.	K	.1				
2	Know pr	inciples of a	construction of mathematical models of conflicting situ	uations.		K	2				
3	Analyze	the relation	ship between a linear program and its dual.			K	3				
4 Apply techniques constructively to make effective decisions in business and solve problems in industry.											
5 Build and solve transportation problems. K4											
K 1	- Rememb	per; K2 - U1	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - Cr	eate	5					
		I									
Un	<u>it:1</u>	Basics O	f Operations Research and Formulation Of L.P.P		9	hou	rs				
Bas of C	CS of O.R - D.R in Indus	- Definition stry $-$ O.R a	of O.R – Characteristics of O.R - Scientific methods in nd Decision Making – Scope of O.R in Modern Mana	n O.R – . gement-	Nec -Us	essa es a	.ry nd				
limi	tations of C	J.R .Linear	Programming Problem – Formulation of L.P.P.								
Ur	nit:2	Linear F	rogramming Problem -Simplex method		9	hou	rs				
Gra	phical solu	tions of L.P	P – Problems. Simplex Method – Problems.								
		I									
	<u>it:3</u>		Big-M and Two-Phase Method	D 11	9	hou	rs				
Cha	rne's Pena	ity Method	or) Big – M Method - Two Phase Simplex method –	Problem	IS.						
Ur	nit:4		Duality In L.P.P		9	hou	rs				
Du	ality in L.F	P.P – Conce	pt of duality – Duality and Simplex Method – Problem	ns.	-						
			· · · · ·								
Un	nit:5		Transportation Model		9	hou	rs				
The – ur	The transportation Problems – Basic feasible solution by L.C.M – NWC- VAM- optimum solutions – unbalanced Transportation problems.										
			Total Lecture hours		45	hou	rs				
Te	Text Book										
1	1 Operations Research – Kanti Swarup, P. K. Gupta, Man Mohan (S. Chand & Sons Education Publications, New Delhi, 12th Revised edition-2003)										

Re	eference Books
1	Operations Research – Prem Kumar Gupta D. S. Hira (S. Chand & Company Ltd, Ram Nagar, New Delhi ,2014)
2	Operations Research Principles and Problems- S. Dharani Venkata Krishnan(Keerthi publishing house PVT Ltd.1994)
	·
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	https://nptel.ac.in/courses/111/102/111102012/
2	https://nptel.ac.in/courses/111/104/111104027/
Co	ourse Designed By: 1. Dr.T.Narppasalai Arasu
	2. Dr.P.Rajarajeswari

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	S	S	М	М	М	S	S
CO2	S	М	S	S	S	S	S	М	М	S
CO3	S	S	S	S	М	М	S	S	S	S
CO4	S	S	S	S	S	S	S	S	М	S
CO5	S	S	S	S	S	S	S	М	S	S



Core/Elective/Supportive Core Paper-VII 3 - 4 Pre-requisite Knowledge in Forces and Vector Algebra Syllabus Version 2022- 2023 Course Objectives: To impart knowledge about the projectile, Simple Harmonic Motion and understanding the notions of impact between two smooth spheres. Image: Syllabus Version 2022- 2023 Expected Course Outcomes: On the successful completion of the course, student will be able to: Image: Syllabus Version K1 2 Describe the differential equation of Central Orbits. K2 3 Apply the concepts of projectiles to solve problems relating to the motion of a projectile. K3 4 To understand & apply the concepts of composition of simple harmonic motion in two directions. K3 5 Understand impulsive forces and analyze loss of K.E due to direct and oblique impact. K4 K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create Vinit:1 Projectiles 9 hours Path of a projectile-Greatest height-time of flight – Range -range on an inclined plane through the point of projection-Maximum range. 9 hours Unit:2 Central Orbits 9 hours Radial and transverse components of velocity and acceleration – areal velocity of central orbits -	Course code	DYNAMICS	L	Т	Р	С						
Pre-requisite Knowledge in Forces and Vector Algebra Syllabus Version 2022-Version Course Objectives: To impart knowledge about the projectile, Simple Harmonic Motion and understanding the notions of impact between two smooth spheres. To impart knowledge about the projectile, Simple Harmonic Motion and understanding the notions of impact between two smooth spheres. Expected Course Outcomes: On the successful completion of the course, student will be able to: K1 1 Remember the basic kinematics and dynamic concepts. K1 2 Describe the differential equation of Central Orbits. K2 3 Apply the concepts of projectiles to solve problems relating to the motion of a projectile. K3 4 To understand & apply the concepts of composition of simple harmonic motion in two directions. K3 5 Understand impulsive forces and analyze loss of K.E due to direct and oblique impact. K4 K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create Phours Path of a projectile-Greatest height-time of flight - Range -range on an inclined plane through the point of projection-Maximum range. 9 hours Unit:1 Projectile acceleration - areal velocity of central orbits - Differential equation of central orbit in polar coordinates only. 9 hours Madii and transverse co	Core/Elective/Supportive	Core Paper-VII	3	-	-	4						
Course Objectives: To impart knowledge about the projectile, Simple Harmonic Motion and understanding the notions of impact between two smooth spheres. Expected Course Outcomes: On the successful completion of the course, student will be able to: 1 Remember the basic kinematics and dynamic concepts. K1 2 Describe the differential equation of Central Orbits. K2 3 Apply the concepts of projectiles to solve problems relating to the motion of a projectile. K3 4 To understand & apply the concepts of composition of simple harmonic motion in two directions. K4 5 Understand impulsive forces and analyze loss of K.E due to direct and oblique impact. K4 K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create Unit:1 Projectiles Projectile-Greatest height-time of flight – Range -range on an inclined plane through the point of projection-Maximum range. Unit:2 Central Orbits 9 hours Radial and transverse components of velocity and acceleration – areal velocity of central orbits - Differential equation of central orbit in polar coordinates only. Unit:3 Simple Harmonic Motion 9 hours Multick, periodic time, phase-composition of two simple harmonic motions of the same period in a strai	Pre-requisite	Knowledge in Forces and Vector Algebra	Syllabu Versior	is 1	2022- 2023							
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- Loss of Knette energy during oblique impact.	- Loss of Kinetic energy	during oblique impact.										
Total Lecture hours 45 hours		Total Lecture hours 45 hours										
Text Book	Text Book											

1	Dynamics -M.K.Venkataraman (11th Ed. Agasthiar Publications, Trichy, 1994.)								
Re	Reference Books								
1	Dynamics -A.V.Dharamapadam (S.Viswanathan Printers and Publishers Pvt., Ltd,								
	Chennai, 1998)								
2	Dynamics -K.Viswanatha Naik and M.S.Kasi (Emerald Publishers, 1992)								
3	Dynamics -Naryanamurthi (National Publishers, New Delhi, 1991)								
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]								
1	https://nptel.ac.in/courses/115/106/115106119/								
2	https://www.askiitians.com/iit-jee-physics/mechanics/motion-of-projectile.aspx								
Co	ourse Designed By: 1. Dr.T.Nandhagopal								
	2. Mr.M.Balasankar								

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	М	М	S	S	S	S	S
CO2	М	М	М	М	М	S	М	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	М	М	М	М	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	М

Course code			PROGRAMMING IN C	L	Т	Р	С			
Core/Elective/Supportive			Core Paper-VIII	2	-	-	3			
Pre	e-requisite		Higher Secondary Level Mathematics	Syllabus2022 –Version2023						
Cou	rse Object	tives:								
To ii	To impart the importance of C language, its structure, Data types, Operators of C, Various control									
state	ments, Ari	ays, differe	nt types of functions and practical problems.							
T.		0.4								
Exp On	the succes	rse Outcon	nes: ation of the course, student will be able to:							
0 in the successful completion of the course, student will be able to: 1 Demember the importance of C language and determined										
2	 Remember the importance of C language and datatypes. Understand the basis structure operators and statements of C language 									
2	Understa	nd decision	control statements loop control statements			K2 K2				
	Apply th	nu uccision	of data types operators expressions control st	atemení	c	K2 K3				
-	arravs. ch	naracter arra	aves and strings to write the C code for a given algorith	m.	,	KJ				
5	Read, und	lerstand and	trace the execution of programs written in C language	•		K4				
K1	- Rememb	oer; K2 - U1	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate	; K6 – (Cre	ate				
Un	it:1		Constants, Variables and Data Types			6 hou	rs			
Intro	duction -	Importance	e of C- Basic structure of C programme - Characte	er set -(Cor	nstants	-			
Key	words and	identifiers -	- Variables Data types – Declaration of variables – A	Assignii	ng v	values t	0			
varia	ables –Deli	ining symbo	DIC constants.							
Un	it:2		Operators and Expressions			6 hou	rs			
Arith	nmetic ope	erators -	Relational operators - logical operators - assig	nment	ope	erators	_			
incre	ement and	decrement	operators - Conditional operators - Special operators	ators –	Ar	ithmeti	С			
expr	essions –E	valuation of	f expressions – Precedence of arithmetic operators – S	ome con	mp	utationa	ul			
prob	lems – Typ	be conversion	on in expressions – operator precedence and associa	ating m	ath	ematica	ιl			
Tune	uons.									
Un	Unit:3 Managing Input -Output Operations, Decision Making and Branching					6 hours				
Read	ling and W	riting chara	acter – formatted input and output. Decision making	with IF	sta	tement	_			
Simp lodd	ole IF state	ement – Th	e IF ELSE statement - Nesting of IF ELSE stateme	nt – Th	ne I	ELSE I	F			
ladder. The Switch statement – The ? Operator – The GOTO statement.										
Un	it:4		Decision Making and Looping			6 hou	rs			
The	e WHILE s	tatement - th	ne DO statement - the FOR statement –Jumps in loops							
•										

Uı	nit:5	Arrays and Strings	6 hours						
Or —E the	ne, Two dir Declaring ar e screen – A	nensional arrays – initializing two dimensional arrays – Multid ad initializing string variables – reading strings from terminal – ` Arithmetic operations on characters.	imensional arrays Writing strings on						
		Total Lecture hours	30 hours						
Te	ext Book								
1	Programm limited, N	ing in ANSI C -E.Balagurusamy (Tata McGraw –Hill Pu ew Delhi, Fifth Edition,2008)	blishing Company						
Re	eference Bo	ooks							
1	Programming with C (Schaum's outline series)- Byron Gottfried (Tata McGraw Hill publishing company -1998.)								
2	Programm 2002)	ing with ANSI and Turbo C -Ashok N.Kamthane (Pearson Ec	lucation publishers,						
3	The spirit	of 'C' -Henry Mullish and Herbert L cooper (Jaico publisher, 1	.996.)						
4	The ANS Private Li	C- Brian W.Kernighan, Dennis M.Ritchie (Published by Prention mited, M-97, New Delhi- 110001, Second edition, Ocober 1992	ce- Hall of India						
5	ANSI C: Publishing	With Microsoft C 5.1 and Quick C 2.0 -C.Balasubramanian.(g company limited, New Delhi.)	Tata McGraw-Hill						
6	Programm	ing In C - Kris A.Jamsa (Galgotia Publications Pvt.ltd. 1992)							
R	elated Onli	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]							
1	https://nn	tel.ac.in/courses/106/104/106104128/							
2	https://np	tel.ac.in/courses/106/105/106105171/							
C	ourse Desig	ned By: 1 Dr T Narppasalai Arasu							
C	Juise Desig								
		2. Dr.P.Kajarajeswari							

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	S	S	М	М	М	S	S
CO2	S	S	М	М	S	М	Μ	S	М	S
CO3	S	М	М	М	S	S	Μ	S	S	S
CO4	S	S	S	S	S	Μ	S	S	S	М
CO5	S	S	S	S	S	М	S	S	S	S

Course code		PROGRAMMING IN C-(PRACTICAL)	L	Т	Р	C		
Core/Elective/S	Supportive	Core Paper VIII (Practical)	-	-	1	1		
Pre-requisite		Knowledge in C	Syllabus Version		2022 2023	-		
PRACTICAL LIST								
1. Write a C pr 2. Write a C pr	ogram to ge ogram to pr	enerate 'N' Fibonacci number. Fint all possible roots for a given quadratic equation.						

- 3. Write a C program to calculate the statistical values of mean, median.
- 4. Write a C program to calculate the statistical values of Standard Deviation and variance of the given data.
- 5. Write a C program to sort a set of numbers.
- 6. Write a C program to sort the given set of names.
- 7. Write a C program to find factorial value of a given number 'N' using recursive function call.
- 8. Write a C program to find the product of two given matrix

Cou	rse code		OPERATIONS RESEARCH – PAPER II	L	Т	Р	С			
Core	e/Elective/S	Supportive	SKILL BASED SUBJECT	2	-	- 2				
Pre	e-requisite)	Knowledge in Basic Mathematical Concepts	Knowledge in Basic Mathematical Concepts Syllabus Version						
Course Objectives:										
To in optin	To impart knowledge in Assignment Problems, Game theory, performance measures of queues and optimal use of Inventory.									
D		0.4								
Exp	the succes	rse Outcon	nes:							
			tion of the course, student will be able to.	· · · · · · · · ·		12	1			
1	determin	e the optimation	al order quantity for models.	;anizatio	on,	K	.1			
2	Explain t	he various of	costs related to inventory system.			K	.2			
3	3 Apply game theory concepts to articulate real-world situations by identifying, analyzing and practicing strategic decisions.									
4	Apply an	d extend qu	leueing models to analyze real world systems.			K	4			
5	5 Build and solve assignment model.									
K1	- Rememb	oer; K2 - Ui	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 – C	reat	e				
Un	it:1		Assignment Model		6	hou	rs			
The Prob	Assignmen dems.	nt Problems	– Assignment algorithm – optimum solutions – Unbal	anced A	ssig	gnme	nt			
Un	it:2		Game Theory	6 hours			rs			
Gam Solu – Pro	Game Theory – Two-person zero sum game – The Maximin – Minimax principle – problems - Solution of 2 x 2 rectangular Games – Domination Property – (2 x n) and (m x 2) graphical method – Problems.									
Un	Unit:3 Oueveing Model 6						rs			
Ou	eueing The	eory – Intro	oduction – Oueueing system – Characteristics of Ou	eueing s	vste	m –				
Syr	nbols and	Notations –	Classifications of queues – Problems in $(M/M/1)$: (م/FIFO))					
Unit:4Multi-Channel Queueing Models6 h										
Prob	olems in (N	1/M/1):(N/F	EIFO); (M/M/C) : (∞/FIFO); (M/M/C) : (N/FIFO) Mo	odels.						
Un	it:5		Inventory Models		6	b hours				
Inve Prod – EC	ntory cont luction pro DQ with pr	rol – Types blem with r ice breaks.	of inventories – Inventory costs – EOQ Problem w io shortages – EOQ with shortages – Production prob	ith no s lem with	hort 1 sho	ages ortag	es			

		Total Lecture hours	30 hours								
Те	ext Book										
1	 Operations Research – Kanti Swarup, P. K. Gupta, Man Mohan (S. Chand & Sons Education Publications, New Delhi, 12th Revised edition, 2003) 										
Re	eference Bo	oks									
1	Operations New Delh	s Research – Prem Kumar Gupta D. S. Hira (S. Chand & Compar i,2014)	ny Ltd, Ram Nagar,								
2	2 Operations Research Principles and Problems- S. Dharani Venkata Krishnan (Keerthi publishing house PVT Ltd.1994)										
Re	elated Onlin	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]									
1	https://npt	el.ac.in/courses/111/102/111102012/									
2	https://you	tu.be/zADj0k0waFY									
	https://you	<u>itu.be/xvDdrswAj8M</u>									
	https://ww	w.youtube.com/watch?v=xVPoWkkQTrQ									
	https://ww	w.youtube.com/watch?v=7kDtTAnvuww									
	https://ww	w.youtube.com/watch?v=IfLsPHKk51w									
3	https://npt	el.ac.in/courses/109/103/109103021/									
4	https://n	otel.ac.in/courses/110/105/110105082/									
	https://nptel.ac.in/courses/110/106/110106045/										
Co	ourse Desig	ned By: 1. Dr.T.Narppasalai Arasu									
		2. Dr.P.Rajarajeswari									

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	S	S	М	S	М	М	М	S	S
CO2	М	М	М	М	S	S	М	М	М	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	М	S	М	S	М	S	М

Fifth Semester


Cou	rse code		REAL ANALYSIS - I	L	Т	Р	С					
Core	/Elective/S	upportive	Core Paper – IX	5	-	-	4					
Pre	-requisite		Knowledge in the basic properties of real numbers	Syllabus Version	20 20)22 ·)23	•					
Cou	rse Object	tives:										
Aime unde	ed at exposing rstanding	sing the real various phy	l number systems that underpin the development of sical phenomena.	real analys	is a	ind i	n					
Expe	ected Cou	rse Outcon	nes:									
On	On the successful completion of the course, student will be able to:											
1	Rememb	er the basic	topological properties of subsets of the real number	s.		K	.1					
2	2 Understand the fundamental properties of the real numbers and analyze the real K2 number system.											
3	Learn the concept of limits, sequence, continuity, convergent sequence in metric K2 spaces appreciating the abstract ideas and their applicability.											
4	Have the proficiency in the formulation and construction of proofs of basic results in K3 real analysis.											
5Demonstrate skills in communicating Mathematics and learn basic techniques and examples in analysis to be well prepared for extended learning.K4												
K1	- Rememb	oer; K2 - Ur	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate	e; K6 – Cre	eate							
Uni	···1		The Real and Complex Number Systems		15	hou	re					
Unit:1The Real and Complex Number Systems15 hoursIntroduction -the field axioms, the order axioms –integers –the unique Factorization theorem for integers –Rational numbers –Irrational numbers –Upper bounds, maximum Elements, least upper bound –the completeness axiom –some properties of the supremum –properties of the integers deduced from the completeness axiom- The Archimedean property of the real number system –Rational numbers with finite decimal representation of real numbers –absolute values and the triangle inequality –the Cauchy-Schwarz inequality –plus and minus infinity and the extended real number system.												
Um	4.7	[Degic Notions of a Set Theory		15	hav						
Nota	tions –ord	lered nairs	-Cartesian product of two sets - Relations and t	functions -	<u>15</u> _ f	urth	er					
termi seque the re	Notations –ordered pairs –Cartesian product of two sets – Relations and functions – further terminology concerning functions –one–one functions and inverse –composite functions – sequences –similar sets-finite and infinite sets –countable and uncountable sets –uncountability of the real number system –set algebra –countable collection of countable sets.											
Uni	it:3		Elements of Point Set Topology		15	hou	irs					

Ele	ements of p	oint set topology: Euclidean space R ⁿ -open balls and open sets	in R ⁿ . The structure							
of	open sets i	n \mathbb{R}^n –closed sets and adherent points –The Bolzano –Weier	strass theorem –the							
Ca	ntor Interse	ction Theorem								
Ur	nit:4	Covering and Compactness	15 hours							
Cov	vering –Lind	lelof covering theoremthe Heine- Borel covering theoremC	ompactness in R ⁿ							
-M	letric Space	s-point set topology in metric spaces -compact subsets of a met	ric space – Boundary							
of a	set.									
Ur	nit:5	Limits and Continuity in Metric Spaces	15 hours							
Cor	vergent sec	uences in a metric space -Cauchy sequences -Completeness se	quences – complete							
met	metric Spaces. Limit of a function –Continuous functions –continuity of composite functions.									
Cor	tinuous cor	nplex valued and vector valued functions.	-							
		Total Lecture hours	75 hours							
Te	xt Book									
1	Mathemati	cal Analysis-T.M.Apostol (2nd ed., Narosa Publishing Comp	any, Chennai, 1990.)							
	Un	it I : Chapter 1 Sections 1.2, 1.3, 1.6 to 1.16, 1.18 to 1.20	, , , , , , , , , , , , , , , , , , ,							
	Un	it II : Chapter 2 Sections 2.2 to 2.15								
	Un	it III : Chapter 3 Sections 3.2 to 3.9								
	Un	it IV : Chapter 3 Sections 3.10 to 3.16								
	Un	it V : Chapter 4 Sections 4.2 to $4.5, 4.8$ to 4.10								
	U									
Re	eference Bo	oks								
1	Methods o	f Real Analysis -R.R.Goldberg.(NY, John Wiley, New York 19	976.)							
2	Introductio	on to Topology and Modern Analysis- G.F.Simmons. (McGrav	v – Hill, New York,							
	1963.)									
3	A survey of	f Modern Algebra (3rd Edition)-G.Birkhoff and MacLane.(N	Iacmillan, New							
	York, 196	5.)								
4	Real Ana	lysis -J.N.Sharma and A.R.Vasishtha.(Krishna Prakashan Mec	ia (P) Ltd, 1997)							
Re	lated Onlin	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]								
1	https://nr	otel.ac.in/courses/111/105/111105069/#								
2	2 https://nptel.ac.in/courses/111/101/11101134/									
3	3 https://www.digimat.in/nptel/courses/video/111105098/									
4	4 https://nptel.ac.in/courses/111/106/111106053/									
	<u>,,,,,,,</u>									
Co	ourse Desig	ned By: 1 Dr S Palaniammal								
		2. Dr.E.Rameshkumar.								
3 4 Co	https://w https://np https://np	ww.digimat.in/nptel/courses/video/111105098/ otel.ac.in/courses/111/106/111106053/ ned By: 1. Dr.S.Palaniammal 2. Dr.E.Rameshkumar.								

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	М	М	М	М	М	S	S
CO2	S	S	М	М	М	S	S	М	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	М

Cours	se code		COMPLEX ANALYSIS - I	L	Т	Р	С					
Core/E	Clective/Su	pportive	Core Paper – X	6	-	-	4					
Pre-r	equisite		Knowledge in Calculus	Syllabu Versioi	is 2 1 2	2022 – 2023						
Cours	e Objecti	ves:										
To equ analyti	uip the stucture the stucture city ,pow	idents with er series ar	the understanding of the fundamental concepts on d complex integration.	f compl	ex fu	nctior	ıs,					
Evnor	tod Cour	so Outcom	2001									
Expected Course Outcomes: On the successful completion of the course, student will be able to:												
	1 Learn techniques of complex analysis effectively to establish mathematical results K1											
1	Pagani	the sime	le and multiple connected domains	litearies	suns.							
2 Recognize the simple and multiple connected domains.												
3 Investigate a function for its analyticity and find it series development.												
4	Examine	the relation	nship between conformal mapping and analytic fu	nctions		K4						
5	Compute	contour in	tegrals directly and by the fundamental theorem.			K4						
K1 -]	Remembe	er; K2 - Un	derstand; K3 - Apply; K4 - Analyze; K5 - Evalua	ite; K6 ·	- Cre	ate						
Unit:	1		Complex Plane		1	8 hou	ırs					
Compl	lex numb	er system	-Field of Complex numbers – Scalar multiplica	tion of	a co	mplex	•					
numbe	r – Conju	gation – A	bsolute value of a complex number-inequalities in	terms of	of mo	dulı –	-					
Elemen	ntary Tra	nsformatio	ns 1) $W=Z + \alpha$ 11) $W = aZ$ 111) $W = 1/Z$.Fixed p	ooints -	cross	-ratio-						
Stereo	araphic p	oiection	der binnear transformation –Definition of extende	eu comp	nex p	nane –	-					
SICICO	graphic p	ojection.										
Unit:	2		Analytic Functions		1	8 hou	ırs					
Compl	ex Functi	ions- Limit	t of a function -continuity -differentiability - A	Analytic	al fu	nctior	t					
defined	d in a re	egion –nec	cessary conditions for differentiability -sufficient	ent con	ditio	ns foi	•					
differe	ntiability	-Cauchy-F	Riemann equation in polar coordinates –Definition	of enti	re fur	nction						
Unit:	3	Po	wer Series and Elementary Functions		-	18 hou	ırs					
Absolu	ite conver	gence –ciro	cle of convergence – Analyticity of the sum of powe	er series	in th	e Circ	le					
of con	vergence	(term by t	term differentiation of a series). Elementary fun	ctions:	Expo	nentia	ıl,					
Logari	thmic, Tr	igonometri	c and Hyperbolic functions.									
Unit:	4	Har	monic Functions and Conformal Mapping			18 hou	ırs					
Conjug	gate Harn	nonic func	tions: Definition and determination. Conformal	Mappi	ng: I	sogon	al					
mappii	ng –Confe	ormal Map	ping-Mapping $z \rightarrow f(z)$, where f is analytic, particu	larly th	e maj	opings	.					
$w = e^{z}$	$w = z^{2};$	$w = \sin z;$	$w = \cos z$; $w = z + 1/z$.									

T I	4. E		10 h
Uni	it:5	Complex Integration	18 hours
Simp	bly and mul	tiply connected regions in the complex plane. Integration of	f(z) from definition
along	g a curve joi	ning Z_1 and Z_2 . Proof of Cauchy's Theorem (using Goursat's	s lemma for a simply
conn	ected regio	n). Statement of Cauchy's integral formula for higher der	rivatives - Morera's
theor	rem.		
		Total Lecture hours	90 hours
T.	4 D 1	Total Ecclure nours	70 Hours
1 ex	Commission	Analysia (Fan Undergraduate Students of Mathematic	a Dhusiaa and
1	Engineerir	Analysis (For Undergraduate Students of Mathematic	s, Physics and
	And Com	ng) - F. Duraipanulaii and Kayalai Facharyappa (S Chand Fuol Dany Limited Reprint 2020)	iisiinig, 5 Chand
	$\mathbf{IInit I} \cdot$	Chapter 1 Sections 1 1 to 1 3 1 6 to 1 9	
		Chapter 2. Sections 2.1 to 2.2.2.6 to 2.10	
		Chapter 7 Section 7.1	
	Unit II :	Chapter 4 Sections 4 1 to 4 10	
	Unit III:	Chapter 6 Sections 6.1 to 6.11	
	Unit IV :	Chapter 6 Sections 6.12 to 6.13	
		Chapter 7 Sections 7.4.7.6 to 7.10	
	Unit V :	Chapter 8 Sections 8.1 to 8.9	
		•	
Ref	erence Boo	ks	
1	Complex V	Variable and Applications -Churchill and Others.(Tata McC	Fraw Hill Publishing
1	Company	Ltd, 1974.)	_
n	Theory of	functions of Complex Variable -Shanti Narayan (S.Ch	and and Company,
Z	Meerut, 19	995.)	
2	Functions	of Complex Variable -Tyagi B.S(17th Edition, Pragati Pral	kasham Publishing
3	Company	Ltd, Meerut, 1992-93)	
Rel	ated Onlin	e Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://npt	rel.ac.in/courses/111/103/111103070/	
2	https://npt	rel.ac.in/courses/111/107/111107056/	
3	https://npt	el.ac.in/courses/122/103/122103012/	
Cot	urse Designo	ed By 1.Dr.T.Narppasalai Arasu	
		2.Ms.S.Kavunthi	

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	М	М	S	S	Μ	Μ	М	S	S
CO2	S	М	М	М	М	S	Μ	S	S	S
CO3	S	S	Μ	S	S	S	S	S	S	S
CO4	S	S	Μ	S	М	S	S	S	S	S
CO5	S	S	S	S	Μ	S	S	S	S	М

Cour	se code		MODERN ALGEBRA - I	L	Т	Р	С				
Core/l	Elective/Su	pportive	Core Paper – XI	6	-	-	4				
Pre-	requisite		Higher Secondary Level Mathematics	Syllat Versio	ous on	202 202	2 - 3				
Cours	se Objecti	ves:									
Focus	es on the o	concepts of	algebraic structures which is one of a pillar of mo	dern M	lathe	mati	CS				
and er	nphasis or	their prop	erties and applications.								
T.	4.10	0.4									
Expec	be success	ful complex	tion of the course, student will be able to:								
1	Decall th	a propertie	s and extend group structure to finite permutation g	roung		K	1				
2	Exploin t	be concent	s of homomorphism, isomorphism and automorphism	m			.1 ')				
2	Domonot		thinking conscituted chility to prove theorems	5111.			2				
3	Demonst	rate abstrac	ci uniking capacity and ability to prove theorems.			K V	.3				
4	Compare	i features of	f different algebraic structures.			K	.4				
5 Examine the properties of algebraic structures and their role in applied contexts.											
<u>K1 -</u>	K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create										
Unit:1Groups and its Basic Properties18 hour											
Sets -	mappings	- Relation	ns and binary operations – Groups: Abelian group, S	Symme	etric g	grou)				
Defini	itions and	Examples -	– Basic properties.								
Unit	:2		Subgroups and Normal Subgroups		1	8 ho	urs				
Subgr	oups – Cy	clic subgro	oup - Index of a group – Order of an element – Fer	mat th	eoren	n - A	1				
Count	ing Princi	ple - Norm	al Subgroups and Quotient Groups.								
Unit	:3		Automorphisms		18	ho	urs				
Hom	omorphisi	ns (Applic	ations 1 and 2 are omitted) -Automorphisms – Inn	er auto	morp	hisn	1				
- Ca	yley's theo	orem, perm	utation groups.								
T			Dinga		10	ha					
Dofini	:4 ition and E	vomnlog	Kings	Field	51 Int	o no	urs				
domai	in - Homo	morphisms	of Rings.	- Field	— III(egia	1				
TT. •4			Ideals and Or direct Pin		14	0 1.					
Ideala	and Quet	ient Pingo	More Ideals and Quotient Rings Maximal ide	al Ti	$\frac{1}{10}$	o no	urs f				
Quotio	ents of an	Integral Do	main.	ai - 11		JU U	L				
domai Unit Ideals Quotic	in - Homo :5 and Quot ents of an	morphisms ient Rings Integral Do	of Rings. Ideals and Quotient Rings – More Ideals and Quotient Rings – Maximal ide omain.	al - Th	18 ne fie	<mark>8 ho</mark> Id o	urs f				

		Total Lecture hours	90 hours
Tex	kt Book		
1	Topics in	Algebra -I.N. Herstein (John Wiley & Sons, New York, 2003	3.)
	Unit I :	Chapter 1 Sections 1.1 to 1.3,	
		Chapter 2 Sections 2.1 to 2.3	
	Unit II	Chapter 2 Sections 2.4 to 2.6	
	Unit III :	Chapter 2 Sections 2.7 to 2.10	
	Unit IV:	Chapter 3 Sections 3.1 to 3.3	
	Unit V :	Chapter 3 Sections 3.4 to 3.6.	
Ref	erence Boo	oks	
1	Modern A	Algebra -Surjeet Singh and Qazi Zameeruddin. (Vikas Publis	shing house, 1992.)
2	Modern A	Algebra- A.R.Vasishtha (Krishna Prakashan Mandir, Meerut	, 1994 - 95.)
Rel	ated Onlin	e Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://npte	l.ac.in/courses/106/104/106104149/	
2	https://npte	el.ac.in/courses/111/106/111106113/	
3	https://www	w.classcentral.com/course/swayam-modern-algebra-14201	
Cou	urse Design	ed By: 1.Ms.A.Karpagam	
		2. Mr.M.Balasankar	

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	М	М	S	М	S	S	М	S	S
CO2	Μ	Μ	S	S	Μ	S	S	S	S	S
CO3	S	М	М	S	S	S	S	S	S	S
CO4	S	М	М	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

Cou	rse code		DISCRETE MATHEMATICS	L	Т	Р	С		
Core	e/Elective/S	upportive	Core paper XII	5	-	-	4		
Pre	e-requisite		Higher Secondary Level Mathematics	Syllabu Version	S	202 202	2- 3		
Cou	rse Object	tives:							
Prep	are studer	nts to deve	elop mathematical foundations to understand, crea	te matl	ner	natio	cal		
argu Theo	ments and ory.	focuses on	the Formal languages, Automata, Lattices, Boolean A	lgebra a	nd	Gra	ph		
Fwn	ootod Cou	nco Autoon	2052						
<u>Exp</u> On	the succes	sful comple	tion of the course, student will be able to:						
1			result the course, student will be able to:	actions		K	[]		
2	Know and	d understan	d about partially ordered sets. Boolean algebra lattices	and thei	r	K	2		
types.									
3 Apply Karnaugh map for simplifying the Boolean expression.									
4	4 Demonstrate the skill to construct simple mathematical proofs and to validate.								
5 To achieve greater accuracy, clarity of thought and language.									
K1 - Remember: K2 - Understand: K3 - Apply: K4 - Analyze: K5 - Evaluate: K6 - Create									
Un	it:1		Mathematical logic		15	hou	irs		
Con impl	nectives, ications, I	well-forme Duality law	d formulas, Tautology, Equivalence of formula, Normal forms, Predicates, Variables, Quantifiers,	as, Tau Free ar	ito] id	logic bou	al nd		
Vari	ables. The	ory of infer	ence for predicate calculus.						
		[
Un	it:2	of volations	Relations and Functions		15	hou	irs		
Col	nposition (notions U	Composition of functions, inverse functions, one-to-	one, one), (^	Jack	10- 200		
stru	ctures: Sei	mi groups	Free semi groups. Monoids	metions	. Л	iget	па		
Un	it:3		Formal Languages and Automata		15	hou	irs		
Reg	gular expre	essions, Typ	es of grammar, Regular grammar and finite state autor	nata, Co	ont	ext			
free	e and sensi	tive gramm	ars.						
Un	it•1		Lattices and Boolean Algebra		15	hou	irs		
Par	tial orderin	ig, Poset,	Lattices, Boolean algebra, Boolean functions, Theorem	ns, Min	$\frac{10}{10}$	izati	on		
of l	of Boolean functions(Karnaugh Method only).								
Un	it·5		Cranh Theory		15	hou	irc		
Dir	ected and i	Indirected o	raphs. Paths. Reachability. Connectedness. Matrix ren	resentati	<u>13</u>	. En	ler		
pat	hs, Hamilto	onian paths	Trees, Binary trees - theorems, and applications.			, u			

		Total Lecture hours	75 hours							
Те	xt Book									
1	Discrete	Mathematical Structures with applications to computer	science-J.P							
	Tremblay	and R.P Manohar (Mc.Graw Hill, 1975.)								
	Unit I	: Chapter 1. Sections - 1-2, 1-2.7. 1-2.9, 1-2.10, 1-2.11, 1-3, 1-5	5.1, 1-5.2, 1-5.4, 1-6.4							
	Unit II	: Chapter 2- Sections - 2-3.5, 2-3.7, 2-4.2, 2-4.3, 2-4.6,								
		Chapter 3- Sections-3-2, 3-5, 3-5.3,								
	Unit III	: Chapter 3- Sections 3-3.1, 3-3.2								
		Chapter 4- Section 4-6.2								
	Unit IV : Chapter 4- Section 4-1.1, 4-2, 4-3, 4-4.2									
	Unit V : Chapter 5- Section 5-1.1, 5-1.2, 5-1.3, 5-1.4									
Re	eference Bo	ok								
1	Discrete N	Athematics-Oscar Levin (3 rd Edition, 2016)								
Re	elated Onlin	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]								
1	https://npte	1.ac.in/courses/106/106/106094/								
2	https://npte	l.ac.in/courses/111/107/111107058/								
Co	ourse Design	ned By: 1. Ms.A.Karpagam								
		2. Ms.S.Kavunthi								

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	S	S	S	М	S	Μ	М	S	S
CO2	S	Μ	S	S	М	S	S	S	S	S
CO3	S	Μ	S	S	М	S	Μ	S	S	S
CO4	S	Μ	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

Course code		OPERATIONS RESEARCH – PAPER III	L	Т	Р	С					
Core/Elective	Supportive	Skill Based Subject	3	-	-	2					
D			Syllabu	s 2	2022	2-					
Pre-requisi	e	Knowledge in Basics of Operations Research	Version	1 2	2023	3					
Course Obje	ctives:										
Presents appli	cations and 1	nethod to solve Integer Programming Problems, Non-	linear Pro	ogra	mm	ing					
Problems and	Dynamic Pro	gramming problems.									
Eveneeted Co	unco Outoor	noge									
On the successful completion of the course, student will be able to:											
1 Know t	be concept of	f simulation and simulate a queueing system			K	1					
1 Kilow t	and the over	Il approach of dunamic programming				.1 `?					
$\frac{2}{2}$		in approach of dynamic programming.	a ~ V.sha			2					
5 Solve n Tucker	conditions	traniming problems using Lagrange multiplier and usi	ng Kunn	-	K	.2					
4 Apply concepts in optimal scheduling											
5 To formulate a model for solving the intractable problems.											
K1 - Remember: K2 - Understand: K3 - Apply: K4 - Applyze: K5 - Evaluate: K6 - Create											
The residence, The Charles and Tappin, and											
Unit:1 Simulation 9 hours											
Introduction-	simulation n	nodels-Event-Types of simulation- Generation of	random	nun	nber	-s-					
Monte-Carlo	simulation- s	imulation of queueing system.									
Unit:2		Network Scheduling By PERT/CPM		91	hou	rs					
Introduction-	Network ar	d basic components- Rules of Network construction-	Time ca	alcu	latio	on					
in Networks-	CPM. Pert C	alculations- Cost Analysis- crashing the network- Pro	blems.								
Unit:3		Integer Programming Problem		91	hou	rs					
Integer Progra	amming Prob	lem – Gomory's fractional cut Method – Branch an	d Bound	l Me	etho	d.					
Unit:4		Non-linear Programming Problems		91	hou	rs					
General NLP	P – Lagrang	ge multiplier – Hessian bordered Matrix – Kuhn Tu	icker Co	ndit	ion	_					
Problems.											
Unit.5		Dynamic Programming Problem		91	hou	rs					
Dynamic Pro	pramming Pi	oblem – Recursive equation approach – D.P.P Algori	thm – So	oluti	ion	of					
L.P.P by D.P.	P.										
		Total Lecture hours		45 I	hou	rs					
Text Book				~							
1 Operatio	ns Research	– Kanti Swarup, P. K. Gupta, Man Mohan (S. Ch	and &	Son	S						

	Education Publications, New Delhi, 12th Revised edition, 2003)									
Re	Reference Books									
1	Operations Research – Prem Kumar Gupta& D. S. Hira (S. Chand & Company Ltd, Ram Nagar, New Delhi ,2014)									
2	Operations Research Principles and Problems- S. Dharani Venkata Krishnan (Keerthi publishing house PVT Ltd ,1994)									
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]									
1	https://nptel.ac.in/courses/111/107/111107104/									
2	https://nptel.ac.in/courses/111/102/111102012/									
3	https://nptel.ac.in/courses/111/104/111104027/									
4	https://nptel.ac.in/courses/111/105/111105039/									
Co	ourse Designed By: 1. Dr.T.Narppasalai Arasu									
	2. Dr.P.Rajarajeswari									

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	S	S	S	S	S	S	S	S
CO2	S	М	М	М	М	S	S	М	S	S
CO3	S	М	М	S	М	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	М	S	S	S	S	S	S

Sixth Semester



Cou	rse code		REAL ANALYSIS - II	L	Т	P	С				
Core	e/Elective/S	upportive	Core Paper – XIII	5	-	-	4				
Pre	e-requisite		Knowledge in Mappings and Properties of Real Numbers	Syllabu Version	S	202 202	2- 3				
Cou	rse Objec	tives:									
To present a deeper and rigorous understanding of fundamental concepts like continu											
connectivity, derivative, monotonic functions with properties and Riemann - Stieltjes integral.											
Even acted Courses Outcomes											
Exp	ected Cou	rse Outcon	nes:								
	On the successful completion of the course, student will be able to:										
1	Demonst connecte	rate the ur dness.	iderstanding of continuity, uniform continuity, co	mpactnes	3S,	K	.1				
2	Understa	nd partition	s and their refinement.			K	2				
3	Determin bounded	the Riem function.	nann integrability and the Riemann-Stieltjes integral	oility of	a	K	2				
4	Examine	the derivation	ives of function.			K	3				
⁵ Acquire skills in writing and analyze the proofs that arise in the context of real analysis											
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create											
Un	it:1		Topological Mappings		15	hou	rs				
Exar	nples of co	ontinuous fu	nctions -continuity and inverse images of open or clos	ed sets –	fun	ctio	ns				
cont	inuous on	compact set	s – Topological mappings – Bolzano's theorem.								
		ſ									
Un	it:2		Monotonic Functions		15	hou	rs				
Con	nectedness	-compone	nts of a metric space – Uniform continuity - Unifo	rm contii	nui	ty ai	nd				
com	pact sets –	fixed point	theorem for contractions –monotonic functions.								
Un	it·3		Derivatives		15	hou	rs				
Def	finition of	 derivative –	Derivative and continuity –Algebra of derivatives – t	he chain	rul	e –0	ne				
side	ed derivati	ves and infi	inite derivatives –functions with non-zero derivatives	-zero de	eriv	vativ	es				
and	local ex	trema –Rol	lle's theorem -The mean value theorem for deriv	vatives –	Та	yloı	's				
for	nula with	remainder.				-					
		ſ									
Un	<u>it:4</u>		Functions of Bounded Variation		15	hou	rs				
Prop	erties of r	nonotonic f	functions –functions of bounded variation –total Va	riation –	add	litive	2				
prop	erties of to	tal variatioi	1 on (a, x) as a function of $x - $ functions of bounded variations functions continuous functions of bounded variations	riation ex	pre	essec	1				
as til	as the unterence of increasing functions –continuous functions of bounded variation.										
Un	it:5		The Riemann-Stielties Integral		15	hou	rs				
Intro	duction -	Notation –	The definition of Riemann –Stielties integral –li	near pro	per	ties					
Integ	gration by	parts –chan	ge of variable in a Riemann – Stieltjes integral – Reduc	tion to a	Rie	emai	nn				
integ	integral.										

		Total Lecture hours	75 hours								
Te	ext Book										
1	Mathemati Company,	cal Analysis(2nded)-Tom. M. APOSTOL(Addison-Wisely. Naros Chennai, 1990.)	a Publishing								
	Unit I :	Chapter 4 Sections 4.11 to 4.15									
	Unit II :	Chapter 4 Sections 4.16, 4.17, 4.19, 4.20, 4.21, 4.23									
	Unit III : Chapter 5 Sections 5.2 to 5.10 and 5.12										
	Unit IV : Chapter 6 Sections 6.2 to 6.8										
	Unit V : Chapter 7 Sections 7.1 to 7.7										
Re	eference Bo	oks									
1	Methods	of Real Analysis -R.R.Goldberg (NY, John Wiley, New York	1976.)								
2	Introduct 1963.)	ion to Topology and Modern Analysis -G.F.Simmons (McGrav	v – Hill, New York,								
3	A survey 1965.)	of Modern Algebra -G.Birkhoff and MacLane (3rd Edition, Mac	cmillian, NewYork,								
4	Real Ana	lysis -J.N.Sharma and A.R.Vasistha.(Krishna Prakashan Media	(P) Ltd, 1997.)								
D											
		ne Contents [MOUC, SWAYAM, NPTEL, Websites etc.]									
1	<u>nttps://np</u>	el.ac.in/courses/111/106/111106053/									
2	https://wv https://wv	/w.math.ucdavis.edu/~emsiivia/math12//chapter/.pdf /w.whitman.edu/Documents/Academics/Mathematics/grady.pdf									
3	https://np	el.ac.in/courses/122/101/122101003/									
Co	ourse Desig	ned By: 1. Dr.S.Palaniammal									
		2. Dr.E.Rameshkumar									

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	М	S	S	S	М	S	S
CO2	М	М	М	М	М	S	S	М	S	S
CO3	S	М	М	S	S	S	М	S	S	S
CO4	S	М	М	S	S	S	М	S	S	S
CO5	М	М	S	М	М	S	S	S	S	М

Cou	rse code		COMPLEX ANALYSIS - II	L	Т	Р	С					
Core	e/Elective/S	Supportive	Core Paper – XIV	5	-	-	4					
Pro	e-requisite)	Knowledge in Analytic Functions, Complex Integration.	Syllabu Version	IS 1	2022 2022	2- 3					
Cou	rse Objec	tives:					-					
To func	functions, integrations of complex functions, meromorphic functions and their applications.											
Expected Course Outcomes:												
On the successful completion of the course, student will be able to:												
1	1 To recognize and apply the Liouville's theorem, the mean-value property of a function and the maximum modulus principle. K1											
2 Demonstrate understanding and appreciation of deeper aspects of complex analysis.												
3	Apply re	sidue theore	em to compute integrals.			K	3					
4	Ability t theorems	o think cri	tically by proving mathematical conjectures and oblex analysis.	establish	ing	K	4					
5 Classify the nature of singularity, poles and residues.												
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create												
Unit:1 Integral Theorems 15 hours												
Resu	ults based	on Cauch	y's theorem(I)-Zeros-Cauchy's Inequality – Liou	ville's tl	1e0	rem	-					
Fund	amental t	heorem of	algebra – Maximum modulus theorem – Gauss mear	i value t	neo	rem	_					
Gau	ss mean va											
Un	it:2		Taylor's Series and Laurent's Series		15	hou	rs					
Resi	ults based of	on Cauchy's	s theorem(II)-Taylor's series –Laurent's series.									
Un	it:3		Singularities and Residues		15	hou	rs					
Isola	ated singul	arities (Ren	novable Singularity, pole and essential singularity) –	Residues	–R	esid	ue					
theo	rem.											
Un	it:4		Real Definite Integrals		15	hou	rs					
Eval	uation usin	g the calcul	us of residues – Integration on the unit circle –Integral v	with $-\infty a$	nd	$+\infty$	as					
lowe	er and uppe	r limits with	the following integrals:									
i) P((x) / Q(x) wł	here the deg	ree of $Q(x)$ exceeds that of $P(x)$ at least 2.									
ii) (s real	in ax).f(x) axis.	, (cos ax).f(x), where a>0 and $f(z) \rightarrow 0$ as $z \rightarrow \infty$ and $f(z)$ does not	have a p	ole	on t	he					
iii) f	iii) $f(x)$ where $f(z)$ has a finite number of poles on the real axis.											
Integ	Integral of the type $\int_0^\infty \frac{x^{a-1}}{1+x} dx$, $0 < a < 1$.											
Un	it:5		Meromorphic Functions		15	hou	rs					

Theorem on number of zeros minus number of poles –Principle of argument-Rouche's theorem –								
Theorem that a function which is meromorphic in the extended plane is a rational function.								
Total Lecture hours 75 hours								
Text Book								
Complex Analysis (For Undergraduate Students of Mathematics, Physics and Engineering) -P.Duraipandian and Kayalal Pachaiyappa (S Chand Publishing, S Chand And Company Limited ,Reprint 2020)								
Unit I : Chapter 8 Sections 8.10, 8.11								
Unit II : Chapter 9 Sections 9.1 to 9.3, 9.13.								
Unit III : Chapter 9 Sections 9.5 to 9.12, 9.13. Chapter 10 Sections 10.1, 10.2 and 10.4.								
Unit IV : Chapter 10 Sections 10.3 and 10.4.								
Unit V : Chapter 11 Sections 11.1 to 11.3 (Except theorems 11.5 and 11.6)								
Reference Books								
1 Complex Variable and Applications -Churchill and Others(Tata Mc-graw Hill Publishing Company Ltd, 1974.)								
2 Theory of functions of Complex Variable - Shanti Narayan (S.Chand and Company ,Meerut, 1995)								
3 Functions of Complex Variable (17 ^h Edition)- Tyagi B.S (Pragati Prakasham Publishing Company Ltd, Meerut, 1992-93.)								
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]								
I nttps://nptel.ac.in/courses/111/105/1111050/0/ 2 https://mptel.ac.in/courses/111/106/111106004/								
2 <u>intps://nptel.ac.in/courses/122/103/122103012/</u> 4 https://nptel.ac.in/courses/122/103/122103012/								
4 <u>nups.//nptc1.ac.nl/courses/122/105/122105012/</u>								
Course Designed By: 1 Dr T Narnnasalai Arasu								
2.Ms.S.Kavunthi								

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	S	М	S	S	М	S	S
CO2	S	S	М	S	М	S	М	М	М	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	М	S	S	M	S	S	S	S	S
CO5	S	М	М	S	М	S	S	S	S	S

Course	code		MODERN ALGEBRA - II	L	Т	P	С			
Core/Ele	ctive/S	upportive	Core Paper – XV	5	-	-	4			
Pre-rec	luisite		Knowledge in Groups, Rings and Fields	Syllabu Versior	IS 1	202 202	2- 3			
Course	Object	tives:								
To devel	op und	derstanding	in the domain of matrix theory, vector spaces, linear	transfor	ma	tion	s as			
well as the	ne prin	ciples unde	erlying the subject.							
Expected	d Com	rse Outcor	nes							
On the	succes	sful comple	etion of the course, student will be able to:							
	mmun	icate and u	nderstand mathematical ideas and results with the corr	ect use c	of	K	[]			
	thema	tical definit	ions, terminology and symbols	eet use c	'1		.1			
2 Explain the concepts of base and dimension of Vector space.										
3 To apply the Gram-Schmidt process to construct an orthonormal set of vectors in an K										
inner product space.										
4 Demonstrate competence with the basic ideas of Matrix theory, Vector spaces, Dual spaces, Linear transformation.										
5 Ha	ve an i	nsight to a	alvze a real life problem and solve it.			K	4			
-										
K1 - Re	ememb	oer; K2 - U1	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - Cre	eate	2				
Unit:1			Matrices		15	hou	irs			
Introdu	$t_1 = \frac{1}{2}$	- Addition a	and Scalar Multiplication of Matrices – Product of Ma	itrices –	Fra	nspc	ose			
of a Ma	tr1X – .	Matrix Inve	erse – Symmetric and Skew - Symmetric Matrices.							
Init.?			Special Matrices		15	hou				
Hermiti	an and	l Skew-Her	mitian Matrices – Orthogonal and Unitary Matrices –	Rank of	<u>13</u> f a	<u>nou</u> Mati	niv			
-Chara	teristi	c Roots and	Characteristic Vectors of a Square Matrix	Kalik O	a	Iviau				
Churu	2001150	e Roots un								
Unit:3			Vector Spaces		15	hou	irs			
Elemen	tary B	asic Conce	pts – Subspace of a Vector space - Homomorphism	– Isom	orr	hisn	<u>1 -</u>			
Internal	and E	xternal dire	ect sums - Linear span - Linear Independence and Bas	es.	1					
			<u>^</u>							
Unit:4			Dual Spaces		15	hou	irs			
Dual Sp	aces –	Annihilato	or of a subspace - Inner Product Spaces – Norm of a Ve	ector - O	rth	ogor	ıal			
Vectors	- Orth	nogonal Con	mplement of a subspace – Orthonormal set.							
Unit:5	0.7.1		Linear Transformations		<u>15</u>	hou	irs			
Algebra	of Li	near Transf	ormations – Regular, Singular Transformations – Ran	ge of T	– F	lank	of			
T - Cha	racteri	stic Roots -	- Characteristic Vectors – Matrices.							

	Total Lecture hours 75 hours
Те	xt Books
1	Modern Algebra -R.Balakrishnan and M. Ramabadran.(Vikas Publishing House Pvt. Ltd, New Delhi, Second Revised Edition 1994) (For Units I & II) .
	Unit I : Chapter 1 Sections 1.1 to 1.3, 1.5 to 1.7
	Unit II : Chapter 1 Sections 1.8 and 1.9 Chapter 2 Section 2.9 Chapter 3 Section 3.9
2	Topics in Algebra -I.N. Herstein.(John Wiley & Sons, New York, 2003.) (For Units III, IV & V)
	Unit III : Chapter 4 Sections 4.1 and 4.2
	Unit IV : Chapter 4 Sections 4.3 and 4.4
	Unit V : Chapter 6 Sections 6.1, 6.2 and 6.3
Re	ference Books
1	Modern Algebra -Surjeet Singh and Qazi Zameeruddin (Vikas Publishing house, 1992.)
2	Modern Algebra - A.R. Vasishtha (Krishna Prakashan Mandir, Meerut, 1994 – 95.)
3	Linear Algebra -Seymour Lipschutz and Marc Lipson (3rd Edition, McGraw Hill, 2001.)
Re	lated Online Contents [MOOC_SWAVAM_NPTEL_Websites etc.]
1	https://nptel.ac.in/courses/111/106/111106135/
2	https://nptel.ac.in/courses/115/105/115105097/
3	https://nptel.ac.in/courses/111/101/111101115/
4	https://nptel.ac.in/courses/111/108/111108066/
Co	urse Designed By: 1.Mrs.A.Karpagam
	2 Mr M Balasankar

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	М	М	S	S	М	S	S
CO2	М	М	S	S	М	S	Μ	М	S	S
CO3	S	М	S	S	М	S	Μ	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	М

Course code	urse code OPERATIONS RESEARCH - PAPER -IV L T P							
Core/Elective/	Supportive	Skill Based Subject	2		-	2		
Pre-requisit	e	Knowledge in Basics of Operations Research	Syllabu Version		202 202	2- 3		
Course Object	ctives:							
To enhance the based on cost of	e students' ki optimization,	nowledge in decision analysis, sequencing of the jobs to replacement policies and analyze the cases according to	be carrie their cat	d ou egoi	ıt ries	3.		
Expected Cor	urse Outcor	nes•						
On the succe	ssful comple	etion of the course, student will be able to:						
1 Know th	ne principles	and applications of information theory.			ŀ	<u>X1</u>		
2 To unde	rstand seque	encing, replacement problems.			ŀ	<u>K2</u>		
3 Demons	trate skills to	o achieve their objective using sequencing models.			ŀ	ζ3		
4 Apply d	ecision mak	ing under different business environments.			ŀ	ζ4		
5 Determi	ne a solutior	to a rectangular game using simplex method.			ŀ	<u>K</u> 3		
K1 - Remem	ber; K2 - U	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - Cre	ate				
Unit:1		Decision Analysis		6	hou	ırs		
Decision Ma Tree Analysi	king enviror s.	ment – Decisions under uncertainty – Decision under	risk – D)eci:	sio	n —		
Limite?		Sequencing Droblems		6	har			
Introduction-	problem of	sequencing - basic terms used in sequencing- processi	ing n-ioh	s th	ror	115 10h		
2 machines (Problems or	- processing ly).	n –jobs through k machines - processing 2 jobs thr	rough k	mac	chi	nes		
	-							
Unit:3		Replacement Problems		6	hou	irs		
Introduction equipment th	- Replacem at fails sudd	ent of equipment / assets that deteriorates gradually enly and problems.	- replac	em	ent	of		
I Imited		Information Theory		6	har			
Introduction-	A measur	e of Information-Axiomatic Approach to Informat	ion- Ent	ron	по v-7	ns The		
expected info	ormation- Sc	me properties of entropy function-Joint and condition	al entrop	vies	<u> </u>	ne		
Unit.5		Applications		6	hoi	ire		
General solu	tion of (mx	n) rectangular games using simplex method - Relia	bility an	d s	yst	em		
failure rates	using replace	ement problems.						
		Total Lecture hours		30	hou	ırs		
Text Book						_		

1	Operations Research - Kanti Swarup, P. K. Gupta , Man Mohan (S. Chand & sons education									
	publications ; New Delhi,2003)									
Re	Reference Books									
1	Operations Research - P K Gupta & D S Hira (S. Chand and company ltd. Ram Nagar; New									
	Delhi,2014.)									
2	Operations Research principles problems - S Dharani Venkata Krishnan (keerthi publishing									
	house Pvt. Ltd.1994)									
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]									
1	https://nptel.ac.in/courses/117/104/117104129/									
2	https://nptel.ac.in/courses/110/105/110105082/									
3	https://nptel.ac.in/courses/110/106/110106045/									
Co	ourse Designed By: 1. Dr.T.Narppasalai Arasu									

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COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	S	S	S	S	М	S	S
CO2	S	S	S	S	S	S	S	М	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	М
CO5	S	М	М	S	S	S	S	S	М	S

Elective Courses



Cou	rse code		ASTRONOMY – I	L	T	Р	С			
Core	e/Elective/S	Supportive	ELECTIVE I – A	5	-	-	3			
Pro	e-requisite	2	Knowledge in Physics and Mathematics	Syllabu Version	ıs n	202 202	2- 3			
Cou	rse Objec	tives:								
To e	nable the s	tudents to u	nderstand the Astronomical aspects and about the laws g	governin	g th	e pla	anet			
mov	ements.									
Exp	ected Cou	rse Outcon	nes:							
On	the succes	sful comple	etion of the course, student will be able to:							
1	Define pr	roperties of	physical systems that comprise the known universe			K	.1			
2	Understa	nd the Solar	r system, Celestial sphere, Dip-Twilight & Kepler's la	ıws.		K	2			
3	3 Apply their physics and mathematical skills to problems in the areas of planetary K3 science.									
4	Demonst conclusio	rate the skil	l to infer valid scientific conclusions and communicat r and articulate manner.	e those		K	4			
5	Analyze	the astronor	he astronomical concepts.							
K1	- Rememb	oer; K2 - Ui	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - Cre	eate	;				
Un	it:1		Solar system		15	hou	irs			
Ge	neral descr	iption of the	e Solar system. Comets and meteorites – Spherical tri	gonomet	try.					
Un	it:2		Celestial sphere		15	hou	irs			
Cel	lestial sphe	ere – Celesti	al co – ordinates – Diurnal motion – Variation in leng	th of the	e da	y.				
Un	it:3		Geocentric parallax		15	hou	irs			
Dip	o – Twiligh	nt – Geocen	tric parallax.							
Un	it:4		Refraction		15	Shou	irs			
Re	fraction – 7	Fangent for	mula – Cassini's formula.							
						_				
Un	it:5		Kepler's law		15	hou	I rs			
Ke	pler's laws	– Relation	between true eccentric and mean anomalies.							
			Total Lecture Hours		75	hou	irs			
Te	xt Book									
1	Astronom Edition 19	y-S.Kumara 986)	velu and Susheela Kumaravelu (TextPublisher: Sival	casi: Jan	ki7	ιn				
Co	urse Desig	ned By: 1. I	Ms. S.Sobia							
		2. N	Mr.M.Balasankar							

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	Μ	Μ	Μ	S	S	S	S	М	S	S
CO2	М	М	Μ	S	S	S	S	М	S	М
CO3	М	М	Μ	М	М	S	М	S	S	S
CO4	S	S	Μ	S	S	S	S	S	S	S
CO5	S	М	Μ	S	S	S	Μ	S	М	S

Course code		NUMERICAL METHODS - I	L	T P	C							
Core/Elective/S	upportive	ELECTIVE I – B	5		3							
Pro-requisite		Knowledge in Higher Secondary Level	Syllabu	s 202	22-							
11e-requisite		Mathematics	Versior	a 202	23							
Course Object	ives:											
It exposes the	students to	o study numerical techniques to find solutions of n	umerical	, alget	oraic							
	quations, so	Sitution of simultaneous inteat argeoraic equations and in	lierpolatio	JII.								
Expected Cou	Expected Course Outcomes:											
On the successful completion of the course, student will be able to:												
1 Remember	er the conce	epts of errors and its effect on computation.		H	X1							
2 Obtain nu	imerical so	lutions of algebraic and transcendental equations		F	<u>K2</u>							
$\frac{2}{3}$ Apply the	finite diff	erence and interpolation concepts		I	<u>73</u>							
4 Develop skills in designing methomatical models for constructing polynomials to												
the given data and drawing inferences.												
5 Analyze t	he efficien	cy of iteration methods.		ŀ	K4							
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create												
Unit:1 The Solution of Numerical Algebraic and Transcendental 15 hours												
		Equations										
Bisection met	hod – Iterat	tion Method – Convergence condition – Regula Falsi	Method	– New	ton							
– Raphson me	thod - Con	vergence Criteria – Order of Convergence.										
	~		1									
Unit:2	Soluti	on of Simultaneous Linear Algebraic Equations		15 ho								
Gauss elimina	tion metho	d – Gauss Jordan method – Method of Triangularizati	on – Gai	iss Jac	OD1							
method – Gau	ss Seidel II	lemod.										
Unit•3		Finite Differences		15 ho	urs							
Differences –	operators -	- forward and backward difference tables – Difference	es of a po	olvnom	nial							
– Factorial pol	lynomial –	Error propagation in difference table.		,,								
1	2											
Unit:4		Interpolation (for equal intervals)		15 ho	urs							
Newton's forv	vard and ba	ackward formulae – equidistant terms with one or mor	e missing	g value	es –							
Central differ	ences and	central difference table - Gauss forward and back	ward fo	rmulae	e –							
Stirling's form	nula.											
TT •/ F				1 - 1								
Unit:5		Interpolation (for unequal intervals)		15 ho	urs							
Newton's di	vided diffa	prenues – Kelations between divided differences and for rences formula – Lagrange's formula and inverse inte	rpolation	hieren	ces							
– Newton's divided differences formula – Lagrange's formula and inverse interpolation.												
		Total Lecture hours		75 ho	urs							

Text Books	
1 Numerical methods -Kandasamy. P, Thilagavathy. K and Gunavathy. K (S. Chand ar	nd
Company Ltd, New Delhi – Revised Edition 2007.)(Chapters: 3,4,5,6,7 and 8)	
2 Introductory Methods of Numerical Analysis-S.S. Sastry (Prentice Hall of India Pvt. Ltd.Ne	W
Delhi-110001Fourth Edition,2006)	
Reference Books	
1 Numerical Methods in Science and Engineering -Venkataraman M. K.(National Publishir company V Edition 1999.)	ng
2 Numerical Methods for Scientists and Engineers -Sankara Rao K .(2 nd Edition Prentice Hall Ind	lia
2004.)	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1 <u>http://www.simumath.com/library/book.html?code=Alg_Equations_Examples</u>	
2 <u>http://jupiter.math.nctu.edu.tw/~smchang/9602/NA_lecture_note.pdf</u>	
http://www.iosrjournals.org/iosr-jm/papers/Vol6-issue6/J0665862.pdf	
3 <u>https://nptel.ac.in/courses/122/102/122102009/</u>	
https://nptel.ac.in/courses/111/107/111107105/	
Course Designed By: 1. Dr.C.Janaki	
2. Dr.P.Rajarajeswari	

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	S	S	М	М	S	М	S	S
CO2	S	S	S	М	S	S	М	М	М	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	М	S
CO5	S	М	S	S	М	S	М	S	S	S

Cou	rse code		ASTRONOMY II	L	T	P	С
Core	/Elective/S	upportive	ELECTIVE II – A	5	-		3
Pre	e-requisite		Knowledge in Physics & Mathematics	Syllabu Version	ıs n	202 202	2- 3
Cou	rse Object	tives:					
To e	nable the st	tudents to le	arn about the interesting facts of Moon, Sun Planetary M	lotion.			
Evn	ected Cou	rse Outcon	165.				
On	the succes	sful comple	tion of the course, student will be able to:				
1	Underst	and the con	cepts of precession and nutation.			K	.1
2	Describ	e the eclips	e of the moon.			K	2
3	Find eq	uation of tir	ne.			K	3
4	Demons	strate the ab	ility to analyze the concepts.			K	4
5	Describ	e the proper	ties of stellar system.			K	2
K1	- Rememt	oer; K2 - Ui	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 – Cr	eat	e	
Un	it:1		Time		15	hou	Irs
Equ	uation of ti	me – Conve	ersion of time – Seasons – Calendar.				
Unit:2 Aberration 15 h							irs
An	nual Parall	ax – Aberra	tion.				
TT		[D		1 -	1	
Un	11:5		Precession		15	nou	rs
Pre	cession – I	Nutation.					
Un	it•A		Felinses		15	hou	ire
	11.7		Ecupses		15	nou	15
The	e Moon – E	Eclipses.					
Un	it:5		The Stellar System		15	hou	irs
		1			-		
Plan	etary Phen	omenon – 7	The Stellar system.				
			Total Lecture hours		75	hou	Irs
Te	kt Book	1					
1	Astronom edition,19	y-Mr.S.Kur 86)	naravelu and Susheela Kumaravelu. (Text publisher: S	Sivakasi	: Ja	anki,	7 th
				<u></u>			
Col	urse Desig	ned By: I. I	vis. S.Sodia				
		2. 1	Mr.M.Balasankar				

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	Μ	М	М	Μ	Μ	М	М	М	S	S
CO2	Μ	М	S	Μ	Μ	S	М	М	М	S
CO3	Μ	М	S	S	S	S	М	S	S	S
CO4	S	М	S	S	S	S	М	S	S	S
CO5	S	М	S	S	Μ	S	М	S	S	S

Cou	rse code		Numerical Methods II	L	T	P	С					
Core	/Elective/S	upportive	ELECTIVE II-B	5	-	-	3					
Dre	roquisito		Knowledge in Higher Secondary Level	Syllabu	IS	202	2-					
110	-i equisite	,	Mathematics	Versior	1	202	3					
Cou	rse Object	tives:										
1.	To equip t	he learners	with the powerful tool for numerical differentiation, numerical solution to ODE	merical i	nte	grati	ion,					
	unterence	equation, i	iumencal solution to O.D.E.									
Exp	ected Cou	rse Outcor	nes:									
On	On the successful completion of the course, student will be able to:											
1	Familia	rize with n	umerical integration and differentiation, numerical s	olution c	of	K	.1					
	ordinary differential equations.											
2 Distinguish methods of Taylor series, Euler's, Modified Euler's and Runge Kutta methods to find solutions of differential equations.												
3 Apply the techniques for enormous application in the field of Science and some I fields of Engineering.												
4	4 Compute the integrals and derivatives by using the appropriate technique.											
5	Find the	e numerical	solution of second order O.D.E by finite difference r	nethod.		K	4					
K1 - Remember: K2 - Understand: K3 - Apply: K4 - Analyze: K5 - Evaluate: K6 – Create												
		,										
Un	it:1		Numerical Differentiation		15	hou	Irs					
Nev	wton's forv	ward and ba	ckward formulae to compute the derivatives – Derivat	ve using	St	irling	g's					
for	nulae – to	find maxin	a and minima of the function given the tabular values	3.								
TT-	4.0		N		15	1						
No	u:2 vton Cot	te's formuls	Trapezoidal rule Simpson's 1/3 rd and 3/8 th rules	<u> </u>	15	nou	irs					
INC			1 - 11apezoidai tule - Simpson S 1/5 and 5/8 tules	•								
Un	it:3		Difference Equation		15	hou	irs					
Or	der and de	gree of a dif	ference equation – solving homogeneous and non – he	omogene	ou	s line	ear					
diff	erence equ	ations.										
Un	it:4		Numerical Solution Of O.D.E		15	hou	Irs					
Тау	lor series	method – I	Suler's method – improved and modified Euler meth	od - Ru	nge	e Ku	tta					
me	mod (Seco	nu &fourth	order Kunge Kulla method only)									
Un	it·5		Multi Sten Methods		15	hou	irs					
Mil	ne's predi	ctor correct	or formulae – Adam-Bash forth predictor corrector for	ormulae	- s	oluti	on					
of o	ordinary di	fferential e	quations by finite difference method (for second order	· O.D.E).								
	•		- · · · · · · · · · · · · · · · · · · ·									
			Total Lecture hours		75	hou	irs					
To	rt Rooks	I										

1	Numerical methods - Kandasamy. P, Thilagavathy. K and Gunavathy. K (S. Chand and
	Company Ltd, New Delhi - Revised Edition 2007.)(Chapters: 9,10,11,Appendix and
	Appendix E)
2	Introductory Methods of Numerical Analysis-S.S. Sastry (Prentice Hall of India Pvt.
	Ltd.NewDelhi-110001Fourth Edition,2006)
Re	eference Books
1	Numerical Methods in Science and Engineering -Venkataraman M. K.(National Publishing
	company V Edition 1999.)
2	Numerical Methods for Scientists and Engineers -Sankara Rao K. (Prentice Hall India , 2 nd
	Edition 2004)
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	http://nptel.ac.in/courses/104101002/downloads/lecturenotes/module1/chapter6.pdf
	https://www.britannica.com/science/difference-equation
2	https://nptel.ac.in/courses/122/102/122102009/
3	https://nptel.ac.in/courses/111/107/111107063/
Co	ourse Designed By: 1. Dr.C.Janaki
	2. Dr.P.Rajarajeswari

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	S	S	S	S	S	М	S	S
CO2	Μ	Μ	S	S	М	S	Μ	М	М	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	Μ	S	М	М	S	Μ	S	S	S
CO5	S	М	S	М	М	S	S	S	S	S

Cou	rse code		GRAPH THEORY	L	Т	Р	С				
Core	e/Elective/S	upportive	ELECTIVE III - A	5	-	-	4				
Pro	e-requisite		Knowledge In Basic Mathematics	Syllabu Version	1S n	2022 2023	2- 3				
Cou	rse Objec	tives:									
Enal touri	oles the stunaments, co	idents to le	arn the basic concepts of Graphs, sub-graphs, Euleria graphs, matrix representation of graphs, trees, planar gra	in graphs iphs.	s, D	igraț	ohs,				
Exp	ected Cou	rse Outcon	nes:								
	the succes		ction of the course, student will be able to:			IZ	1				
1	Identify t	ne propertie	es of different types of graph and their application.			K	1				
2	Demonst	rate knowle	dge of basic concepts in graph theory			K	2				
3	3 Understand cut graphs, cycle spaces										
4	Apply pr			K	.3						
5	Analyze			K	.4						
K1	- Rememb	per; K2 - Ui	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 – Cr	eate	e					
Unit:1 Graphs 15 ho											
Gra	Graphs – Sub graphs – Degree of a vertex walks, paths and cycles in a Graphs – connectedness										
Cut	vertex and	i cut eage.									
Un	it•2		Fuler and Hamiltonian Granhs		15	hou	rs				
Eul	ler and Har	niltonian G	raphs – Algorithm for Euler circuits – Bipartite Grap	hs –Tree	es.	nou	10				
Un	it:3		Cut set graphs		15	hou	rs				
Ma	trix repres.	entation of	a graph – vector spaces, associated with a graph – cy	cle spac	es a	nd c	ut				
set	graphs.										
TT	•				1 -						
	lt:4	Eular's t	Planar graphs	anomba (15	hou	rs				
Pla	nar grapns be difficul	- Euler's u t part of the	characterization	graphs (1	no p	prool	.s)				
011		i part or the									
Un	it:5		Directed graphs		15	hou	rs				
Dir	ected grap	hs – Conne	ctivity – Euler Digraphs – Tournaments.								
			· · · · · · · · · · · · · · · · · · ·								
	Total Lecture hours 75										
Te	xt Book	L	I								
1	A First Co	ourse in Gra	ph Theory - A. Choudum (Macmillan, 2001) Chapters	1 to 7.			_				
-	• •										
Re	terence Bo	ooks									
1	Graph the	eory with ap	plications to Engineering and computer science-Narsi	ngh Dec) (Pi	enti	ce				
	Hall of Ir	ndia1979).									

2 0	Jraph Theory	-Frank Harary	(Narosa	Publishing	HQCK 2001).
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3 Introduction to Graph Theory- Dr. M. Murugan.(Muthali Publishing House,2005)

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1 https://nptel.ac.in/courses/111/106/111106102/

2 https://www.digimat.in/nptel/courses/video/106104170/L19.html

Course Designed By: 1. Dr.T.Narppasalai Arasu

2. Dr.C.Janaki

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	S	S	S	S	М	S	S
CO2	М	М	М	S	S	S	М	М	М	S
CO3	М	М	М	S	М	S	М	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	М	М	S	М	S	М	S	S	S

Cou	rse code		AUTOMATA THEORY AND FORMAL LANGUAGES	L	Т	P	С					
Core	/Elective/S	upportive	ELECTIVE III - B	5	-	-	4					
Pre	-requisite		Knowledge in Mathematics	Syllabu Versior	IS 1	202 202	2- 3					
Cou	rse Object	tives:										
To i gram langi	mpart kno mars, lang 1age classe	owledge in guages, and es and their	Finite automata, regular languages, regular gram pushdown automata which play a crucial role to Ident relationship.	mars, co ify differ	onto ren	ext for	free mal					
		<u> </u>	P									
Expe	On the successful completion of the course, student will be able to:											
	A a guine		etion of the course, student will be able to:	1-	d	V	1					
1	formal la	a Tundamer	that understanding of the core concepts in automata	theory a	na	Ň	.1					
2	Design g	rammars an	d automata for different language classes.			K	2					
3	Describe	the types of	f grammar and derivation tree.			K	2					
4 To apply context-free languages, push-down automata.												
5 Design automata, regular expressions and context-free grammars accepting or												
	generating a certain language.											
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create												
Unit:1Phrase Structure Languages.15 hor							Irs					
Intr	oduction –	- phrase stru	acture languages.									
Uni	it•2		Closure Operations		15	hou	irs					
	10.2				15	nou	15					
Clo	sure opera	tions.										
T T •		[1 =							
Uni	it:3		Context Free Languages.		15	hou	Irs					
Con	ntext free l	anguages.										
Uni	it:4		Finite State Automata		15	hou	irs					
Fini	ite state au	tomata.										
Uni	Unit-5 Push Down Automata 15 hours											
	1 1		i ush Down Automata.		10	nou						
Pus	h down au	tomata.										
			Total Lecture hours		75	hou	rs					

Те	Text Book									
1	Formal Languages and Automata- Rani Siromoney. (Revised edition 1984) (Published by the									
	Christian Literary Society, Madras-3) Chapters 1 to 6.									
R	Reference Books									
1	Formal languages and their relation automata-J.E. Hopcroft and D.Ullman (Addison									
	Wesley1969)									
2	Automata theory: Machines and Languages-Richard .Y.Kain (McGraw Hill1972)									
R	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]									
1	https://nptel.ac.in/courses/106/103/106103070/									
2	https://www.digimat.in/nptel/courses/video/111103016/L02.html									
Co	ourse Designed By: 1. Dr.T.Nandhagopal									
	2. Ms.S.Kavunthi									

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	М	М	М	М	М	S	S
CO2	S	М	S	S	S	S	М	М	М	S
CO3	М	М	S	S	S	S	М	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

Course code PROGRAMMING IN C++ L T P												
Core	/Elective/S	Supportive	ELECTIVE III - C	4	-		3					
Pre	-requisite	•	Knowledge in C Programming	Syllabu Versioi	IS 1	202 202	2- 3					
Cou	rse Objec	tives:										
To e hand	handling.											
Exp	ected Cou	rse Outcor	nes:									
On	On the successful completion of the course, student will be able to:											
1	Know ab and exam	out class st	ructure, member functions & data members, inheritans.	nce type	s	K	.1					
2 Understand how C++ improves C with object-oriented features.												
3 Develop programming skills.												
4 To make use of objects and classes for developing programs.												
5 Build C++ classes.												
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create												
	In Remember, In Chaerstane, Inc. Appropriate Transfer, Inc. Evaluate, Inc. Create											
Uni	it:1	Т	okens, Expressions and Control Structures		12	hou	irs					
dyn ope thei	identifiers and constants – basic data types – user-defined data types – constant pointers and pointers to constants – symbolic constants –type compatibility – declaration of variables – dynamic initialization of variables – reference variables – operators in C++ - scope resolution operator – memory management operators – manipulators – type cast operator – expressions and their types – special assignment expressions – implicit conversions – operator precedence.											
Uni	it:2		Functions in C++		12	hou	irs					
Unit:2Functions in C++12 hoursThe main function – function prototyping – call by reference – return by reference – inline functions – default arguments – const arguments – function overloading. Managing Console, I/O Operations: C++ streams – C++ stream classes – unformatted console I/O operations – formatted console I/O operations –managing output with manipulators.												
Uni	it•3		Classes and Objects		12	hou	irc					
Spec mem objec cons cons cons	Unit:3Classes and Objects12 hoursSpecifying a class – defining member functions – making an outside function inline – nesting of member functions – private member functions – arrays within a class – memory allocation for objects –arrays of objects – objects as function arguments – friend functions – returning objects – const member functions. Constructors and Destructors: Introduction – constructors – parameterized constructors – multiple constructors in a class – constructors with default arguments – copy constructor.											

Ur	nit:4	Operator Overloading	12 hours							
Int	roduction -	- defining operator overloading - overloading unary operators -	overloading binary							
op	erators - ov	erloading binary operators using friends – rules for overloading	operators.							
Ur	nit:5	Inheritance	12 hours							
Int — r	– multilevel inheritance – multiple inheritance – hierarchical inheritance – hybrid inheritance.									
		Total Lecture hours	60 hours							
Те	xt Books									
1	Object Ori	ented programming with C++- E.Balagurusamy (McGraw Hill	^{3rd Edition 2006.)}							
2	Object ori	ented programming in Turbo C++-Robert Lafore (Galgotia pu	ublications Pvt.Ltd,							
	New Delhi- 110002,2002)									
3	3 The C++ programming language- Bjarne Stroustrup (II Edition, Addison Wesley, 1991.)									
Re	eference Bo	oks								
1	Program limited, N	ning with C++ - D. Ravi Chandran (Tata McGraw-Hill p New Delhi 1996)	ublishing company							
2	Object O Education	riented Programming with ANSI and Turbo C++- Ashok N. (n publishers 2003)	Kamthane (Pearson							
3	Program	ning with C++ - John R.Hubbard (2nd Edition, TMH publisher	rs 2002).							
Pa	lated Only	na Contants [MOOC_SWAVAM_NPTEL_Wabsitas ata]								
1	https://npt	rel ac in/courses/106/105/106105151/								
2	https://np	rel.ac.in/courses/106/101/106101208/								
3	https://wv	vw.classcentral.com/course/swayam-programming-in-c-6704								
-	<u> </u>									
Co	ourse Desig	ned By: 1. Dr.T.Narppasalai Arasu								
		2. Dr.P.Rajarajeswari								

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	S	S	М	S	М	S	S
CO2	Μ	М	М	М	S	S	S	М	S	S
CO3	S	S	S	S	S	S	Μ	S	S	S
CO4	S	S	S	М	S	S	S	S	S	S
CO5	S	S	S	М	S	М	S	S	S	М
Course code		PROGRAMMING IN C++ (PRACTICAL)	L	Т	Р	С				
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Core/Elective/Supportive		ELECTIVE III - C(Practical)	-	-	1	1				
Pre-requisite		Knowledge in C++	Sylla Versi	bus ion	2022 2023	2- 3				

PRACTICAL LIST

1. Write a function 'power()'to raise a number 'm' to a power 'n'. The function takes a 'double' value for 'm' and 'int' value for 'n', and returns the result correctly. Use a default vale of 2 for 'n' to make the function to calculate squares when this argument is omitted. Write a main() that gets the values of 'm' and 'n' from the user to test the function.

2. Write a program to compute compound interest of a given amount AMT for 'n' years. Use function overloading so that the program gets input of interest rate RATE in any of the data type 'float' or 'int'

3. Create a class which consist of employee detail ENO, ENAME, DEPT, BASIC SALARY. Write a member function to get and display them. Derive a class PAY from the above class and write a member function to calculate DA, HRA and PF depending on the grade and display the pay slip in a neat format using console I/O

4. Define two classes POLAR and RECTANGLE to represent points in the polar and rectangle system. Write a program to convert from one system to another.

5. Create a class FLOAT that contains one float data member. Overload all the four arithmetic operators so that they operate on the objects of FLOAT.

Course code		NUMBER THEORY	L	Т	P	С				
Core/Elective/S	upportive	ELECTIVE III – D	5	-	-	4				
Pre-requisite		Knowledge in Algebra	Syllabu Versior	IS 1	2022 2023					
Course Objectives:										
10 impart knowledge in the basic concepts of number theory, fundamental definitions, theorems.										
Expected Cou	rse Outcor	nes:								
On the succes	sful comple	etion of the course, student will be able to:								
1 Underst	and the con	cepts of divisibility and primes			K	.1				
2 Solve co	ongruence.				K	2				
3 Describ	e the fundat	mental theorem of Arithmetic.			K	3				
4 Underst	and the con	cepts and apply the theorems in areas of Mathematics	5.		K	3				
5 Comput	e powers of	f integers modulo prime numbers.			K	4				
K1 - Rememb	ber; K2 - Ui	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 – Cr	eat	e					
Unit:1		Early Number Theory		15	hou	rs				
Peano's Axior	n - Mathem	natical Induction - The Binomial Theorem - Early Nur	nber The	<u>er:</u>	у.					
Unit:2		Divisibility Theory in Integers		1	5hou	rs				
Divisibility T Diophantine I	heory in Int Equation ax	egers - The Division Algorithm - The g.c.d Euclidea + by = c	ın Algori	thr	n - T	he				
U:4-2		Drimes and their Distributions		15	har					
Unit:3		Primes and their Distributions		15	nou	rs				
Primes and t Eratosthenes	heir Distril - The Gull (butions - The Fundamental Theorem of Arithmeti Conjecture.	c - The	si	eve	of				
TT . A. A				1.5	1					
Unit:4		The Theory of Congruence		15	hou	rs				
The Theory of Congruence - Basic Properties of Congruence - Special Divisibility test - Linear Congruence-Prime modulus- Power residues.										
Unit:5		Fermat's Theorem		15	hou	rs				
Fermat's Theo	orem - Ferm	at's factorization method - The Little theorem - Wilso	on's theor	rem	1.					
		Total Lecture hours		75	hou	rs				

Τe	ext Book
1	Elementary Number theory -David M. Burton (W.M.C. Brown Publishers, Dubuque, Lawa,
	1989.)
Re	eference Books
1	An Introduction to theory of Numbers -Ivan Niven and H. Zuckerman (5 th edition, Wiley 1991)
2	Elements of Number Theory - Prof. S.Kumaravelu and Susheela Kumaravelu (Raja Sankar offset Printers, Siva kasi, 2002)
3	Beginning Number Theory -Neville Robinns (2 nd Ed., Narosa Publishing House Pvt. Ltd., Delhi, 2007)
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	https://nptel.ac.in/courses/111/103/111103020/
	https://nptel.ac.in/courses/111/101/111101137/
Co	ourse Designed By: 1.Dr.C.Janaki
	2. Dr.M.Anandhi

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	М	М	М	Μ	М	S	S
CO2	S	S	S	М	S	S	S	М	М	S
CO3	Μ	М	Μ	Μ	Μ	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	М	S	S	S	S	Μ	S	S	S

Course code		INTRODUCTION TO INDUSTRY 4.0	L	Т	Р	С			
Core/Elective/S	Supportive	ELECTIVE III – E	5	-	-	4			
Pre-requisite	•	Basic Knowledge of Computer and Internet	Syllabu Version	S	2022 2022	2- 3			
Course Object	tives:								
To impart know tools:	ledge on In	dustry 4.0, need for digital transformation and the fo	llowing	Indu	stry	4.0			
1.									
2.	Big Data a	nd Data Analytics							
3.	Internet of	Things							
Expected Cou	ma Outoor	mage							
On the succes	rse Outcor	nes: ation of the course, student will be able to:							
1 Know the		adapting Industry 4.0 and Artificial Intelligence			V	1			
1 Know the	e reason for	adopting industry 4.0 and Artificial Intelligence.			K	.1			
2 Understa	nd the need	for digital transformation.			K	2			
3 Apply the	e industry 4	.0 tools.			K	.3			
4 Analyze	the applicat	ions of Big Data			K	.4			
5 Examine	the applica	tions and security of IoT Applications.			K	4			
K1 - Rememb	oer; K2 - U	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate	e; K6 – (Create	e				
Unit:1		Industry 4.0		15	hou	rs			
Need – Reaso Technologies o - Cyber Securi	on for Ado of Industry 4 ity – Cloud	botting Industry 4.0 - Definition – Goals and L 4.0 – Big Data – Artificial Intelligence (AI) – Industria – Augmented Reality.	Jesign F al Interno	Princi	ples Thin	- gs			
Unit:2		Artificial Intelligence		15	hou	rs			
Artificial Intelligence: Artificial Intelligence (AI) – What & Why? - History of AI - Foundations of AI - The AI -environment - Societal Influences of AI - Application Domains and Tools - Associated Technologies of AI - Future Prospects of AI - Challenges of AI.									
Unit.3			<u> </u>	15	hou	re			
	Unit:3 Big Data and IoT 15 nours								
Big Data : Evolution - Data Evolution - Data : Terminologies - Big Data Definitions - Essential of Big Data in Industry 4.0 - Big Data Merits and Advantages - Big Data Components : Big Data Characteristics - Big Data Processing Frameworks - Big Data Applications - Big Data Tools - Big Data Domain Stack : Big Data in Data Science - Big Data in IoT - Big Data in Machine Learning - Big Data in Databases - Big Data Use cases Big Data in Social Causes - Big Data for Industry -Big Data Roles and Skills -Big Data Roles - Learning Platforms; Internet of Things (IoT) : Introduction to IoT - Architecture of IoT - Technologies for IoT - Developing IoT Applications - Applications of IoT - Security in IoT .									

Uni	t:4	Applications and Tools of Industry 4.0	15 hours						
App	lications	of IoT – Manufacturing – Healthcare – Education – Aerosp	ace and Defense –						
Agri	iculture –	Transportation and Logistics – Impact of Industry 4.0 on	Society: Impact on						
Busi	iness, Gov	vernment, People. Tools for Artificial Intelligence, Big Data a	and Data Analytics,						
Virt	ual Realit	y, Augmented Reality, IoT, Robotics.							
.			4.5.1						
Uni	t:5	Jobs 2030	15 hours						
Indus	try 4.0 –	Education 4.0 – Curriculum 4.0 – Faculty 4.0 – Skills required	for Future - Tools for						
Educa	ation – A	rtificial Intelligence Jobs in 2030 - Jobs 2030 - Framework for	or aligning Education						
with 1	Industry 4	.0 .							
		Total Lecture hours	75 hours						
Tex	t Book								
1 _I	Jigher Ed	ucation for Industry 4.0 and Transformation to Education 5.0	(2021) D Kalirai &						
		ucation for industry 4.0 and transformation to Education 5.0	(2021) - T.Kailiaj &						
	I. Devi								
Dale	tod Only	no Contonta IMOOC SWAVAM NDTEL Wahaitaa ata 1							
	Kelated Unline Contents [MOUC, SWAYAM, NPTEL, Websites etc.]								
1	<u>mups.//IIp</u>	(c1.ac.111/c0u15c5/100/105/100105175/							
Com	ma Dasi-	and Drug 1 Dr. C. Longhi							
Course Designed By: 1.Dr.C.Janaki									
		2 Dr. i Inandnagopai							

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	Μ	М	Μ	S	S	S	S	М	S	S
CO2	М	М	М	S	S	S	S	М	М	S
CO3	S	S	S	S	S	S	S	S	S	М
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	М	S	Μ	S	S	S	S	S	S

B. Sc.MATHEMATICS

Syllabus (2021-2022)

Program Code : 22A



DEPARTMENT OF MATHEMATICS (Affiliated Colleges) Bharathiar University (A State University, Accredited with "A" Grade by NAAC and 13th Rank among Indian Universities by MHRD-NIRF)

Coimbatore 641 046, INDIA

Program Educational Objectives (PEOs)

The **B. Sc. Mathematics** program describe accomplishments that graduates are expected to attain within five to seven years after graduation

PEO1	Acquire knowledge in functional areas of Mathematics and apply in all the fields of learning.
PEO2	Recognise the need for life long learning and demonstrate the ability to explore some mathematical content independently.
PEO3	Employ mathematical ideas encompassing logical reasoning ,analytical, numerical ability , theoretical skills to model real-world problems and solve them.
PEO4	Develop critical thinking ,creative thinking, self confidence for eventual success in career.
PEO5	Analyze, interpret solutions and to enhance their Entrepreneurial skills, Managerial skill and leadership
PEO6	To prepare the students to communicate mathematical ideas effectively and develop their ability to collaborate both intellectually and creatively in diverse contexts.
PEO7	Rewarding careers in Education, Industry, Banks, MNCs and pursue higher studies

Program	Program Specific Outcomes (PSOs)								
After the	After the successful completion of B. Sc. Mathematics program, the students are expected								
to									
	Maintain a core of mathematical and technical knowledge that is adaptable to								
PSO1	changing technologies and provides a solid foundation for extended learning.								
PSO2	Identify the applications of Mathematics in other disciplines and society.								
	Develop an in-depth knowledge in Mathematics appreciating the connections								
PSO3	between theory and its applications .								
	Demonstrate their mathematical modeling ability, problem solving skills, creative								
P304	talent and power of communication necessary for various kinds of employment.								
PSO5	Develop mathematical aptitude and the ability to think abstractly.								
PSO6	Learn independently and improve ones performance.								
PSO7	Students are equipped to appear competitive examinations.								

Program	n Outcomes (POs)
On succe	essful completion of the B. Sc. Mathematics program
DO1	Students are empowered with analytical and logical skills-to formulate results
POI	and construct mathematical argument.
PO2	Ability to organize, analyze and interpret data accurately in both academic and
FO2	non -academic context.
	Demonstrate effective communication of mathematical ideas and creative
PO3	thinking skills to facilitate solving real world problems as a team and
	independently.
PO4	Appreciate and identify the connections between Mathematics and other
104	disciplines.
PO5	Competency to obtain employment in education, public and private sectors
DO6	Identify the area of interest for extended learning from the understanding gained
FOO	from the domain and allied areas of Mathematics.
PO7	Develop mathematical aptitude and make critical observations.
PO8	Garner innovative ideas to face global challenges.
PO9	Instill a sense of responsibility in tackling professional and social issues
	ethically.
PO10	Trigger their passion for research in unexplored areas of Mathematics.

BHARATHIAR UNIVERSITY: COIMBATORE 641 046

B. Sc. Mathematics Curriculum (Affiliated Colleges) (CBCS PATTERN)

(For the students admitted from the academic year 2021-2022 and onwards)

Scheme of Examination

			E	xamina	ation		-	
			ns	Ma	ximum	Marks		
Part	Title of the Course	Hours/ Week	Duratio in Hour	CIA	CEE	Total	Credits	
	Semester I							
Ι	Language - I	6	3	50	50	100	4	
II	English - I	6	3	50	50	100	4	
III	Core Paper I - Classical Algebra	4	3	50	50	100	4	
III	Core Paper II-Calculus	5	3	50	50	100	4	
III	Allied A : Paper I Chosen by the	7	3	50	50	100	4	
	college	,						
IV	Environmental Studies*	2	3	-	50	50	2	
	Total	30		250	300	550	22	
	Semester II							
Ι	Language – II	6	3	50	50	100	4	
II	English – II	6	3	50	50	100	4	
III	Core Paper III - Analytical Geometry	4	3	50	50	100	4	
III	Core Paper IV-Trigonometry,	5	3	50	50	100	4	
	Vector Calculus and Fourier Series	5						
III	Allied A: Paper II Chosen by the	7	2	50	50	100	4	
TX 7	College	2	3	50	50	100	4	
IV	Value Education – Human Rights*	2	3	-	50	50	2	
		30		250	300	220	22	
т	Semester III	(2	50	50	100	4	
<u>l</u>	Language – III	6	3	50	50	100	4	
	English – III	0	3	30	30	100	4	
111	Core Paper V- Differential Equations	3	3	50	50	100	4	
171	and Laplace Transforms.	2	2	50	50	100	A	
	Core Paper VI- Statics	3	3	50	50	100	4	
111	Allied B : Paper I – Chosen by the college	7	3	30	45	75	3	
IV	Skill based Subject - Operations Research -I	3	3	30	45	75	3	

IV	Tamil** / Advanced Tamil* (OR)						
	Non-major elective - I (Yoga for	2	2		50	50	2
	Human Excellence)* / Women's	2	5		50	50	2
	Rights*						
	Total	30		260	340	600	24
	Semester IV						
Ι	Language – IV	5	3	50	50	100	4
II	English – IV	5	3	50	50	100	4
III	Core Paper VII-Dynamics	3	3	30	45	75	3
III	Core Paper VIII- Programming in	2	3	30	45	75	3
III	C						
	Core Paper VIII -Programming in	1	3	10	15	25	1
	C Practical						
III	Allied B - Paper II	F	2	20	45	75	2
	Chosen by the college	5	5	30	45	/5	3
III	Allied B - Paper II						
	Chosen by the college (For	2	3	25	25	50	2
	Practical Paper)						
IV	Skill based Subject - Operations	2	2	25	25	50@@	2
	Research – Paper II	2	5	23	23	50	2
IV	Office Fundamentals :Digital Skills						
	for Employability						
	http://kb.naanmudhalvan.in/Special:	3	-	25	25	50##	2
	Filepath/Microsoft_Course_Details.xl						
	<u>SX</u>						
IV	Tamil**/Advanced Tamil* (OR)						
	Non-major elective -II (General	2	3		50	50	2
	Awareness*)						
	Total	30		275	375	650	26
	Semester V	[-	1		[
III	Core Paper IX-Real Analysis-I	5	3	50	50	100	4
III	Core Paper X- Complex Analysis-I	6	3	50	50	100	4
III	Core Paper XI- Modern Algebra-I	6	3	50	50	100	4
III	Core Paper XII- Discrete	5	3	50	50	100	4
	Mathematics	5		50	50	100	
III	Elective I	5	3	30	45	75	3
IV	Skill based Subject - Operations	3	3	25	25	50@@	2
	Research - Paper III	5	5	23	23	50	2
IV	Computational Intelligence for	_	_	25	75	100	2
	Employability		_	23	15	100	
	Total	30		280	345	625	23
	Semester VI						
III	Core Paper XIII - Real Analysis-II	5	3	50	50	100	Λ
		5	5	50	50	100	+
III	Core Paper XIV - Complex	5	2	50	50	100	1
	Analysis-II	5	5	50	50	100	4

III	Core Paper XV -Modern Algebra-	_	2			100	
		5	3	50	50	100	4
III	Elective II	5	3	30	45	75	3
III	Elective III	5	3	50	50	100	4
IV	Skill Based Subject - Operations	2	3	25	25	50@@	2
	Research- Paper IV	2	5	23	23	30	L
IV	Project Based learning 2-Advanced						
	Platform Technology -(Govt(auto)						
	& Govt (Non-Auto)) /						
		2		25	25	ح ٥##	2
	Data Analytics & Visualization -	3	-	25	25	50""	2
	Aided (Non-auto) & SF(Non-Auto)						
	http://kb.naanmudhalyan.in/Bharathi						
	ar University (BU)						
V	Extension Activities ** / Swachh						
	Bharath @			50		50	2
	Total	30		330	295	625	25
	Grand Total	180		1645	1955	3600	142
# All co	omputer papers have theory and pract	ical exa	ms	•			
	Theory			30	45	75	100
	Practicals			10	15	25	100
Note							
@@ Ur	niversity semester examination will be con	ducted fo	or 50 marks	(As per	existin	ig pattern o	f
Examin	ation) and it will be converted for 25 mark						-
## Naar	n Mudhalvan –Courses- external 25 marks	will be a	ssessed by I	Industr	y and in	iternal will	be
* No	Continuous Internal Assessment (CIA).	nly Univ	orcity Exor	ination	0		
** No I	Iniversity Examinations Only Continuous	Internal		$\frac{1111011}{11011}$	15		
@Swac	hh Bharath Internshin Scheme (SBIS) is	to be ad	ded for 2 cr	edits i	1 the ex	tension	
act	ivities			cuits ii			
	Subjects(Colleges can choose any two	suhiects)				
1 Physi	cs 2 Chemistry 3 Accountancy 4 S	subjects statistics)				
1.1 11951	List of F	lective r	Daners				
			Jupers				
	(Colleges can choose an	y one of	the paper a	s electi	ves)		
	_	Α	Astronom	ny- I			
Electiv	e – I	В	Numeric	al -Met	hods-I		
A ASUTOHOHIY—II P Nymerical Matheda II							
Liecuv	c = 11		Graph Th	ai ivieti	ious-II		
		A R		a Theory	rv & I	Formal Las	າແມ່ງແລະ
Electiv	e – III	C D	Program	a 11100	$C \perp \pm 4$	t	iguages
Liccuv			Number	Theory	$\frac{1}{2}$	r	
		U U	Tunioel	i neor y			
		F	Introduct	ion to	Induct	$v A \cap$	



Cou	rse code		CLASSICAL ALGEBRA	L	T	P	С			
Core	/Elective/S	upportive	Core Paper – I	4	-	-	4			
Pre	e-requisite		Knowledge of Limits	Syllabı Versio	ıs n	202	1 22			
Cou	rse Obiec	tives:				202				
1.To	enable the	e students to	elearn Binomial, Exponential, Logarithmic series and	l their						
aj	oplication	to summati	on of series.							
2.To	study inte	nsively the	convergence and divergence of different types of series	es.						
3. To	o demonsti	ate the star	ndard methods to solve both polynomial and transcene	lental						
type	equations.									
		a								
Exp	ected Cou	rse Outcon	nes:							
On	the succes	sful comple	etion of the course, student will be able to:							
1	Know the	e concept o	f Binomial ,Exponential , Logarithmic series and their	r		K1				
	application	on to summ	ation of series.							
2	Acquire	cquire a clear knowledge regarding methods to find an approximate roots of the K2								
2	equations	equations								
3	3 Apply the appropriate tests to find the convergence or divergence of an infinite K3									
	series.									
4	A pulyDescartes's rule of signs to find the number of positive and negative roots K3									
-	if any in	a polynomi	al equation.	/10003		IX.J				
5	Analyze	the relation	between roots and coefficients of the polynomial eq	uations.		K4				
K1	- Rememb	ber; K2 - Ui	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - Cr	eate	e				
Uni	it:1	Summa	ation Of Series Using Binomial And Exponential		12	2hou	Irs			
			Theorem							
Bino	mial, expo	onential the	prems-their statements only- their immediate application	on to						
sumi	mation and	l approxima	tion only.							
TT	24.0	T		<u> </u>	10					
Un	It:2	Logarith	mic Series, Convergence And Divergence Of Series		12	hou	irs			
Loga	erithinic se	only Conv	arganey and divergency of series definitions aleman	atory	10					
rosul	ts compa	onny. Conv rison tests I	A lembert's and Cauchy's tests	lital y						
Tesui	its- compa	115011 10515-1	Se -Alembert's and Cauchy's tests.							
Uni	Unit:3 Absolute Convergence Of Series 12 hours									
Abso	Absolute convergence-series of positive terms-Cauchy's condensation test-Raabe's test									
Tessiale contergence series of positive terms caucity is condensation test radies is test.										
Uni	it:4		Theory Of Equations		12	hou	irs			
Root	s of an e	quation- R	elations connecting the roots and coefficients- tran	sformat	ion	s				
of e	quations-c	haracter an	d position of roots-Descarte's rule of signs-symme	tric fun	ctic	n				
of ro	of roots-Reciprocal equations.									

Uı	nit:5	Multiple Roots	12 hours							
Mu app	ltiple roots- roximation	Rolle's theorem - position of real roots of $f(x) = 0$ – Newton's n to a root – Horner's method.	nethod of							
		Total Lecture hours	60 hours							
Te	ext Book(s)	Total Lecture nours	00 110013							
1	1 Algebra-T.K .Manicavachasam Pillai, T.Natarajan& K.S Ganapathy , (S.Viswanatham Printers & Publishers Private Ltd-2006)									
Re	eference Bo	ooks								
1	1 Mathematics for B.Sc. Branch I -Vol. I- P. Kandasamy and K.Thilagavathy (For B.Sc-I semester) (S. Chand and Company Ltd, New Delhi, 2004.)									
2	Algebra -	N.P.Bali(Publisher: Laxmi Publications-New Delhi Edition 201	0).							
Re	elated Onli	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]								
1	https://ww series_351	w.brainkart.com/article/Introduction-to-Binomial,-Exponential-and- 07/	-Logarithmic-							
2	http://ww	v.jjernigan.com/172/ConvergenceDivergenceNotes.pdf								
3	3 <u>http://home.iitk.ac.in/~psraj/mth101/lecture_notes/Lecture11-13.pdf</u> <u>https://maths4uem.files.wordpress.com/2015/09/1028-infinite-series.pdf</u> <u>https://ocw.mit.edu/high-school/mathematics/exam-prep/concept-of-series/series-convergence-divergence/</u>									
	<u> </u>									
Co	Course Designed By: 1.Dr.C.Janaki 2.Mrs .B.Thenmozhi									

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	М	М	S	S	S	S	М	S	S
CO2	S	Μ	Μ	Μ	S	S	S	Μ	М	S
CO3	S	Μ	S	S	S	S	S	S	S	S
CO4	S	Μ	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

Cou	rse code		CALCULUS	L	Т	Р	С		
Core	e/Elective/S	upportive	Core Paper – II	5	-	-	4		
Pre	e-requisite		Higher Secondary Level Mathematics.	Syllabu Versior	IS N	20 2)21 - 022		
Cou	rse Object	tives:							
То	orient the	students to	get an idea of curvatures, Integration of different types	s of func	tior	ıs,			
its	geometrica	l applicatio	ns, double, triple and improper integrals.						
Exp	ected Cou	rse Outcon	nes:						
On	the succes	sful comple	etion of the course, student will be able to:						
1	Identify a	areas in Ma	thematics and other fields where Calculus is useful.			K	.1		
2 Understand the concepts of Evolutes and Envelopes, methods to find						K	2		
	curvature	and evolut	es.						
3 Apply the concept of change of variables in double and triple integrals.							.3		
4 Apply double , triple integral to find the area and volume respectively.						K	3		
5 Apply the Beta and gamma function to solve the multiple integrals.						K	4		
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create									
Un	it:1		Curvature			15h	ours		
Curv	ature-radi	us of curvat	ure in Cartesian and polar forms-evolutes and envelor	bes- Peda	al		0		
equa	tions- tota	l differentia	tion- Euler's theorem on homogeneous functions.						
			C C						
				-					
Un	it:2		Integration			15 h	ours		
Integ	gration of f	f'(x)/f(x), f	$(x)\sqrt{f(x)},[(px+q)/\sqrt{(ax^2+bx+c)}],[\sqrt{(x-a)/(b-x)}],[\sqrt{(x-a)/(b-x)}],$	-a)(b-x)],1/	[√(x	-a)(b-		
x),1/	(acosx+bs	inx+c), 1/(a	acos ² x+bsin ² x+c),Integration by parts-Bernoulli's For	mula.					
Un	it:3	Eva	aluation Of Double And Triple Integrals		1	5 h	ours		
Rec	duction for	mulae- prol	plems- evaluation of double and triple integrals- applie	cations to	0				
cale	culations o	f areas and	volumes-areas in polar coordinates.						
Un	it:4	Change C	f Variables In Double And Triple Integrals		1	5 h	ours		
Cha	ange of ord	ler of integr	ation in double integral-Jacobians- Change of variable	s in doul	ole a	and	triple		
inte	integrals.								
Un	it:5		Beta And Gamma Functions			15 h	ours		
Beta	and Gam	na integrals	-their properties, relation between them- evaluation of	f multipl	e				
integ	integrals using Beta and Gamma functions - Improper Integrals.								
			Total Lecture hours			75 h	ours		
Te	xt Book(s)								

1	Calculus Vol 1 - S. Narayanan and T.K.M. Pillai. (Viswanathan Publishers 2008)
2	Calculus Vol 2- S. Narayanan and T.K.M. Pillai.(Viswanathan Publishers 2008)
Re	eference Books
1	Mathematics for BSc – Vol I and. II - P. Kandasamy &K.Thilagarathy(S.Chand and Co-2004)
2	A Text book of calculus- Shanthi Narayanan &J.N.Kapoor(S.Chand& Co.2014)
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	https://ocw.mit.edu/resources/res-18-006-calculus-revisited-single-variable-calculus-fall-2010/study-
	materials/
	https://www.whitman.edu/mathematics/calculus_online/chapter15.html
2	https://www.khanacademy.org/math/calculus-home
3	https://www.sac.edu/FacultyStaff/HomePages/MajidKashi/PDF/MATH_150/Bus_Calculus.pdf
4	http://nptel.ac.in/courses/111104085/29
5	http://www.math.odu.edu/~jhh/Volume-1.PDF
	http://www.math.odu.edu/~jhh/Volume-2.PDF
	https://www.math.cmu.edu/~wn0g/2ch6a.pdf
6	https://nptel.ac.in/courses/111/105/111105122/http://www.staff.ttu.ee/~lpallas/multipleintegrals.pdf
Co	ourse Designed By: 1.Dr.C.Janaki
	2.Mr.R.Subramanian

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	М	S	S	S	S	S	S	S	S
CO2	S	Μ	S	S	S	S	S	М	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	Μ	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

Second Semester



Cou	rse code		ANALYTICAL GEOMETRY	L	T	P	С			
Core	e/Elective/S	upportive	Core Paper – III	4	-	-	4			
Pre	e-requisite		Basic Knowledge In Trigonometry &Vector Algebra.	Syllabi Versio	ıs n	202 - 202	21 22			
Cou	rse Object	tives:								
Emp	hasis to en	hance stude	ent knowledge in three dimensional analytical geomet	ry and	the	e				
geon	netrical asp	pects of three	e dimensional figs, viz, sphere, cone and cylinder.							
Exp	ected Cou	rse Outcon	165.							
On the successful completion of the course, student will be able to:										
1	Gain kno	wledge abo	ut the regular geometrical figures and their properties	•		K	.1			
2	Describe	the geome	tric concepts.			K	2			
3 Find equation to tangent, normal at a point on a conic							3			
4	Analyze	condition of	f tangency and find the tangent plane to the central co	onicoid		K	4			
5 Analyze conics to explain natural phenomenon						K	4			
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						e				
Un	Unit:1 Straight Lines 12 hours									
Ana	lytical Geo) between t	Straight lines-coplanarity of straight line-shortest d	istance	(5.)	D) a	nd			
cqua			wo miles-simple problems.							
Un	it:2		Sphere		12	hou	irs			
Sphe	ere: standa	rd equation	of sphere-results based on the properties of a sphere-t	angent						
plan	e to a sphe	re- equatior	n of a circle.							
Un	it:3		System Of Spheres		12	hou	irs			
Tang	gency of sp	heres- coax	ial system of spheres- radical planes- Orthogonal spl	neres.						
Un	it:4		Cone And Cylinder		12	hou	irs			
Con	e whose ve	ertex is at the	e origin- envelope cone of a sphere-right circular con-	e-equati	on					
01 a	cynnaer-n	gin circular	cymder.							
Un	it:5		Conicoid		12	hou	irs			
Natu	re of a co	onicoid- sta	ndard equation of central conicoid -enveloping co	ne- tang	ent	plar	ne-			
condition for tangency –director Sphere- director plane .										
			Total Lecture hours		60	hou	Irs			
Text Book(s)										
2	 2 Solid Geometry, N.P. Bali(Laymi Publications (P) Ltd 2015) 									
Ref	Reference Books									

1	Solid	Geometry-	M.L.	Khanna(Jainath&	Co Publishers,	Meerut)
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Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

http://www.brainkart.com/article/Three-Dimensional-Analytical-Geometry_6453/

2 http://egyankosh.ac.in/bitstream/123456789/11990/1/Unit-2.pdf

Course Designed By: 1.Dr.C.Janaki 2.Mrs .B.Thenmozhi

1

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	Μ	М	S	S	Μ	S	S	S	S	S
CO2	S	Μ	S	S	S	S	S	М	S	S
CO3	S	Μ	S	Μ	Μ	Μ	S	S	S	S
CO4	S	Μ	S	S	Μ	S	Μ	S	S	S
CO5	S	S	S	S	М	S	S	S	S	S

Cou	rse code		TRIGONOMETRY, VECTOR CALCULUS AND FOURIER SERIES	L	Г	P	С		
Core	e/Elective/S	upportive	Core Paper – IV	5	-	-	4		
Pre	e-requisite		Knowledge In Vector Algebra, Differentiation, Integration	Syllabu Versioi	is 1	2021 - 2022			
Cou	rse Objec	tives:							
To e	nable the st	tudents to le	arn about the expansion of trigonometric, hyperbolic fu	nctions,					
vecto	or calculus	and the exp	ansions of Fourier series .						
Exp	ected Cou	rse Outcon	nes:						
On the successful completion of the course, student will be able to:									
1Know the expansion of trigonometric functions and hyperbolic functions .KI									
2	Acquire t	he basic kno	owledge of vector differentiation and vector integration			K	2		
3	Determin	e and apply	the important quantities associated with vector fields su	ich as the		K	3		
1	divergenc	e,curl and second and second and second s	calar potential.			ĸ	3		
4	Examina	line integra	I surface integral volume integral and inter relation	s among		K	.5 7/		
5	them								
K1	- Rememb	ber; K2 - Ur	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate:	, K6 - Cre	eate	e			
TT	•				4 -				
Un	It:1	orios Ern	Expansion in Series	of multi	15 nlo	hou	irs		
-Exp	nansions c	of cosnA sir	$\mathbf{n}\mathbf{\theta}$ and $\mathbf{f}\mathbf{a}\mathbf{n}\mathbf{n}\mathbf{\theta}$ in powers of sines – cosines and tange	$r_{\rm or multiple}$	pie van	s or sion	0		
of si	$n \theta$, $\cos \theta$ a	and $\tan \theta$ in	powers of θ – hyperbolic functions and inverse hype	rbolic fu	ict	ions.			
	-								
Un	it:2	Logar	ithm Of Complex Quantities And Summation Of Series		15	hou	Irs		
Loga – C	arithm of c + iS,metho	omplex qua	ntities - summation of series – when angles are in arit ation – method of differences.	hmetic pr	og	ressi	on		
TT					4 -				
	It:3	tor fields	Vector Differentiation	nd Curl S	15 15	hou	irs		
and	irrotational	l vectors-La	aplacian Operator.	lu Cull-S	010		101		
Un	it:4		Vector Integration		15	hou	irs		
Integration of vectors – line integral – surface integral – Green's theorem in the plane – Gauss divergence theorem – Stoke's theorem – (Statements only) - verification of the above said theorems.									
TT									
	IC:3	ione Four	$\frac{\mathbf{Fourier Series}}{\mathbf{Fourier Series}} = \frac{\mathbf{Fourier Series}}{\mathbf{Fourier Series}}$		15	hou	Irs		
rel	Periodic functions – Fourier series of periodicity 2π – half range series.								

		Total Lecture hours	75 hours						
Te	xt Book								
1	Mathemat	tics for B.Sc. Branch I, Volume I, II and IV -	004						
	P.Kandasa	my&K. I hilagavathi(S.Chand and Company Ltd, New Delhi, 2	004.)						
Re	eference Bo	ooks							
1	Vector A Emerald	Analysis -P. Duraipandian, Laxmiduraipandian (Revised Ec Publishers)	lition-Reprint 2005						
2	2 Trigonometry -T.K. Manichavasagam Pillai and S.Narayanan(Viswanathan Publishers and Printers Pvt. Ltd 2009.)								
Re	elated Onlin	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]							
1	<u>http://www</u>	v.math.odu.edu/~jhh/Volume-2.PDF							
	http://www	w-math.mit.edu/~djk/18_01/chapter20/section03.html							
	<u>https://ww</u>	w.whitman.edu/mathematics/calculus_online/chapter16.html							
	http://www	v.mecmath.net/calc3book.pdf							
2	http://ww	vw.nptelvideos.in/2012/11/mathematics-iii.html							
3	https://n	otel.ac.in/courses/111107108/1							
Co	ourse Design	ned By: 1.Dr.C.Janaki							
	U	2.Mr.R.Subramanian							

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	Μ	М	Μ	М	S	S	Μ	М	S	S
CO2	S	Μ	S	S	Μ	Μ	Μ	S	М	S
CO3	S	Μ	S	S	Μ	Μ	Μ	S	S	S
CO4	S	S	S	S	S	S	S	S	S	М
CO5	S	S	S	S	М	S	S	S	S	S

Third Semester



Core/Elective/SupportiveCore Paper – V3-4Pre-requisiteKnowledge Of Ordinary And Partial DerivativesSyllabus - - - - - - - - - - - - - - 4						
Pre-requisiteKnowledge Of Ordinary And Partial DerivativesSyllabus - Version2021 - 2022						
Pre-requisite Derivatives Version Course Objectives: 2						
Course Objectives:						
and Second Order, Partial Differential equations, Laplace Transforms, its inverse and application of Laplace Transform to solve the first and second Order Differential Equations with constant coefficients.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1Acquire knowledge to solve Differential and Partial Differential Equations.K1						
2Solve higher order linear differential equations.K2						
3 Expose differential equation as a powerful tool in solving problems in Physical and K3 Social sciences.						
4 Demonstrate competency to solve linear PDE by Lagrange's method K3						
5 Analyze the concepts of Laplace transforms and inverse Laplace K4 transforms to solve ODE with constant coefficients.						
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1 Differential Equation Of First Order And Higher Degree. 9hours						
Ordinary Differential Equations: Equations of First Order and of Degree Higher than one – Solvable for p, x, y– Clairaut's Equation – Simultaneous Differential Equations with constant coefficients of the form i) $f_1(D)x + g_1(D)y = \phi_1(t)$						
i) $f_2(D)x + g_2(D)y \phi_2(t)$ where f_1 , g_1 , f_2 and g_2 are rational functions D=d/dt with constant						
coefficients and ϕ_1 , ϕ_2 explicit functions of tand explicit functions of t.						
Unit:2 Higher Order Linear Differential Equation 9hours						
Finding the solution of Second and Higher Order with constant coefficients with Right Hand Side is of the form Ve^{ax} where V is a function of x – Euler's Homogeneous Linear Differential Equations.						
Unit:3 Partial Differential Equations 9 hours						
Unit:3Partial Differential Equations9 hoursPartial Differential Equations: Formation of equations by eliminating arbitrary constants and arbitrary functions – Solutions of P.D Equations – Solutions of Partial Differential Equations by direct integration – Methods to solve the first order P.D. Equations in the standard forms – Lagrange's Linear Equations.						
Unit:4 Laplace Transforms 9 hours						

Laplace Transforms: Definition – Laplace Transforms of standard functions – Linearity property – First Shifting Theorem – Transform of tf(t), f(t)/t, f'(t), f''(t).

Ur	nit:5	Inverse Laplace Transforms	9 hours
Inve	erse Laplac	e Transforms - Applications to solutions of First Order	and Second Order
Diff	ferential Eq	uations with constant coefficients.	
		Total Lecture hours	45 hours
Te	xt Book		
1	Mathemat	ics for B.Sc – Branch – I Volume III-P.Kandasamy&K.Thilaga	vathi (S.
	Chand and	Company Ltd, New Delhi, 2004.)	
Re	ference Bo	oks	
1	Calculus V	ol III -S. Narayanan and T.K. Manickavasagam Pillai, (S.	Viswanathan
	Printers a	nd Publishers Pvt. Ltd, Chennai 1991)	
2	Different	ial Equations -N.P. Bali(Laxmi Publication Ltd, New Delhi, 20)04)
3	Laplace ar	d Fourier Transforms-Dr. J. K. Goyal and K.P. Gupta(Pragatil	Prakashan
	Publishers	, Meerut, 2000)	
Re	lated Onlin	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://npt	el.ac.in/courses/111105035/	
2	http://www	v.nptelvideos.in/2012/11/mathematics-iii.html	
	https://www	wy digimat in/pptel/courses/video/111108081/L02 html	
	<u>mtps.//ww</u>		
3	https://ww	w.math.ust.hk/~machas/differential_equations.pdf.	
	https://ww	w.ijsr.net/archive/v2i1/ijsron2013331.pdf	
	https://ww	w.whitman.edu/mathematics/calculus_online/chapter17.html	
Co	ourse Design	ned By: 1.Dr.C.Janaki	

2.Mr.R.Subramanian

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	M	S	S	М	S	М	М	S	S
CO2	S	Μ	S	S	S	S	Μ	М	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	М	S	S	S	S	Μ	S	S	S
CO5	S	S	S	S	S	S	S	S	S	М

Course code		STATICS	L	T	P	C		
Core/Elective/S	Supportive	Core Paper – VI	3	-		4		
Pre-requisite	e	Basic Knowledge In Vector Algebra &Trigonometric Functions	Syllabı Versioi	ıs n	2021 - 2022			
Course Object	tives:							
1.To enable t one force acts 2.To know at	he students s on a partic pout the con-	to realize the nature of forces and resultant forces whe cle. ditions of equilibrium of couples and coplanar forces.	en more	tha	n			
Expected Cor	irse Outcor	nes:						
On the succes	ssful comple	etion of the course, student will be able to:						
1 Rememb	ber the vario	ous laws.			K	.1		
2 Understa	and the conc	epts of forces and moments.			K	2		
3 Understa	and the conc	epts of equilibrium .			K	2		
4 Apply th	e concepts of	of forces and moments.			K	3		
5 Analyze	the basics o	f coplanar forces, equilibrium of forces acting on a ri	gid body	Y	K	4		
K1 - Remem	ber: K2 - Ui	nderstand: K3 - Apply: K4 - Analyze: K5 - Evaluate:	K6 - Cre	eate	e			
	,							
Unit:1		Law Of Forces		9	hou	irs		
Forces acting a Polygon Law	at a point – l of Forces- L	Parallelogram law-triangle law –Converse of Triangle ami's Theorem	law-					
Unit:2		Resolution And Components Of Forces		9	hou	irs		
$(\lambda - \mu)$ theore	em –Resolu	tion of forces- Components of a force- Resultant of	of any n	un	nber	of		
Coplanar for	ces acting at	a point- Conditions of equilibrium.						
Unit:3		Parallel Forces ,Moment And Couple		9	hou	irs		
Parallel Force	es and Mom	ents – Resultant of two parallel forces (Like and unlike)-Condi	tior	ıs			
of equilibriu	m of three c	coplanar forces- Moment of a force- Geometrical rep	presenta	tio	1-			
Sign of the m	noment- Un	it of moment – Varignon's Theorem on couples	-Equilib	riu	m			
of two coup	les- Equival	ence of two couples.						
Unit:4	Unit:4 Forces Acting On A Rigid Rody 0					irs		
Moment of a	force about	a point-Varignon's Theorem - Coplanar forces acting	on a rig	id				
body – Theor	em on three	coplanar forces in equilibrium .						
Unit:5	General Co-plana	Conditions of Equilibrium Of A System Of r Forces		9	hou	Irs		
Reduction of	a system of	coplanar forces to a single force and a couple - nece	ssary &	su	fficie	ent		
conditions of equilibrium only – Equation to the line of action of the resultant.								

		Total Lecture hours	45 hours					
Te	xt Book							
1	Statics -M.K.Venkataraman(Agasthiar Publications, Trichy, 1999.)							
Re	eference Bo	ooks						
1	Statics -A	V.Dharmapadam.(S.Viswanathan Printers and Publishing Pvt.	, Ltd, 1993.)					
2	Mechanie	es -P.Duraipandian and Laxmi Duraipandian.(S.Chand and Com	npany Ltd, Ram					
	Nagar, N	ew Delhi -55, 1985.)						
3	Statics -Dr.P.P.Gupta(Kedal Nath Ram Nath, Meerut, 1983-84)							
Re	lated Onli	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]						
1	<u>https://n</u>	otel.ac.in/courses/112/105/112105164/						
2	<u>https://n</u>	otel.ac.in/courses/122/102/122102004/						
3	<u>https://w</u>	ww.khanacademy.org/science/ap-physics-1						
Co	ourse Desig	ned By: 1.Dr.C.Janaki						
		2.Dr. Renu Thomas						

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	M	М	М	S	S	М	М	S	S
CO2	S	М	S	S	М	М	Μ	М	М	S
CO3	S	М	S	S	Μ	Μ	Μ	S	S	S
CO4	S	S	S	S	S	S	S	М	S	S
CO5	S	S	S	S	Μ	S	S	S	S	S

Course code		Operations Research – Paper I	L	Т	P	С		
Core/Elective/Supp	portive	Skill Based Subject	3	-	-	3		
Pre-requisite		Knowledge In Basic Mathematical Concepts	Syllabu Versior	IS 1	2021 - 2022			
Course Objectives	es:		-					
To familiarize stude ,model formulation	To familiarize students with the basic concepts ,models and techniques for effective decision making ,model formulation and applications.							
Expected Course	Outcom	965.						
On the successful	l comple	tion of the course, student will be able to:						
1 Understand the fields.	1 Understand the basic concepts and application of operations researchin various fields. K1							
2 Know princip	iples of c	onstruction of mathematical models of conflicting sit	uations.		K	2		
3 Analyze the r	relations	hip between a linear program and its dual.			K	3		
4 Apply technic problems in i	4 Apply techniques constructively to make effective decisions in business and solve K3 problems in industry							
5 Build and sol	olve trans	portation problems.			K	4		
K1 - Remember;	K2 - Un	derstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - Cre	eate	e			
Unit:1 B	Basics Of	f Operations Research & Formulation Of L.P.P		9	hou	irs		
Basics of O.R – De	efinition	of O.R - Characteristics of O.R - Scientific methods	in O.R -	-				
Necessary of O.R i Management–Uses L.P.P.	in Indust es and lim	ry – O.R and Decision Making – Scope of O.R in Me itations of O.R. Linear Programming Problem – For	odern mulatior	1 01	f			
Unit:2 L	Linear P	rogramming Problem -Simplex method		9	hou	irs		
Graphical solutions	ns of L.P.	P – Problems. Simplex Method – Problems.						
IL 4.2					1.			
Unit:3 Charna's Danality I	Mathad	Big-M & I wo Phase Method	Droblan	<u>9</u>	hou	rs		
	Method	(or) Big – M Method - Two Phase Shiplex method –	FIODIell	118.				
Unit:4		Duality In L.P.P		9	hou	irs		
Duality in L.P.P –	- Concer	ot of duality – Duality and Simplex Method – Probler	ns.					
	1	· · · · ·						
Unit:5		Transportation Model		9	hou	irs		
The transportation	Problem	as – Basic feasible solution by L.C.M – NWC- VAM- on problems.	optimum	I SO	lutio	ns		
		Total Lastura haura		15	hor			
Text Book		Total Lecture nours		-13	nou	13		

1	Operations Research – Kantiswarup, P. K. Gupta, Man Mohan(S. Chand & Sons Education
	Publications, New Delhi, 12th Revised edition-2003)
Re	eference Books
1	Operations Research – Prem Kumar Gupta D. S. Hira(S. Chand & Company Ltd, Ram Nagar,
	New Delhi ,2014)
2	Operations Research Principles and Problems- S. Dharani Venkata Krishnan(Keerthi
	publishing house PVT Ltd.1994)
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	https://nptel.ac.in/courses/111/102/111102012/
2	https://nptel.ac.in/courses/111/104/111104027/
Co	ourse Designed By: 1.Dr.C.Janaki
	2.Dr.M.S. Annie Christi

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	M	М	S	S	М	М	М	S	S
CO2	S	Μ	S	S	S	S	S	М	М	S
CO3	S	S	S	S	М	М	S	S	S	S
CO4	S	S	S	S	S	S	S	S	М	S
CO5	S	S	S	S	S	S	S	М	S	S



Cou	rse code		DYNAMICS	L	Т	Р	С
Core	e/Elective/S	Supportive	Core Paper-VII	3	-	-	3
Pro	e-requisite	;	Knowledge In Forces And Vector Algebra	Syllabu Versior	IS I	202 202	1 2
Cou	rse Objec	tives:					
To not	impart kno ions of imp	owledge abo pact betwee	but the projectile, Simple Harmonic Motion and under in two smooth spheres.	standing	th	e	
Exp	ected Cou	rse Outcon	nes:				
On	the succes	sful comple	etion of the course, student will be able to:				
1	Rememb	er the basic	kinematics and dynamic concepts.			K	.1
2	Describe	the differe	ntial equation of Central Orbits .			K	2
3	Apply the projectile	e concepts	of projectiles to solve problems relating to the motion	n of a		K	3
4	To under two direc	stand & app ctions .	ly the concepts of composition of simple harmonic m	otion in		K	3
5	Understa impact.	nd impulsi	ve forces and analyze loss of K.E due to direct and ol	olique		K	4
K1	- Rememb	ber; K2 - U	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 – Cre	eat	e	
Un	it:1	otila Craata	Projectiles	nlong	ļ	hou	rs
thro	ugh the poi	int of project	ction-Maximum range.	plane			
Un	it:2		Central Orbits		9	hou	rs
Ra	dial and tra	insverse con	mponents of velocity and acceleration - areal velocity	of centr	al o	orbit	s -
Dif	ferential e	quation of c	entral orbit in polar coordinates only.				
Un	it:3		Simple Harmonic Motion		9	hou	rs
An	nplitude, pe	eriodic time	, phase-composition of two simple harmonic motions	of the			
san	ne period i	n a straight	line and in two perpendicular lines.				
Um	:4.1	Colligion	n Of Elastic Radios Direct Impact Of Subaras		0	hou	
Imp	IL:4	Comsion Newton	's experimental law Principle of conservation of mor	nontum	9	nou	rs
Dire	ect Impact of	on a smooth	fixed plane -Direct impact of two smooth spheres- lo	oss of			
kine	tic energy	during dire	ct impact.				
Un	;+.5		Oblique Impact Of Spheres		0	hou	rc
Ob	lique impa	ct of a smoo	oth sphere on fixed smooth plane – oblique impact of ty	vo smool	, th s	pher	es
- L	oss of Kine	etic energy	during oblique impact.			1	
			Total Lecture hours		45	hou	rs
							-0

Te	ext Book					
1	Dynamics -M.K.Venkataraman(11th Ed. Agasthiar Publications, Trichy, 1994.)					
Re	Reference Books					
1	Dynamics -A.V.Dharamapadam(S.Viswanathan Printers and Publishers Pvt., Ltd, Chennai, 1998)					
2	Dynamics -K.Viswanatha Naik and M.S.Kasi(Emerald Publishers, 1992)					
3	Dynamics -Naryanamurthi(National Publishers, New Delhi, 1991)					
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]					
1	https://nptel.ac.in/courses/115/106/115106119/					
2	https://www.askiitians.com/iit-jee-physics/mechanics/motion-of-projectile.aspx					
Co	ourse Designed By: 1.Dr.C.Janaki					
	2. Dr. Renu Thomas					

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	М	М	S	S	S	S	S
CO2	Μ	Μ	Μ	Μ	М	S	Μ	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	Μ	М	Μ	Μ	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	М

Cou	rse code		PROGRAMMING IN C	PROGRAMMING IN C L T P							
Core	e/Elective/S	upportive	Core Paper-VIII	2	-	-	3				
Pre	e-requisite	Higher Secondary level Mathematics	Syllabı Versio	ıs n	2021 - 2022	-					
Cou	Course Objectives:										
To i	To impart the importance of C language, its structure, Data types, Operators of C, Various control										
state	statements, Arrays, different types of functions and practical problems.										
F											
Exp	the succes	sful comple	tes:								
	Domomb	or the impre	extense of C language and detetunes			V 1					
1	Kememo		stance of C language and datatypes.								
2	2 Understand the basic structure, operators and statements of C language.										
3	Understa	nd decision	control statements, loop control statements .			K2					
4	Apply the	e concepts o	f data types, operators, expressions, control statem	ents,		K3					
	arrays, cl	naracter arra	sys and strings to write the C code for a given algorith	ım.							
5	5Read, understand and trace the execution of programs written in C language.K4										
K1	- Rememt	per; K2 - U1	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate	; K6 – 0	Cre	ate					
			~ ~ ~ ~ ~ ~ ~ ~ ~			<i></i>					
Un	it:1	.	Constants, Variables &Data Types			6 hou	rs				
Intro	duction –	Importance	of C- Basic structure of C programme - Character s	et -Cons	star	its –					
to	words and	a fining syn	- variables Data types - Declaration of variables	– Assig	gnir	ig value	es				
10 10		cinnig syn	ibone constants.								
Un	it:2		Operators & Expressions			6 hou	rs				
Arit	nmetic op	erators -]	Relational operators - logical operators – assign	ment of	oera	ators –					
incre	ement and	decrement	operators -Conditional operators - Special oper	ators –	Ar	ithmeti	c				
expr	essions –E	valuation o	f expressions - Precedence of arithmetic operators -	Some c	om	putation	nal				
prob	lems –Typ	e conversio	n in expressions – operator precedence and associat	ing mat	hen	natical					
func	tions.										
Un	it.3	Managing	Input Quitnut Anarotions Decision Making	<u> </u>		6 hou	rc				
UI	11.5	And Bran	ching			0 IIOu	15				
Read	ling and W	riting chara	acter – formatted input and output. Decision making	with IF	⁷ sta	atement	t —				
Sim	ole IF state	ment – The	if ELSE statement - Nesting of IF ELSE statement – '	The ELS	SE	IF ladde	er.				
The	Switch sta	tement –Th	e ? Operator – The GOTO statement.								
Un	it:4		Decision Making And Looping			6 hou	rs				
The	WHILE s	tatement - th	e DO statement the FOR statement –Jumps in loops.	1		- 100					
			<u>^</u>								
Un	it:5		Arrays And Strings			6 hou	rs				

One, Two dimensional arrays – initializing two dimensional arrays – Multidimensional arrays –									
Declaring and initializing string variables –reading strings from terminal – Writing strings on the									
screen – Arithmetic operations on characters.									
	Total Lastura hours	20 hours							

		Total Lectur	e hours	30 hours						
Те	Text Book									
1	Programm	ning in ANSI C -E.Balagurusamy(Tata McGrav	v –Hill	Publishing						
	Company limited, New Delhi, Fifth Edition, 2008)									
Re	Reference Books									
1	1 Programming with C (Schaum's outline series)- Byron Gottfried (TataMcGrawHill publishing company -1998.)									
2	Programm 2002)	ning with Ansi and Turbo C -Ashok N.Kamthane(P	earson E	ducation publishers,						
3	The spirit	t of C -HentryMullish and Herbert L cooper (Jaico pub	lisher, 19	96.)						
4	The Ansi (C- Brian W.Kernighan, Dennis M.Ritchie (Published by	Prentice-	Hall of India						
	Private Li	imited, M-97,New Delhi- 110001, Second edition, Oc	ober 1992							
5	Ansi C: V	With Microsoft C 5.1 and Quick C 2.0 -C.Balasubran	nanian.(T	ata McGraw-						
	Hill Publis	ishing company limited, New Delhi.)								
6	Drogramm	ning In C. Kris A James (Colgotia Publications Dut Itd	1002)							
0	Tiogramm	ning in C - Kirs A.Janisa(Gargona i ubications i vi.itu	. 1992)							
Re	elated Onlin	ine Contents [MOOC, SWAYAM, NPTEL, Website	es etc.]							
1	https://np	nptel.ac.in/courses/106/104/106104128/	-							
2	https://np	nptel.ac.in/courses/106/105/106105171/								
Co	ourse Design	gned By: 1.Dr.C.Janaki								
		2.Dr.K.Malar								

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	S	S	M	М	М	S	S
CO2	S	S	Μ	Μ	S	Μ	М	S	М	S
CO3	S	Μ	Μ	Μ	S	S	Μ	S	S	S
CO4	S	S	S	S	S	Μ	S	S	S	М
CO5	S	S	S	S	S	М	S	S	S	S

Course code		PROGRAMMING IN C-(PRACTICAL)	L	Т	Р	C			
Core/Elective/Su	pportive	Core Paper VIII (Practical)	-	-	1	1			
Pre-requisite		Knowledge in C	Sylla Versi	2021- 2022					
PRACTICAL LIST									

1. Write a C program to generate 'N' Fibonacci number.

2. Write a C program to print all possible roots for a given quadratic equation.

3. Write a C program to calculate the statistical values of mean, median.

4. Write a C program to calculate the statistical values of Standard Deviation and variance of the given data .

5. Write a C program to sort a set of numbers.

6. Write a C program to sort the given set of names.

7. Write a C program to find factorial value of a given number 'N' using recursive function call.

8. Write a C program to find the product of two given matrix

Cou	rse code		OPERATIONS RESEARCH – PAPER II	L	Т	Р	С				
Core	e/Elective/S	upportive	SKILL BASED SUBJECT	2	-	-	2				
Pre	e-requisite		Knowledge In Basic Mathematical Concepts	edge In Basic Mathematical Concepts Syllabi							
Cou	Course Objectives:										
To in	To impart knowledge in Assignment Problems, Game theory, performance measures of queues and										
optin	optimal use of Inventory.										
Exp	Expected Course Outcomes:										
On	the succes	sful comple	etion of the course, student will be able to:								
1	Identify	the importa	nce of stocks, the reasons for holding stockin an org	anizatio	n	K	.1				
	,determin	$\frac{1}{1}$ e the optim	al order quantity for models .			1/	0				
2	Explain t	he various o	costs related to inventory system.			K	.2				
3	Apply ga	me theory og and praction	concepts to articulate real-world situations by identi- cing strategic decisions.	fying,		K	.3				
4	Apply an	d extend qu	eueing models to analyze real world systems.			K	4				
5	Build and	l solve assig	gnment model.			K	4				
K1	K1 - Remember: K2 - Understand: K3 - Apply: K4 - Analyze: K5 - Evaluate: K6 – Create										
Un	it:1		Assignment Model		6	hou	rs				
The	Assignme	nt Problems	- Assignment algorithm - optimum solutions - Unb	alanced							
Assi	gnment Pr	oblems.									
		ſ	a	- 1							
Un	it:2		Game Theory		6	hou	rs				
Gam - Sol meth	Game Theory – Two person zero sum game – The Maximin – Minimax principle – problems - Solution of 2 x 2 rectangular Games – Domination Property – (2 x n) and (m x 2) graphical method – Problems.										
Un	it:3		Queueing Model		6	hou	rs				
Qu	eueing Th	eory – Inti	oduction – Queueing system – Characteristics of	Queue	ing						
sys	tem – Sym	bols and N	otations - Classifications of queues - Problems in (M	[/M/1):							
(∞/FIFO)											
Un	it:4		Multi Channel Queueing Models		6	hou	rs				
Prob	Problems in $(M/M/1)$: $(N/FIFO)$; $(M/M/C)$: $(\infty/FIFO)$; $(M/M/C)$: $(N/FIFO)$ Models.										
Un	Unit:5 Inventory Models -6 hours										
Inve	Inventory control – Types of inventories – Inventory costs – EOQ Problem with no										
shor	shortages – Production problem with no shortages – EOQ with shortages – Production										
prob	lem with s	hortages – I	EOQ with price breaks.								

		Total Lecture hours	30 hours								
Те	Text Book										
1	Operations Research – Kantiswarup, P. K. Gupta, Man Mohan(S. Chand & Sons Education Publications, New Delhi, 12th Revised edition, 2003)										
Re	eference Ro	noks									
IN											
1	Operations Research – Prem Kumar Gupta D. S. Hira(S. Chand & Company Ltd, Ram Nagar, New Delhi,2014)										
2	Operations Research Principles and Problems- S. Dharani Venkata krishnan(Keerthi publishing house PVT Ltd.1994)										
Re	elated Onli	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]									
1	https://npt	el.ac.in/courses/111/102/111102012/									
2	https://you	<u>atu.be/zADj0k0waFY</u>									
	https://you	utu.be/xvDdrswAj8M									
	https://ww	/w.youtube.com/watch?v=xVPoWkkQTrQ									
	https://ww	/w.youtube.com/watch?v=7kDtTAnvuww									
	https://ww	/w.youtube.com/watch?v=IfLsPHKk51w									
3	https://npt	tel.ac.in/courses/109/103/109103021/									
4	https://n	otel.ac.in/courses/110/105/110105082/									
	https://n	otel.ac.in/courses/110/106/110106045/									
Co	ourse Desig	ned By: 1.Dr.C.Janaki									
2.	.Dr.M.S. A	nnie Christi									

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	Μ	S	S	М	S	М	М	М	S	S
CO2	Μ	М	М	Μ	S	S	Μ	М	М	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	Μ	S	Μ	S	М	S	М
Fifth Semester



Cou	rse code		REAL ANALYSIS - I	L	Т	Р	С	
Core	/Elective/S	Supportive	Core Paper – IX	5	-	1	4	
Pre	-requisite		Knowledge in the basic properties of real numbers	Syllabus Version	20 20)21 -)22	-	
Cou	rse Objec	tives:						
Aim	ed at expo	sing the rea	al number systems that underpin the development of	real analys	sis a	and	in	
unde	erstanding	various phy	sical phenomena .					
Fyn	ected Cou	rse Autcor	165.					
On	the succes	sful comple	tion of the course, student will be able to:					
1	1 Remember the basic topological properties of subsets of the real numbers K1							
2	Understa	nd the fund	amental properties of the real numbers, and analyze	the real		ĸ	2	
2	number s	system.	amental properties of the real numbers' and analyze	the real		13		
3 Learn the concept of limits, sequence, continuity, convergent sequence in metric K2						2		
	spaces appreciating the abstract ideas and their applicability.							
4	Have the	proficiency	v in the formulation and construction of proofs of ba	asic results		K	3	
	in real analysis.							
5	5 Demonstrate skills in communicating Mathematics and learn basic techniques and K4							
	examples	s in analysis	to be well prepared for extended learning.					
K1	- Rememb	per; $\mathbf{K2} - \mathbf{U1}$	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate	e; K6 – Cre	ate			
TTer	4.1		The Deel Ard Conversion Newsberr Contenue		15	1		
Intro	duction_t	he field avid	The Real And Complex Number Systems	vation theo	<u>15</u> ren	nou 1	IFS	
for i	ntegers –	Rational nu	mbers –Irrational numbers –Upper bounds maxim	um Eleme	ents			
least	upper b	ound –the	completeness axiom –some properties of th	e supremu	m -	_		
prop	erties of th	ne integers o	leduced from the completeness axiom- The Archime	edean prop	erty	y		
of th	ne real nu	mber system	m -Rational numbers with finite decimal represent	ntation of	rea	1		
num	bers –abso	olute values	and the triangle inequality the Cauchy-Schwarz ir	nequality –	plu	S		
and 1	minus infi	nity and the	extended real number system.					
Uni	it·?		Basic Notions Of A Set Theory		15	hou	irs	
Nota	tions –or	dered pairs	S -Cartesian product of two sets - Relations a	nd function	<u>ns</u> -	<u>-</u>	15	
furth	er termin	ology cond	cerning functions –one–one functions and inverse	se –compo	osite	e		
func	tions –seq	uences –sin	ilar sets-finite and infinite sets –countable and unc	ountable se	ets -	_		
unco	ountability	of the real r	number system -set algebra -countable collection of	countable s	sets	•		
		1		T				
Uni	it:3		Elements Of Point Set Topology		15	hou	irs	
Ele	ments of p	point set top	ology: Euclidean space R ["] – open balls and open					
sets	1n K". The	structure o	t open sets in K" –closed sets and adherent points					
		10 - weither st	rass meorem – the Cantor intersection Theorem		15	hor	rc	
Com	Unit:4 Covering & Compactness 15 hours							
COVE	Covering –Lindelof covering theorem –the Heine Borel covering theorem –Compactness in R ⁿ							

Unit.5	Limits And Continuity In Matric Spaces	15
Boundary of a	set.	
-Metric Space	s -point set topology in metric spaces -compact subsets of a me	etric space –

Uı	nit:5	Limits And Continuity In M	etric Spaces	15 hours				
Cor	nvergent sec	uences in a metric space – Cauchy sequ	ences –Completeness se	equences –				
con	nplete metri	Spaces. Limit of a function -Continue	ous functions -continuit	y of				
con	composite functions. Continuous complex valued and vector valued functions.							
				1				
			Total Lecture hours	75 hours				
Те	ext Book(s)							
1	Mathemat	cal Analysis-T.M.Apostol(2nd ed., N	arosa Publishing Compa	ny, Chennai, 1990.)				
	Unit I Chapter 1 Sections 1.2, 1.3, 1.6 to 1.16, 1.18 to 1.20							
	Un	t II Chapter 2 Sections 2.2 to	2.15					
	Un	t III Chapter 3 Sections 3.2 to	3.9					
	Un	t IV Chapter 3 Sections 3.10 to	0 3.16					
	Un	t V Chapter 4 Sections 4.2 to	4.5, 4.8 to 4.10					
Re	eference Bo	OKS						
1	Methods of	Real Analysis -R.R.Goldberg.(NY, Jo	ohn Wiley, New York 19	976.)				
2	Introduction 1963.)	n to Topology and Modern Analysis- C	G.F.Simmons.(McGrav	v – Hill, New York,				
3	A survey of	Modern Algebra(3rd Edition)-G.Bir	khoff and					
	MacLane.	Macmillian, New York, 1965.)						
4	Real Ana	ysis -J.N.Sharma and A.R.Vasistha.(K	Krishna Prakashan Medi	a (P) Ltd, 1997)				
	elated Onli	e Contents [MOOC, SWAYAM, NP	TEL, Websites etc.]					
1	https://n	:el.ac.in/courses/111/105/111105069/#						
2	https://n	el.ac.in/courses/111/101/111101134/						
3	https://w	w.digimat.in/nptel/courses/video/11110	5098/					
4	https://n	:el.ac.in/courses/111/106/111106053/						
	Course Designed By: 1.Dr.C.Janaki							
2.	2Dr.M.S. Annie Christi							

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	М	М	М	М	М	S	S
CO2	S	S	М	М	М	S	S	Μ	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	М

Course code		COMPLEX ANALYSIS - I	L	Т	Р	С		
Core/Elective/Su	pportive	Core Paper – X	6	-	-	4		
Pre-requisite		Knowledge in Calculus	Syllab Versio	us n	2021 -2022			
Course Objecti	ves:							
To equip the stu analyticity ,pow	idents with er series ar	the understanding of the fundamental concepts on the complex integration.	of comp	lex f	unction	IS,		
Expected Course Outcomes:								
On the success	ful comple	tion of the course, student will be able to:						
1 Learn teo results.	1 Learn techniques of complex analysis effectively to establish mathematical results.							
2 Recogniz	ze thesimp	le and multiple connected domains.			K2			
3 Investiga	te a functi	on for its analyticity and find it series developm	nent.		K3			
4 Examine	Examine the relationship between conformal mapping and analytic functions							
5 Compute	contour in	tegrals directly and by the fundamental theorem			K4			
K1 - Remembe	er; K2 - Un	derstand; K3 - Apply; K4 - Analyze; K5 - Evalu	ate; K6	- C1	reate			
Unit:1		Complex Plane			18 h	18 hours		
Elementary Tran invariance of cro – Stereographic	er – Field of nsformation oss-ratio un projection	the complex numbers – Conjugation – Absolute values i) $w=z + \alpha$ ii) $w = az$ iii) $w = 1/z$.Fixed point of extended bilinear transformation –Definition of extended	tue -Arg ts -cross ded com	ration plex	ent – 0- plane			
Unit:2		Analytic Functions			18 ł	ours		
Complex Functions Is nours Complex Functions- Limit of a function –continuity –differentiability – Analytical function defined in a region –necessary conditions for differentiability –sufficient conditions for differentiability –Cauchy-Riemann equation in polar coordinates –Definition of entire function.								
Unit:3	Po	wer Series And Elementary Functions			18 F	1011rs		
Absolute conver	gence –cir	cle of convergence – Analyticity of the sum of p	ower sei	ies i	n the C	ircle		
of convergence functions : Expo	(term by te onential, Lo	rm differentiation of a series)	ons.		Elemer	ntary		
`	·	· · · · · · · · · · · · · · · · · · ·	-					
Unit:4	Unit:4 Harmonic Functions And Conformal Mapping 1							
Definition and d >> $f(z)$, where f	etermination	on. Conformal Mapping: Isogonal mapping – Confo , particularly the mappings.	rmal ma	ppın	g-Mapp	ing z-		

$w=e^{z}$; $w=z^{2}$; $w=\sin z$; $w=\cos z$; $w=z+1/z$.									
Uni	it:5	Complex Integration	18 hours						
Simp	oly and mul	tiply connected regions in the complex plane. Integration of a	f(z) from definition						
along a curve joining Z ₁ and Z ₂ . Proof of Cauchy's Theorem (using Goursat's lemma for a simply									
conn	connected region). Statement of Cauchy's integral formula for higher derivatives -Morera's								
theor	rem.								
		Total Lecture hours	90 hours						
Tex	xt Book(s)	· · · · · ·							
1	Complex Chennai –	Analysis -P.Duraipandian and Laxmi Duraipandian.(En 2, 1986.)	nerald Publishers,						
	Unit I	Chapter 1 Sections 1.1 to 1.3, 1.6 to 1.9							
		Chapter 2 Sections 2.1 to 2.2, 2.6 to 2.9,							
		Chapter 7 Section 7.1							
	Unit II	Chapter 4 Sections 4.1 to 4.10							
	Unit III	Chapter 6 Sections 6.1 to 6.11							
	Unit IV	Chapter 6 Sections 6.12 to 6.13							
		Chapter 7 Sections7.4,7.6 to 7.9							
	Unit V	Chapter 8 Sections 8.1 to 8.9							
Ref	erence Boo	bks							
1	Complex Company	Variable and Applications -Churchill and Others.(Tata McG y Ltd, 1974.)	raw Hill Publishing						
2	Theory of Meerut, 1	functions of Complex Variable -Santhinarayan(S.Chand and 1995.)	Company,						
3	Functions	of Complex Variable -Tyagi B.S(17th Edition, Pragati Prak	asham Publishing						
	Company	Ltd, Meerut, 1992-93)							
Rel	ated Onlin	e Contents [MOOC, SWAYAM, NPTEL, Websites etc.]							
1	https://n	otel.ac.in/courses/111/103/111103070/							
2	https://n	otel.ac.in/courses/111/10//111107056/							
3 C	nttps://n	otel.ac.in/courses/122/103/122103012/							
Coi	arse Design	ed By 1.Dr.C.Janaki							
		2.Mr.K.Subramanian							

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	М	М	S	S	М	Μ	М	S	S
CO2	S	М	М	Μ	Μ	S	Μ	S	S	S
CO3	S	S	М	S	S	S	S	S	S	S
CO4	S	S	М	S	Μ	S	S	S	S	S
CO5	S	S	S	S	Μ	S	S	S	S	М

Cour	se code		MODERN ALGEBRA - I	L	Т	Р	С		
Core/	Elective/St	pportive	Core Paper – XI	6	-	-	4		
Pre-	requisite		Higher Secondary level Mathematics	Syllabu Versior	is 2 n 2				
Cours	se Objecti	ves:							
Focus	es on the	concepts of	f algebraic structures which is one of a pillar of me	odern M	athen	natics	and		
empha	asis on the	eir properti	ies and applications.						
_									
Expected Course Outcomes:									
On the successful completion of the course, student will be able to:									
1	Recall th	e propertie	s and extend group structure to finite permutation g	groups.		K1			
2	Explain	the concept	s of homomorphism, isomorphism and automorph	ism.		K2			
3 Demonstrate abstract thinking capacity and ability to prove theorems.						K3			
4	Compare	e features of	f different algebraic structures .			K4			
5 Examine the properties of algebraic structures and their role in applied contexts.						K4			
K1 -	Remembe	er; K2 - Un	derstand; K3 - Apply; K4 - Analyze; K5 - Evaluate	; K6 – (Create	e			
Unit	:1		Groups & its Basic Properties		1	8 ho	urs		
Sets –	Sets – mappings – Relations and binary operations – Groups: Abelian group, Symmetric group								
Defini	itions and	Examples -	- Basic properties.						
		1							
Unit	:2		Subgroups& Normal Subgroups			<u>18 ho</u>	urs		
Subgr	oups – Cy	clic subgro	oup - Index of a group – Order of an element – Fer	mat theo	orem	- A			
Count	ing Princi	pie - Norm	al Subgroups and Quotient Groups.						
Unit	•3		Automorphisms		1	8 ho	urs		
Hom	omorphis	ms (Applic	cations 1 and 2 are omitted) -Automorphisms –	Inner		0 110	uis		
autor	morphism	- Cayley's	theorem, permutation groups.						
	i								
Unit	:4		Rings		1	8 ho	urs		
Defini	ition and E	Examples –	Some Special Classes of Rings – Commutative ring	– Field –	Integ	gral			
domai	in - Homo	morphisms	of Rings.						
T T •/	-					101			
Unit	:5		Ideals & Quotient Rings	The fire	11.6	<u>18 ho</u>	urs		
Quoti	and Quot ents of an	ieni Kings - Inteoral De	– More ideals and Quotient Kings – Maximal ideal	- 1 ne 11e					
	Total Lecture hours 90 hours								
Text	Text Book								
1	1 Topics in Algebra -I.N. Herstein(John Wiley & Sons, New York, 2003.)								

	Unit I	Chapter 1 Sections 1.1 to 1.3,							
	Chapte	er 2 Sections 2.1 to 2.3							
	Unit II	Chapter 2 Sections 2.4 to 2.6							
	Unit III	Chapter 2 Sections 2.7 to 2.10							
	Unit IV	Chapter 3 Sections 3.1 to 3.3							
	Unit V	Chapter 3 Sections 3.4 to 3.6.							
Reference Books									
1	Modern Algebra -Surjeet Singh and Qazi Zameeruddin.(Vikas Publishing house, 1992.)								
2	Modern Algo	ebra- A.R.Vasishtha(Krishna Prakashan Mandir, Meerut, 1994 - 95.)							
Rel	ated Online C	ontents [MOOC, SWAYAM, NPTEL, Websites etc.]							
1	https://nptel.a	c.in/courses/106/104/106104149/							
2	https://nptel.a	c.in/courses/111/106/111106113/							
3	https://www.c	lasscentral.com/course/swayam-modern-algebra-14201							
	•								
Cou	Course Designed By: 1.Dr.C.Janaki								

2. Dr. G.V. Chandrasekar

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	М	М	S	М	S	S	М	S	S
CO2	Μ	Μ	S	S	Μ	S	S	S	S	S
CO3	S	Μ	Μ	S	S	S	S	S	S	S
CO4	S	Μ	Μ	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

Course code		DISCRETE MATHEMATICS	L	Т	P	С			
Core/Elective/S	Supportive	CORE PAPER XII	5	-	-	4			
Pre-requisite	2	Higher Secondary level Mathematics	Syllabu Versior	ıs 1	202 - 202	1 2			
Course Objec	tives:								
Prepare studen	nts to deve	elop mathematical foundations to understand, cre	ate mat	hei	natio	cal			
arguments and Theory.	Theory.								
Expected Course Outcomes:									
On the succes	sful comple	etion of the course, student will be able to:							
1 Assimila	te various g	raph theoretic concepts and familiarize with their appl	lications		K	.1			
2 Know and understand about partially ordered sets, Boolean algebra, lattices and K2 their types.									
3Apply Karnaugh map for simplifying the Boolean expression.K3									
4 Demonstrate the skill to construct simple mathematical proofs and to validate . K									
5 To achie	ve greater a	ccuracy, clarity of thought and language.			K	4			
K1 - Rememb	ber; K2 - U	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - Cre	eato	e				
	1								
Unit:1	11 C 1	Mathematical logic		15	hou	hours			
implications	vell formed Duality law	I formulas, l'autology, Equivalence of formulas, l'a V Normal forms Predicates Variables Quantifiers	utologic Free and	ai d					
bound Variable	es. Theory of	of inference for predicate calculus.		1					
	2								
Unit:2		Relations And Functions		15	hou	irs			
Composition	of relations	, Composition of functions, Inverse functions, one-to-	one, ont	0,	one-1	:0-			
one& onto fu	inctions, Ha	ashing functions, Permutation function, Growth of f	unctions	. A	Algeb	ra			
structures: Se	mi groups,	Free semi groups, Monoids.							
Unit:3		Formal Languages And Automata	·	15	hou	irs			
Regular expr	essions, Ty	pes of grammar, Regular grammar and finite state a	utomata	,					
Context free and sensitive grammars.									
Unit:4		Lattices And Boolean Algebra		15	hou	irs			
Partial orderi	Partial ordering, Poset, Lattices, Boolean algebra, Boolean functions, Theorems, Minimization								
of Boolean fu	of Boolean functions (Karnaugh Method only).								

Uni	Unit:5 Graph Theory 15 hours										
Dire	ected and	undirected graphs, Paths, Reachability, Connectedness, Ma	atrix representation,								
Eule	er paths, H	amiltonian paths, Trees, Binary trees - theorems, and application	ons.								
		Total Lecture hours	75 hours								
Tex	t Book										
1	Discrete	Mathematical Structures with applications to computer s	science-J.P								
	Tremblay and R.P Manohar (Mc.Graw Hill, 1975.)										
	Unit 1: C	hapter 1. Sections - 1-2, 1-2.7. 1-2.9, 1-2.10, 1-2.11, 1-3, 1-5.1,	1-5.2, 1-5.4, 1-6.4								
	Unit 2: C	hapter 2- Sections - 2-3.5, 2-3.7, 2-4.2, 2-4.3, 2-4.6,									
	Chapter 3- Sections-3-2, 3-5, 3-5.3,										
	Unit 3: C	hapter 3- Sections 3-3.1, 3-3.2									
	Chapter	4-Section 4-6.2									
	Unit4: C	hapter 4- Section 4-1.1, 4-2, 4-3, 4-4.2									
	Unit 5: C	hapter 5- Section 5-1.1, 5-1.2, 5-1.3, 5-1.4									
DØ											
Ref	erence Bo	ok									
1	Discrete N	Athematics-Oscar Levin(3 rd Edition,2016)									
Rela	ated Onlin	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]									
1	https://npt	el.ac.in/courses/106/106/106106094/									
2	2 https://nptel.ac.in/courses/111/107/111107058/										
Cou	Irse Design	ned By: 1.Dr.C.Janaki									
		2.Mr.R.Subramanian									

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	S	S	S	М	S	М	М	S	S
CO2	S	Μ	S	S	Μ	S	S	S	S	S
CO3	S	Μ	S	S	Μ	S	Μ	S	S	S
CO4	S	Μ	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

			1		1	r	
Course code		OPERATIONS RESEARCH – PAPER III	L	T	P	С	
Core/Elective/S	Supportive	Skill Based Subject	3	-	-	2	
Pre-requisite		Knowledge In Basics of O.R	Syllabu Version	IS	202 - 202	1 2	
Course Object	tives:						
Presents applic	ations and 1	nethod to solve Integer Programming Problems, Non-I	inear Pro	ogi	amn	ning	
Problems and I	Dynamic Pro	gramming problems.					
Expected Cou	rse Outcor	nes:					
On the succes	sful comple	etion of the course, student will be able to:					
1 Know the	e concept of	f simulation and simulate a queueing system			K	.1	
2 Understa	nd the overa	all approach of dynamic programming.			K	2	
3 Solve no	nlinear pros	gramming problems using Lagrange multiplier and usi	ng		K	2	
Kuhn-Tu	cker condit	ions.	0				
4 Apply co	ncepts in o	ptimal scheduling			K	K3	
5 To form	ilate a mode	el for solving the intractable problems			K	4	
K1 - Rememb	per; K2 - U	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - Cre	eat	e		
Unit:1		Simulation		9	hou	Irs	
Introduction-si	mulation r	nodels-Event-Types of simulation- Generation of	random	nu	mbe	rs-	
Monte-Carlo si	imulation- s	simulation of queueing system.					
	T						
Unit:2		Network Scheduling By PERT/CPM		9	hou	irs	
Introduction-	Network an	nd basic components- Rules of Network construction	- Time				
calculation in I	Networks-C	PM. Pert Calculations- Cost Analysis- crashing the ne	etwork-				
Problems.							
	1			-			
Unit:3		Integer Programming Problem		9	hou	irs	
Integer Progra	imming Pro	oblem – Gomory's fractional cut Method – Branch	n and				
Bound Method							
T 1		Non-lincon Programming Problems		-	han		
Unit:4	T	Non-inear Programming Problems	<u>Can 1'4'</u>	9	nou	Irs	
Brobloma	– Lagrange	: mulupher – Hessian bordered Matrix – Kunn Tucker	Conditi	on			
– FIODIEIIIS.							
Unit.5		Dynamic Programming Problem		0	hou	ire	
Dynamic Progr	l ramming Pr	D ynamie i rogramming i robiem oblem – Recursive equation approach – D P P Algorit	hm _	7	nou	11.5	
Solution of L.F	P by D P I	D					

		Total Lecture hours	45 hours					
Те	xt Book	· · · ·						
1	Operation Education	s Research – Kantiswarup, P. K. Gupta, Man Mohan(S. Ch Publications, New Delhi, 12th Revised edition, 2003)	and & Sons					
	e D	•						
Ke	eierence Bo	OKS						
1	Operation Nagar, Ne	s Research – Prem Kumar Gupta& D. S. Hira(S. Chand & Com w Delhi ,2014)	apany Ltd, Ram					
2	2 Operations Research Principles and Problems- S. Dharani Venkatakrishnan(Keerthi publishing house PVT Ltd ,1994)							
Re	elated Onli	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]						
1	https://n	otel.ac.in/courses/111/107/111107104/						
2	https://n	otel.ac.in/courses/111/102/111102012/						
3	https://n	otel.ac.in/courses/111/104/111104027/						
4	https://n	otel.ac.in/courses/111/105/111105039/						
Co	ourse Desig	ned By: 1.Dr.C.Janaki						
	C	2.Dr.M.S. Annie Christi						

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	Μ	S	S	S	S	S	S	S	S
CO2	S	М	Μ	Μ	Μ	S	S	М	S	S
CO3	S	Μ	Μ	S	Μ	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	М	S	S	S	S	S	S

Sixth Semester



Cou	rse code		REAL ANALYSIS - II	L	Т	Р	С		
Core	/Elective/S	upportive	Core Paper – XIII	5	-	-	4		
Pre	-requisite		Knowledge in Mappings &Properties of Real Numbers	Syllabu Versior	IS I	202 - 202	1 2		
Cou	rse Object	tives:							
To p conn	resent a d ectivity, d	eeper and r erivative, m	igorous understanding of fundamental concepts like c nonotonic functions with properties and Riemann - S	ontinuity tieltjes in	, teg	ral.			
Exp	ected Cou	rse Outcon	nes:						
On	the succes	sful comple	etion of the course, student will be able to:						
1	Demonst ,connecte	rate the und dness.	lerstanding of continuity, uniform continuity ,compac	tness		K	.1		
2	Understa	nd partition	s and their refinement.			K	2		
3	Determin bounded	e the Riem function.	ann integrability and the Riemann-Stieltjes integrabil	ity of a		K	2		
4	Examine	the derivation	ives of function.			K	3		
5 Acquire skills in writing and analyze the proofs that arise in the context of real K4 analysis.							4		
K1	- Rememb	oer; K2 - Ui	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - Cre	eate				
Uni	it:1		Topological Mappings		15	Shou	iours		
Exar func	nples of continues of the second s	ontinuous fi nuous on co	unctions –continuity and inverse images of open or compact sets –Topological mappings –Bolzano's theory	losed set em	s -	_			
Uni	it•?		Monotonic Functions		15	hou	rc		
Con	nectedness		nts of a metric space – Uniform continuity - Uniform	continuit	v	nou	15		
and o	compact se	ets –fixed p	oint theorem for contractions –monotonic functions.		5				
		-							
Uni	it:3		Derivatives		15	hou	rs		
Def	inition of	derivative –	Derivative and continuity –Algebra of derivatives –	the chain	rul	e			
-OI der	ivatives	ind local	extrema Rolle's theorem. The mean value	valives –	zer fo	0)r			
der	ivatives –	Tavlor's fo	rmula with remainder.	uicorein	п	Л			
Uni	it:4		Functions Of Bounded Variation		15	hou	rs		
Prop	erties of m	ionotonic fu	unctions -functions of bounded variation -total Variat	ion - add	itiv	e			
prop	erties of to	otal variati	on on (a, x) as a function of x – functions of boun	ded varia	tio	n d			
expr varia	essed as 1	ine attreret	nce of increasing functions –continuous functions	of bour	ide	a			
, 1110									

Ur	nit:5	The Riemann-Stieltjes Integral	15 hours					
Intr	oduction -	Notation – The definition of Riemann – Stieltjes integral – linear	properties –					
Inte	gration by	parts -change of variable in a Riemann -Stieltjes integral -Re	eduction to a					
Rie	mann integ	ral.						
		Total Lecture hours	75 hours					
Те	ext Book							
1	Mathemat	ical Analysis(2 nd ed)-Tom. M. APOSTOL(Addison-Wisely. Narosa	Publishing					
	Company,	Chennai, 1990.)	e					
	Unit I :C	hapter 4 Sections 4.11 to 4.15						
	Unit II :Chapter 4 Sections 4.16, 4.17, 4.19, 4.20, 4.21, 4.23							
	Unit III: C	hapter 5 Sections 5.2 to 5.10 and 5.12						
	Unit IV :C	hapter 6 Sections 6.2 to 6.8						
	Unit V :Cl	hapter 7 Sections 7.1 to 7.7						
	<u> </u>							
Re	eference Bo	ooks						
1	Methods	of Real Analysis -R.R.Goldberg(NY, John Wiley, New York 197	76.)					
2	Introduc	tion to Topology and Modern Analysis -G.F.Simmons(McGraw -	- Hill, New York,					
	1963.)							
3	A survey	of Modern Algebra -G.Birkhoff and MacLane(3rd Edition, Macn	nillian, NewYork,					
	1965.)		, , ,					
4	Real Ana	lysis -J.N.Sharma and A.R.Vasistha.(Krishna Prakashan Media (I	P) Ltd, 1997.)					
	1 4 1 0 1							
Re	elated Onli	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]						
1	https://n	ptel.ac.in/courses/111/106/111106053/						
2	https://w	ww.math.ucdavis.edu/~emsilvia/math127/chapter7.pdf						
~	https://w	ww.whitman.edu/Documents/Academics/Mathematics/grady.pdf						
3	<u>https://n</u>	ptel.ac.in/courses/122/101/122101003/						
Co	ourse Desig	ned By: 1.Dr.C.Janaki						
		2.Dr. M.S. Annie Christi						

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	Μ	М	М	М	S	S	S	М	S	S
CO2	Μ	Μ	Μ	М	Μ	S	S	М	S	S
CO3	S	М	М	S	S	S	М	S	S	S
CO4	S	Μ	Μ	S	S	S	Μ	S	S	S
CO5	Μ	Μ	S	М	М	S	S	S	S	М

Cou	rse code		COM	PLEX ANALYS	IS - II	L	Т	P	С
Core	e/Elective/S	Supportive	Core Paper – X	IV		5	-	-	4
Pre	e-requisite		Knowledge In A Integration .	Analytic Function	ns, Complex	Syllabu Versior	IS 1	202 202	1- 2
Cou	rse Objec	tives:	0			I			
To 1	familiarize	the studer	s with some fur	ndamental theorem	ns, singularity ,	residues i	in (comp	olex
func	tions, integ	rations of co	nplex functions, r	neromorphic funct	tions and their app	olications.			
Exp	ected Cou	rse Outcon	es:						
On	the succes	sful comple	ion of the course,	student will be al	ble to:				
1	To recog	nize and ap	ly the Liouville's	theorem, the mea	n-value property	of a		K	.1
	function	and the max	mum modulus pr	inciple.					
2	Demonst	rate underst	nding and apprec	iation of deeper a	spects of comple	Х		K	2
	analysis.								
3	Apply re	esidue theor	m to compute int	egrals.				K	3
4	Ability to	o think critic	ally by proving m	athematical conie	ctures and establ	ishing		K	4
	theorems	from comp	ex analysis.	J		0			
5	Classify	the nature o	singularity, poles	and residues.				K	2
K1	- Rememb	per; K2 - U	derstand; K3 - Ap	ply; K4 - Analyz	e; K5 - Evaluate	; K6 - Cre	eate)	
Un	it:1		Integr	al Theorems			15	hou	rs
Resi	ilts based	on Cauch	's theorem(I)-Ze	eros-Cauchy's In	equality – Liou	ville's th	neo	rem	_
Fund	damental t	heorem of	lgebra –Maximu	m modulus theor	em –Gauss mea	n value t	heo	orem	. —
Gau	ss mean va	lue theoren	for a harmonic fu	nction on a circle	·				
		-							
Un	it:2		Taylor's Serie	s &Laurent's Se	eries		15	hou	irs
Resi	ults based o	on Cauchy's	theorem(II)-Tayle	or's series –Laure	nt's series .				
		1							
Un	it:3		Singularities	And Residues			15	hou	Irs
Isola	ted singul	arities (Ren	ovable Singularity	, pole and essent	ial singularity) –	Residues	-R	lesid	ue
theo	rem.								
Un	it:4		Real Defin	ite Integrals			15	hou	Irs
Eval	uation usin	g the calcul	s of residues – Inte	gration on the uni	t circle –Integral	with - ∞ a	nd	$+\infty$	as
lowe	er and uppe	r limits with	the following integ	grals:					
1) P(1	(x) / Q(x) wł	here the deg	the of $Q(x)$ exceeds	that of $P(x)$ at leas	st 2.				
ii) (s real	in ax).f(x) axis.	, (cos ax).f(2	, where a>0 and f	$(z) \rightarrow 0 \text{ as } z \rightarrow \infty$	and f(z) does not	have a po	le c	on the	3
iii) f	(x) where f	(z) has a fin	e number of poles	on the real axis.					

Inte	gral of the	$ \sum_{x \to a}^{\infty} \int x^{a-1}/(1+x) dx; 0 < a < 1. $	
	0		
Ur	nit:5	Meromorphic Functions	15 hours
Th	eorem on i	number of zeros minus number of poles – Principle of argument	- Rouche's theorem
_7	Theorem th	at a function which is meromorphic in the extended plane is a ra	ational function.
		1 1	
		Total Lecture hours	75 hours
То	vt Rook		
1	Complex 2, 1997.)	analysis -P. Duraipandian and Laxmi Duraipandian(Emerald Pu	ıblishers, Chennai –
	Unit I :Ch	apter 8 Sections 8.10, 8.11	
	Unit II :C	hapter 9 Sections 9.1 to 9.3, 9.13.	
	Unit III: C	Chapter 9 Sections 9.5 to 9.12, 9.13. Chapter 10 Sections 10.1, 1	0.2 and 10.4.
	Unit IV: C	Chapter 10 Sections 10.3 and 10.4.	
	Unit V: C	hapter 11 Sections 11.1 to 11.3 (Except theorems 11.5 and 11	.6)
Re	forence R	ooks	
INC.			
1	Complex Company	Variable and Applications -Churchill and Others(Tata Mc-graw H Ltd, 1974.)	ill Publishing
2	Theory of	functions of Complex Variable -Santhinarayan(S.Chand and Comp	pany, Meerut, 1995)
3	Functions Ltd, Meer	of Complex Variable (17 ^h Edition)- Tyagi B.S (PragatiPrakasham at, 1992-93.)	Publishing Company
Re	elated Onli	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	<u>https://n</u>	ptel.ac.in/courses/111/103/111103070/	
2	<u>https://n</u>	ptel.ac.in/courses/111/106/111106094/	
4	https://n	ptel.ac.in/courses/122/103/122103012/	
Co	ourse Desig	ned By: 1.Dr.C.Janaki	
	C C	2.Mr.R.Subramanian	

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	Μ	М	М	S	М	S	S	М	S	S
CO2	S	S	Μ	S	Μ	S	М	М	М	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	Μ	S	S	Μ	S	S	S	S	S
CO5	S	Μ	Μ	S	Μ	S	S	S	S	S

Course code		MODERN ALGEBRA - II	L	Т	Р	С
Core/Elective/S	Supportive	Core Paper – XV	5	-	-	4
Pre-requisite))	Knowledge in Groups, Rings and Fields	Syllabu Version	s 2 - 2	021 022	1 2
Course Objec	tives:					
To develop un	derstanding	in the domain of matrix theory ,vector spaces, linear	transform	natio	ons	as
well as the pri	nciples und	erlying the subject.				
Exported Cou	rso Autoor	nos•				
On the succes	sful comple	etion of the course student will be able to:				
	vicate and w	adarstand mathematical ideas and results with the cor	root uso		V	1
of mathe	matical defi	nitions, terminology and symbols	lect use		К	.1
2 Explain	the concept	s of base and dimension of Vector space			K	2
3 To apply	the Gram	Schmidt process to construct an orthonormal set of ve	ctors in a	n	K	3
5 10 appry	duct space	seminat process to construct an orthonormal set of ve		11	К	5
	uuei space.					
4 Demonst	trate compet	ence with the basic ideas of Matrix theory, Vector sp	baces,		K	3
Dual spa	ces, Linear	transformation.				
5 Have an	insight to a	halyze a real life problem and solve it.			K	.4
K1 - Rememl	ber; K2 - Ui	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - Cre	ate		
Unit:1		Matrices		15 h	ou	rs
Introduction -	– Addition a	and Scalar Multiplication of Matrices – Product of M	atrices –7	Trans	spo	se
of a Matrix –	Matrix Inve	erse – Symmetric and Skew - Symmetric Matrices.				
	1					
Unit:2	1 01 11	Special Matrices		<u>15 h</u>	lou	rs
Hermitian and	d Skew-Her	mitian Matrices – Orthogonal and Unitary Matrices -	- Rank of	a M	latr	1X
-Characterist	ic Roots and	Characteristic Vectors of a Square Matrix.				
TI:4-2		Vector Spaces		15 L		
Elementary F	Pasic Conce	nts Subspace of a Vector space Homomorphism	Isom	15 II	iom	rs
Internal and F	External dire	ect sums - Linear span - Linear Independence and Bas	i – 150110 ses	որո	1911	
		et sams Emear span Emear meependenee and Bas				
Unit:4		Dual Spaces		15 h	011	rs
Dual Spaces -	- Annihilato	r of a subspace - Inner Product Spaces – Norm of a V	ector – O	rthos	gon	al
Vectors - Ort	hogonal Co	mplement of a subspace – Orthonormal set.		2	ر	
Unit:5		Linear Transformations	-	l5 h	ou	rs

Al T	gebra of Linear Transformations – Regular, Singular Transformations – Range of T – Rank of - Characteristic Roots – Characteristic Vectors – Matrices
	Total Lecture hours 75 hours
Те	ext Book(s)
1	Modern Algebra -R.Balakrishnan and M. Ramabadran.(Vikas Publishing House Pvt. Ltd, New Delhi, Second Revised Edition 1994) (For Units I & II).
	Unit I :Chapter 1 Sections 1.1 to 1.3, 1.5 to 1.7
	Unit II : Chapter 1 Sections 1.8 and 1.9 Chapter 2 Section 2.9 Chapter 3 Section 3.9
2	Topics in Algebra -I.N. Herstein.(John Wiley & Sons, New York, 2003.) (For Units III, IV & V) Unit III: Chapter 4 Sections 4.1 and 4.2 Unit IV :Chapter 4 Sections 4.3 and 4.4 Unit V :Chapter 6 Sections 6.1, 6.2 and 6.3
Re	eference Books
1	Modern Algebra -Surjeet Singh and Qazi Zameeruddin(Vikas Publishing house, 1992.)
2	Modern Algebra -A.R.Vasishtha(Krishna Prakashan Mandir, Meerut, 1994 – 95.)
3	Linear Algebra -Seymour Lipschutz and Marc Lipson(3rd Edition, McGraw Hill, 2001.)
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	https://nptel.ac.in/courses/111/106/111106135/
2	https://nptel.ac.in/courses/115/105/115105097/
3	https://nptel.ac.in/courses/111/101/111101115/
4	https://nptel.ac.in/courses/111/108/111108066/
Сс	ourse Designed By: 1.Dr.C.Janaki
	2.Dr. G.V. Chandrasekar

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	Μ	М	М	М	М	S	S	М	S	S
CO2	Μ	Μ	S	S	Μ	S	Μ	М	S	S
CO3	S	Μ	S	S	Μ	S	Μ	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	М

Cou	irse code		OPERATIONS RESEARCH - PAPER -IV	L	Т	P	С			
Core	e/Elective/S	upportive	Skill Based Subject	2		-	2			
Pro	e-requisite	;	Knowledge in Basics of O.R	Syllabu Version	IS N	202 - 202	1			
Cou	irse Objec	tives:								
To e base	enhance the d on cost o	students kn ptimization,	owledge in decision analysis, sequencing of the jobs to replacement policies and analyze the cases according t	be carried to their ca	d o .teg	ut ories	s.			
Exp	ected Cou	rse Outcon	nes:							
On	the succes	sful comple	etion of the course, student will be able to:							
1	1 Know the principles and applications of information theory.									
2	2 To understand sequencing, replacement problems.									
3	Demonst	rate skills to	b achieve their objective using sequencing models.			K	3			
4	Apply de	ecision mak	ing under different business environments .			K	34			
5 Determine a solution to a rectangular game using simplex method.										
K1	- Rememb	oer; K2 - Ui	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - Cre	eate	e				
		1								
Un	<u>it:1</u>		Decision Analysis	· 1	<u>6</u>	hou	irs			
De Tre	ee Analysis	ang enviror	iment – Decisions under uncertainty – Decision unde	r risk - L		1810r	1-			
Un	it:2		Sequencing Problems		6	hou	irs			
Int	roduction-p	problem of	sequencing - basic terms used in sequencing- process	ing n-job	s t	hrou	gh			
2	machines	- processi	ng n –jobs through k machines - processing 2	2 jobs th	iro	ugh	k			
ma	cnines(Pro	blems only).							
Un	it:3		Replacement Problems		6	hou	irs			
Int	roduction -	- Replacem	ent of equipment / assets that deteriorates gradually	y - replac	en	nent	of			
equ	uipment the	at fails sudd	enly and problems.							
		1								
Un	<u>it:4</u>	•	Information Theory	· .	6	hou	irs			
Int	roduction-	A measur	e of information-Axiomatic Approach to information properties of entropy function loint and condition	uon- Ent nal entror	roj	by-T	ne			
			sine properties of endopy function-joint and condition			,				
TT										
Un	it:5		Applications		6	hou	irs			
Ge	n it:5 neral solut	ion of (mx	Applications n) rectangular games using simplex method - Relia	ability an	6 1d	hou syste	ers em			
Ge fail	h it:5 neral solut lure rates u	ion of (mx sing replace	Applications n) rectangular games using simplex method - Relia ement problems.	ability an	6 1d	hou syste	em			

		Total Lecture hours	30 hours
Te	xt Book		
1	Operations	s Research -Kantiswarup, P. K. Gupta , Man Mohan (S.Chand&	csons education
	publication	ns; New Delhi,2003)	
Re	eference Bo	ooks	
1	Operation	ns Research - P K Gupta & D S Hira (S. Chand and company ltd	d. Ram Nagar; New
	Delhi,202	14.)	
2	Operation	ns Research principles problems - S Dharani Venkatakrishnan	(keerthi publishing
	house Pv	t. Ltd.1994)	
Re	lated Onli	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://np	otel.ac.in/courses/117/104/117104129/	
2	https://np	otel.ac.in/courses/110/105/110105082/	
3	<u>https://np</u>	otel.ac.in/courses/110/106/110106045/	
Co	ourse Design	ned By: 1.Dr.C.Janaki	
		2.Dr.M.S. Annie Christi	

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	М	М	S	S	S	S	М	S	S
CO2	S	S	S	S	S	S	S	М	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	М
CO5	S	М	М	S	S	S	S	S	M	S



Cou	rse code		ASTRONOMY – I	L		Т	Р	С
Core	e/Elective/S	Supportive	ELECTIVE I – A	5		-	-	3
Pre	e-requisite	ļ	Knowledge In Physics and Mathematics	Syllal Versi	ous on	2	2021 2022	l- 2
Cou	rse Objec	tives:						
To e	enable the s	tudents to un	iderstand the Astronomical aspects and about the laws	governi	ng	the	e pla	net
mov	ements.							
Exp	ected Cou	rse Outcon	Jes:					
On	the succes	sful comple	tion of the course, student will be able to:					
1	Define p	properties of	physical systems that comprise the known universe				K	1
2	Understa	nd the Solar	system, Celestial sphere, Dip-Twilight & Kepler's	laws.			K	2
3	Apply the planetary	eir physics a	and mathematical skills to problems in the areas of				K	3
4	Demonst conclusio	rate the skil	to infer valid scientific conclusions and communic	ate thos	e		K	4
5	Analyze	the astronor	nical concepts.				K	4
K1	- Rememb	oer; K2 - Ur	derstand; K3 - Apply; K4 - Analyze; K5 - Evaluate	; K6 - C	rea	ite		
Un	it:1	,	Solar system		1	51	hou	rs
Ge	neral descr	iption of the	e Solar system. Comets and meteorites – Spherical t	igonom	etry	y		
		-						
Un	it:2		Celestial sphere		1	51	hou	rs
Cel	lestial sphe	ere – Celesti	al co – ordinates – Diurnal motion – Variation in ler	igth of t	he o	day	/.	
Un	it:3		Geocentric parallex		1	51	hou	rs
Dip	p – Twiligh	nt – Geocen	ric parallex.					
	•. •							
Un	it:4		Refraction			15	hou	rs
Re		rangent ion	nuta – Cassinis formuta.					
Un	it:5		Kepler's law		1	51	hou	rs
Ke	pler's laws	– Relation	between true eccentric and mean anamolies.					
		T						
	<u> </u>		Total Lecture Hours		7	'5 I	hou	rs
1 Te	xt Book	V C V	valu and Suchaala Kumanavalu (Tout Dublish or Store)	7001. To	1.27	7th		
	Edition 10	y-5.rumara 186)	veru and SusneeraKumaraveru(Text <i>Publisher</i> : Siva	kasi: Jan	K1 /			
Co	urse Desig	ned By: 1.D	r.C.Janaki					
		2.1	Dr. A.Pushpalatha					

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	Μ	М	М	S	S	S	S	М	S	S
CO2	Μ	Μ	Μ	S	S	S	S	М	S	М
CO3	Μ	М	М	М	М	S	Μ	S	S	S
CO4	S	S	Μ	S	S	S	S	S	S	S
CO5	S	Μ	Μ	S	S	S	М	S	М	S

Cou	rse code		NUMERICAL METHODS – I	L	T	Р	С
Core	/Elective/S	upportive	ELECTIVE I – B	5	-	-	3
Dro	roquisito		Knowledge In Higher Secondary Level	Syllabu	IS	202	1-
rre	-requisite	;	Mathematics	Versio	n	2022	2
Cou	rse Objec	tives:					
It ex	poses the	students to	study numerical techniques to find solutions of n	umerica	l, a	lgeb	raic
trans	cendental e	equations, so	Sitution of simultaneous linear algebraic equations and in	iterpolat	10n.		
Fyn	ected Cou	rse Autcor	neç•				
On	the succes	sful comple	etion of the course, student will be able to:				
1	Rememb	er the conce	ents of errors and its effect on computation			K	1
2	Obtain n	umerical so	lutions of algebraic and transcendental equations			K	.1 .7
2	A pply th	a finita diff	propage and interpolation concents				.2 ·2
3	Apply the			. 1 .			
4	Develop	skills in des	signing mathematical models for constructing polynor	nials to		K	.4
5	Analyze	the efficier	awing interestion methods			K	· <u>/</u>
J V1	Domomk		adarstand: K3 Apply: K4 Apply: 25 Evoluate:	K6 Cr	ooto		.т
KI - Keinember, K2 - Onderstand, K5 - Appry, K4 - Anaryze, K5 - Evaluate, K6 - Create						;	
Un		r	The Solution Of Numerical Algebraic And		15	hou	
UII	11:1		Transcendental Fountions		15	nou	15
Bis	ection met	hod – Iterat	ion Method – Convergence condition – Regula Falsi	Method	– N	[ewt	on
- R	aphson me	ethod - Con	vergence Criteria – Order of Convergence.		_		
Uni	it:2	Solutio	on Of Simultaneous Linear Algebraic Equations		15	hou	rs
Gaı	uss elimina	ation metho	d – Gauss Jordan method – Method of Triangularizati	on – Ga	uss	Jaco	obi
met	thod – Gau	iss Seidel m	nethod.				
T T ([1 -		
	it:3		Finite Differences		15	hou	rs
	actorial po	operators -	From propagation in difference table	es of a p	oryi	10111	lai
-1	actoriai po	-Tynonnai –	Entor propagation in unreferee table.				
Uni	it:4		Interpolation (for equal intervals)		15	hou	rs
Nev	vton's for	ward and ba	ckward formulae – equidistant terms with one or more	e missin	g va	lues	<u>-~</u> } —
Cer	ntral differ	rences and	central difference table - Gauss forward and back	ward fo	orm	ulae	_
Stir	ling's forr	nula.					
		Γ					
Uni	it:5	_	Interpolation (for unequal intervals)	_	15	hou	rs
Div	rided differ	rences – Pro	operties – Relations between divided differences and for	orward d	iffe	renc	es
- N	ewton's d	ivided diffe	rences formula – Lagrange's formula and inverse inte	rpolatioi	n.		
			Total Lastura hours		75	hor	rc
m			I otal Lecture nours		13	nou	19
lex	IL ROOK						

1	Numerical methods -Kandasamy. P, Thilagavathi. K and Gunavathi. K (S. Chand and
	Company Ltd, New Delhi – Revised Edition 2007.)(Chapters: 3,4,5,6,7 and 8)
2	Introductory Methods of Numerical Analysis-S.S. Sastry(Prentice Hall of India Pvt. Ltd.New
	Delhi-110001Fourth Edition,2006)
Re	eference Books
1	Numerical Methods in Science and Engineering -Venkataraman M. K.(National Publishing company V Edition 1999.)
2	Numerical Methods for Scientists and Engineers -Sankara Rao K.(2 nd Edition Prentice Hall India 2004.)
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	http://www.simumath.com/library/book.html?code=Alg_Equations_Examples
2	http://jupiter.math.nctu.edu.tw/~smchang/9602/NA_lecture_note.pdf
	http://www.iosrjournals.org/iosr-jm/papers/Vol6-issue6/J0665862.pdf
3	https://nptel.ac.in/courses/122/102/122102009/
	https://nptel.ac.in/courses/111/107/111107105/
Co	ourse Designed By: 1.Dr.C.Janaki
	2.Mr.R.Subramanian

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	М	M	S	S	М	М	S	М	S	S
CO2	S	S	S	М	S	S	М	М	М	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	М	S
CO5	S	M	S	S	Μ	S	М	S	S	S

Cou	rse code		ASTRONOMY II	L	ſ	P	С
Core	e/Elective/S	upportive	ELECTIVE II – A	5	-		3
Pre	e-requisite	•	Knowledge In Physics & Mathematics	Syllab Versio	us n	202 202	1- 2
Cou	rse Objec	tives:					
To e	nable the st	tudents to le	arn about the interesting facts of Moon, Sun Planetary N	<i>Motion</i> .			
Exp	ected Cou	rse Outcon	nes:				
On	the succes	sful comple	tion of the course, student will be able to:				
1	Underst	and the con	cepts of precession and nutation.			K	51
2	Describ	e the eclips	e of the moon.			K	.2
3	Find eq	uation of tir	ne.			K	3
4	Demons	strate the ab	ility to analyze the concepts.			K	4
5	Describ	e the proper	ties of stellar system.			K	2
K1	- Rememb	oer; K2 - Ui	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 – C	reat	e	
Un	it:1		Time		15	hou	irs
Equ	uation of ti	me – Conve	ertion of time – Seasons – Calendar.				
Un	;+.7		Abbaration		15	hor	
An	nual Parall	ax – Abber	ation		15	IIOL	115
	ildul I ululi						
Un	it:3		Precession		15	hou	irs
Pre	cession – l	Nutation.					
TT	•				1.5		
Un Th	<u>1t:4</u>	Zalingag	Eclipses		15) hou	irs
110	= MOOII – I	compses.					
Un	it:5		The Stellar System		15	hou	irs
Plan	etary Phen	omenon – 7	The Stellar system.				
		T					
			Total Lecture hours		75	hou	irs
Te	xt Book(s)						
1	Astronom	y-Mr.S.Ku	maravelu and SusheelaKumaravelu.(Textpublishe	r: Sivak	asi:		
	Jank1, / e	uttion, 1986)				
Co	urse Desig	ned Bv: 1 Г	Dr.C.Janaki				
	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	2A	Pushpalatha				

Cos	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10
CO1	Μ	Μ	М	М	Μ	Μ	М	М	S	S
CO2	М	М	S	М	М	S	М	М	М	S
CO3	Μ	Μ	S	S	S	S	М	S	S	S
<b>CO4</b>	S	М	S	S	S	S	М	S	S	S
CO5	S	М	S	S	Μ	S	М	S	S	S

Cou	rse code		Numerical Methods II	L T								
Core	e/Elective/S	Supportive	ELECTIVE II-B	5	-	-	3					
Pro	e-requisite	)	Knowledge In Higher Secondary Level Mathematics	Syllabu Version	is 1	202 - 202	1 2					
Cou	rse Objec	tives:										
1.	To equip t	he learners	with the powerful tool for numerical differentiation, nu	merical	int	egra	tion					
	,difference	e equation,	numerical solution to O.D.E.									
Exp	ected Cou	rse Outcon	nes:									
On	the succes	sful comple	etion of the course, student will be able to:									
1	Familia	rize with n	umerical integration and differentiation, numerical sol	ution of		K	[1					
	ordinary	y differentia	l equations.									
2	Disting method	uish method s to find sol	ls of Taylor series, Euler's, Modified Euler's and Run utions of differential equations	ge Kutta		K	.2					
3	3 Apply the techniques for enormous application in the field of Science and some											
	fields of	fields of Engineering.										
4 Compute the integrals and derivatives by using the appropriate technique.												
) 1/1	Find th		solution of second order O.D.E by finite difference f	$\frac{1}{1}$	4	K	.4					
	- Rememt	ber; <b>K</b> 2 - Ui	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	<b>K0</b> – Cre	eat	e						
Un	it:1		Numerical Differentiation		15	hou	irs					
Ne	wton's forv	ward and ba	ckward formulae to compute the derivatives – Derivati	ve using	St	irling	g's					
for	mulae – to	find maxin	a and minima of the function given the tabular values			,	J					
				-								
Un	it:2		Numerical Integration		15	5 hou	irs					
Ne	wton $-$ Co	te's formula	- Trapezoidal rule – Simpson's 1/3 rd and 3/8 th rules	•								
Un	it•3		Difference Faustion		15	hou	irs					
Or	der and de	gree of a dif	ference equation – solving homogeneous and non – ho	mogene	ou	s line	ear					
dif	ference equ	uations.		0								
Unit:4 Numerical Solution Of O.D.E 15hou												
Tay	vlor series	method – I	Euler's method – improved and modified Euler method	od – Rui	ng	e Ku	tta					
me	thod(Secol	na &fourth	order Runge Rutta method only)									
Un	it:5		Multi Step Methods		15	hou	irs					
Mi	lne's predi	ctor correct	or formulae – Adam-Bashforth predictor corrector fo	rmulae -	- s	oluti	on					
of o	ordinary di	fferential e	quations by finite difference method (for second order	0.D.E).								
			Total Lastura hours		75	hor	irc					
			Total Lecture nours		12	1100	11.9					

Te	ext Book						
1	Numerical methods -Kandasamy. P, Thilagavathi. K and Gunavathi. K (S. Chand and						
	Company Ltd, New Delhi – Revised Edition 2007. )(Chapters: 9,10,11,Appendix and						
	Appendix E)						
2	Introductory Methods of Numerical Analysis-S.S. Sastry(Prentice Hall of India Pvt.						
	Ltd.NewDelhi-110001Fourth Edition,2006)						
Re	eference Books						
1	Numerical Methods in Science and Engineering -Venkataraman M. K.(National						
	Publishing company V Edition 1999.)						
2	Numerical Methods for Scientists and Engineers -Sankara Rao K. (Prentice Hall India, 2 nd						
	Edition2004)						
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]						
1	http://nptel.ac.in/courses/104101002/downloads/lecturenotes/module1/chapter6.pdf						
	https://www.britannica.com/science/difference-equation						
2	https://nptel.ac.in/courses/122/102/122102009/						
3	https://nptel.ac.in/courses/111/107/111107063/						
Co	ourse Designed By: 1.Dr.C.Janaki						
	2.Mr.R.Subramanian						

Cos	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10
CO1	Μ	Μ	S	S	S	S	S	М	S	S
CO2	Μ	Μ	S	S	Μ	S	М	М	М	S
CO3	S	S	S	S	S	S	S	S	S	S
<b>CO4</b>	S	Μ	S	Μ	Μ	S	Μ	S	S	S
CO5	S	М	S	М	М	S	S	S	S	S

Course code			GRAPH THEORY	L	Т	Р	С				
Core/Elective/Supportive			ELECTIVE III - A	5	-	-	4				
Pre-requisite			Knowledge In Basic Mathematics	Syllabus Version		2021 2022	l- 2				
Course Objectives:											
Enat tourr	Enables the students to learn the basic concepts of Graphs, sub-graphs, Eulerian graphs, Digraphs, tournaments ,connectivity, graphs, matrix representation of graphs, trees, planar graphs.										
Expected Course Outcomes:											
On the successful completion of the course, student will be able to:											
1	Identify t	he propertie	es of different types of graph and their application.			K	1				
2	Demonst	rate knowle	dge of basic concepts in graph theory.			K	2				
3	Understa	nd cut grap	ns, cycle spaces			K	2				
4	Apply pr	inciples and	concepts of graph theory in practical situations.			K	3				
5	Analyze	the concept	s of Planar graphs.			K	4				
K1	- Rememb	er; <b>K2</b> - Ur	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	<b>K6</b> – Cr	eate	e					
Un	it:1		Graphs		15	hou	rs				
Gra	aphs –Sub	graphs – D	egree of a vertex walks, paths and cycles in a Graphs	s – conn	ect	edne	ss				
cut	vertex and	cut edge.									
TT	:4-0		Entry and Hamiltonian Coursely	<del></del>	15	1					
Un Ful	Unit:2         Euler and Hamiltonian Graphs         15           Euler and Hamiltonian Craphs         Algorithm for Euler airquits         Pipertite Craphs         Tracs						rs				
Lui			raphs – Augoriumi for Euler Circuits – Dipartie Graph		<b>.</b> .						
Un	it:3		Cut set graphs	15 hours							
Ma set	trix repres	entation of	a graph – vector spaces, associated with a graph – cyc	ele space	es a	ind c	ut				
500	Siupiis.										
Un	it:4		Planar graphs		15	hou	rs				
Pla of t	nar graphs he difficul	– Euler's tl t part of the	neorem on planar graphs – characterization of planar g characterization.	raphs (r	ıo t	proof	fs)				
		1									
Un	it:5		Directed graphs		15	hou	rs				
Dir	rected grap	hs – Connee	ctivity – Euler Digraphs – Tournaments.								
			Total Lecture hours	,	75	hou	rs				
Text Book											
A First Course in Graph Theory - A. <i>Choudum</i> (Macmillan,2001) Chapters 1 to 7.											
Re	ference Bo	oks									
1	Graph th	eory with	applications to Engineering and computer science	e-Narasi	inal	h D	e0				
1	(Prentice Hall of India1979).										

2	Graph Theory	/ -Frank Harary	(Narosa	Publishing	HOCK 2001)	
_		I I MILLE I MIMI J	(1 (11 0)04	i wombhing	112011 2001 )	•

3 Introduction to Graph Theory- Dr. M. Murugan.(Muthali Publishing House,2005)

## Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1 https://nptel.ac.in/courses/111/106/111106102/

2 https://www.digimat.in/nptel/courses/video/106104170/L19.html

Course Designed By: 1.Dr.C.Janaki 2.Mr.R.Subramanian

Cos	<b>PO1</b>	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	PO8	PO9	PO10
CO1	Μ	Μ	Μ	S	S	S	S	М	S	S
CO2	Μ	Μ	Μ	S	S	S	М	М	М	S
CO3	М	М	М	S	М	S	М	S	S	S
<b>CO4</b>	S	S	S	S	S	S	S	S	S	S
CO5	S	Μ	Μ	S	М	S	М	S	S	S
Course code		AUTOMATA THEORY AND FORMAL LANGUAGES	L	Т	Р	С				
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Core/Elective/Su	pportive	ELECTIVE III - B	5	-	-	4				
Pre-requisite		Knowledge in Mathematics	Syllabu Version	<b>S</b>	202 202	1- 2				
Course Objectiv	ves:									
To impart know grammars, langu language classes	vledge in ages, and and their	Finite automata, regular languages, regular gram pushdown automata which play a crucial role to Ident relationship.	mars, co ify differ	ont en	ext 1 t for	free mal				
<b>Expected Cours</b>	se Outcon	nes:								
On the successf	ful comple	tion of the course, student will be able to:								
1 Acquire a f formal lang	fundament guages.	tal understanding of the core concepts in automata the	ory and		K	.1				
2 Design grat	mmars an	d automata for different language classes.			K	2				
3 Describe th	ne types of	f grammar and derivation tree.			K	2				
4 To apply c	context-fre	e languages, push-down automata.			K	3				
5 Design auto	omata, reg a certain l	gular expressions and context-free grammars acceptin anguage.	g or		K	4				
K1 - Remember	r; <b>K2</b> - Ur	nderstand; <b>K3</b> - Apply; <b>K4</b> - Analyze; <b>K5</b> - Evaluate;	$\mathbf{K6} - \mathbf{Cre}$	eat	e					
			-							
Unit:1		Phrase Structure Languages.		15	hou	Irs				
Introduction – p	ohrase stru	icture languages.								
Unit:2		<b>Closure Operations</b>		15	hou	irs				
Closure operation	ons.		•							
Unit:3 Context free lar	10112005	Context Free Languages.	-	15	hou	Irs				
	izuages.									
Unit:4		Finite State Automata		15	hou	irs				
Finite state auto	omata.									
Unit:5 Push Down Automata. 15 hour										
Push down automata.										
	Total Lecture hours 75 hours									
Text Book	Text Book									
1Formal Languages and Automata- Rani Siromoney. (Revised edition 1984)(Published by the Christian Literary Society, Madras-3 )Chapters 1 to 6.										

Re	eference Books
1	Formal languages and their relation automata-J.E. Hopcroft and D.Ullman(Addision Wesley 1969)
	wesey(1707)
2	Automata theory: Machines and Languages-Richard .Y.Kain(McGraw Hill1972)
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	https://nptel.ac.in/courses/106/103/106103070/
2	https://www.digimat.in/nptel/courses/video/111103016/L02.html
Co	ourse Designed By: 1.Dr.C.Janaki
	2.Dr.A.Pushpalatha

Cos	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10
CO1	М	М	М	М	М	М	М	М	S	S
CO2	S	Μ	S	S	S	S	Μ	М	М	S
CO3	Μ	М	S	S	S	S	М	S	S	S
<b>CO4</b>	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

Course code		PROGRAMMING IN C++	L	Т	P	С		
Core/Elective/Sup	oportive	ELECTIVE III - C	4	-		3		
Pre-requisite	-	Knowledge in C Programming	Syllabu Versior	IS 1	202 - 202	1 2		
<b>Course Objectiv</b>	'es:							
To enable the stu handling.	idents to l	earn about the class structure, operators, inheritance,	, polymor	phi	ism,	file		
Expected Course Outcomes:								
On the successfu	ul comple	tion of the course, student will be able to:						
1 Know abou and exampl	it class str le problem	ructure, member functions & data members, inheritans.	nce types		K	.1		
2 Understand	how C+-	+ improves C with object-oriented features.			K	2		
3 Develop pro	ogrammir	ng skills.			K	2		
4 To make us	se of objec	cts and classes for developing programs.			K	3		
5 Build C++ classes.						[4		
K1 - Remember	r; <b>K2</b> - Un	derstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	<b>K6</b> – Cr	eat	e			
Unit:1	To	kens, Expressions And Control Structures		12	hou	Irs		
identifiers and c pointers to cons dynamic initializ operator – memo their types – spe	++ - appl constants stants – s zation of ory manaş ecial assig	- basic data types – user-defined data types – cor symbolic constants –type compatibility – declarate variables – reference variables – operators in C++ gement operators – manipulators – type cast operator nment expressions – implicit conversions – operator	ens – ke istant poi ion of va - scope i c – expres preceden	yw nte tria reso sic	ords ers a ibles olutions a	nd – on nd		
<b>I</b> I '' <b>O</b>				10				
Unit:2	n functio	Functions in C++	o inline	12 fr:	nou	irs		
The main function – function prototyping – call by reference – return by reference – inline functions – default arguments – const arguments – function overloading. Managing Console I/O Operations: C++ streams – C++ stream classes – unformatted console I/O operations – formatted console I/O operations –managing output with manipulators.								
Unit:3		Classes And Objects		12	hou	irs		
Specifying a class – defining member functions – making an outside function inline – nesting of member functions – private member functions – arrays within a class – memory allocation for objects –arrays of objects – objects as function arguments – friend functions – returning objects – const member functions. Constructors and Destructors: Introduction – constructors – parameterized constructors – multiple constructors in a class – constructors with default arguments – copy constructor.								

Ur	nit:4	Operator Overloading	12 hours				
Int	roduction -	defining operator overloading - overloading unary operators -	- overloading binary				
op	erators - ov	erloading binary operators using friends – rules for overloading	g operators.				
Un	nit:5	Inheritance	12 hours				
Int – r	Introduction – defining derived classes – single inheritance – making a private member inheritable – multilevel inheritance – multiple inheritance – hierarchical inheritance – hybrid inheritance.						
		Total Lecture hours	60 hours				
Те	xt Book(s)						
1	Object Ori	ented programming with C++- E.Balagurusamy(McGraw Hill	3 rd				
	- J		-				
	Edition 20	06.)					
2	Object orio	ented programming in Turbo C++-Robert Lafore(Galgotia publ	ications Pvt.Ltd,				
	New Delh	i- 110002,2002)					
3	The C++ p	programming language- Bjarne Stroutstrup( II Edition, Addision	n Wesley, 1991.)				
Re	ference Bo	oks					
1	Program New Dell	ning with C++ -D.Ravi Chandran ( Tata McGraw-Hill publishir ni 1996)	ng company limited,				
2	Object C Education	riented Programming with ANSI and Turbo C++-AshokN.I n publishers 2003)	Kamthane(Pearson				
3	Program	ning with C++ -John R.Hubbard( 2nd Edition, TMH publishe	ers2002).				
Re	Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]						
1	<u>https://np</u>	otel.ac.in/courses/106/105/106105151/					
2	2 <u>https://nptel.ac.in/courses/106/101/106101208/</u>						
3	3 <u>https://www.classcentral.com/course/swayam-programming-in-c-6704</u>						
Co	urse Desig	ned By: 1.Dr.C.Janaki					
	2.Dr. K. Malar						

Cos	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10
CO1	М	M	M	S	S	М	S	М	S	S
CO2	Μ	Μ	Μ	М	S	S	S	М	S	S
CO3	S	S	S	S	S	S	М	S	S	S
<b>CO4</b>	S	S	S	Μ	S	S	S	S	S	S
CO5	S	S	S	M	S	M	S	S	S	М

Course code	PROGRAMMING IN C++ (PRACTICAL)	L	Т	Р	C
Core/Elective/Supportive	ELECTIVE III - C( Practical)	-	-	1	1
Pre-requisite	Knowledge in C++	Sylla Versi	bus on	2021- 2022	•

## PRACTICAL LIST

1. Write a function 'power()'to raise a number 'm' to a power 'n'. The function takes a 'double' value for 'm' and 'int' value for 'n', and returns the result correctly. Use a default vale of 2 for 'n' to make the function to calculate squares when this argument is omitted. Write a main() that gets the values of 'm' and 'n' from the user to test the function.

2. Write a program to compute compound interest of a given amount AMT for 'n' years. Use function overloading so that the program gets input of interest rate RATE in any of the data type 'float' or 'int'

3. Create a class which consist of employee detail ENO, ENAME, DEPT, BASIC SALARY. Write a member function to get and display them. Derive a class PAY from the above class and write a member function to calculate DA, HRA and PF depending on the grade and display the pay slip in a neat format using console I/O

4. Define two classes POLAR and RECTANGLE to represent points in the polar and rectangle system. Write a program to convert from one system to another.

5. Create a class FLOAT that contains one float data member. Overload all the four arithmetic operators so that they operate on the objects of FLOAT.

Cou	rse code		NUMBER THEORY	L	]	P	С	
Core	e/Elective/S	upportive	ELECTIVE III – D	5	-	-	4	
Pre	e-requisite		Knowledge in Algebra	Syllabu Versior	IS 1	202 - 202	1 2	
Cou	rse Objec	tives:						
То	impart kno	owledge in t	the basic concepts of number theory, fundamental de	finitions	, t	heore	ems	
Exp	ected Cou	rse Outcon	1es:					
On	the succes	sful comple	tion of the course, student will be able to:					
1	Underst	and the con	cepts of divisibility and primes			K	.1	
2	Solve co	ongruence.				K	2	
3	Describ	e the funda	nental theorem of Arithmetic.			K	3	
4	Underst	and the con	cepts and apply the theorems in areas of Mathematic	s.		K	3	
5	5 Compute powers of integers modulo prime numbers.					K	4	
K1	- Rememb	oer; <b>K2</b> - Ui	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	<b>K6</b> – Cre	eat	e		
		-						
Un	it:1		Early Number Theory		15	5 hou	irs	
Pea	ano's Axioi	n - Mathem	atical Induction - The Binomial Theorem - Early Nur	nber The	or	у.		
TIm	:4.2	[	Divisibility Theory in Integrate		1	<u>51</u>		
	II:2 visibility T	heary in Int	Division Algorithm - The g c d - Euclidea	n Algori	1 thu	<u>5110u</u> n ₋ T	irs 'he	
Dic	ophontine I	Equation ax	+ by $=$ c		<u> </u>	<u> </u>		
Un	it•3		Primes and their Distributions		14	hou	irs	
Pri	mes and t	heir Distri	outions - The fundamental Theorem of Arithmetic	c - The	S	eive	of	
Era	tosthenes ·	- The Gull (	Conjecture.					
Un	it:4		The Theory of Congruence		15	5 hou	irs	
The Co	e Theory o ngruence-F	f Congruen Prime modu	ce - Basic Properties of Congruence - Special Divisi lus- Power residues.	bility tes	t -	Line	ear	
Un	Unit:5 Fermat's Theorem 15 hours							
Fer	Fermat's Theorem - Fermat's factorization method - The Little theorem - Wilson's theorem.							
Total Lacture hours 75 hou						irc		
Ta	vt Roolz		Total Lecture nours		/ .	, nou	11.5	
1	Text Book     1   Elementary Number theory -David M. Burton (W.M.C. Brown Publishers, Dubuque, Lawa, 1989)							

R	eference Books
1	An Introduction to theory of Numbers -Ivan Nivan and H. Zuckerman (5 th edition,Wiley 1991)
2	Elements of Number Theory - Prof. S.Kumaravelu and SusheelaKumaravelu(Raja Sankar offset Printers ,Sivakasi, 2002)
3	Beginning Number Theory -Neville Robinns( 2 nd Ed., Narosa Publishing House
	Pvt.Ltd.,Delhi, 2007)
R	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	https://nptel.ac.in/courses/111/103/111103020/
	https://nptel.ac.in/courses/111/101/111101137/
Co	ourse Designed By: 1.Dr.C.Janaki
	2.Mr.R.Subramanian

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Cos	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10
CO1	М	М	М	М	М	М	М	М	S	S
CO2	S	S	S	Μ	S	S	S	М	М	S
CO3	Μ	Μ	Μ	Μ	Μ	S	S	S	S	S
<b>CO4</b>	S	S	S	S	S	S	S	S	S	S
CO5	S	Μ	S	S	S	S	М	S	S	S

Course code		<b>INTRODUCTION TO INDUSTRY 4.0</b>	L	Т	Р	С	
Core/Elective/Su	pportive	ELECTIVE III – E	5	-	-	4	
Pre-requisite		Basic Knowledge Of Computer And Internet	Syllabu Versior	IS 1	202 202	1- 2	
Course Objectiv	ves:						
To impart know 4.0 tools:	ledge on I	ndustry 4.0, need for digital transformation and the	followi	ng In	dustr	у	
1. Artificia	l Intellige	nce					
2. Big Data	a and Data	Analytics					
3. Internet	of Things						
Expected Cours	se Outcon	<b>165:</b>					
1 Know that	ui comple	adopting Industry 4.0 and Artificial Intelligence			V	1	
1 Know the f	the need	for digital transformation				.1 `?	
2 Onderstand	industry A				K	.2	
4 Analyze th	e applicat	ions of Big Data			K	<u>.</u> .4	
5 Examine th	e applicat	tions and security of IoT Applications			K	.4	
K1 - Remember	r: <b>K2</b> - Ur	nderstand: K3 - Apply: K4 - Analyze: K5 - Evaluat	e: <b>K6</b> – (	Creat	e		
	-,		-,				
Unit:1		Industry 4.0		15	hou	rs	
Need – Reason fe	or Adopti	ng Industry 4.0 - Definition – Goals and Design Pr	inciples	-			
Technologies of	Industry 4	.0 – Big Data – Artificial Intelligence (AI) – Indus	trial Inte	rnet o	of		
Things - Cyber S	Security –	Cloud – Augmented Reality					
Unit:2		Artificial Intelligence		15	hou	rs	
Artificial Intelligence : Artificial Intelligence (AI) – What & Why? - History of AI - Foundations of AI - The AI - environment - Societal Influences of AI - Application Domains and Tools - Associated Technologies of AI - Future Prospects of AI - Challenges of AI .							
Unit:3	Unit:3Big Data And IoT15 hours						
Big Data : Evolu	ution - Da	ta Evolution - Data : Terminologies - Big Data Det	finitions	- Ess	entia	ıl of	
Big Data in Industry 4.0 - Big Data Merits and Advantages - Big Data Components : Big Data							
Characteristics - Big Data Processing Frameworks - Big Data Applications - Big Data Tools - Big							

Data Domain Stack : Big Data in Data Science - Big Data in IoT - Big Data in Machine Learning - Big Data in Databases - Big Data Use cases Big Data in Social Causes - Big Data for Industry - Big Data Roles and Skills -Big Data Roles - Learning Platforms; Internet of Things (IoT) : Introduction to IoT - Architecture of IoT - Technologies for IoT - Developing IoT Applications - Applications of IoT - Security in IoT .

Unit:4	Applications And Tools Of Industry 4.0	15 hours					
Applications of IoT – Manufacturing – Healthcare – Education – Aerospace and Defense – Agriculture – Transportation and Logistics – Impact of Industry 4.0 on Society: Impact on Business, Government, People. Tools for Artificial Intelligence, Big Data and Data Analytics, Virtual Reality, Augmented Reality, IoT, Robotics.							
Unit:5	15 hours						
Industry 4.0 – Education – A with Industry 4	Industry $4.0 -$ Education $4.0 -$ Curriculum $4.0 -$ Faculty $4.0 -$ Skills required for Future - Tools for Education – Artificial Intelligence Jobs in 2030 – Jobs 2030 – Framework for aligning Education with Industry $4.0$						
	Total Lecture hours	75 hours					
Text Book							
¹ Higher Ed Devi	lucation for Industry 4.0 and Transformation to Education 5.0(2	2021 )-P.Kaliraj & T.					
· ·							
Related Onli	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]						
1 <u>https://n</u>	1 <u>https://nptel.ac.in/courses/106/105/106105195/</u>						
Course Desig	Course Designed By:1.Dr.C.Janaki 2.Mr.R.Subramanian						

Cos	<b>PO1</b>	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	PO8	PO9	PO10
CO1	Μ	Μ	Μ	S	S	S	S	М	S	S
CO2	Μ	Μ	Μ	S	S	S	S	М	М	S
CO3	S	S	S	S	S	S	S	S	S	М
<b>CO4</b>	S	S	S	S	S	S	S	S	S	S
CO5	S	Μ	S	М	S	S	S	S	S	S