SRM
INSTITUTE OF SCIENCE & TECHNOLOGY
(Deemed to be University u/s 3 of UGC Act, 1956)

BACHELOR OF SCIENCE
IN
MATHEMATICS

CURRICULUM AND SYLLABUS

(For students admitted from the academic year 2018-2019)

UNDER CHOICE BASED CREDIT SYSTEM

DEPARTMENT OF MATHEMATICS

FACULTY OF SCIENCE AND HUMANITIES

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

SRM NAGAR, KATTANKULATHUR – 603 203

B.Sc Mathematics

(For students admitted from the academic year 2018 – 2019 onwards)
Curriculum and Syllabus

Objectives:

1. Students understand mathematical concepts, symbols and procedures and are able to apply them to real world situations.
2. Use appropriate mathematical concepts and skills to solve problems in both familiar and unfamiliar situations including those in real-life contexts
3. Select and apply appropriate inquiry and mathematical problem solving techniques in recognize patterns
4. To prepare the students to successfully compete for current employment opportunities.

Eligibility:

The candidates seeking admission to the B.Sc., Degree program shall be required to have passed (10+2) (Higher Secondary) examination or any other equivalent examination of any authority, recognized by the University, with Mathematics-Mandatory, Physics / Chemistry / Computer Science / Statistics.

Duration:

3 Years (6 Semesters)

ALLIED SUBJECTS

NON MAJOR ELECTIVES

CURRICULUM

B. SC MATHEMATICSTOTAL CREDITS: 146

FIRST YEAR – FIRST SEMESTER

CAREER STREAM TITLE	SUBJECT CODE	SUBJECT TITLE	L	T	P	L+T+P	CREDITS
LANGUAGE	ULT18101	TAMIL - I	4	1	0	5	4
	ULH18101	HINDI – I					
	ULF18101	FRENCH - I					
LANGUAGE	ULE18101	ENGLISH-I	4	1	0	5	4
MAJOR CORE	UMA18101	ALGEBRA AND TRIGONOMETRY	4	1	0	5	4
	UMA18102	ANALYTICAL GEOMETRY	4	1	0	5	4
ALLIED	UPY18A01	ALLIED PHYSICS – I	4	0	0	4	4
ALLIED	UPY18A02	ALLIED PHYSICS LABORATORY - I	0	0	3	3	2
VALUE ADDED COURSE*	CAC18101	SOFT SKILLS	2	0	0	2	2
TOTAL			22	4	3	29	24

FIRST YEAR – SECOND SEMESTER

CAREER STREAM TITLE	SUBJECT CODE	SUBJECT TITLE	L	T	P	L+T+P	CREDITS
LANGUAGE	ULT18201	TAMIL – II	4	1	0	5	4
	ULH18201	HINDI – II					
	ULF18201	FRENCH - II					
LANGUAGE	ULE18201	ENGLISH-II	4	1	0	5	4
MAJOR CORE	UMA18201	CALCULUS	4	1	0	5	4
ALLIED	UPY18A03	ALLIED PHYSICS - II	4	0	0	4	4
ALLIED	UPY18A04	ALLIED PHYSICS LABORATORY - II	0	0	3	3	2
SUPPORTIVE COURSE*	UCA18E57	BASIC COMPUTER SKILLS	2	0	2	4	3
VALUE ADDED COURSE*	CAC18201	QUANTITATIVE APTITUDE AND LOGICAL REASONING – I	2	0	0	2	2
EXTENSION ACTIVITY*	UNS18201	NSS	0	0	0	0	1
	UNC18201	NCC					
	USO18201	NSO					
	UYG18201	YOGA					
TOTAL			20	3	5	28	24

SECOND YEAR – THIRD SEMESTER

CAREER STREAM TITLE	SUBJECT CODE	SUBJECT TITLE	L	T	P	L+T+P	CREDITS
MAJOR CORE	UMA18301	DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS	4	1	0	5	4
	UMA18302	DISCRETE MATHEMATICS	4	1	0	5	4
	UMA18303	NUMERICAL ANALYSIS	4	1	0	5	4
	UMA18304	LATEX AND PLOTTING TOOL – LABORATORY	0	0	4	4	2
ALLIED	UCY18A01	ALLIED CHEMISTRY – I	4	0	0	4	4
ALLIED	UCY18A02	ALLIED CHEMISTRY PRACTICALS – I	0	0	3	3	2
SKILL BASED ELECTIVE - I	UMA18S01	C PROGRAMMING	0	1	2	3	2
	UMA18S02	INTRODUCTION TO MATLAB					
	UMA18S03	COMPUTER APPLICATIONS IN STATISTICAL TOOLS					
NON MAJOR ELECTIVE		OPEN ELECTIVE - I	2	0	0	2	2
VALUE ADDED COURSE*	CAC18301	QUANTITATIVE APTITUDE AND LOGICAL REASONING – II	2	0	0	2	2
TOTAL			20	4	9	33	26

SECOND YEAR – FOURTH SEMESTER

CAREER STREAM TITLE	SUBJECT CODE	SUBJECT TITLE	L	T	P	L+T+P	CREDITS
MAJOR CORE	UMA18401	VECTOR CALCULUS, FOURIER SERIES AND FOURIER TRANSFORMS	4	1	0	5	4
	UMA18402	PROBABILITY AND STATISTICS	4	1	0	5	4
	UMA18403	NUMERICAL METHODS USING C LANGUAGE - LABORATORY	0	0	4	4	2
ALLIED	UCY18A03	ALLIED CHEMISTRY – II	4	0	0	4	4
ALLIED	UCY18A04	ALLIED CHEMISTRY PRACTICALS - II	0	0	3	3	2
CORE BASED ELECTIVE-I	UMA18C01	LINEAR ALGEBRA	3	0	0	3	3
	UMA18C02	STATICS					
	UMA18C03	INTRODUCTION TO PARTIAL DIFFERENTIAL EQUATIONS					
SKILL BASED ELECTIVE I	UMA18S04	DATA ANALYSIS USING R	0	1	2	3	2
	UMA18S05	STATISTICAL ANALYSIS USING SPSS					
	UMA18S06	INTRODUCTION TO PYTHON					
NON MAJOR ELECTIVE		OPEN ELECTIVE - II	2	0	0	2	2
MINOR PROJECT**	UMA18404	MY INDIA PROJECT	0	0	0	0	2
VALUE ADDED COURSE*	CAC18401	VERBAL ABILITY AND REASONING	2	0	0	2	2
TOTAL			19	3	9	31	27

THIRD YEAR – FIFTH SEMESTER

CAREER STREAM TITLE	SUBJECT CODE	SUBJECT TITLE	L	T	P	L+T+P	CREDITS
MAJOR CORE	UMA18501	REAL ANALYSIS	4	1	0	5	4
	UMA18502	ALGEBRAIC STRUCTURES	4	1	0	5	4
	UMA18503	OPERATIONS RESEARCH	4	1	0	5	4
	UMA18504	C++ PROGRAMMING - LABORATORY	0	1	3	4	2
	UMA18505	MATHEMATICAL MODELING	0	0	4	4	2
CORE BASED ELECTIVE-II	UMA18C04	DYNAMICS	3	0	0	3	3
	UMA18C05	ASTRONOMY					
	UMA18C06	SEQUENCES AND SERIES					
SUPPORTIVE COURSE	UES18501	ENVIRONMENTAL STUDIES	3	0	0	3	3
TOTAL			18	4	7	29	22

THIRD YEAR – SIXTH SEMESTER

CAREER STREAM TITLE	SUBJECT CODE	SUBJECT TITLE	L	T	P	L+T+P	CREDITS
MAJOR CORE	UMA18601	COMPLEX ANALYSIS	4	1	0	5	4
	UMA18602	GRAPH THEORY	3	1	0	4	4
	UMA18603	MECHANICS	3	1	0	4	4
	UMA18604	MATHEMATICAL SOFTWARE - SCILAB	0	0	4	4	2
CORE BASED ELECTIVE-III	UMA18C07	FUZZY MATHEMATICS	3	0	0	3	3
	UMA18C08	COMBINATORICS					
	UMA18C09	NUMBER THEORY					
VALUE ADDED COURSE*	CAC18601	COMMUNICATION SKILLS	2	0	0	2	2
MAJOR CORE	UMA18605	CORE BASED PROJECT	0	0	8	8	4
TOTAL			15	3	12	30	23
GRAND TOTAL			**114**	**21**	**45**	**180**	**146**

Legend:

L - Number of lecture hours per week
T - Number of tutorial hours per week
P - Number of practical hours per week
C - Number of credits for the course

Note: *Internal Evaluation Only
**Socially Relevant project – Internal Evaluation Only.

SUMMARY							
CAREER STREAM TITLE	**NO. OF COURSES (CREDITS IN BRACKET)-SEMESTER WISE**						
	I	**II**	**III**	**IV**	**V**	**VI**	**Total Credits**
LANGUAGE	1(4)	1(4)	-	-	-	-	8
LANGUAGE-II	1(4)	1(4)	-	-	-	-	8
MAJOR CORE THEORY	2(4)	1(4)	3(4)	2(4)	3(4)	3(4)	56
MAJOR CORE LAB	-	-	1(2)	1(2)	2(2)	1(2)	10
ALLIED SUBJECT-THEORY	1(4)	1(4)	1(4)	1(4)	-	-	16
ALLIED SUBJECT-LAB	1(2)	1(2)	1(2)	1(2)	-	-	8
SKILL BASED ELECTIVES	-		1(2)	1 (2)	-	-	4
SUPPORTIVE COURSES		BCS 1 (3)					3
PROJECT	-	-	-	-	-	1(4)	4
VALUE ADDED COURSE	1(2)	1(2)	1(2)	1(2) + MI 1 (2)	EVS 1 (3)	1(2)	15
EXTENSION ACTIVITY	-	1(1)	-	-	-	-	1
CORE BASED ELECTIVE(S)	-	-	-	1(3)	1(3)	1(3)	9
NON-MAJOR ELECTIVE(S)	-	-	1(2)	1(2)	-		4
NUMBER OF CREDITS	**24**	**24**	**26**	**27**	**22**	**23**	**146**
TOTAL NUMBER OF CREDITS	**146**						

Allied Courses (offered to other departments)

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UMA18A01	ALLIED MATHEMATICS - I	4	1	0	5	4
UMA18A02	ALLIED MATHEMATICS - II	4	1	0	5	4

Non–Major Electives (offered to other departments)

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UMA18E81	BASIC STATISTICS	2	0	0	2	2
UMA18E82	BASIC MATHEMATICS					
UMA18E83	NUMERICAL METHODS	2	0	0	2	2
UMA18E84	RESOURCE MANAGEMENT TECHNIQUES					

FIRST YEAR – FIRST SEMESTER

குறியீட்டு எண்	பாடம்	L	T	P	TOTAL L+T+P	C
ULT18101	**தமிழ் - I**	**4**	**1**	**0**	**5**	**4**

பாடத்திட்டத்தின் நோக்கம்

- இரண்டாயிரம் ஆண்டுகாலத் தமிழின் தொன்மையையும் வரலாற்றையும் அதன் விழுமியங்களையும் பண்பாட்டையும் எடுத்துரைப்பதாக இப்பாடத்திட்டம் அமைக்கப் பட்டுள்ளது.
- காலந்தோறும் தமிழ் இலக்கியம் உள்ளடக்கத்திலும், வடிவத்திலும் பெற்ற மாற்றங்கள், அதன் சிந்தனைகள், அடையாளங்கள் ஆகியவற்றை காலந்தோறும் எழுதப்பட்ட இலக்கியங்களின் வழியாகக் கூறுவதாகவும், மொழியின் கட்டமைப்பைப் புரிந்து கொள்வதாகவும் பாடத்திட்டம் வடிவமைக்கப்பட்டுள்ளது.
- வாழ்வியல் சிந்தனைகள், ஒழுக்கவியல் கோட்பாடுகள், சமத்துவம், சூழலியல் எனப் பல கூறுகளை மாணவர்களுக்கு எடுத்துரைக்கும் விதத்தில் இப்பாடத்திட்டம் உருவாக்கப்பட்டுள்ளது.

அலகு – 1

இக்காலக் கவிதைகள் - 1

1. பாரதியார் – கண்ணன் என் சேவகன்
2. பாரதிதாசன் – தமிழ்ப்பேறு
3. அப்துல் ரகுமான் – அவதாரம்
4. மீரா – கனவுகள் +கற்பனைகள் = காகிதங்கள்
5. து. நரசிம்மன் – மன்னித்துவிடு மகனே

அலகு – 2

இக்காலக் கவிதைகள் - 2

1. ராஜா சந்திரசேகர் – கைவிடப்பட்ட குழந்தை
2. அனார் – மேலும் சில இரத்தக் குறிப்புகள்
3. சுகிர்தராணி – அம்மா
4. நா.முத்துக்குமார் – தூர்

அலகு – 3

சிற்றிலக்கியம்

1. கலிங்கத்துப் பரணி – பொருதடக்கை வாள் எங்கே... (பாடல் - 485)

2. அழகர்கிள்ளை விடு தூது – இதமாய் மனிதருடனே... (கண்ணி – 45)
3. நந்திக் கலம்பகம் – அம்பொன்று வில்லொடிதல்... (பாடல் – 77)
4. முக்கூடற் பள்ளு – பாயும் மருதஞ் செழிக்கவே... (பாடல் – 47)
5.குற்றாலக் குறவஞ்சி – ஓடக் காண்பதுமே... (பாடல் - 9)

காப்பியங்கள்

மணிமேகலை – உலகவறவி புக்க காதை – "மாசுஇல் வால்ஒளி! - இந்நாள் போலும் இளங்கொடி கெடுத்தனை" . (28 அடிகள்)

அலகு – 4 – தமிழ் இலக்கிய வரலாறு

1) சிற்றிலக்கியம் - தோற்றமும் வளர்ச்சியும், 2) புதுக்கவிதை - தோற்றமும் வளர்ச்சியும், 3) சிறுகதை - தோற்றமும் வளர்ச்சியும், 4) புதினம் - தோற்றமும் வளர்ச்சியும், 5) உரைநடை - தோற்றமும் வளர்ச்சியும்

அலகு -5

மொழிப்பயிற்சி :

1. கலைச்சொல்லாக்கம், 2. அகரவரிசைப்படுத்துதல், 3. மரபுத்தொடர் / பழமொழி, 4. கலை விமர்சனம், 5. நேர்காணல்

உரைநடைப் பகுதி :

1. உ.வே.சாமிநாதையர் – சிவதருமோத்திரச் சுவடி பெற்ற வரலாறு,
2. தஞ்சாவூர்க் கவிராயர் –கூஜாவின் கோபம்,
3. இரா.பச்சியப்பன் – மாடல்ல மற்றையவை

பார்வை நூல்கள்

1. *கைலாபதி, க., தமிழ் நாவல் இலக்கியம் ,குமரன் பதிப்பகம், வடபழனி. 1968.*
2. *சுந்தரராஜன், பெ. கோ., சிவபாதசுந்தரம், சோ., தமிழில் சிறுகதை வரலாறும் வளர்ச்சியும், க்ரியா, சென்னை, 1989.*
3. *பரந்தாமனார், அ.கி., நல்ல தமிழ் எழுத வேண்டுமா, பாரி நிலையம், சென்னை, 1998,*
4. *பாக்யமேரி, வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு, என்.சி.பி. எச். பதிப்பகம், சென்னை, 2011*

வல்லிக்கண்ணன், புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும், அன்னம், சிவகங்கை, 1992.

SUBJECT CODE	TITLE OF THE SUBJECT	L	T	P	TOTAL L+T+P	C
ULH18101	HINDI-I	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES	
1.	To express and communicate literature which is part of life
2.	To incorporate day to day personal and professional life's need to communicate in the language
3.	To help the students to imagine and express their mind through literature

UNIT – I: PROSE **(35 hours)**

1. BADE GHAR KI BETI - PREMCHAND
2. VAISHNAV KI FISLAN (VYANGYA KATHA) - HARISHANKAR PARSAI
3. BENAM RISHTA - MRIDULA GARG
4. UTSAH (NIBAND) - RAMCHANDAR SHUKLA
5. PURUSKAR - JAYSHANKAR PRASAD
6. HARDAM.COM - ALKA SINHA

UNIT – II: ONE ACT PLAY **(15 hours)**

1. MAHABHARAT KI EK SANJH - BHARAT BHUSHAN AGRAWAL
2. REED KI HADDI - JAGDISH CHANDR MATHUR

UNIT – III: CORRESPONDENCE **(10 hours)**

1. OFFICIAL LETTER
2. DEMI-OFFICIAL LETTER

UNIT - IV: CINEMA **(10 hours)**

1. PANCHLIGHT - PHANISHWAR NATH RENU
2. CHANDI KA JUTA - BAL SHAURI REDDI

UNIT – V: TECHNICAL TERMINOLOGY (5 hours)

BOOK REFERENCE:

1. PRAYOJAN MULAK HINDI – MADHAV SONTAKKE
2. A PRACTICAL GUIDE TO ENGLISH TRANSLATION AND COMPOSTITION – K.P. THAKUR

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
ULF18101	FRENCH-I	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES	
1.	To encourage greater written skills through comprehension writing and composition writing
2.	Improve their oral and written skills through a combination of theory and practice
3.	Extend and expand their savoir-faire through the acquisition of latest skills and techniques by practical training

Unité - I : (15 heures)

Salut-Saluer- Entrer en contact avec quelqu'un – se présenter – s'excuser- *tu* ou *vous* ? Les jours de la semaine – Quelques formules de politesse – L'alphabet – Quelques consignes de classe – Je, tu, vous, il. Elle – Etre – Quelques nationalités – Masculin et féminin – Les nombres de 0 à 10 – Quelques sigles.

Unité - II : (15 heures)

Enchanté- Demander de se présenter – Présenter quelqu'un – La négation : ne…pas – Les adjectifs possessifs –Etre, avoir+quelques verbes en –er – C'est, il est – L'interrogation par l'intonation – Quelques professions – Les nombres de 11 à 69 – Oui, non, si. **J'adore !**- Exprimer ses gouts –échanger sur ses projet – Aller – Moi aussi – Nous, ils, elles – La conjugaisons des verbes en –er être et avoir – Faire du, de l', de la +sport – Les nombres après 69 – On=nous – Le futur proche – Quelques indicateurs de temps – Les adjectifs possessifs.

Unité - III : (15 heures)

Tu veux bien – Demander à quelqu'un de faire quelque chose – Demander poliment – Parler d'actions passées –Il y a – Les articles définis et indéfinis – Les marques du pluriel des noms – Les pronoms après une préposition (avec lui, chez, moi) – Le passé composé – Pouvoir, vouloir, venir, connaître.

Unité - IV : **(15 heures)**

On se voit quand ? - Proposer, accepter, refuser une invitation – indiquer la date – Prendre et fixer un rendez-vous – Demandez et indiquer l'heure – Les pronoms compléments directs me, te, nous, vous –Pourquoi ? Parce que – Quel(s), Quelle(s) – L'interrogation avec est-ce que – Finir- Savoir – L'heure et la date – Les mois de l'année – Quelques indicateurs de temps

Unité - V : **(15 heures)**

Bonne idée ! – Exprimer son point de vue positif et négatif – s'informer sur le prix – S'informer sur la quantité – Exprimer la quantité – La négation : ne …pas de – Les articles partitifs – Combien ? –Un peu de, beaucoup de,…. –Qu'est-ce que, combien – offrir, croire – Penser à, penser de – Plaire à – Les couleurs – Le masculin et le féminin des adjectifs – Les pronoms compléments directs le, la, les.

REFERENCE:

''Latitudes-1'' Méthode de français, REGIME MERIEUX, YVES LOISEAU Les éditions Didier, Paris, 2012.

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
ULE18101	ENGLISH-I	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES	
1.	To enhance students' proficiency in English language
2.	To enable the students to think in English
3.	To become aware of the regional literature and the writers
4.	To equip students with the awareness and strategies needed to enable the study of English as a lifelong process
5.	To help expand the consciousness of every student pertaining to gender formation

UNIT – I: POETRY **(15 Hours)**

1. Yayum Nyayum – Kurunthogai 40
2. My Grandmother's House – Kamala Das
3. Transgender – Olivia Kent
4. Obituary – A K Ramanujam

UNIT - II: PROSE **(15 Hours)**

1. On Marriages – Nirad C Choudhary
2. Response to Welcome addresses ii)Why Do We Disagree– Swami Vivekananda
3. I have a dream – Martin Luther King

UNIT – III: SHORT STORY **(15 Hours)**

A Nincompoop – Anton Chekhov

1. The Rat – Ashokamitran

2. Quantum of Solace – Ian Flemming
3. Squirrel - Ambai

UNIT - III: POPULAR LITERATURE **(15 Hours)**

1. Shabdo -Kaushik Ganguli
2. TEDX Talks
3. John Lennon - Imagine
4. Bob Marley - No woman no cry

UNIT – V: LANGUAGE COMPONENT **(15 Hours)**

1. Spot the Errors
2. Jumbled Sentence
3. Homophones & Homonyms
4. Idioms and Phrases
5. Antonyms and Synonyms
6. Story through Images
7. Hints Development
8. Autobiography of Concrete Objects
9. Advertisements
10. Slogan Writing

TEXT BOOKS

Cambridge University Press, Raymond Murphy, *Essential Grammar in Use* 3rd Edition 2010

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UMA18101	ALGEBRA AND TRIGONOMETRY	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES		Student Outcomes				
1.	Apply the concepts of matrices, in solving a system of linear equations	a	e			
2.	Be familiar with the theory of equations	a				
3.	Get exposed to the transformation of equations	a	e			
4.	Expand trigonometric functions and also find the summation of Trigonometric-series	a				
5.	Work with complex number in terms of trigonometric	a	e			

UNIT - I : MATRICES

Rank of a matrix – Consistency of a system of linear equations, Characteristic equation – Eigen values and Eigen vectors – properties – problems - Cayley – Hamilton theorem (statement only) and its applications – Diagonalization of Matrices – Orthogonal Transformation – problems.

UNIT - II : THEORY OF EQUATIONS

Polynomial equations – Imaginary and Irrational roots – relation between roots and coefficients of equations – Symmetric functions of roots in terms of coefficients of third degree equation - problems.

UNIT - III : RECIPROCAL EQUATIONS

Sum of the powers of the roots of an equation – Newton's theorem on the sum of the powers of the roots – Transformation of equations – Roots with sign changed – Roots multiplied by a given number – Reciprocal equations – problems.

UNIT - IV : TRANSFORMATION OF EQUATIONS

Increase or decrease the roots of a given equation by a given quantity. Removal of terms - Square of the roots – Transformations in general – Descarte's rule of signs – problems.

UNIT - V : TRIGONOMETRY

Expansions of sinnθ, Cosnθ and tannθ – Expansions of $\sin^n\theta$, $\cos^n\theta$ and $\tan^n\theta$ in terms of cosθ and sinθ – Hyperbolic and inverse hyperbolic functions and their properties – Logarithm of a complex number – General and principal values – problems.

TEXT BOOKS

1. T. K. Manickavasagam Pillai, Natarajan and Ganapathy, Algebra, Volume II, S.Viswanathan Pvt. Ltd., 2004.
2. S. Narayanan and T. K. Manickavachagam Pillai, Trigonometry, S. Viswanathan Printers & Publishers, (Reprint), 2012.

REFERENCES

1. T.K.Manickavachagam Pillai, Matrices, S.Viswanathan Printers & Publishers, 2012.
2. P.R.Vittal, *Coordinate Geometry*, Margham Publishers, 2003.
3. P. Duraipandian, Trigonometry, Emerald publishers, 2009.
4. A. Singaravelu, Algebra & Trigonometry, Vol. I & II, Meenakshi Agency, 2003.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Assignment**	**Attendance**	**Total**
	Marks	**10**	**10**	**20**	**5**	**5**	**50%**
End Semester Weightage							**50%**
Total							**100%**

COURSE CODE	**COURSE TITLE**	**L**	**T**	**P**	**TOTAL L+T+P**	**C**
UMA18102	**ANALYTICAL GEOMETRY**	**4**	**1**	**0**	**5**	**4**

INSTRUCTIONAL OBJECTIVES		**Student Outcomes**				
1.	To learn about analytical geometry two dimension in polar coordinates.	a				
2.	To understand about straight lines in three dimension.	a	e			
3.	To have knowledge about sphere.	a				
4.	To have knowledge about cone and cylinder.	a				
5.	Be familiar with conicoids.	a				

UNIT – I: CONICS

Polar coordinates equation of a conic - equation of directrix - equation of chord-equation of tangent and normal - derivation and simple problems.

UNIT- II : STRAIGHT LINES

Straight lines - co-planarity of straight lines - shortest distance (S.D) and equation of S.D between two lines - simple problems.

UNIT- III : SPHERE

Standard equation of sphere - results based on the properties of sphere - tangent plane to a sphere- Plane section of a sphere - Equation of a sphere through the circle.

UNIT - IV : CONE AND CYLINDER

Cone whose vertex is at the origin-right circular cone-equation of a cylinder-right circular cylinder.

UNIT - V : CONICOIDS

Nature of a conicoid - standard equation of central conicoid - enveloping cone of a sphere- tangent plane-condition for tangency - director Sphere-director plane.

TEXT BOOKS

1. P. Duraipandian, Laxmi Duraipandian, D.Muhilan, *Analytical Geometry-3 Dimensional*, Emerald Publishers, 1983.
2. G.S.Pandey, R.R.Sharma, *Vectors and Geometry*, Wishwa Prakashan.1988.

REFERENCES

1. T.K.Manicavachagom Pillay, T.Natarajan, *A text book of Analytical Geometry-Part-I-Two Dimensions*, Viswanathan Publications, 1986.
2. M.L. Khanna, *Solid Geometry*, Jai Prakashnath & Co Publishers, Meerut, 2008.
3. P.R.Vittal, *Coordinate Geometry*, Margham Publishers, 2003.
4. G.B.Thomas and R.L.Finney, *Calculus & Analytic Geometry*, Addison Wesley, Mass (Indian Print), 1998.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Assignment**	**Attendance**	**Total**
	Marks	**10**	**10**	**20**	**5**	**5**	**50%**
End Semester Weightage							**50%**
Total							**100%**

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UPY18A01	ALLIED PHYSICS – I	4	0	0	4	4

INSTRUCTIONAL OBJECTIVES		Student Outcomes				
1.	To understand the fundamentals of physics.					

2.	To give the basic understanding of material properties.					
3.	To educate and motivate the students in the field of science.					
4.	To acquire knowledge on magnetism and dielectrics.					

UNIT - I: SIMPLE HARMONIC MOTION AND CIRCULAR MOTION

Time period - Amplitude - Phase - Spring mass system - Simple pendulum - Composition of two simple harmonic motions of equal periods in a straight line and at right angles - Lissajous figures - Damping force - Damped harmonic oscillator - Uniform circular motion - Acceleration of a particle in a circle - Centripetal and centrifugal forces - Banking on curved roads.

UNIT - II: PROPERTIES OF MATTER

Elasticity and plasticity - Elastic constants - Bending of beams - Young's modulus by non - Uniform bending - Torsion in a wire - Determination of rigidity modulus of torsion pendulum - Viscosity - Coefficient of viscosity - Stoke's law - terminal velocity - Surface tension - Molecular theory of surface tension - Excess pressure inside a drop and bubble.

UNIT - III: HEAT AND THERMODYNAMICS

Kinetic theory of gases - Basic postulates - Ideal gas laws - Van Der Waal's equation of states - Pressure of an ideal gas - Laws of thermodynamics - Entropy - change of entropy in reversible and irreversible processes - Low temperature - Joule - Kelvin effect - Theory and applications - Liquefaction of gases - Linde's process - Adiabatic demagnetization.

UNIT - IV: ELECTRICITY AND MAGNETISM

Electric charge - Conservation of charge - Permittivity - Coulomb's law - Electric field - Electric potential - Gauss's law and its applications - Conductors - Dielectrics - Electric Current - Ohm's law - Magnetic induction - Permeability - Susceptibility - Magnetic field due to a current carrying conductor - Biot Savart's law - Field along the axis of a coil - Force on a conductor carrying current in a magnetic field - Ampere's circuital law - Faraday's law – Gradient - Curl and Divergence - EM waves.

UNIT - V: GEOMETRICAL OPTICS

Light and Optics - Fermat's principle - Laws of reflection and refraction - Total internal reflection and its illustrations - Mirrors and lenses - Lens formula - Refraction through a prism - Combination of two prisms to produce dispersion without deviation and deviation without dispersion - Defects of images - Coma distortion - Spherical and chromatic aberration in lenses.

TEXT BOOKS

1. Resnick R. and Halliday D., Fundamentals of Physics, Wiley Publication, 8th Edition, 2011.
2. Sundaravelusamy A., Allied Physics I, Priya Publications, 2009.

REFERENCES

1. Naik P.V., Principles of Physics, PHI Learning Pvt. Ltd, 2006.
2. John Thiruvadigal D., Ponnusamy S., Sudha L. and Krishnamohan M., Physics for Technologists, Vibrant Publication, 2013.
3. Rajam J. B., Physics for Technologists, S. Chand, 1981.
4. Brijilal and Subramanian, Elements of properties of matter, S. Chand Limited, 1974.
5. Zemansky M. W. and Ditlman R.H., Heat and Thermodynamics, Tata Mcgraw Hill, 2011.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Assignment**	**Attendance**	**Total**
	Marks	**10**	**10**	**20**	**5**	**5**	**50%**
End Semester Weightage							**50%**
Total							**100%**

COURSE CODE	**COURSE TITLE**	**L**	**T**	**P**	**TOTAL L+T+P**	**C**
UPY18A02	**ALLIED PHYSICS LABORATORY - I**	**0**	**0**	**3**	**3**	**2**

INSTRUCTIONAL OBJECTIVES		**Student Outcomes**				
1.	To acquire basic understanding of laboratory techniques.					
2.	To educate the basics of instrumentation, data acquisition and interpretation of results.					
3.	To educate and motivate the students in the field of science.					
4.	To allow the students to acquire knowledge of					

	fundamentals of optics					

List of Experiments:

1. Determination of Young's Modulus- Uniform bending Method
2. Determination of Young's Modulus- Non Uniform bending Method
3. Determination of Rigidity Modulus of a wire – Torsional pendulum
4. Determination of thermal conductivity of a bad conductor using Lee's disc method
5. Calibration of Voltmeter using potentiometer
6. Calibration of Ammeter using potentiometer
7. Determination of magnetic susceptibility using Quincke's Method
8. Determination of dispersive power of a prism using spectrometer
9. Determination of Cauchy's constant using spectrometer

TEXT BOOKS

1. C.H. Bernard and C.D. Epp, John, Laboratory Experiments in College Physics Wiley and Sons, Inc., 1995.
2. F.A. Jenkins and H.E. White, Fundamentals of Optics, 4th Ed., McGraw-Hill Book Co., 1981.

REFERENCES

1. G. L. Squires, Practical Physics, Fourth edition, Cambridge University Press, 2001.
2. D. Halliday, R. Resnick and J. Walker, Fundamentals of Physics, 6th Ed., John Wiley and Sons, Inc., 2001.
3. F.A. Jenkins and H.E. White, Fundamentals of Optics, 4th Ed., Reprint McGraw-Hill Book Co., 2007.
4. GeetaSanon, B. Sc., Practical Physics, 1st Edition. R. Chand & Co, 2007.
5. Benenson, Walter, and Horst Stöcker, Handbook of physics. Springer, 2002.

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
CAC18101	SOFT SKILLS	2	0	0	2	2

COURSE OBJECTIVE	
To enhance holistic development of students and improve their employability skills	
INSTRUCTIONAL OBJECTIVES	
1.	To acquire inter personal skills and be an effective goal oriented team player
2.	To develop professionalism with idealistic, practical and moral values
3.	To acquire communication and problem solving skills
4.	To re-engineer their attitude and understand and understand its influence on behavior

UNIT – I : ATTITUDE (6 hours)

Who am I? SWOT analysis, Importance of self confidence and self esteem, Factors influencing attitude, Challenges and lessons from attitude

UNIT - II : COMMUNICATION **(6 hours)**

Practice activities (JAM, spin a story, diagram description, etc…), Activities for evaluation (Extempore, speaking news, book review)

UNIT – III: GOAL SETTING **(6 hours)**

SMART goals, Blue print for success, Short term, Long term, Life time goals, Value of time, Diagnosing time management, Prioritizing work

UNIT – IV: PUBLIC SPEAKING **(6 hours)**

Activities for evaluation (Surveying and reporting, Debate, Group discussion)

UNIT – V: CREATIVITY **(6 hours)**

Out of box thinking, lateral thinking

REFERENCES

1. Covey Sean, Seven habits of highly effective teens, New York, Fireside Publishers, 1998.
2. Carnegie Dale, How to win friends and influence people, New York, Simon and Schuster, 1998.
3. Thomas A Harris, I am ok, you are ok, New York, Harper and Row, 1972.

FIRST YEAR – SECOND SEMESTER

குறியீட்டு எண்	பாடம்	L	T	P	Total L+T+P	C
ULT18201	**தமிழ் - II**	**4**	**1**	**0**	**5**	**4**

பாடத்திட்டத்தின் நோக்கம்

- இரண்டாயிரம் ஆண்டுகாலத் தமிழின் தொன்மையையும் வரலாற்றையும் அதன் விழுமியங்களையும் பண்பாட்டையும் எடுத்துரைப்பதாக இப்பாடத்திட்டம் அமைக்கப் பட்டுள்ளது.
- காலந்தோறும் தமிழ் இலக்கியம் உள்ளடக்கத்திலும், வடிவத்திலும் பெற்ற மாற்றங்கள், அதன் சிந்தனைகள், அடையாளங்கள் ஆகியவற்றை காலந்தோறும் எழுதப்பட்ட இலக்கியங்களின் வழியாகக் கூறுவதாகவும், மொழியின் கட்டமைப்பைப் புரிந்து கொள்வதாகவும் பாடத்திட்டம் வடிவமைக்கப்பட்டுள்ளது.
- வாழ்வியல் சிந்தனைகள், ஒழுக்கவியல் கோட்பாடுகள், சமத்துவம், சூழலியல் எனப் பல கூறுகளை மாணவர்களுக்கு எடுத்துரைக்கும் விதத்தில் இப்பாடத்திட்டம் உருவாக்கப்பட்டுள்ளது.

அலகு – 1

1. **எட்டுத்தொகை :** 1. குறுந்தொகை (பாடல் – 130), 2. நற்றிணை (பாடல் - 27), 3. அகநானூறு (**பாடல்** – 86)
2. **பத்துப்பாட்டு -** சிறுபாணாற்றுப்படை **(**அடிகள் **-** 126-143)
3. **பதினெண் கீழ்க்கணக்கு** : திருக்குறள் - வெகுளாமை (அதிகாரம்31), காதல் சிறப்புரைத்தல் (அதிகாரம் 113)

அலகு – 2

1. **எட்டுத்தொகை :** 1. ஐங்குறுநூறு (பாடல் - 203), 2. கலித்தொகை - பாலைத்திணை (பாடல் - 9), 3. புறநானூறு (பாடல் - 235)
2. **பத்துப்பாட்டு -** முல்லைப்பாட்டு (அடிகள் - 6 – 21)
3. **பதினெண் கீழ்க்கணக்கு -** 1. நாலடியார் - நல்லார் எனத்தான் (221), 2. திரிகடுகம் - கோலஞ்சி வாழும் குடியும் (33), இனியவை நாற்பது - குழவி தளர்நடை (14), கார் நாற்பது - நலமிகு கார்த்திகை (26), 5. களவழி நாற்பது - கவளங்கொள் யானை (14)

அலகு - 3

சைவம் – பன்னிரு திருமுறைகள்

1. திருஞானசம்பந்தர் - வேயுறு தோளிபங்கன் (இரண்டாம் திருமுறை)
2. திருநாவுக்கரசர் - மனமெனும் தோணி (நான்காம் திருமுறை)
3. சுந்தரர் - ஏழிசையாய் இசைப்பயனாய் (ஏழாம் திருமுறை)
4. மாணிக்கவாசகர் - ஆதியும் அந்தமும் இல்லா (திருவெம்பாவை)
5. திருமூலர் - அன்பு சிவம் இரண்டு (திருமந்திரம்)

வைணவம் – நாலாயிரத் திவ்யப் பிரபந்தம்

1. பேயாழ்வார் - திருக்கண்டேன் பொன்மேனி ...
2. பெரியாழ்வார் - கருங்கண் தோகை மயிற் பீலி...
3. தொண்டரடிப்பொடி ஆழ்வார் - பச்சைமாமலை போல்...
4. ஆண்டாள் - கருப்பூரம் நாறுமோ? கமலப்பூ ...
5. திருமங்கையாழ்வார் - வாடினேன் வாடி வருந்தினேன்

இஸ்லாமியம்

சீறாப்புராணம் - மானுக்குப் பிணை நின்ற படலம் - – 5 பாடல்கள் (பாடல் எண்கள் : 61 - 65)

கிறித்துவம்

இரட்சண்ய யாத்ரீகம் – கடைதிறப்புப் படலம் **–** 5 பாடல்கள் (பாடல் எண்கள் : 3,9,10,15,16)

அலகு – 4

தமிழ் இலக்கிய வரலாறு

1. சங்க இலக்கியங்கள், 2. நீதி இலக்கியங்கள், 3.பக்தி இலக்கியங்கள், 4. காப்பியங்கள்

அலகு – 5

சிறுகதைகள்

1. புதுமைப்பித்தன் – அகலிகை
2. ந.பிச்சமூர்த்தி – வேப்பமரம்
3. அகிலன் – ஒரு வேளைச் சோறு
4. ஜி. நாகராஜன் – பச்சக் குதிரை
5. கி.ராஜநாராயணன் – கதவு
6. சா.கந்தசாமி – தக்கையின் மீது நான்கு கண்கள்
7. ஆண்டாள் பிரியதர்ஷினி – மாத்திரை
8. வண்ணதாசன் – ஒரு உல்லாசப் பயணம்
9. சு. தமிழ்ச்செல்வன் – வெயிலோடு போய்
10. பாரததேவி – மாப்பிள்ளை விருந்து

பார்வை நூல்கள்

1. *அரசு, வீ., இருபதாம் நூற்றாண்டுச் சிறுகதைகள் நூறு, அடையாளம் பதிப்பகம், திருச்சி, 2013*
2. *அருணாசலம், ப., பக்தி இலக்கியங்கள், பாரி நிலையம், சென்னை, 2010*
3. *தமிழண்ணல், புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு, மீனாட்சி புத்தக நிலையம், மதுரை, 2000*
4. *பாக்யமேரி, வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு, என்.சி.பி. எச். பதிப்பகம், சென்னை, 2011*

பசுபதி, ம.வே. செம்மொழித்தமிழ் இலக்கண இலக்கியங்கள், தமிழ்ப் பல்கலைக்கழகம், தஞ்சாவூர், 2010.

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
ULH18201	HINDI-II	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES	
1.	To express and communicate literature which is part of life
2.	To incorporate day to day personal and professionl life's need to communicate in the language
3.	To help the students to imagine and express their mind through literature

UNIT – I: POETRY : **(30hours)**

1. KABIR, TULSI, RAHIM, BIHARI
2. KAIDI AUR KOKILA - MAKHAN LAL CHATURVEDI
3. AB AUR NAHI - OM PRAKASH VALMIKI
4. PREM KA ROG - KUNWAR NARAYAN
5. MAA GAON ME HAI - DIVIK RAMESH
6. ADHIK NAYA HOTA HUN - LILADHAR MANDLOI

UNIT – II STORY : **(25 hours)**

1. VAISHNAVI - YASHPAL
2. DOPAHAR KA BHOJAN - AMARKANT
3. JUNGLE - CHITRA MUDGAL
4. KINARE SE DOOR - RAKESH BIHARI
5. PRECIOUS BABY - ANITA NAIR

UNIT – III : **(10 hours)**

1. ADMINSTRATIVE WORDS, ANUVAD : ANUVAD KI PARISBHASHA EVAM BHED

UNIT – IV: **(10 hours)**

1. ANUVAD : ENGLISH TO HINDI

BOOK REFERENCE :

1. PRAYOJAN MULAK HINDI – MADHAV SONTAKKE
2. A PRACTICAL GUIDE TO ENGLISH TRANSLATION AND COMPOSTITION – K.P. THAKUR

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
ULF18201	FRENCH-II	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES	
1.	Consolidate the knowledge of theoretical aspects of French grammar with examples provided from different angles: from present day literature, day to day conversation
2.	Improve their oral and written skills through a combination of theory and practice

Unité-I **(15 heures)**

C'est où ? – Demander et indiquer une direction – Localiser (près de, en face de,….) - L'impératif – Quelques prépositions de lieu- Les articles contractés au, à la …. – Le passé composé et l'accord du participe passé avec être –Les nombres ordinaux – Ne…plus, ne … jamais – Les adjectifs numéraux ordinaux – Faire.

Unité-II **(15 heures)**

N'oubliez pas ! - Exprimer l'obligation ou l'interdit – Conseiller – En dans les constructions avec de – Quelque chose, rien – Quelqu'un, personne – Il faut, devoir – Qui, que, où – Les pronoms compléments indirects (me, te, lui, leur…). **Belle vue sur la mer !** – Décrire un lieu –Situer – se situer dans le temps – La place des adjectifs – Des, De devant un adjectif – Le genre des noms de pays – Les prépositions et les noms de villes, de pays, de continents – Tout(e) (s), tous – Y, pronoms complément – Les adjectifs démonstratifs.

Unité-III **(15 heures)**

Quel beau voyage !- Raconter – Décrire les étapes d'une action – Exprimer l'intensité et la quantité – Interroger- Les verbes pronominaux – à la pièce, au kilo – un sachet de, un litre de … -d'abord, puis … - peu, assez, trop… - En pronom complément – L'interrogation par l'inversion et révision de l'interrogation – Partir.

Unité-IV **(15 heures)**

Oh !joli !- Décrire quelqu'un – comparer – Exprimer l'accord ou le désaccord – Se situer dans le temps –L'imparfait – L'imparfait ou le passé composé – la description d'une personne.

Unité-V **(15 heures)**

Et après ? - Parler de l'avenir- Exprimer des souhaits – Décrire quelqu'un- S'en aller, partir, quitter – Les indicateurs de temps (en, dans) – Le futur simple – Le subjonctif présent- La place des pronoms à l'impératif.

Référence:

"**Latitudes-1"** Méthode de français, REGIME MERIEUX, YVES LOISEAU Les éditions Didier, Paris, 2012.

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
ULE18201	ENGLISH-II	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES	
1.	To enhance students' proficiency in English language
2.	To enable the students to think in English
3.	To become aware of the world literature and the writers
4.	To equip students with the awareness and strategies needed to enable the study of English as a lifelong process
5.	To help expand the consciousness of every student pertaining to gender formation

UNIT – I: POETRY **(15 Hours)**

1. The Unknown citizen – Auden
2. Nada Kondro Kada Kondro- Pura Naanooru 187
3. On being Trans- Lee Mokobe
4. Girl Child – Pawani Mathur

UNIT - II: PROSE **(15 Hours)**

1. Men and Women – Virginia Woolf
2. Farewell Speech of Mark Antony – William Shakespeare
3. The Autobiography of an unknown Indian –Nirad C.Chaudhuri

UNIT - III: SHORT STORIES AND PLAY **(15 Hours)**

1. A Wrong Man in Worker's Paradise – Rabindranath Tagore
2. Refund – Karen E.Bender
3. Paper Money – Razia Fasih Ahmad
4. Karukku - Bama

UNIT – IV : POPULAR LITERATURE **(15 Hours)**

1. Paul Simon –The Sound of Silence
2. Tedx Talks – If I had a daughter
3. John Lennon – I have a dream
4. Pink Floyd – Brick in the Wall

UNIT – V: LANGUAGE COMPONENT **(15 Hours)**

1. Spot the Errors & Punctuation
2. Antonyms and Synonyms
3. Parts of speech
4. Articles
5. Vowels
6. Road Mapping
7. Movie Review
8. Crossword Puzzles
9. Open ended Stories
10. Quiz

TEXT BOOKS:

Cambridge University Press, Raymond Murphy, *Essential Grammar in Use* 3rd Edition 2010

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UMA18201	CALCULUS	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES		Student Outcomes				
1.	To learn nth derivative of product of two functions and understand the concept of homogeneous functions	a	e			
2.	To understand the concept of extreme values of functions involving two and three variables	a				
3.	Learn the concept of integration by means of various methods	a	e			
4.	Study in detail the topic on definite integrals as well as reduction formulae.	a				
5.	Knowledge to apply the concept of integration for finding length and area of different values	a	e			

Unit - I: DIFFERENTIAL CALCULUS

Introduction to differentiation – Successive differentiation – n^{th} derivatives – Leibnitz formula for nth derivative of a product - Partial differentiation – total differential Coefficient –Homogeneous functions – Euler's theorem

Unit - II: DIFFERENTIAL CALCULUS

Maxima and minima of functions of two variables – Lagrange's method of undetermined multipliers –simple problems – Envelopes.

Unit - III: INTEGRAL CALCULUS

Introduction to integration - Methods of integration – Integration by parts - Bernoulli's formula**.**

Unit - IV: INTEGRAL CALCULUS

Properties of definite integrals – reduction formulae for standard integrals.

Unit - V: GEOMETRICAL APPLICATIONS OF INTEGRATION

Areas in polar coordinates - Length of the curve (Cartesian and polar coordinates) – Area of surface of revolution (Cartesian and polar coordinates).

Tutorials: Tutorial sheets with relevant problems will be provided by the instructor.

TEXTBOOKS:

1. S. Narayanan and T K Manicavachagom Pillay. *Calculus*, Vol.I, ,S. Viswanathan Printers and Publishers Pvt. Ltd., 2010.
   Chapter 3: Sections 1.1 – 1.6, 2.1, 2.2, Chapter 8: Sections 1.1 – 1.6, Chapter 8: Sections 4.1, 5, Chapter 10: Sections 1.1, 1.2, 1.3.
2. S. Narayanan and T K Manicavachagom Pillay, *Calculus*, Vol. II, S. Viswanathan Printers and Publishers Pvt. Ltd., 2010.
   Chapter 1: Sections 5, 6.1 – 6.6, 7.1 – 7.5, 8, 9, 10, 12, 15.1, Chapter 1: Sections 11, 13.1 – 13.10, 14,
   Chapter 2: Sections 1.4, 4.1, 4.2, 5

REFERENCES:

1. P. Kandasamy and Thilagavathy, *Mathematics*, Volume 1, S. Chand, New Delhi, 2004.
2. G.V. Thomas and R.L. Finney, *Calculus*, Pearson Education, 9th Edition, 2006.
3. Murray Spigiel and Robert Wrede, *Shaums Outline of Advanced Calculus*, 3rd Edition, Tata McGraw Hill Company, New Delhi, 2010.
4. P.R. Vittal, *Calculus*, Margham Publications, T.Nagar, Chennai, 2013.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semest	**Assessm ent Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examina**	**Assig nment**	**Atte ndan**	**Total**

er				tion		ce	
	Marks	10	10	20	5	5	50%
End Semester Weightage							50%
Total							100%

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UPY18A03	ALLIED PHYSICS – II	4	0	0	4	4

OBJECTIVES	
1.	To understand the fundamentals of physics.
2.	To emphasize the significance of Green technology and its applications.
3.	To understand the structural, optical, nuclear and electronic properties of solids.
4.	To acquire knowledge on elementary ideas of integrated circuits.

UNIT - I: RENEWABLE ENERGY PHYSICS

Sources of conventional energy - Need for non - Conventional energy – Resources - Solar energy - Solar cells and its applications - Wind energy - Generation and applications - Bio mass energy - Generation and applications - Geothermal energy - Generation - Applications - Tidal energy - Generation and applications.

UNIT - II: MODERN PHYSICS

Atomic structure - Alpha, beta and gamma radiation - Law of radioactive decay - Decay constant - Half life - Mean life - Nuclear energy - Mass defect - Binding energy - Fission and fusion - Biological effects of radiation - Black body radiation - Planck's quantum hypothesis - Photoelectric effect - Compton effect - De Broglie equation - Uncertainty principle.

UNIT - III: WAVE AND FIBRE OPTICS

Wave nature of light - Huygens's principle - Interference - Young's double slit experiment - Coherence - Interference from thin films - Michelson's interferometer. Diffraction - Wave theory of light - Single slit experiment - Diffraction grating - Polarization - Fiber optics - Propagation of light in optical fiber - Acceptance angle - Numerical aperture - Attenuation - Types of optical fibers and its Applications.

UNIT - IV: CRYSTAL PHYSICS

Space lattice - Basis - Unit Cell - Lattice parameters - Two dimensional and three dimensional Bravais lattices and Crystal systems - Cubic crystal system - Crystal symmetry - Reciprocal lattice and its importance - Density and atomic packing fraction - Directions - Planes and Miller indices - Interplanar distance - Hexagonal Closely Packed (HCP) structure - Crystal imperfections - X ray diffraction - Laue method - Single crystal and powder diffraction.

UNIT - V: ELECTRONICS

Basic Electronics - P and N type semiconductors - Junction Diode and their characteristics - Half wave - Full wave rectifiers - Voltage regulations - Zener diode - Junction transistor - PNP - Digital electronics - AND, OR, NOT gates - NAND and NOR as universal building Blocks - Boolean algebra - Laws of Boolean algebra – De Morgan's theorem, basics ofintegrated circuit (IC)

TEXT BOOKS

1. Kittel C., *Introduction to Solid State Physics*, 8th Edition, Wiley Eastern Ltd, 2005.
2. Malvino and Leach, *Digital Principles & their applications*, Tata McGraw Hill, 2010.

REFERENCES

1. Jha A.K., *Textbook of Applied Physics*, International Publishing House Pvt. Ltd, 2011.
2. Mansi Karkare and RajniBahuguna, *Applied Physics*, Volume – II International Publishing House Pvt. Ltd, 2010.
3. TasneemAbbasi, Abbasi S. A, *Renewable Energy Sources: Their Impact on Global Warming and Pollution*, PHI Learning Pvt. Ltd. 2013.
4. Thyagarajan K. and Ajay Ghatak, *Introduction to Fiber Optics*, Cambridge, University Press, 1998.
5. Grob B., *McGraw Basic Electronics*, 6th Edition, McGraw Hill, 2010.

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UPY18A04	ALLIED PHYSICS LABORATORY - II	0	0	3	3	2

OBJECTIVES

1.	To familiarized with the concept of material properties.
2.	To educate the basics of instrumentation, data acquisition and analysis.
3.	To understand the optical and electronic properties of solids through experimentations.

List of Experiments:

1. Study the I-V Characteristic of a Solar Cell
2. Determination of wire thickness using air wedge experiment.
3. Study of attenuation and propagation characteristics of optical fiber cable
4. Band gap determination using Post Office Box – Specific resistance
5. Band gap determination using Four Probe Method.
6. Dielectric constant Measurement
7. Hall effect- Hall coefficient determination

8. Determination of regulation properties of a given power supply using a integrated circuit (IC)
9. Construction of AND, OR, NOT gates using diodes, resistors and Transistors

TEXT BOOKS

1. S.O. Kasap, Principles of Electronic Materials and Devices, Tata McGraw Hill Edition, 2002
2. Thiruvadigal, J. D., Ponnusamy, S. and Vasuhi.P. S., Materials Science, Vibrant Publications, 2012.

REFERENCES

1. C.Ouseph, K.Rangarajan,A Text Book of Practical Physics, Volume I,II,S.Viswanathan Publishers,1997
2. Chauhan and Singh, Advanced Practical Physics, Revised edition, Pragati Prakashan, 1985.
3. Van Vlack, L.H., Material Science for Engineers, 6th edition, .Addison Wesley, 1985
4. Callister, Jr. W.D. Materials Science and Engineering: An Introduction, Seventh Edition, Wiley, 2007.
5. Shackelford, James F., and William Alexander, CRC materials science and engineering handbook. CRC press, 2010.

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UCA18E57	BASIC COMPUTER SKILLS	2	0	2	4	3
INSTRUCTIONAL OBJECTIVES						
1.	To have an insight in to the basic computer concepts					
2.	To acquire knowledge on the storage devices					
3.	To develop skills to handle HTML					
4.	To perform fundamentals exercises in computer programming					

UNIT – I: INTRODUCTION TO COMPUTER

History of development of computers - Computer system concepts -Characteristics - Capabilities and limitations - Generations of computers. - Basic components of a computer system – Control Unit, ALU, I/ O Devices, memory – RAM, ROM, EPROM, PROM, Flash Memory and other types of memory.

UNIT – II: STORAGE DEVICES

Storage fundamentals – Primary Vs Secondary - Data Storage and Retrieval methods – Sequential, Direct and Index Sequential. - Various Storage Devices – Magnetic Tape, Magnetic Disks, Cartridge Tape, Data Drives, Hard Disk Drives, Floppy (Winchester Disk), Disks, Optical Disks, CD, VCD, CD-R, CD-RW, Zip Drive, DVD, SVCD.

UNIT – III: COMPUTER SOFTWARE

Types of Software – System software, Application software, Utility Software, Demoware, Shareware, Freeware, Firmware, Free Software. - Operating Systems – Functions, Types – Batch Processing, Single User, Multi User, Multiprogramming, Multi-Tasking. -Programming languages – Machine, Assembly, High Level, 4 GL.

UNIT – IV: HTML

HTML Introduction: History of HTML – HTML Document – Anchor Tags – Hyper Links-Sample HTML Documents.HEAD AND BODY SECTIONS: Header Section – Title – Prologue – Links – Comment – Heading – Horizontal Rule – Paragraph – Images and Pictures .

UNIT – V: TABLES AND FRAMES

Ordered and Unordered List - TABLES: Table Creation – ColSpan, RowSpan – Cell Spacing, Cell Padding – Nested Tables. FRAMES: Frameset Definition – Frame Definition – Nested Frames. FORMS: Action Attribute – Method Attribute – Drop Down List – Sample Forms.

List of Experiments

1. Create a web page with necessary formats, images and marquees.
2. Create a web page with lists (Ordered, Unordered and Definition Lists).
3. Create a web page with table content.
4. Create a web page site using links for text and images.
5. Using frames, create web page for a travel agency.
6. Create a web-page using forms for our college students admission process
7. Create a web page which displays the wage of style attributes and event function with demo.
8. Create a web page which displays the mouse co-ordinates and image co-ordinates.
9. Create a web page which receives suggestions from customers for a software development and consultancy agency using necessary functions.

TEXT BOOKS

1. Rajaraman, V., *Fundamental of Computers,* New Delhi: Prentice Hall India Pvt. Limited, 2014.
2. Xavier.C,"*World Wide Web design with HTML",* Tata McGraw Hill Publishing Limited, New Delhi.

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
CAC18201	QUANTITATIVE APTITUDE AND LOGICAL REASONING-I	2	0	0	2	2
COURSE OBJECTIVE						
To enhance holistic development of students and improve their employability skills						

INSTRUCTIONAL OBJECTIVES	
1.	To improve aptitude, problem solving skills and reasoning ability of the students
2.	To help them qualify the written test of competitive exams, campus placements and PSUs
3.	To collectively solve problems in teams and groups
4.	To adopt new techniques in solving problem

UNIT – I : **(6 Hours)**

Numbers: Classification of numbers – Test of divisibility – Unit digit – HCF and LCM – Remainder theorem – Progression – Simplification – Averages – Combined mean (simple problems)

UNIT – II: **(6 Hours)**

Simple interest and compound interest – Word problems

UNIT – III: **(6 Hours)**

Problems related to permutation and combination – Probability (simple problems)

UNIT – IV: **(6 Hours)**

Reasoning (Analytical and logical): Odd man out – Word series – Number series – Direction test – Blood relationship – Coding and decoding – Seating arrangements

UNIT – V:

Problems related to clocks and calendar

REFERENCES

1. Dinesh Khattar, *The Pearson guide to quantitative aptitude for competitive examinations*.
2. Dr. Agarwal.R.S, *Quantitative Aptitude for Competitive Examinations*, S.Chand and Company Limited
3. Abhijit Guha, *Quantitative Aptitude for Competitive Examinations*, Tata Mcgraw Hill, 3rd Edition
4. Edgar Thrope, *Test Of Reasoning for Competitive Examinations*, Tata Mcgraw Hill, 4th Edition
5. http://fw.freshersworld.com/placementweek/papers.asp

SECOND YEAR – THIRD SEMESTER

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UMA18301	DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS	4	1	0	5	4

	INSTRUCTIONAL OBJECTIVES	Student Outcomes				
1.	Solve second order differential equations	a	e			
2.	Form PDEs by different methods	a	e			
3.	Solve differential equations of Lagrange's type and also by the method of multipliers	a	e			
4.	Laplace transform properties, Periodic functions – problems	a	e			
5.	Be thorough with applications of Laplace transform, particularly solving differential equations	a	e			

UNIT – I :

Equations of differential equations of first order and higher degree – Type I: Equations solvable for p – Type II: Equations solvable for y – Type III: Equations solvable for x –

Clairaut's form.

UNIT – II : DIFFERENTIAL EQUATIONS WITH CONSTANT COEFFICIENTS

Second Order Differential Equations with Constant Coefficients - Second Order Differential Equations with Variable Coefficients - Method of Variation of Parameters - Simple Problems.

UNIT - III : SIMULTANEOUS DIFFERENTIAL EQUATIONS

Simultaneous differential equations with constant co-efficients – Linear differential equations of second order with variable co-efficients – Method of reduction of order – Special type of equations.

UNIT - IV : LAPLACE TRANSFORMS

Laplace Transform; Inverse Laplace Transform (usual types) and Laplace transform of Periodic functions

UNIT - V : APPLICATIONS OF LAPLACE TRANSFORMS

Initial and final value theorem, Convolution theorem; Applications of Laplace Transform to solution of first and second order linear differential equations (constant coefficients) and simultaneous linear differential equations - simple problems.

TEXT BOOKS

1. T.Veerarajan, *Engineering Mathematics – II*, MC-Graw Hill Education(India) Private Limited, 2014.
   Chapter 1: Section 1.10 – 1.13; Chapter 2: Section 2.1-2.3, 2.4, 2.7; Chapter 3: Section 3.1 – 3.6;
   Chapter 3: Section 3.9, 3.10, 3.11.
2. T.Veerarajan, *Transforms and Partial Differential Equations*, Third Edition, MC-Graw Hill Education(India) Private Limited, 2016.

REFERENCES

1. J.N.Sharma, Kehar Singh, *Partial Differential Equations for Engineers and Scientistics*, Narosa Publishing house, New Delhi, 2000.
2. Narayanan, T.K. Manickavasagam Pillai, *Calculus*, Vol. I, S. Viswanathan Printers Pvt. Limited, 2007.
3. K. Thilagavathy, *Mathematics for B. Sc Branch – I*, Volume 3, 1st Edition, S. Chand and Co.Ltd., New Delhi, 2004.
4. B.S.Grewal, *Higher Engineering Mathematics*, 42nd Edition, Khanna Publications. 2012.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Assignment**	**Attendance**	**Total**
	Marks	**10**	**10**	**20**	**5**	**5**	**50%**
End Semester Weightage							**50%**
Total							**100%**

COURSE CODE	**COURSE TITLE**	**L**	**T**	**P**	**TOTAL L+T+P**	**C**
UMA18302	**DISCRETE MATHEMATICS**	**4**	**1**	**0**	**5**	**4**

INSTRUCTIONAL OBJECTIVES		**Student Outcomes**				
1.	To understand Logic and mathematical reasoning and to count /enumerate objects in a systematic way. To understand Mathematical induction and recursion.	a				
2.	To understand Set theory, relations and functions and to Read, understand and construct mathematical arguments and Recurrence Relation, Generating functions	a				
3.	To understand Algebraic Systems and their applications in coding	a	e			

	theory – Group codes.					
4.	To understand Boolean algebra and its application to switching theory.	a				
5.	To understand grammars, finite state machines and Turing Machines	a	e			

UNIT – I : MATHEMATICAL LOGIC

Propositions and Logical operators – Truth tables and propositions generated by a set – Equivalence and Implication – Tautologies – Laws of logic – Proofs in Propositional calculus – Direct proofs – Conditional conclusions – Indirect proofs - The existential and universal quantifiers – Predicate calculus including theory of inference.

UNIT – II : SET THEORY

Laws of Set theory – Partition of a set – The duality principle – Relations – Properties – Equivalence relation and partial order relation-poset-Graphs of relations – Hasse diagram – Matrices of relations – Closure operations on relations – Warshall's algorithm – Functions

UNIT – III : RECURRENCE RELATION & GENERATING FUNCTIONS

Recurrence relations – Solving a recurrence relation – Homogeneous and Nonhomogeneous Recurrence relations – Formation of Recurrence relations obtained from solutions – Generating functions – Solution of a recurrence relation using generating functions.

UNIT – IV : COMBINATORICS

Pigeonhole Principle – Generalized Pigeon hole principle - Mathematical Induction – Principle of Inclusion and Exclution – only problems

UNIT – V : BOOLEAN ALGEBRA & FORMAL LANGUAGES

Boolean algebra – Application of Boolean Algebra to switching theory.Languages – Recognition and generation – Phase structure grammars and languages – Finite state Machine – Recognition in regular languages.

TEXT BOOKS:

1. Alan Doerr and Kenneth LevAsseur, *Applied Discrete Structures for Computer Science*, Galgotia Publications (P) Ltd, 1992.
2. Tremblay J. P. and Manohar R., *Discrete Mathematical Structures with applications to Computer Science*, Tata Major Core Graw Hill Publishing Co., 35th edition,2008.

REFERENCES:

1. Kolman and Busby, *Discrete Mathematical Structures for Computer Science*, Prentice Hall, 3rd edition,1997.
2. Kenneth H.Rosen, *Discrete Mathematics and its Application*, Fifth edition, Tata Major CoreGraw-Hill Publishing company PVT .Ltd., New Delhi, 2003

3. Lipschutz Seymour, Marc Lars Lipson, *Discrete Mathematics*, Major Core Graw Hill Inc., 1992
4. Narsing Deo, *Graph Theory with applications to Engineering and Computer science*, Prentice-Hall of India pvt. Ltd., New Delhi, 1987.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Assignment**	**Attendance**	**Total**
	Marks	**10**	**10**	**20**	**5**	**5**	**50%**
End Semester Weightage							**50%**
Total							**100%**

COURSE CODE	**COURSE TITLE**	**L**	**T**	**P**	**TOTAL L+T+P**	**C**
UMA18303	**NUMERICAL ANALYSIS**	**4**	**1**	**0**	**5**	**4**

INSTRUCTIONAL OBJECTIVES		**Student Outcomes**				
1.	Solve equations numerically by direct and iterative methods	a	e			
2.	Be familiar with interpolation and numerical differentiation & integration	a	e			
3.	Be exposed to best approximations and spline approximations	a				
4.	Solve equations using predictor – corrector methods	a				
5.	Be thorough with elliptic, parabolic and hyperbolic equations	a				

UNIT – I: SOLUTION OF EQUATIONS & EIGEN VALUE PROBLEMS

Solution of Algebraic and Transcendental Equations: Newton-Raphson method, Regular-Falsi method, Bisection method. Solving system of equations: Direct Method: Gauss elimination method – Iterative methods: Gauss-Jacobi and Gauss-Seidel – Eigen value Problem: Power method – Errors – Types of errors.

UNIT – II: NUMERICAL DIFFERENTIATION

Interpolation: Lagrange's and Newton's interpolation for equal and unequal intervals – Numerical differentiation for equal and unequal intervals.

UNIT – III: NUMERICAL INEGRATION

Numerical Integration: Trapezoidal, Simpson's and Gaussian quadratures.

UNIT – IV: POLYNOMIAL APPROXIMATION

Best Approximations: Least squares polynomial approximation – Approximation with Chebyshev polynomials – Piecewise Linear & Cubic Spline approximation.

UNIT – V: NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS

Single-Step methods: Taylor series method – Euler's method – Modified and improved Euler's method – Runge-Kutta method of fourth order – Multistep methods - Adams-Bashforth and Milne's methods.

TEXT BOOKS:

1. Kandasamy P, Thilagavathy. K and G. Gunawathy, Numerical Methods, S.Chand & Sons, 3rd Revised Edition, 2013.
2. Balagurusamy. E, Numerical Methods, Tata Mcgraw Hill Publishing Company, 3rd Edition, 2000.

REFERENCES:

1. Isaacson E. and Keller, H.B., "Analysis of Numerical Methods" Dover Publication, 1994.
2. Philips G.M and Taylor P.J., "Theory and Applications of Numerical Analysis", Academic Press, 1996.
3. Jain M.K, "Numerical Methods for Scientific and Engineering computation", 3rd Edition, New Age International, 1999.
4. Conte S.D. and Carl de Boor, "Elementary Numerical Analysis", 3rd Edition, Tata McGraw-Hill Publishing Company. 2004.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Assignment**	**Attendance**	**Total**
	Marks	**10**	**10**	**20**	**5**	**5**	**50%**
End Semester Weightage							**50%**
Total							**100%**

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UMA18304	LATEX AND PLOTTING TOOL LABORATORY	0	0	4	4	2

INSTRUCTIONAL OBJECTIVES		Student Outcomes				
1.	To introduce some basic concepts in LaTeX and Gnuplot	a	e	k		
2.	To practice the ideology of LaTeX and Gnuplot	a	e	k		
3.	To make understanding of LaTeX and Gnuplot	a	e	k		
4.	To practice the concepts in LaTeX and Gnuplot	a	e	k		

List of Experiments:

1. Basic Exercises in LaTeX
2. Preparing a Letter using LaTeX
3. Preparing a Question Paper using LaTeX
4. Typesetting Theorems using LaTeX
5. Mathematical Equations using LaTeX
6. Basics of Gnuplot
7. Working with data in Gnuplot
8. Plotting styles
9. Decorations
10. Three dimensional plots
11. Using color for data representation

REFERENCES:

1. H. Kopkaand P.W. Daly, *A Guide to LaTeX*, Third Edition, Addison – Wesley, London, 1999.
2. Philipp K. Janert, *Gnuplot in Action: Understanding Data with Graphs*, 2nd Edition, Manning Publications (2016).
3. Thomas Williams and Colin Kelley, *Gnuplot 5.0 Reference Manual*. Samurai Media Limited, 2014.
4. Lee Phillips, *gnuplot Cookbook,* Packt Publishing, 2012.

Course Nature : Practical						
Assessment Method (Max.Marks: 100)						
In Semester	**Assessment Tool**	**Observation note book**	**Model Examination**	**Performance in Practical Class**	**Regularity and Discipline**	**Total**
	Marks	**10**	**10**	**25**	**5**	**50%**
End Semester Weightage	**Assessment Tool**	**Record Note Book submission**	**Program writing**	**Debugging**	**Result/Output**	**Total**
	Marks	**10**	**10**	**15**	**15**	**50%**
Total						**100%**

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UCY18A01	ALLIED CHEMISTRY-I	4	0	0	4	4

INSTRUCTIONAL OBJECTIVES	
1.	To gain knowledge on the importance of basic organic chemistry.
2.	To acquire knowledge about hydrocarbon and their reactions.
3.	To promote the importance of silicon and metals.
4.	To acquire knowledge in chemical kinetics and photochemistry.

UNIT- I: INTRODUCTION OF HYBRIDISATION AND ISOMERISM

Hybridisation -sp, $sp^2$and sp^3-Bond length- bond angle- dipole moment- inductive effect-mesomeric effect and hyperconjucation -Isomerism-geometrical and optical isomerism- optical activity- asymmetry- dissymmetry, elements of symmetry- R, S notations.

UNIT-II: HYDROCARBONS

Methods of preparation of alkanes, properties -Reactions. Free radical mechanism of halogention of alkanes, Methods of preparation of alkenes -Stereochemistry of dehydrohalogenation (E1, E2, E1CB mechanism). Properties of alkenes -Electrophilic and nucleophilic addition mechanisms.

UNIT- III: CHEMISTRY OF HYDROGEN, SILICON AND METALS

Occurrence- extraction and chemical properties of iron- cobalt- nickel and copper.Position of hydrogen in periodic table- atomic hydrogen and isotopes of hydrogen.Preparation and structure of borazole - SiO_2, SiC and $SiCl_4$.

UNIT- IV: CHEMICAL KINETICS

Rate of reaction, order- molecularity, first order rate law and simple problems- Half-life periodof first order reaction- pseudo first order reaction- zero and second order reactions. Arrheniusand collision theories.

UNIT-V: INDUSTRIAL CHEMISTRY

Industrial Chemistry: Fuel gases–Water gas- producer gas- LPG gas-Gobar gas and natural gas. Fertilizers–NPK and mixed Fertilizers-soaps and detergents.

Pesticides: Dichloromethane- chloroform- carbon tetrachloride- DDT and BHC. Types of solvents: -Polar, Non polar.

TEXT BOOKS

1. B.R. Puri, L.R.Sharma,K.K. Kalia, Principles of Inorganic Chemistry, ShobulalNagin Chand and Co, 2001.
2. P. L.Soni, A Textbook of Inorganic Chemistry,Sultan Chand and Co., 1977.

REFERENCES

1. R. Gopalan, Text Book of Inorganic Chemistry, 2nd edition, Hyderabad, Universities Press, (India), 2012.
2. R.T. Morrison and R.N.Boyd, S. K. Bhattacharjee, Organic Chemistry, 7th edition, Pearson India, 2011.
3. B.R. Puri, L.R.Sharma and M.S. Pathania, Principles of Physical Chemistry, 35th edition, New DelhiShobanLal Nagin Chand and Co, 2013.

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UCY18A02	ALLIED CHEMISTRY PRACTICALS-I	0	0	3	3	2

INSTRUCTIONAL OBJECTIVES	
1.	To gain knowledge on the importance of basic acidimetry.
2.	To acquire knowledge about permanganametry.
3.	To understand the importance of dichrometry.
4.	To acquire knowledge in iodimetry.

VOLUMETRIC ANALYSIS

Acidimetry and Alkalimetry

1) Estimation of HCl using standard oxalic acid
2) Estimation of NaOH using standard sodium carbonate

Permanganametry

1) Estimation of FAS using standard oxalic acid
2) Estimation of KMnO4using standard potassium dichromate

Dichrometry

1) Estimation of $FeSO_4$using standard FAS.

Complexometric or EDTA titration

1) Estimation of Zn/Mg

Iodimetry

1) Estimation of ascorbic acid
2) Estimation of phenol / aniline

TEXT BOOKS

1. V.Venkateswaran, R.Veeraswamy, A.R.Kulandaivelu, *Basic Principles of Practical Chemistry*, 2nd edition, SultanChand and Sons, 1997.
2. B.S. Furniss, A.J. Hannaford, P.W. G. Smith, A.R. Tatchell, *Vogel's Text Book of PracticalOrganic Chemistry*. 5th edition, Pearson Education, 2005.

REFERENCES

1. Sundaram, Krishnan, Raghavan, *Practical Chemistry* (Part II), S. Viswanathan Co. Pvt., 1996.
2. N.S. Gnanapragasam and G.Ramamurthy, *Organic Chemistry – Lab Manual*, S. Viswanathan and Co., 1998.
3. J.N. Gurtu and R. Kapoor, *Experimental Chemistry*, S.Chand and Co, 1987.
4. Mendham, J. *Vogel's Quantitative Chemical Analysis*, Pearson, 2009.

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UMA18S01	C PROGRAMMING	0	1	2	3	2

	INSTRUCTIONAL OBJECTIVES	Student Outcomes				
1.	To introduce some basic concepts in C Program	a	e	k		
2.	To learn about the computer fundamentals and the C programming language concepts.	a	e	k		
3.	To make data interpretation using C Language	a	e	k		
4.	To practice the concepts in C Language	a	e	k		

List of Programs:

1. Write a program for different kinds of operators.
2. Write a program for reading and writing a character.
3. Write a program for
   i. Simple if statement
   ii. if…. Else statement
   iii. Nesting of if…. Else statement
   iv. if else ladder
4. Write a program for
   i. Switch statement
   ii. goto statement
5. Write a program for jumps in loop.
6. Write a program for one dimensional array.

7. Write a program for two dimensional array.
8. Write a program for Multi-dimensional array.
9. Write a program for arguments with return value.
10. Write a program for no arguments with return value.
11. Write a program to demonstrate pointers.
12. Write a program to demonstrate structure.

TEXT BOOK:

1) E. Balagurusamy, *Programming in ANSI C*, 6e, Mc Graw-Hill Pvt Ltd, New Delhi.

REFERENCE BOOK:

1. Gary J. Bronson, *ANSI C Programming*, Cengage Learning India Private Ltd, New Delhi.
2. Byron Gotteried, *Programming with C*, Third edition, Tata Mc Graw-Hill Pvt Ltd, New Delhi.
3. M.V.S.S.N. Prasad, *C Programming*, ACME Learning Private Ltd, New Delhi.
4. Ashok N Kamthane: *Programming with ANSI and Turbo C*, Pearson Edition Publication, 2002.

Course Nature : Practical						
Assessment Method (Max.Marks: 100)						
In Semester	**Assessment Tool**	**Observation note book**	**Model Examination**	**Performance in Practical Class**	**Regularity and Discipline**	**Total**
	Marks	**10**	**10**	**25**	**5**	**50%**
End Semester Weightage	**Assessment Tool**	**Record Note Book submission**	**Program writing**	**Debugging**	**Result/Output**	**Total**
	Marks	**10**	**10**	**15**	**15**	**50%**
Total						**100%**

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UMA18S02	INTRODUCTION TO MATLAB	0	1	2	3	2

INSTRUCTIONAL OBJECTIVES		Student Outcomes				
1.	To introduce some basic concepts in MATLAB	a	e	k		
2.	To practice the ideology of MATLAB	a	e	k		
3.	To make data interpretation using MATLAB	a	e	k		
4.	To practice the concepts in MATLAB	a	e	k		

List of Experiments:

1. Introduction to MATLAB
2. Using MATLAB as a calculator and for Arithmetic operations
3. Built-in functions and variables
4. Arrays and Matrices
5. Scripts and Functions
6. Graphical representations
7. Scientific computations
    a) Matrix Manipulations
    b) Nonlinear Mathematical Model simulations
    c) Curve fitting

REFERENCES:

1. Tobin A. Driscoll, *Learning MATLAB*, Society for Industrial and Applied Mathematics (SIAM), 1969.
2. Andrew Knight, *Basics of MATLAB and Beyond*, CHAPMAN & HALL/CRC, 2000.
3. Brian R. Hunt Ronald L. Lipsman Jonathan M. Rosenbergwith Kevin R. Coombes, John E. Osborn, and Garrett J. StuckTobin A. Driscoll, *A Guide to MATLAB for Beginners and Experienced Users*, Cambridge University Press, 2001.

Course Nature : Practical						
Assessment Method (Max.Marks: 100)						
In Semester	**Assessment Tool**	**Observation note book**	**Model Examination**	**Performance in Practical Class**	**Regularity and Discipline**	**Total**
	Marks	**10**	**10**	**25**	**5**	**50%**
End Semester Weightage	**Assessment Tool**	**Record Note Book submission**	**Program writing**	**Debugging**	**Result/Output**	**Total**
	Marks	**10**	**10**	**15**	**15**	**50%**
Total						**100%**

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UMA18S03	COMPUTER APPLICATIONS IN STATISTICAL TOOLS	0	1	2	3	2

INSTRUCTIONAL OBJECTIVES		Student Outcomes				
1.	To introduce some basic concepts in Statistical Tools	a	e	k		
2.	To practice the ideology of Statistical Tools	a	e	k		

3.	To make data interpretation using Ms Excel	a	e	k		
4.	To practice the concepts in Minitab and Systat	a	e	k		

UNIT – I: BASIC CONCEPTS

Historical evolution of computers, Generations of Computers, Classification of Computers, Hardware: CPU, I/O Devices, Block diagram. System Software. MS-DOS: Filenames, Creating, Editing and Printing of Files. Other File Management Commands, Disk- Management Commands.

UNIT – II: SYSTEM TOOLS

Windows : The user Interface, The Desk Top, The Task Bar, The Control Panel, The Find Features, Properties, Font Management, Systems Tools, Character Map, Note Pad, The My Computer ICON, Folders, Short-Cuts. Word Processing: Creating and saving a document, Editing the text; Printing
Documents.

UNIT – III: MS EXCEL

Classification - Tabulation and Frequency Tables - Bar Graphs, DOT Diagram and Histogram - Stem-and-Leaf Plots - Box Plots - Summary Statistics

UNIT – IV: MINITAB

Two-way tables and plots - Product moment correlation coefficient, Rank Correlation coefficient - Curve setting by method of least squares : Exponential and polynomial (upto three degree) equations - Regression lines -

UNIT – V: SYSTAT

Correlation ratios - Multiple and partial correlation coefficients. Regression equations (for three variables only) - Gram-Schmidt orthonoralization process - Rank and Inverse of a matrix - Solution of set of linear equations - Fitting of Binomial, Poisson, Negative Binomial, Normal and Gamma Distributions.

REFERENCES

1. Norton, Peter : Guide to MS-DOS.
2. Mathur, Rajiv: Learning Windows -98 Step by step. Galgotia
3. Mathur, Rajiv: Learning Excel-97 for Windows step by step. Galgotia
4. Sanders, H.D.: Computer Today. Mc Graw Hill.

Course Nature : Practical						
Assessment Method (Max.Marks: 100)						
In Semester	**Assessment Tool**	**Observation note book**	**Model Examination**	**Performance in Practical Class**	**Regularity and Discipline**	**Total**
	Marks	**10**	**10**	**25**	**5**	**50%**
End Semester	**Assessment**	**Record**	**Program**	**Debugging**	**Result/Out**	**Total**

Weightage	Tool	Note Book submission	writing		put	
	Marks	10	10	15	15	50%
Total						100%

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
CAC18301	QUANTITATIVE APTITUDE AND LOGICAL REASONING - II	2	0	0	2	2

COURSE OBJECTIVE

To enhance holistic development of students and improve their employability skills

	INSTRUCTIONAL OBJECTIVES	Student Outcomes				
1.	To improve aptitude, problem solving skills and reasoning ability of the student	a	e	k		
2.	To help them qualify the written test of competitive exams, campus placements and PSUs	a	e	k		
3.	To collectively solve problems in teams and group	a	e	k		
4.	To adopt new techniques in solving problem	a	e	k		

UNIT – I :

Percentage - Profit or loss - Discount

UNIT – II :

Ratio, proportion - Mixtures and solutions

UNIT – III :
Time and work - Time, Speed and distance; Problems related to pipes and cisterns, Problems related to train, Problems related to boats and streams, Problems related to races

UNIT - IV :
Set theory - Geometry and mensuration - Cubes

UNIT – V:
Data sufficiency - Data interpretation

REFERENCES:

1. Dinesh Khattar, *The Pearson Guide to QUANTITATIVE APTITUDE for competitive examinations*.
2. Dr. Agarwal.R.S, *Quantitative Aptitude for Competitive Examinations*, S.Chand and Company Limited
3. Abhijit Guha, *Quantitative Aptitude for Competitive Examinations*, Tata Mcgraw Hill, 3rd Edition
4. Edgar Thrope, *Test Of Reasoning for Competitive Examinations*, Tata Mcgraw Hill, 4th Edition

http://fw.freshersworld.com/placementweek/papers.asp

Course Nature : Practical						
Assessment Method (Max.Marks: 100)						
In Semester	**Assessment Tool**	**Observation note book**	**Model Examination**	**Performance in Practical Class**	**Regularity and Discipline**	**Total**
	Marks	**10**	**10**	**25**	**5**	**50%**
End Semester Weightage	**Assessment Tool**	**Record Note Book submission**	**Program writing**	**Debugging**	**Result/Output**	**Total**
	Marks	**10**	**10**	**15**	**15**	**50%**
Total						**100%**

SECOND YEAR – FOURTH SEMESTER

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UMA18401	VECTOR CALCULUS, FOURIER SERIES AND FOURIER TRANSFORMS	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES		Student Outcomes				
1.	Familiar with physical interpretation of divergence and curl of a vector	a				
2.	Be exposed to evaluating line, surface and volume integrals	a	e			
3.	Be thorough with the study of Fourier series expansions	a	e			
4.	Be familiar with half range Fourier series and harmonic analysis.	a				
5.	To learn Fourier transforms and its applications	a				

UNIT - I : MULTIPLE INTEGRALS

Double integrals in Cartesian and Polar coordinates - Change of order of integration – Area enclosed by plane curves – Change of variables in double integrals – Area of curved surface – Triple integrals – Volume of solids.

UNIT – II : VECTOR CALCULUS

Gradient, divergence and curl - Directional derivative – Irrotational and solenoidal vector fields – Vector integration – Green's theorem in a plane, Gauss divergence theorem and Stoke's theorem (excluding proofs) – Simple applications involving cubes and rectangular parallelepipeds.

UNIT - III : FOURIER SERIES

Fourier series - definition - Fourier Series expansion of periodic functions with Period 2π and period $2l$ – Use of odd & even functions in Fourier Series

UNIT - IV : HALF RANGE COSINE AND SINE SERIES

Half-range Fourier Series – definition- Development in Cosine series & in Sine series Change of interval.

UNIT - V : FOURIER TRANSFORM

Dirichlet's conditions - Fourier integral formula (without proof), Fourier transform - Inverse Theorem for Fourier transform - Fourier sine and cosine transforms and their inversion formulae - Linearity property of Fourier transforms - Change of scale property - Shifting theorem, Modulation theorem - Convolution theorem of Fourier transforms - Parseval's identity.

TEXT BOOK

1. P.R.Vittal & V.Malini, *Vector Calculus, Fourier series and Fourier transforms*, Margham Publications, 2004.
2. Grewal B.S, *Higher Engineering Mathematics*, Khanna Publications, 42nd Edition,2012

REFERENCES

1. S.Narayanan and T.K.Manickavachagam Pillai, *Vector algebra and Analysis*, S.Viswanathan Pvt. Ltd., 1995.
2. S.Narayanan and T.K.Manickavachagam Pillai, *Calculus*, Volume III, Vijay Nicole Imprints Pvt. Ltd., Chennai, 2004.
3. A.R.Vasistha and R.K.Gupta, *Integral Transforms*, Krishna Prakashan Media Pvt. Ltd., New Delhi, 2011.
4. S. Narayanan, R. Hanumantha and T. K. Manickavachagam Pillai, *Ancillary Mathematics*, Volume I & II, S.Viswanathan Printers, Chennai, 2007.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Assignment**	**Attendance**	**Total**
	Marks	**10**	**10**	**20**	**5**	**5**	**50%**
End Semester Weightage							**50%**
Total							**100%**

COURSE CODE	**COURSE TITLE**	**L**	**T**	**P**	**TOTAL L+T+P**	**C**
UMA18402	**PROBABILITY AND STATISTICS**	**4**	**1**	**0**	**5**	**4**

INSTRUCTIONAL OBJECTIVES		**Student Outcomes**				
1.	Be thorough with two dimensional random variables and the Transformation of Random variables	a				
2.	Be familiar with basic probability concepts and probability distributions	a				
3.	Be exposed to the testing of hypotheses of both small and large samples	a				
4.	Be familiar with correlation and regression analysis	a				
5.	To understand fully the characteristics of control charts and their applications	a				

UNIT - I : PROBABILITY & THEORETICAL DISTRIBUTIONS

Probability theory - Random variables - Moments- Moment generating functions- Binomial, Poisson, Geometric, Exponential, Normal distributions.

UNIT - II : TRANSFORMATION OF RANDOM VARIABLES

Two Dimensional Random variables - Marginal & Conditional Distributions- Transformation of Random variables - Central limit theorem - simple problems.

UNIT - III : TESTING OF HYPOTHESIS

Introduction-large sample test based on normal distribution - Test for single mean- difference between means, proportion, difference between proportion - small sample test based on t, F distributions - Test for single mean, difference between means, standard deviation, difference between standard deviations - Chi square test for goodness of fit, independence of attributes.

UNIT - IV : CORRELATION AND REGRESSION

Pearson's correlation co-efficient - Spearman's Rank correlation co-efficient, Regression – concepts - Regression lines - Analysis of Variance - One way and Two way classification.

UNIT – V: STATISTICAL QUALITY CONTROL

Introduction - Process control - control charts for variables - $\overline{X}$ and R, $\overline{X}$ and S charts, control charts for attributes: P chart, nP chart, C chart and their applications in process control.

TEXT BOOK:

1. T. Veerarajan, *Probability, Statistics and Random process*, 1st reprint, Tata McGraw Hill, 2004.
2. Ross. S., *A first Course in Probability*, Fifth Edition, Pearson Education, Delhi 2002.

REFERENCES:

1. S.C Gupta & V.K. Kapoor, *Fundamentals of Mathematical Statistics*, 11th edition, Sultan chand & sons, reprint, 2007.
2. S. P. Gupta, *Statistical Methods*, 35th edition, Sultan Chand Publication, New Delhi, 2007.
3. Johnson R.A, *Miller & Freund's Probability and Statistics for Engineer's*, 6th edition, Pearson Education, Delhi, 2006.
4. P. R. Vittal, *Mathematical Statistics*, Margham Publications, Chennai, 2013.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In	**Assessm**	**Cycle**	**Cycle**	**Model**	**Assig**	**Atte**	**Total**

Semester	ent Tool	Test I	Test II	Examination	nment	ndance	
	Marks	10	10	20	5	5	50%
End Semester Weightage							50%
Total							100%

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UMA18403	NUMERICAL METHODS USING C LANGUAGE - LABORATORY	0	0	4	4	2

	INSTRUCTIONAL OBJECTIVES	Student Outcomes				
1.	To learn how to find roots of algebraic and transcendental equations	a	k			
2.	To learn how to solve linear equations	a	k			
3.	To form interpolation equation from given numerical values of independent and their corresponding dependent variables	a	k			
4.	To learn the numerical differentiation and integration	a	k			
5.	To learn how to solve ordinary differential equations.	a	k			

LIST OF PROBLEMS

Programming in C for solving the following set of problems:

1. Gauss elimination method.
2. Gauss-Jacobi method.
3. Gauss-Seidel method.
4. Power method (eigenvalue).
5. Newton's forward and backward interpolation.
6. Lagrange interpolation.
7. Trapezoidal and Simpson one-third rules.
8. Euler's method.
9. Runge-Kutta's method.
10. Predictor-corrector method.

TEXT BOOKS:

1. T.Veerarajan and T. Ramachandran, Numerical methods with programs in C, Tata Major CoreGraw Hill, (2006).
2. Geeta Jain and Amit Sehgal, *Programming in C and Numerical Methods*, Jeevansons Publications, 2016.

REFERENCES:

1. E. SrinivAsa Reddy, *C Programming & Numerical Analysis*, Pearson Education India, 2010.
2. Xevier, C, *C Language and Numerical Methods*, New Age International publishers, 2003.
3. J. G. Kori, *Numerical Methods in 'C'*, Firewall Media publishers, 2002.

Course Nature : Practical						
Assessment Method (Max.Marks: 100)						
In Semester	**Assessment Tool**	**Observation note book**	**Model Examination**	**Performance in Practical Class**	**Regularity and Discipline**	**Total**
	Marks	**10**	**10**	**25**	**5**	**50%**
End Semester Weightage	**Assessment Tool**	**Record Note Book submission**	**Program writing**	**Debugging**	**Result/Output**	**Total**
	Marks	**10**	**10**	**15**	**15**	**50%**
Total						**100%**

COURSE CODE	**COURSE TITLE**	**L**	**T**	**P**	**TOTAL L+T+P**	**C**
UCY18A03	**ALLIED CHEMISTRY-II**	**4**	**0**	**0**	**4**	**4**

INSTRUCTIONAL OBJECTIVES	
1.	To gain knowledge on the importance of basic organic chemistry
2.	To acquire knowledge about coordination compounds
3.	To promote the importance of industrial chemistry
4.	To acquire knowledge in phase rule, adsorption and fundamentals in electrochemistry

Unit- I : CARBOHYDRATES, BENZENE AND HETEROCYCLIC COMPOUNDS

Classification of carbohydrates–Properties and uses of glucose and fructosemutarotation - Chemistry of benzene - Preparation, mechanism of electrophillic substitution reactions. Heterocyclic compounds– Preparation and properties of pyrrole and pyridine.

Unit- II : COORDINATION CHEMISTRY

Nomenclature and isomerism of coordination compounds. EAN rule - VB and Crystal field theories of octahedral, tetrahedral and square planar complexes. Chelation and its industrial applications.

Unit -III : INDUSTRIAL CHEMISTRY

Hardness of water – Temporary and permanent hardness, disadvantages of hard water Boiler scales and sludges - Softening of hard water – Zeolite process - demineralization process and reverse osmosis – Purification of water for domestic use: use of chlorine, Ozone and UV light.

Unit- IV: PHASE RULE AND ADSORPTION

Phase rule- Definition of terms involved. phase diagram of H_2O, Pb-Ag . Adsorption - Langmuir adsorption isotherms - Principles of chromatography (Paper, TLC and column).

Unit –V: ELECTROCHEMISTRY

Faradays laws of electrolysis - Specific conductance, equivalent conductance - Cell constant - Arrhenius theory Ostwald‟s dilution law and Kohlrausch law - Nernst equation - Applications of EMF- Measurements.

TEXT BOOKS

1. Puri B.R., Sharma L.R., Kalia K.K., *Principles of Inorganic Chemistry*, ShobulalNagin Chand and Co, 2001.
2. R. Gopalan, S. Sundaram, *Allied Chemistry*, Sultan Chand and Sons, 1995.

REFERENCES

1. B.S. Bahl and ArunBahl, *A Text book of Organic Chemistry*, 21st edition, Sultan Chand and Co., 2012.
2. I.L. Finar, *Organic Chemistry*, Vol 1&2, 6th edition England, Addison Wesley, Longman Ltd, 1996.
3. P.W. Atkins, *Physical Chemistry*, 5thedition, Oxford University press, 1994.
4. M.J.Sienko and R.A.Plane, *Chemistry: Principles and properties*, International Student Edition, 1995

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UCY18A04	ALLIED CHEMISTRY PRACTICALS-II	0	0	3	3	2
INSTRUCTIONAL OBJECTIVES						
1.	To get a good exposure to the basic concepts of chemistry.					
2.	To enable the students to acquire quantitative skills in volumetric analysis.					
3.	To learn the fundamentals of conductometric and potentiometric titrations.					
4.	To understand the method of determination of molecular weight by viscosity average method.					

LIST OF EXPERIMENTS

1. Estimation of $KMnO_4$ using standard Oxalic Acid

2. Estimation of $K_2Cr_2O_7$ using decinormal solution of Sodium thiosulphate solution
3. Estimation of Copper using decinormal solution of Potassium dichromate solution
4. Estimation of Nickel using decinormal solution of EDTA
5. Determination of Molecular Weight of a Polymer
6. Conductometric Titrations –I (HClvsNaOH)
7. Conductometric Titrations- II (KClvs $AgNO_3$)
8. Potentiometric Titration (Redox Titrations)

TEXT BOOKS

1. V.Venkateswaran, R. Veeraswamy, A.R.Kulandaivelu, *Basic Principles of Practical Chemistry*, 2nd Edition Sultan Chand and Sons, 1997.
2. Daniels et al., *Experimental Physical Chemistry*, 7th edition, New York, McGraw Hill, 1970.

REFERENCES

1. N.S. Gnanapragasam and G.Ramamurthy, *Organic Chemistry – Lab Manual*, S. Viswanathan and Co., 1998.
2. A.Findlay, *Practical Physical Chemistry*, 7th Edition, London, Longman, 1959.
3. V.K.Ahluwalia, S.Dingra, and A.Gulati, *College Practical Chemistry*, Orient Longman Pvt. Ltd., Hyderabad, 2005.
4. K.K. Sharma and D.S. Sharma, *Introduction to Practical Chemistry*, Vikas Publishing House, New Delhi, 2005.

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UMA18C01	LINEAR ALGEBRA	3	0	0	3	3

INSTRUCTIONAL OBJECTIVES		Student Outcomes				
1.	To learn about vector spaces	a				
2.	To have knowledge about linear independence and basis	a				
3.	To study about dimension of vector space	a				
4.	Be familiar about inner product spaces	a				
5.	To learn about linear and nilpotent transformation, properties and theorems on Trace and Transpose	a				

UNIT - I : VECTOR SPACE

Vector Spaces – Definition – Simple properties – Examples – Homomorphism – Sub space – Quotient spaces – Internal direct sum – External direct sum.

UNIT - II : DIMENSION OF A VECTOR SPACE

Linear Independence – Dimension of a Vector space – Bases - Dimension of Quotient spaces.

UNIT - III : INNER PRODUCT SPACE

Inner product spaces – Definition – Examples – Applications – Orthogonal complement of a sub space – Orthonormal & Orthonormal Basis - Gram Schmidt Orthogonalization process.

UNIT - IV : LINEAR TRANSFORMATION

Linear Transformation – The Algebra of linear transformations – Characteristic roots – Matrices – Canonical forms – Triangular forms.

UNIT - V : NILPOTENT TRANSFORMATION

Nilpotent Transformations – Definitions – Lemma – Theorems. Trace and Transpose – Definition – Properties – Theorems.

TEXT BOOKS

I.N. Herstein, *Topics in Algebra*, 2nd Edition, John Wiely, NewYork, 2013.

REFERENCES

1. A.R.Vasistha, *A first course in modern algebra,* Krishna Prakasan Mandhir, 9, Shivaji Road, Meerut (UP).
2. ViswanathaNaik, *Modern Algebra*, Emerald Publishers, Anna Salai, Chennai, 2001.
3. Dr.R.Balakrishnan and Dr.N.Ramabadran, *A Text Book of Modern Algebra*, Vikas Publishing Limited, New Delhi.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Assignment**	**Attendance**	**Total**
	Marks	**10**	**10**	**20**	**5**	**5**	**50%**
End Semester Weightage							**50%**
Total							**100%**

SUBJECT CODE	SUBJECT TITLE	L	T	P	TOTAL L+T+P	C
UMA18C02	STATICS	3	0	0	3	3

INSTRUCTIONAL OBJECTIVES		Student Outcomes				
1.	To provide the basic knowledge of equilibrium of a particle	a				
2.	To develop a working knowledge to handle practical problems	a				

UNIT – I :
Introduction – Forces acting at a point: Triangle law of forces – Resolution of force – Condition of equilibrium.

UNIT – II :
Parallel forces and Moments: Resultant of parallel forces – Theorems on Moments – Moment about an axis – Couples.

UNIT - III :
Equilibrium of three forces acting on a rigid body: Conditions of equilibrium – Trigonometrical theorems and problems - Coplanar forces: Reduction of Coplanar forces – Equation of Line of action of the resultant – Conditions of equilibrium

UNIT - IV :
Friction: Introduction – Laws of Friction – Definitions – Equilibrium of a particle on a rough inclined plane.

UNIT – V :
Equilibrium of strings: Equation of the Common Catenary - Parabolic Catenary.

TEXT BOOK:

1. M.K.Venkataraman, *Statics*, Agasthiyar Publications, 17th edition, 2014.
   UNIT I -Chapter1, Chapter2.
   UNIT II -Chapter 3, Chapter 4.
   UNIT III -Chapter 5 (Section 1-6), Chapter 6 (Section 1-12).
   UNIT IV -Chapter 7 (Section 1-13) Pages: 206 – 238.
   UNIT V -Chapter 9 (Section 1- 8)
2. T. Veerarajan, Probability, Statistics and Random process, Tata Major CoreGraw Hill, 1st reprint, 2004

REFERENCES:

1. A.V.Dharmapadham, *Statics*, S.Viswanathan Publishers Pvt.Ltd, 2006.
2. P. Duraipandian, LaxmiDuraipandian and MuthamizhJayapragasam, *Mechanics*, S.Chand& Company PVT, LTD, 2014.
3. S.L.Lony, *Elements of Statics and Dynamics*, Part-I, A.I.T.B.S.Publishers, 2007.

4. S.C Gupta & V.K. Kapoor, Fundamentals of Mathematical Statistics, 11th edition, Sultan chand & sons, reprint, 2007.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	Assessment Tool	Cycle Test I	Cycle Test II	Model Examination	Assignment	Attendance	Total
	Marks	10	10	20	5	5	50%
End Semester Weightage							50%
Total							100%

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UMA18C03	INTRODUCTION TO PARTIAL DIFFERENTIAL EQUATIONS	3	0	0	3	3

	INSTRUCTIONAL OBJECTIVES	Student Outcomes				
1.	To understand ordinary differential equation	a				
2.	To understand partial differential equation	a				
3.	To know the solution procedure for solving some special types of non-linear PDEs	a				
4.	To know how to solve the higher order PDEs (second order equations)	a				
5.	To know how to apply the standard Laplace and Fourier transform for linear PDEs	a				

UNIT – I:
Introduction to Cauchy Problems - Solving Types Non-Linear PDE F(p,q)=0; F(x,p,q) =0; F(y,p,q) =0; F(z,p,q) =0F(x,p) =F(y,q); Clauirts Equations.

UNIT – II:
Classification of PDEs, Solving homogeneous and Non- homogeneous linear PDEs.

UNIT – III:
Solving one dimensional heat equation, one dimensional wave equation – D-Alembert's solution

UNIT – IV:
Solving Laplace equations in Cartesian and polar form.

UNIT – V:
Fourier and Laplace Transforms techniques - Transform Method to solve linear PDEs

TEXT BOOKS:

1. T.Amarnath, An *Elementary Course in Partial Differential Equations*, Narosa Publications, 1st Edition. (Unit-1 to Unit-4)
2. Sankara Rao, *Introduction to Partial Differential Equations*, Printice Hall. (Unit-5)

REFERENCES:

1. I. P. Stavroulakis and S. A.Tersian, *Partial differential equations- an introduction with mathematica and maple*, world - Scientific, Singapore, 1999.
2. I. N. Sneddon, *Elements of Partial Differential Equations*, McGraw-Hill, 1998.
3. L. C. Evans, *Partial Differential Equations*, American Mathematical Society, 2010.
4. W. E. Williams, *Partial differential equations*, Clarendon Press, Oxford, 1980

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Assignment**	**Attendance**	**Total**
	Marks	**10**	**10**	**20**	**5**	**5**	**50%**
End Semester Weightage							**50%**
Total							**100%**

COURSE CODE	**COURSE TITLE**	**L**	**T**	**P**	**TOTAL L+T+P**	**C**
UMA18S04	**DATA ANALYSIS USING R**	**0**	**1**	**2**	**3**	**2**

INSTRUCTIONAL OBJECTIVES		**Student Outcomes**				
1.	To introduce some basic concepts in R	a	k			
2.	To practice the ideology of R	a	k			
3.	To make data interpretation using R	a	k			
4.	To practice the concepts in R	a	k			

List of Experiments:

1. Introduction to R
2. Data Description
3. Probability Theory using R
4. Discrete Distributions
5. Continuous distributions
6. Hypothesis Testing
7. Simple Linear Regression

8. Multiple Linear Regression
9. Data Visualization

REFERENCES:

1. G. Jay Kerns, *Introduction to Probability and Statistics Using R*, First Edition, 2010.
2. Joaquim P. Marques de Sá, *Applied Statistics Using SPSS, STATISTICA, MATLAB and R*, Springer-Verlag Berlin Heidelberg, 2007.

Course Nature : Practical						
Assessment Method (Max.Marks: 100)						
In Semester	**Assessment Tool**	**Observation note book**	**Model Examination**	**Performance in Practical Class**	**Regularity and Discipline**	**Total**
	Marks	**10**	**10**	**25**	**5**	**50%**
End Semester Weightage	**Assessment Tool**	**Record Note Book submission**	**Program writing**	**Debugging**	**Result/Output**	**Total**
	Marks	**10**	**10**	**15**	**15**	**50%**
Total						**100%**

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UMA18S05	STATISTICAL ANALYSIS USING SPSS	0	1	2	3	2

INSTRUCTIONAL OBJECTIVES		Student Outcomes				
1.	To introduce some basic concepts in SPSS	a	k			
2.	To practice the ideology of SPSS	a	k			
3.	To make data interpretation using SPSS	a	k			
4.	To practice the concepts in SPSS	a	k			

List of Experiments:

1. Introduction to SPSS
2. Presenting and Summarizing the data
3. Estimating Data Parameters
4. Statistically Analyzing Data
5. Hypothesis Testing
6. Statistical Classification
7. Data Regression
8. Survey Methods for Research in Business and Management
9. Reporting and Presenting Research

REFERENCES:

1. Robert B. Burns and Richard A. Burns, *Business Research Methods and Statistics Using SPSS*, SAGE Publications, 2008.
2. Joaquim P. Marques de Sá, *Applied Statistics Using SPSS, STATISTICA, MATLAB and R*, Springer-Verlag Berlin Heidelberg, 2007.

Course Nature : Practical						
Assessment Method (Max.Marks: 100)						
In Semester	**Assessment Tool**	**Observation note book**	**Model Examination**	**Performance in Practical Class**	**Regularity and Discipline**	**Total**
	Marks	**10**	**10**	**25**	**5**	**50%**
End Semester Weightage	**Assessment Tool**	**Record Note Book submission**	**Program writing**	**Debugging**	**Result/Output**	**Total**
	Marks	**10**	**10**	**15**	**15**	**50%**
Total						**100%**

COURSE CODE	**COURSE TITLE**	**L**	**T**	**P**	**TOTAL L+T+P**	**C**
UMA18S06	**INTRODUCTION TO PYTHON**	**0**	**1**	**2**	**3**	**2**

	INSTRUCTIONAL OBJECTIVES	**Student Outcomes**				
1.	To write, test, and debug simple Python programs.	a	k			
2.	To implement Python programs with conditionals and loops.	a	k			
3.	Use functions for structuring Python programs.	a	k			
4.	Represent compound data using Python lists, tuples, and dictionaries.	a	k			
5.	Read and write data from/to files in Python.	a	k			

LIST OF PROGRAMS:

1. Compute the GCD of two numbers.
2. Find the square root of a number (Newton's method)
3. Exponentiation (power of a number)
4. Find the maximum of a list of numbers
5. Linear search and Binary search
6. Selection sort, Insertion sort
7. Merge sort
8. First n prime numbers
9. Multiply matrices
10. Programs that take command line arguments (word count)
11. Find the most frequent words in a text read from a file

OUTCOMES: Upon completion of the course, students will be able to:

- Write, test, and debug simple Python programs.
- Implement Python programs with conditionals and loops.
- Develop Python programs step-wise by defining functions and calling them.
- Use Python lists, tuples, dictionaries for representing compound data.
- Read and write data from/to files in Python.

REFERENCES

1. R Nageswara Rao, *Core Python Programming*, Dream Tech Press, 2017.
2. Guido van Rossum and Fred L. Drake Jr, *An Introduction to Python – Revised and updated for Python 3.2*, Network Theory Ltd., 2011.
3. W J Chun, *Core Python Programming*, Prentice Hall, 2007.
4. John V Guttag, *Introduction to computation and programming*, MIT Press, 2013.
5. Robert Sedgewick, Kevin Wayne, Robert Dondero, *Introduction to Programming in Python: An Inter-disciplinary Approach*, Pearson India Education Services Pvt. Ltd., 2016.

Course Nature : Practical						
Assessment Method (Max.Marks: 100)						
In Semester	**Assessment Tool**	**Observation note book**	**Model Examination**	**Performance in Practical Class**	**Regularity and Discipline**	**Total**
	Marks	**10**	**10**	**25**	**5**	**50%**
End Semester Weightage	**Assessment Tool**	**Record Note Book submission**	**Program writing**	**Debugging**	**Result/Output**	**Total**
	Marks	**10**	**10**	**15**	**15**	**50%**
Total						**100%**

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UMA18404	MY INDIA PROJECT	0	0	0	0	2

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
CAC18401	VERBAL ABILITY AND REASONING	2	0	0	2	2
COURSE OBJECTIVE						
To instill confidence in students and develop skills necessary to face the challenges of competitive exams and placements						
INSTRUCTIONAL OBJECTIVES						

1.	To enable the students understand the syntax of English and develop their lexical skills
2.	To develop comprehension and interpretation skills
3.	To enhance vocabulary skills and improve repertoire of words
4.	To help the students succeed in competitive exams and placements

UNIT – I :
Spotting error, Change of speech, Change of voice

UNIT – II :
Synonyms, Antonyms, Idioms, Phrasal verbs, One word substitution

UNIT – III :
Sentence improvement, Sentence completion (Grammar based)

UNIT – IV :
Sentence completion (Vocabulary based), Odd word

UNIT – V :
Reading comprehension, Word analogy, Para jumble

REFERENCES:

1. Hari Mohan Prasad and Meenakshi Upadhyay, *Objective English for Competitive Examinations*, McGraw Hill Education.
2. Norman Lewis, *Word Power Made Easy New Revised and Expanded Edition*, Goyal publication, 2011
3. Raymond Murphy, *Intermediate English Grammar*, Cambridge University Press, 2007.

THIRD YEAR – FIFTH SEMESTER

COUSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UMA18501	REAL ANALYSIS	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES		Student Outcomes				
1.	Be thorough with real and complex fields	a				
2.	To understand confoundable and uncountable set	a				
3.	Be familiar with metric spaces	a				
4.	Understand thoroughly the convergence of the sequences and series	a				
5.	Get exposed to the limits of functions and in detail, derivatives of higher order theorems	a				

UNIT - I : REAL AND COMPLEX FIELDS

Introduction- ordered sets - fields- real field - the extended real number system - the complex field-Euclidean spaces.

UNIT - II : COUNTABLE AND UNCOUNTABLE SETS

Finite, countable and uncountable sets-metric spaces-compact sets-perfect sets-connected sets.

UNIT- III : CONVERGENT SEQUENCES

Convergent sequences - subsequences - Cauchy sequences-upper and lower limits-some special sequences and series - series of non-negative terms – the number *e* - the root and ratio tests.

UNIT - IV : LIMIT AND CONTINUITY OF FUNCTIONS

Limits of functions – Continuous functions – Continuity and – Continuity and Connectedness – Monotonic Functions.

UNIT - V : MEAN VALUE AND TAYLOR'S THEOREMS

The Derivate of a Real Function – Mean Value Theorems – Continuity of Derivatives – L'Hospital's Rule- Derivatives of Higher Order – Taylor's Theorem – Differentiation of Vector Valued Functions.

TEXT BOOKS

1. Walter Rudin, *Principles of Mathematical Analysis*, 3rd Edition, Major CoreGraw–Hill International Editions, Singapore, Reprint 2012.
   Unit I: Chapter 1 (Omit Appendix); Unit II: Chapter 2; Unit III: Chapter 3 (Pages 47 – 69); Unit IV: Chapter 4 (Pages 83 – 96); Unit V: Chapter 5.

2. Royden, H.L., *Real Analysis*, The Macmillan Company, New York, 1963.

REFERENCES

1. Tom M. Apostol, *Mathematical Analysis*, 2nd edition, Pearson, Narosa Publishing House, New Delhi, 2002.
2. Richard R. Goldberg, *Methods of Real Analysis*, Oxford & IBH Publishing Co, Pvt. Ltd., New Delhi, 2010.
3. Sterling K.Berberian, *A first course in Real Analysis*, 4th Edition, Springer India Pvt. Ltd., 2009.
4. Simmons, G.F., Topology and Modern Analysis, McGraw-Hill Book Company, New York, 1963.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Assignment**	**Attendance**	**Total**
	Marks	**10**	**10**	**20**	**5**	**5**	**50%**
End Semester Weightage							**50%**
Total							**100%**

COURSE CODE	**COURSE TITLE**	**L**	**T**	**P**	**TOTAL L+T+P**	**C**
UMA18502	**ALGEBRAIC STRUCTURES**	**4**	**1**	**0**	**5**	**4**

INSTRUCTIONAL OBJECTIVES		**Student Outcomes**				
1.	To enrich with the knowledge of Abstract Algebra	a				
2.	To have a good foundation in Groups	a				
3.	To have a good foundation in Rings.	a				
4.	Study the characteristics of rings and fields	a				
5.	Study further aspects of quotient rings	a				

UNIT - I : GROUPS

Definition of a Group – Elementary Properties of a Group – Equivalent Definitions of a Group.-Permutation Groups.

UNIT - II : CYCLIC GROUPS

Definition and examples – generators of a cyclic group – Number of generators of a cyclic groups – Cosets – Partitioning of a group by Cosets – Lagrange's theorem – Euler's theorem – Fermat's theorem.

UNIT - III : NORMAL SUBGROUPS

Definition and examples - Quotient groups - Homomorphism – Automorphism.

UNIT - IV : RINGS

Definition and examples – Types of rings – Elementary properties of a ring – Integral domain – Field – Sub rings – Subfields – Ideals – Principal ideal.

UNIT - V : QUOTIENT RINGS

Definition and examples– Maximal and prime ideals -Homomorphism of rings – Field of quotient of an integral domain – unique factorization domain-Euclidean domain.

TEXT BOOKS

1. I.N. Herstein, *Topics in Algebra*, John Wiley, New York, 1975.
2. S. Arumugam and A. Thangapandi Issac, *Modern algebra*, New Gamma Publishing House, 2013.

REFERENCES

1. S. Arumugam, *Algebra*, New Gamma publishing house, Palayamkottai.
2. T. K. Manicavachagam Pillai, T. Natarajan, & K. S. Ganapathy, *Algebra*, Vol. I, S. Viswanathan Pvt. Limited, 2012.
3. A.R. Vasistha, *A first course in Modern Algebra*, Krishna Prekasan Mandhir, 9, Shivaji Road, Meerut (UP), 1983.
4. John B. Fraleigh, *First course in Algebra*, Addison Wesley.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Assignment**	**Attendance**	**Total**
	Marks	**10**	**10**	**20**	**5**	**5**	**50%**
End Semester Weightage							**50%**
Total							**100%**

COURSE CODE	**COURSE TITLE**	**L**	**T**	**P**	**TOTAL L+T+P**	**C**
UMA18503	**OPERATIONS RESEARCH**	**4**	**1**	**0**	**5**	**4**

INSTRUCTIONAL OBJECTIVES		**Student Outcomes**				
1.	Solve LPP using different techniques	a				

2.	Be familiar with the formulation of different types of problems	a				
3.	Be exposed to queueing theory	a				
4.	Be familiar with game theory	a				
5.	Study PERT – CPM calculations	a				

UNIT - I : LINEAR PROGRAMMING PROBLEM

Formulation and Graphical Method – Simplex Method – Artificial Variable Techniques – Big-M Method - Duality – Dual Simplex Method.

UNIT - II : TRANSPORTATION AND ASSIGNMENT PROBLEM

Mathematical Formulation of Transportation Problem – Methods of solution of Transportation Problem – Balanced and unbalanced Transportation problem – Maximization in Transportation – Degeneracy and non degeneracy transportation problem - Assignment Algorithm - Unbalanced Assignment Models – Travelling Salesman Problems.

UNIT - III : QUEUEING THEOREM

Queueing Theory – Introduction – Queueing system – Characteristics of Queueing system – symbols and Notation – Classifications of queues – Problems in (M/M/1): (∞/FIFO); (M/M/1): (N/FIFO); (M/M/C): (∞/FIFO); (M/M/C): (N/FIFO) Models.

UNIT - IV : GAME THEORY

Game Theory – Two person zero sum game – The Maxmin – Minimax principle – problems - Solution of m x n rectangular Games – Domination Property – (2 x n) and (m x 2) - graphical method – Problems.

UNIT - V : SCHEDULING PROBLEMS

Network scheduling by PERT / CPM – Introduction – Network and basic components – Rules of Network construction – Time calculation in Networks – CPM. PERT – PERT calculations – Cost Analysis – Crashing the Network – Problems.

TEXT BOOK

1. Kanti Swarup, P. K. Gupta, Man Mohan, *Operations Research*, S. Chand & Sons Education Publications, New Delhi, 12th Revised edition, 2004.
2. Gupta P.K. and Hira D.S., *Problems in Operations Research*, S.Chand & Co.

REFERENCE BOOKS

1. V.Sundaresan, K.S.Ganapathy Subramanian & K.Ganesan, *Resource Management Techniques*, AR Publications, Chennai, 2015.

2. V.Sundaresan, K.S.Ganapathy Subramanian & K.Ganesan, *Applied Operations Research for Management*, A.R.S. Publications, Arapakkam, Tamilnadu, 2006.
3. Ravindran A., Phillips D.T. and Solberg J.J., *Operations research*, John wiley & Sons.
4. Taha H.A., *Operation Research*, Macmillan pub. Company, New York.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Assignment**	**Attendance**	**Total**
	Marks	**10**	**10**	**20**	**5**	**5**	**50%**
End Semester Weightage							**50%**
Total							**100%**

COURSE CODE	**COURSE TITLE**	**L**	**T**	**P**	**TOTAL L+T+P**	**C**
UMA18504	**C++ PROGRAMMING – LABORATORY**	**0**	**0**	**4**	**4**	**2**

	INSTRUCTIONAL OBJECTIVES	**Student Outcomes**				
1.	To introduce some basic concepts in C++ Program	a	k			
2.	To learn about the computer fundamentals and the C++ programming language concepts.	a	k			
3.	To make data interpretation using C++ Language	a	k			
4.	To practice the concepts in C++ Language	a	k			

LIST OF EXPERIMENTS

1. Write a C++ program to print the following output using for loop
   1
   22
   333
   4444
   ……
   ……..
2. Write a C++ program to evaluate the following function to 0.0001% accuracy.
   a) sin(x)
   b) cos(x)
   c) exp(-x)
3. Write a C++ program to find roots of a quadratic equation.
4. Write a C++ program to sort the array of numbers.

5. Write a C++ Program to create a class ARITHMETIC which consists of a FLOAT and an INTEGER variable. Write a Member function ADD (), SUB (), MUL (), DIV () to perform addition, subtraction, multiplication, division respectively. Write a member function to get and display values.
6. Write a C++ Program to read an integer number and find the sum of all the digits until it reduces to a single digit using constructors, destructors and inline member functions.
7. Write a C++ Program to create a class STRING. Write a Member Function to initialize, get and display stings. Overload the Operator —+ to Concatenate two Strings, —= = to Compare two strings.
8. Write a C++ Program to create structure, which consists of EMPLOYEE Detail like E_Number, E_Name, Department, Basic, Salary, Grade. 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.
9. Write a C++ Program to create a class SHAPE which consists of two VIRTUAL FUNCTIONS Calculate_Area () and Calculate_Perimeter () to calculate area and perimeter of various figures. Derive three classes SQUARE, RECTANGLE, TRIANGE from class Shape and Calculate Area and Perimeter of each class separately and display the result.
10. Write a C++ Program to read two Matrices of different Data Types such As integers and floating point numbers. Find out the sum, product of the above two matrices.
11. Write a C++ Program to check whether the given string is a palindrome (with & without Pointers).
12. Write a C++ program to illustrate hybrid inheritance.
13. Write a C++ Program to create a File and to display the contents of that file with line numbers.

REFERENCES

E. Balagurusamy*, Programming in ANSI C*, Mc Graw-Hill Pvt Ltd, New Delhi.

Course Nature : Practical						
Assessment Method (Max.Marks: 100)						
In Semester	**Assessment Tool**	**Observation note book**	**Model Examination**	**Performance in Practical Class**	**Regularity and Discipline**	**Total**
	Marks	**10**	**10**	**25**	**5**	**50%**
End Semester Weightage	**Assessment Tool**	**Record Note Book submission**	**Program writing**	**Debugging**	**Result/Output**	**Total**
	Marks	**10**	**10**	**15**	**15**	**50%**
Total						**100%**

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UMA18505	MATHEMATICAL MODELLING	0	0	4	4	2

INSTRUCTIONAL OBJECTIVES		Student Outcomes				
1.	To introduce some basic concepts in Mathematical Modelling	a	k			
2.	To practice some mathematical modeling concepts	a	k			
3.	To use the Mathematics for application purposes	a	k			
4.	To corroborate the real world situations with Mathematics	a	k			

List of Experiments:

Formulate/frame the following for suitable situations:

1. Basic Mathematical Identities and Formulae (how they come into existence?)
2. Any two methods to find the simple interest and compound interest
3. The staircase problem and handshake problem
4. Tower of Hanoi problem
5. Line and Curve Fitting model
6. Linear and nonlinear models
7. Predator-Prey Model
8. Compartmental Models
9. Models with constraints
10. Probability Models
11. Numerical Simulations for all these models

REFERENCES:

1. Edward A. Bender, *An Introduction to Mathematical Modelling*, John Wiley & Sons, 1978.
2. J.D. Murray, *Mathematical Biology: I. An Introduction*, (Interdisciplinary Applied Mathematics, Volume 17), Springer-Verlag Berlin Heidelberg, 2002.
3. Jim Caldwell, Douglas K.S. Ng, *Mathematical Modelling: Case Studies and Projects, Kluwer Texts in the Mathematical Sciences*, volume 28, Kluwer Academic Publishers, 2004.
4. Ang Keng, *Teaching Mathematical Modelling in Singapore Schools*, http://math.nie.edu.sg/kcang/TME_paper/teachmod.html

Course Nature : Practical						
Assessment Method (Max.Marks: 100)						
In Semester	Assessment Tool	Observation note book	Model Examination	Performance in Practical Class	Regularity and Discipline	Total
	Marks	10	10	25	5	50%

End Semester Weightage	Assessment Tool	Record Note Book submission	Program writing	Debugging	Result/Output	Total
	Marks	10	10	15	15	50%
Total						100%

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UMA18C04	DYNAMICS	3	0	0	3	3

INSTRUCTIONAL OBJECTIVES		Student Outcomes				
1.	To provide a basic knowledge of the behavior of objects in motion	a				
2.	To develop a working knowledge to handle practical problems	a				

UNIT – I:

Introduction-Kinematics: Velocity-Relative Velocity-Angular Velocity-Acceleration Relative Acceleration-Motion in a straight line under uniform acceleration.

UNIT – II:

Projectile: Projectile-Path of a projectile-Characteristics-Horizontal projection-Projectile up/down an inclined plane-Enveloping parabola.

UNIT – III:

Collision of Elastic Bodies: Introduction-Definitions-Fundamental Laws of impact – Impact of a smooth sphere on a fixed smooth plane-Direct impact of two smooth spheres-Oblique impact of two smooth spheres-Dissipation of energy due to impact – Compression and Restitution-Impact of a particle on a rough plane.

UNIT – IV:

Simple Harmonic Motion: Introduction-S.H.M. in straight line-Compositions of simple harmonic motions of the same period.

UNIT – V:

Motion Under The action Of Central Forces: Velocity and acceleration in polar coordinates-Equiangular spiral-Differential Equation of central orbits-Pedal Equation of the central orbit-Two-fold problems in central orbits.

TEXT BOOK:

1. Dr.M.K.Venkataraman, *Dynamics*, Agasthiyar Publications, Thirteenth Edition, July 2009.

2. UNIT I -Chapter2, Chapter 3, Section 3.1-3.22; UNIT II -Chapter6, Sections 6.1-6.17;
3. UNIT III -Chapter8, Sections 8.1-8.11; UNIT IV -Chapter 10, Sections 10.1-10.13;
4. UNIT V -Chapter 11, Sections 11.1-11.13.

REFERENCES

1. P. Duraipandian, LaxmiDuraipandian and MuthamizhJayapragasam, *Mechanics*, S.Chand&Company PVT, LTD, 2014.
2. A.V.Dharmapadham, *Dynamics*, S, Viswanathan Publishers Pvt.Ltd. 2006.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Assignment**	**Attendance**	**Total**
	Marks	**10**	**10**	**20**	**5**	**5**	**50%**
End Semester Weightage							**50%**
Total							**100%**

COURSE CODE	**COURSE TITLE**	**L**	**T**	**P**	**TOTAL L+T+P**	**C**
UMA18C05	**ASTRONOMY**	**3**	**0**	**0**	**3**	**3**

INSTRUCTIONAL OBJECTIVES		**Student Outcomes**				
1.	This course aims to provide working knowledge about the universe.	a				

UNIT - I :

Celestial Sphere - Diurnal motion - Simple Problems (No derivation.)

UNIT - II :

Zones of Earth - Terrestrial Latitudes and Longitudes - Rotation of Earth - Dip of the horizon - Simple problems.(No derivation).

UNIT - III :

Twilight-simple problems-Astronomical refraction - Simple problems. (No derivation)

UNIT - IV :

Kepler's Laws - simple problems .(No derivation)

UNIT – V :

Moon - phases of moon - Eclipses - Introduction – umbra and penumbra - lunar eclipse - solar eclipse - condition for the occurrence of lunar and solar eclipses.

TEXT BOOK :

S. Kumaravelu and Susheela Kumaravelu, *Astronomy*, SKV Publishers, Nagarkoil, 2004.

REFERENCES :

1. V.Thiruvenkatacharya, *A text book of Astronomy*, Schand & Co. Pvt. Ltd., 1972.
2. H.Kartunen, *Fundamental Astronomy*, Content Technologies Publications, 2013.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Assignment**	**Attendance**	**Total**
	Marks	**10**	**10**	**20**	**5**	**5**	**50%**
End Semester Weightage							**50%**
Total							**100%**

COURSE CODE	**COURSE TITLE**	**L**	**T**	**P**	**TOTAL L+T+P**	**C**
UMA18C06	**SEQUENCES AND SERIES**	**3**	**0**	**0**	**3**	**3**

INSTRUCTIONAL OBJECTIVES		**Student Outcomes**				
1.	To learn about sequence	a				
2.	To understand about infinite series	a				
3.	To have thorough knowledge about alternative series	a				
4.	To be familiar with summation of series	a				

UNIT - I :

Sequence, constant sequence, convergent sequence, divergent sequence, oscillatory sequence, limit of a sequence (Definitions with examples only) – Cauchy's general principle of convergence – Cauchy's first theorem on limits - Bounded sequences – monotonic sequence always tends to a limit ,finite or infinite- Limit superior and Limit inferior .

UNIT - II :

Infinite series- Definition of Convergence, Divergence & Oscillation – Necessary condition for convergence –Convergence of Geometric series. Comparison test,

D'Alemberts ratio test , and Raabe's test (Statement only). Simple problems based on above tests.

UNIT – III :
Cauchy's condensation Test , Cauchy's root test (Statement only) and their simple problems-Alternative series with simple problems.

UNIT – IV:
Binomial Theorem for a rational index-Exponential & Logarithmic series-Summation of series & approximations using these theorems (problems only).

UNIT – V:
General summation of series including successive difference and recurring series.

TEXT BOOKS:

1. T.K. Manickavasagam Pillai, T. Natarajan, K.S. Ganapathy, *Algebra*, Vol. I, S. Viswanathan Pvt Limited, Chennai, 2004.
2. A.R. Vasistha et al., *Textbook on Algebra*, 23rd Edition, Krishna Prakashan Media Pvt. Ltd, (Kanpur Edition), 2014.

REFERENCES:

1. M.K.Singal & Asha Rani Singal, *A first course in Real Analysis*, R. Chand & Co. 1999.
2. Dr.S.Arumugam, *Sequences & Series*, New Gamma Publishers, 1999.
3. J. A. Green, *Sequences & Series*, Routledge & Kegan Paul Ltd. 1958.
4. James Stewart, *Calculus,* 7th Edition, Cengage Learning, 2012.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Assignment**	**Attendance**	**Total**
	Marks	**10**	**10**	**20**	**5**	**5**	**50%**
End Semester Weightage							**50%**
Total							**100%**

COURSE CODE	**COURSE TITLE**	**L**	**T**	**P**	**TOTAL L+T+P**	**C**
UES18501	**ENVIRONMENTAL STUDIES**	**3**	**0**	**0**	**3**	**3**

INSTRUCTIONAL OBJECTIVES		**Student Outcomes**				
1.	To gain knowledge on the importance of natural resources and energy.					

2.	To understand the structure and function of an ecosystem.					
3.	To imbibe an aesthetic value with respect to biodiversity, understand the threats and its conservation and appreciate the concept of interdependence.					
4.	To understand the causes of types of pollution and disaster management.					
5.	To observe and discover the surrounding environment through field work.					

UNIT - I: Introduction to Natural Resources/Energy

Natural Resources – Definition – Scope and Importance – Need for Public Awareness – Renewable and Non-renewable Resources: Natural resources and associated problems. Forest resources and over-exploitation – Water resources and over-utilization – Mineralresource extraction and its effects - Food resources - food problems and Modern agriculture - Energy resources and its future.

UNIT - II: Ecosystems

Concept of an ecosystem-structure and function of an ecosystem-producers, consumers and decomposers- ecological succession- food chains(any 2 Examples)-food webs(any 2 Examples)-ecological pyramids.

UNIT - III: Environmental Pollution /Disaster Management

Definition-causes, effects and control measures of: Air, Water and Soil pollution- e-waste management- Disaster management: Natural and manmade-food/earthquake/cyclone, tsunami and landslides.

UNIT - IV: Social Issues and the Environment

Sustainable development- Climate change: global warming, acid rain, ozone layer depletion and nuclear radiation- Environment Protection Act (any 2) air, water, wildlife and forest.

UNIT - V: Human Population and the Environment

Population growth, variation among nations - Population explosion—Family Welfare Programme - Environment and human health - Human rights - Value education - HIV/AIDS - Women and Child Welfare - Role of Information Technology in environment and human health.

FIELD WORK

Students will visit any one of the following place of interest and submit a written report by the end of the semester:

1. Visit to a hospital/industry/canteen for solid waste management

2. Visit to a chemical industry to study about the practices followed there for waste disposal
3. Visit to Vandalur zoo for study of animal conservation/plants- flora and fauna
4. Study of simple ecosystems-lake/hill slopes
5. Naming the trees in the campus at SRM
6. Study of common plants, insects, birds in the neighbourhood
7. Study of common diseases and their prevention
8. Optional: Street plays and rally for awareness of obesity/diabetes/ vitamin D deficiency/health issues/ waste management/ solid waste management/ no plastics/ energy consumption/wild life protection.

REFERENCES

1. Bharucha Erach, (2013), Textbook of Environmental Studies for Undergraduate Courses (Second edition). Telangana, India: Orient BlackSwan.
2. Basu Mahua, Savarimuthu Xavier, (2017), SJ Fundamentals of Environmental Studies. Cambridge, United Kingdom: Cambridge University Press.
3. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
4. De A.K., Environmental Chemistry, Wiley Eastern Ltd.

e-BOOK

1. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380013, India, Email:mapin@icenet.net (R)

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Exam**	**Assignment**	**Attendance**	**Total**
	Marks	**10**	**10**	**20**	**5**	**5**	**50%**
End Semester Weightage							**50%**
Total							**100%**

THIRD YEAR – SIXTH SEMESTER

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UMA18601	COMPLEX ANALYSIS	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES		Student Outcomes				
1.	Get exposed to the harmonic functions and its properties	a				
2.	Have sound knowledge in the mappings of analytic functions	a				
3.	Grasp several facts on complex integration	a				
4.	Be familiar with singularities of different types and the corresponding theorems	a				
5.	Be thorough with the evaluation of integrals of different types	a				

UNIT – I : ANALYTIC FUNCTION

Complex Numbers - Point at Infinity- Stereographic Projection - Analytic functions: Definitions of Function of a Complex Variable- Mappings- Limits, Continuity - Derivatives and Differentiation Formula - Cauchy-Riemann Equations - Properties of Analytic Functions - Necessary and Sufficient Conditions for Analytic Functions - Harmonic Functions - Determination of Harmonic Conjugate and Analytic Function.

UNIT - II : CONTOUR INTEGRAL

Integrals Contours - Line Integrals-Cauchy- Goursat's Theorem (without proof) Cauchy's Integral Formula - Derivatives of Analytic Functions - Maximum Modulus Theorem.

UNIT – III : TAYLOR'S AND LAURENT'S THEOREM

Power series - Taylor's and Laurent's Theorem - Singularities and Classification – Problems

UNIT - IV : TRANSFORMATIONS

Mappings Conformal Mapping - The transformations $w = az+b$, $w = 1/z$, $w = z^2$, $w = \sqrt{z}$, $w = e^z$, Bilinear Transformation and special Bilinear Transformation.

UNIT – V : EVALUTION OF INTEGRAL

Cauchy's Residue theorem – Evaluation of integrals of the following types – $\int_0^{2\pi} f(\cos\theta, \sin\theta)\, d\theta$, $\int_{-\infty}^{\infty} f(x)\sin ax\, dx$, $\int_{-\infty}^{\infty} f(x)\cos ax\, dx, a > 0$, $\int_{-\infty}^{\infty} \frac{p(x)}{q(x)} dx$, $\int_{-\infty}^{\infty} f(x)\, dx$, where f(z) has finite number of poles on the real axes – Jordan's lemma(without proof)

TEXT BOOK

1. P.Duraipandian and Laxmi Duraipandian, *Complex Analysis*, Emerald Publishers, Chennai, 1999.
2. Chapter 2:2.1,2.7,2.8 Chapter 4:4.1-4.8,4.10 Chapter 6:6.12,6.13; Chapter 7:7.1,7.2,7.4,7.5,7.6,7.8,7.9;
3. Chapter 8:8.3-8.11(Theorems 8.13-8.16); Chapter 9:9.1-9.11; Chapter 10:10.1-10.4

REFERENCES

1. S. Narayanan and T. K. Manicavachagam Pillay, *Complex Analysis*, Revised Edition, S. Viswanathan Printers & Publishers, 2002.
2. S.Ponnusamy, *Foundations of Complex Analysis*, Narosa Publishing House, New Delhi. 2000.
3. Murray R. Spiegel, *Theory and Problems of Complex Variable*, Tata-McGraw Hill Edition, New Delhi. 2005.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Assignment**	**Attendance**	**Total**
	Marks	**10**	**10**	**20**	**5**	**5**	**50%**
End Semester Weightage							**50%**
Total							**100%**

COUSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UMA18602	GRAPH THEORY	3	1	0	4	4

INSTRUCTIONAL OBJECTIVES		Student Outcomes				
1.	To introduce the students to the beautiful and elegant theory of graphs.	a				
2.	To equip the students with problem solving, critical thinking and algorithm techniques that may be used to solve a host of problems in other fields.	a				
3.	To understand the concepts of graphs, their types, important principles like connectivity, Eulerian and Hamiltonian graphs, colouring and planarity.	a				
4.	To enable the students to apply graph theoretical techniques to solve problems in other fields.	a				

UNIT - I: GRAPHS AND SUBGRAPHS

Graphs, subgraphs, Degree of a vertex, Isomorphism of graphs, independent sets and coverings; intersection graphs.

UNIT - II: DEGREE SEQUENCES, GRAPH OPERATIONS

Adjacency and incidence of matrices; Operations on graphs; degree sequences; graphic sequences; Walks; trails; paths; problems.

UNIT - III: CONNECTEDNESS

Connectedness and components; cut point, bridge, block; Connectivity theorems and simple problems.

UNIT - IV: EULERIAN AND HAMILTONIAN GRAPHS

Eulerian graphs and Hamiltonian graphs; simple problems; Trees, theorems, and simple problems.

UNIT - V : PLANARITY AND COLOURABILITY

Planarity; definition and properties; Characterisation of planar graph; Colourability; chromatic number and index.

TEXT BOOK :

1. S. Arumugam and S. Ramachandran, *Invitation to Graph Theory*, SCITECH Publications India Pvt. Ltd, Chennai – 17, 2006.
   Unit I: Chapter 2 : Sections 2.0 – 2.4, 2.6-2.7; Unit II: Chapter 2 : Sections 2.8 & 2.9, Chapter 3 fully and Chapter 4: Section 4.0 – 4.1; Unit III: Chapter 4: Sections 4.2-4.4; Unit IV: Chapters 5 and 6; Unit V: Chapter 8: Sections 8.0-8.2 and Chapter 9: 9.0 and 9.1.

2. R. Balakrishnan, K. Ranganathan, A text book of graph theory, 2nd Edition, Springer-Verlag, 2012.

REFERENCES :

1. S. Kumaravelu, Susheela Kumaravelu, *Graph Theory*, SKV Publishers, Sivakasi, 1999.
2. S. A. Choudham, *A First Course in Graph Theory*, Macmillan India Ltd, 2000.
3. Robin J. Wilson, *Introduction to Graph Theory*, Prentice Hall, 2012.
4. J. A. Bondy and U. S. R. Murthy, *Graph Theory with Applications*, Macmillon, London, 2008.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Assignment**	**Attendance**	**Total**
	Marks	**10**	**10**	**20**	**5**	**5**	**50%**
End Semester Weightage							**50%**
Total							**100%**

COURSE CODE	**COURSE TITLE**	**L**	**T**	**P**	**TOTAL L+T+P**	**C**
UMA18603	**MECHANICS**	**3**	**1**	**0**	**4**	**4**

INSTRUCTIONAL OBJECTIVES		**Student Outcomes**				
1.	Understand in detail, simple harmonic motion	a				
2.	Be familiar with the characteristic of elasticity	a				
3.	Study, in detail, motion of a projectile	a				
4.	Be familiar with central forces and orbit	a				
5.	Be thorough with motion of a rigid body	a				

UNIT - I : RECTILINEAR MOTION

Simple harmonic motion – Composition of two simple harmonic motions – Motion under gravity in a resisting medium – Resistance varying As the velocity and As the square of the velocity.

UNIT - II : IMPACT

Definition of impulsive forces and impulse – Principle of conservation of linear momentum – Elasticity – Collision of two smooth spheres – change in kinetic energy and impulse imparted due to collision – Impact of a smooth sphere on a fixed smooth plane.

UNIT – III : MOTION OF A PROJECTILE

Motion of a projectile, nature of a trajectory – Range on a horizontal plane – Range on an inclined plane – Moment of inertia of simple bodies – Perpendicular and parallel axis theorems (Statement only)

UNIT - IV : CENTRAL ORBIT

Central forces and central orbit – Orbit As a plane curve – Differential equation of the central orbit in polar co-ordinates – Given a central orbit, to find the law of force and the speed of any point – to obtain the nature of the orbit when the central force is M / r^2 and M / r only.

UNIT - V : MOTION OF A RIGID BODY

Two dimensional motion of a rigid body – motion about a fixed axis – Kinetic energy – Moment of momentum – Moment of the effective forces about the fixed axis.

TEXT BOOKS :

1. P. Durai Pandian, *Mechanics*, S. Chand & Company Ltd., 2012.
2. Unit 1: Chapter 5: 5.1-5.4, 5.7, 5.8; Unit 2: Chapter12: 12.1-12.5; Unit 3: Chapter13:13.1-13.5
3. Unit 4: Chapter15:15.1- 15.5
4. Unit 5: Chapter 17: 17.1-17.4

REFERENCES :

1. A.V. Dharmapadam, *Mechanics*, S. Viswanathan and Co., 2011.
2. M. K. Venkatraman, *Statics*, National Publishing co., 2012
3. K. V Nailk and M. S. KAsi, *Statics*, Emerald publishing co.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Assignment**	**Attendance**	**Total**
	Marks	**10**	**10**	**20**	**5**	**5**	**50%**
End Semester Weightage							**50%**
Total							**100%**

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UMA18604	MATHEMATICAL SOFTWARE PRACTICAL - SCILAB	0	0	4	4	2

INSTRUCTIONAL OBJECTIVES		Student Outcomes				
1.	To introduce some basic concepts in Scilab	a				
2.	To practice the ideology of Scilab	a				
3.	To make data interpretation using Scilab	a				
4.	To practice the concepts in Scilab	a				
5.	To introduce some basic concepts in Scilab	a				

List of Experiments:

1. Basic Exercises in MATLAB/Scilab
2. Fibonacci Sequence
3. Matrix Manipulation (Including eigenvectors and svd)
4. Solution of Linear Equations in Different Methods
5. Bisection Method and Newton Raphson Method
6. Zeros and Roots
7. Fourier Series
8. Least squaresline and curve fitting
9. Interpolation
10. (a) Construct the polynomial $y = (x+2)^2(x^3+1)$ for values of x from minus one to one in steps of 0.1.

    (b) Construct the function $y = \frac{x^2}{x^3+1}$ for values of x from one to two in steps of 0.01.
11. Ordinary Differential Equations (ode solvers, Euler and R-K Methods)
12. Comparison of Euler, R-K Method and built-in ode solvers.

REFERENCES:

1. Eike Rietsch, *An Introduction to Scilab from a Matlab User's Point of View Version 2.6-1.0*, 2001,2002.
2. Hema Ramachandran, Achuthsankar S. Nair, *SCILAB (A free Software to MATLAB)*, S. Chand & Company Ltd., First Edition, 2012.
3. Steven C.Chapra, *Applied Numerical Methods with MATLAB for Engineers and Scientists*, Tata Major Core Graw Hill Publishing Company Ltd., 2007.
4. *Technical Analysis and Applications with MATLAB*, Stanley printed and bounded in India by Barkha Nath. Printers, Delhi, Reprint, 2007.

Course Nature : Practical						
Assessment Method (Max.Marks: 100)						
In Semester	**Assessment Tool**	**Observation note book**	**Model Examination**	**Performance in Practical Class**	**Regularity and Discipline**	**Total**
	Marks	**10**	**10**	**25**	**5**	**50%**
End Semester Weightage	**Assessment Tool**	**Record Note Book submission**	**Program writing**	**Debugging**	**Result/Output**	**Total**
	Marks	**10**	**10**	**15**	**15**	**50%**
Total						**100%**

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UMA18C07	FUZZY MATHEMATICS	3	0	0	3	3

INSTRUCTIONAL OBJECTIVES		Student Outcomes				
1.	To know the basic definitions of fuzzy set theory.	a				
2.	To know the fundamentals of fuzzy Algebra	a				
3.	To know the applications of fuzzy Technology	a				

UNIT – I: FUZZY SUBSETS AND FUZZY MAPPINGS

Introduction - Fuzzy subsets-Lattices and Boolean Algebras - L fuzzy sets-operations on fuzzy – level sets – properties of fuzzy subsets.

UNIT – II: OPERATIONS ON FUZZY SUBSETS

Algebraic product and sum of two fuzzy subsets-properties satisfied by Addition and product-cartesian product of fuzzy subsets.

UNIT – III: FUZZY RELATIONS AND FUZZY LOGIC

Introduction - Algebra of fuzzy relations - logic-connectives - Some more connectives.

UNIT – IV: FUZZY SUBGROUPS

Introduction-fuzzy subgroup - homomorphic image and Pre-image of subgroupoid.

UNIT – V: FUZZY SUBRINGS

Fuzzy invariant subgroups - fuzzy subrings.

TEXT BOOK:

S. Nanda and N. R. Das, *Fuzzy Mathematical concepts*, Narosa Publishing House, New Delhi, 2010.

REFERENCES:

1. M.Ganesh, *Introduction to Fuzzy Sets & Fuzzy Logic*, Prentice Hall of India Pvt. Ltd., 2006.
2. John N.Mordeson and Premchand S.Nair, *Fuzzy Mathematics*, Spring verlong, 2001.
3. Sudhir K. Pundir, Rimple Pundir, *Fuzzy sets and their applications*, Pragati Prakash Publications, 2008.
4. G.J. Klir and B. Yuan, *Fuzzy sets and fuzzy logics, theory and applications*, Prentice Hall of India, 1995.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Assignment**	**Attendance**	**Total**
	Marks	**10**	**10**	**20**	**5**	**5**	**50%**
End Semester Weightage							**50%**
Total							**100%**

COURSE CODE	**COURSE TITLE**	**L**	**T**	**P**	**TOTAL L+T+P**	**C**
UMA18C08	**COMBINATORICS**	**3**	**0**	**0**	**3**	**3**

INSTRUCTIONAL OBJECTIVES		**Student Outcomes**				
1.	To learn about recurrence relation	a				
2.	To have knowledge about permutation	a				
3.	To be familiar with Assignment problems	a				
4.	To have knowledge in Fibonacci relation and exclusion principle	a				

UNIT - I :

Introduction to BAsic ideAs – Gformula for f(n,k) – Recurrence Relation – boundary condition - Fibonacci sequence – generating function .

UNIT - II :

Permutation – Ordered seletion – unordered selection – further remarks on Binomial theorem.

UNIT – III :

PAssing within a set – Pairing between set and optimal Assignment problem – Gala's optimal Assignment problem.

UNIT - IV :
Fibonacci type relation – using generating function – Miscellaneous method – counting simple electrical networks .

UNIT – V:
The inclusion – Exclusion principle - Rook polynomial.

TEXT BOOKS :
1. Jan Anderson, *A First Course in Combinatorial Mathematics*, Oxford Applied Mathematics and Computing Science Series, UK, 2013.

REFERENCES :
1. V.K.Balakrishnan, *Combinatorics*, Schuam Series, 1996.
2. Russell Merris, *Combinatorics*, John Wiley & Sons, 2003.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Assignment**	**Attendance**	**Total**
	Marks	**10**	**10**	**20**	**5**	**5**	**50%**
End Semester Weightage							**50%**
Total							**100%**

COURSE CODE	**COURSE TITLE**	**L**	**T**	**P**	**TOTAL L+T+P**	**C**
UMA18C09	**NUMBER THEORY**	**3**	**0**	**0**	**3**	**3**

INSTRUCTIONAL OBJECTIVES		**Student Outcomes**				
1.	To learn about division algorithm	a				
2.	To have knowledge about fundamental theorem of arithmetic	a				
3.	To be familiar with linear congruences	a				
4.	To have knowledge in Mobius inversion formula and Euler's theorem	a				

UNIT – I:
The Division Algorithm – The g.c.d. – The Euclidean Algorithm – The Diophantine Equation ax + by = c.

UNIT – II:
The Fundamental theorem of arithmetic , The sieve of Eratesthenes – The Goldbach conjecture – bAsic properties of congruence.

UNIT – III:
Special Divisibility tests – Linear congruences – The Little Fermat's theorem – Wilson's theorm.

UNIT – IV:
The random functions – The Mobius inversion formula – The greatest integer function.

UNIT – V:
Euler's Phi – function – Euler's theorem – Some properties of the Phi – function.

TEXT BOOK:
David M. Burton, *Elementary Number Theory*, Universal Book Stall, 2001.

REFERENCES:

1. T.M.Apostol, *Introduction to Analytic Number Theory*, Springer Valley, 1976.
2. Kumaravelu and Suseela Kumaravelu, *Number Theory*, SKV Publications, 2002.
3. Kennath & Rosen, *Elementary number theory & its applications*, Addison Wesley Publishing Co. Ltd., 1968.
4. George E, Andrea, *Number Theory*, Hindustan Publishing, 1989.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Assignment**	**Attendance**	**Total**
	Marks	**10**	**10**	**20**	**5**	**5**	**50%**
End Semester Weightage							**50%**
Total							**100%**

COURSE CODE	**COURSE TITLE**	**L**	**T**	**P**	**TOTAL L+T+P**	**C**
CAC18601	**COMMUNICATION SKILLS**	**2**	**0**	**0**	**2**	**2**
INSTRUCTIONAL OBJECTIVES						
1.	To actively participate in formal discussions and manifest professional skills such as working in team, empathy, communicating appropriately and assertiveness					
2.	To foster problem solving and decision making skills through case studies on work ethics, decision making, organizational behavior etc.,					
3.	To build confidence to face audience and overcome stage fear with necessary training in public speaking and presentation skills					

4.	To develop written business communication skills

UNIT – I

Etiquettes– social, professional, communication, dinning and grooming etiquettes

UNIT – II

Interpersonal skills– Empathy, Managing conflicts, Effective decision making

UNIT – III

Team work– Role of leader and effective leadership, Role of team members and team ethics,Case study analysis (in teams) to understand team dynamics

UNIT – IV

Professional writing– Report, Letter, Summary and e–mail

UNIT – V

Presentation skills– Importance of verbal and non–verbal communication, Body language, Use of appropriate language

TEXT BOOK

1. 'How to deliver a presentation' By Paul Newton; e–book
2. 'A–Z of Presentation' By Eric Garner; e–book

REFERENCES

1. 'Emotional Intelligence' By Daniel Coleman

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Assignment**	**Attendance**	**Total**
	Marks	**10**	**10**	**20**	**5**	**5**	**50%**
End Semester Weightage							**50%**
Total							**100%**

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UMA18605	CORE BASED PROJECT	0	0	8	8	4

Internal Assessment Tool	Marks
Review 1 • Literature Survey • Problem Statement	10

• Presentation Skills • Interaction	
Review 2 • Problem Understanding • Methodology • Relevance/Quality of the work • Status of the work • Presentation Skills • Tackling Questions and Interaction	15
Review 3 • Significance of the work • Novelty and Approach • Scientific Findings • Presentation Skills • Tackling Questions and Interaction	25
Total	50

External Assessment Tool	Marks
Report (Dissertation)	10
Scientific Approach/ Innovation	10
Findings and Conclusion	15
Presentation	05
Viva-Voce	10
Total	50

COURSE CODE	COURSE TITLE	L	T	P	TOTAL L+T+P	C
UMA18A01	**ALLIED MATHEMATICS I**	**4**	**1**	**0**	**5**	**4**

INSTRUCTIONAL OBJECTIVES		Student Outcomes				
1.	To apply basic concepts for clear understanding of mathematical principles.	a				
2.	To solve practical problems	a				
3.	Improve their ability in solving applications of sets and logics	a				

4.	Learning the numerical techniques by solving the theory of equations	a				

UNIT I: Sets, Relations and Functions (12 hours)

Sets: sets, representation of sets, types of sets, operation on sets, Venn diagram.
Relation: types of relation, equivalence relation.
Function: types of functions, composite of two functions, composite of three functions

UNIT II: Mathematical connectives Logic (12 hours)

Statements, connectives, conjunction, disjunction, negation, tautology, contradiction, logical equivalence, tautological implications, arguments, validity of arguments – Normal forms – Principal disjunctive normal form - Principle conjunctive normal form.

UNIT III: Theory of equations (12 hours)

Polynomial equations, irrational roots, complex roots, (up to third order equations only) - Reciprocal equations, Approximation of roots of a polynomial equation by Newton's and Horner's methods.

UNIT IV: Matrices (12 hours)

Symmetric, skew symmetric, Hermitian, skew Hermitian, Orthogonal,Unitary matrices – Cayley Hamilton Theorem –Eigenvalues– Eigenvectors – solving the equations using Cramer's rule.

UNIT V: Differentiation (12 hours)

Simple problems only – maxima and minima of functions of single variable – Radius of curvature (Cartesian co– ordinate) – partial differentiation – Euler's theorem.

TEXT BOOK:

1. Veerarajan, T., *Discrete Mathematics*, 7th Edition, Tata-Mcgraw hill, New Delhi, 2006.
2. Singaravelu, A., *ALLIED MATHEMATICS*, 6th Revised Edition, Meenakshi Agency, Chennai, 2014.
3. Alan Doerr and Kenneth Levasseur, *Applied Discrete Structures for Computer Science*, Galgotia Publications (P) Ltd, 1992.

Treated as in : DISCRETE MATHEMATICS
Unit I: Chapter 2 (pg.no: 51-70), Chapter 4 (pg.no: 182-186) of
Unit II: Chapter 1 (pg.no: 1-14)

Treated as in : ALLIED MATHEMATICS
Unit III: Chapter 3 (3.1 – 3.16, 3.36 – 3.61)
Unit IV: Chapter 2 (2.1 - 2.23, 2.63 - 2.140)
Unit V: Chapter 5 (5.1 – 5.12, 5.31 – 5.35, 5.52-5.60)

BOOKS FOR REFERENCE:

1. Vittal, P.R, *Allied Mathematics*, 4th Edition Reprint , Margham Publications, Chennai, 2013.
2. Venkatachalapathy, S.G., *Allied Mathematics*, 1st Edition Reprint, Margham Publications, Chennai, 2007.
3. Kreyszig.E, *Advanced Engineering Mathematics*, John Wiley & Sons. Singapore,
4. 10th edition, 2012.
5. Veerajan. T, *Engineering Mathematics I*, Tata McGraw Hill Publishing Co, New Delhi, 5th edition, 2006.
6. Grewal B.S, *Higher Engineering Mathematics*, Khanna Publications, 42nd Edition, 2012.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Assignment**	**Attendance**	**Total**
	Marks	**10**	**10**	**20**	**5**	**5**	**50%**
End Semester Weightage							**50%**
Total							**100%**

COURSE CODE	**COURSE TITLE**	**L**	**T**	**P**	**TOTAL L+T+P**	**C**
UMA18A02	**ALLIED MATHEMATICS II**	**4**	**1**	**0**	**5**	**4**

INSTRUCTIONAL OBJECTIVES		**Student Outcomes**				
1.	To apply basic concepts for clear understanding of mathematical principles.	a				
2.	To understand integral calculus	a				
3.	To solve practical problems.	a				
4.	Improve the Students knowledge for solving integration problems and their applications.	a				
5.	Improve student ability to solving Laplace transforms and applying Engineering and Science.	a				

UNIT I - INTEGRAL CALCULUS **(12 hours)**

Integral calculus- polynomial and irrational function – Partial fraction (Simple algebraic functions only) - Bernoulli's formula – Reduction formula- $\int \sin^n x dx - \int \cos^n x dx - \int_0^{\pi/2} \sin^n x dx - \int_0^{\pi/2} \cos^n x dx$

UNIT II - TRIGONOMETRY **(12 hours)**

Trigonometry – Expansion of $\sin n\theta, \cos n\theta$ and $\tan n\theta$ – Expansion of $\sin^n \theta$ and $\cos^n \theta$ in terms of multiples of $\sin\theta$ and $\cos\theta$.

UNIT III - DIFFERENTIAL EQUATION **(12 hours)**

Differential Equations - Second order differential equations with constant coefficients. Problem based on R.H.S: 0, e^{ax} , *Sin ax*, *Cos ax*, *x* .

UNIT IV - LAPLACE TRANSFORMATION **(12 hours)**

Laplace Transformation – Basic properties and simple problems – $L[e^{at} f(t)] - L[tf(t)] - L[e^{at} tf(t)] - L[f(t)/t]$.

UNIT V - INVERSE LAPLACE TRANSFORMATION **(12 hours)**

Inverse Laplace transformation – Simple Problems based on Inverse Laplace Transformation - Multiplied by 's'- Multiplied by '1/s'- 'Partial Fraction Method'.

TEXT BOOK

1. Singaravelu. A, Allied Mathematics, 6th Revised Edition, Meenakshi Agency, 2014.
2. Vittal. P.R, Allied Mathematics, 4th Edition Reprint, Margham Publications, 2013.

Treated as in: Singaravelu. A, Allied Mathematics, 6th Revised Edition, Meenakshi Agency, 2014.
Unit – I: Chapter 7: 7.1 – 7.95 (Simple Algebraic Functions only);
Unit – II: Chapter 6: 6.1 – 6.25 (Problems only); Unit – III: Chapter 8: 8.41 – 8.87;
Unit – IV: Chapter 10: 10.1 – 10.48; Unit – V: 10.63 – 10.102.

REFERENCES

1. Venkatachalapathy, S.G,Allied Mathematics, 1st Edition Reprint, Margham Publications, 2007.
2. Manickavasagam Pillai. T.K and Narayanan. S, Ancillary Mathematics, Reprint,S.Viswanathan Printers and Publishers Pvt. Ltd.,Chennai.
3. Kreyszig.E, *Advanced Engineering Mathematics*, John Wiley & Sons. Singapore,

10th edition, 2012.
4. Veerajan. T, "*Engineering Mathematics I*", Tata McGraw Hill Publishing Co, New Delhi, 5th edition, 2006.
5. Grewal B.S, Higher Engineering Mathematics, Khanna Publications, 42nd Edition,2012.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Assignment**	**Attendance**	**Total**
	Marks	**10**	**10**	**20**	**5**	**5**	**50%**
End Semester Weightage							**50%**
Total							**100%**

SUBJECT CODE	**SUBJECT TITLE**	**L**	**T**	**P**	**TOTAL L+T+P**	**C**
UMA18E81	**BASIC STATISTICS**	**2**	**0**	**0**	**2**	**2**

INSTRUCTIONAL OBJECTIVES		**Student Outcomes**					
1.	To apply basics statistics in our day to day life	a					
2.	To solve practical problems	a					

UNIT - I: BASICS OF STATISTICS

Statistics- Definition - Primary and secondary Data- Limitations of statistics – Statistical methods.

UNIT - II : DIAGRAMMATIC REPRESENTATION

Graphical representation of data- Bar chart- Pie diagram- Classification of data- frequency Histogram- Polygon- Ogive curves

UNIT - III : MEASURES OF CENTRAL TENDENCY

Mean-Median- Mode- properties – Merits- Demerits- graphical method

UNIT - IV : MEASURES OF DISPERSION

Measures of Dispersion – Range- Mean deviation about mean –Standard Deviation- Properties- Coefficient of variation.

UNIT - V : CORRELATION

Simple correlation- Types of Correlation - Rank correlation- Repeated Ranks.

TEXT BOOK:

1. Pillai, R.S.N, Bagavathi, V. (2009), *Statistics, Theory and Practice*, 7Th Edition, S.Chand Ltd,New Delhi.

REFERENCES:

1. Ken Black, (2013), *Business Statistics for Contemporary Decision Making*, 7th Edition, John Wiley Publications
2. Gupta, S.P. (2011), *Applied Statistical Methods*, 4th Edition, Sultan Chand & Sons, New Delhi.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Assignment**	**Attendance**	**Total**
	Marks	**10**	**10**	**20**	**5**	**5**	**50%**
End Semester Weightage							**50%**
Total							**100%**

SUBJECT CODE	**SUBJECT TITLE**	**L**	**T**	**P**	**TOTAL L+T+P**	**C**
UMA18E82	**BASIC MATHEMATICS**	**2**	**0**	**0**	**2**	**2**

INSTRUCTIONAL OBJECTIVES		**Student Outcomes**				
1.	To apply basics of Mathematical techniques for its usage in Information Technology	a				
2.	To solve practical problems	a				

Unit - I: SETS, RELATIONS AND FUNCTIONS

Sets - representation of set - types of sets - operation on sets -Venn diagram.

Unit - II: SYMBOLIC LOGIC

Logic: Statements, connectives – conjunction- disjunction – negation – tautology-contradiction- logical equivalence

UNIT - III: NORMAL FORMS

Tautological implications- Disjunctive Normal form – Conjunctive normal form – Principal Disjunctive normal form - Principal Conjunctive normal form (Truth table method)

UNIT - IV: MATRICES
Types of matrices – addition – subtraction – determinant - multiplication of matrices - inverse of the matrix

UNIT - V: SOLUTION OF LINEAR EQUATIONS
Solution by inverse of matrix - Rank of the matrix – Echelon form - Cramer's Rule.

TEXT BOOKS:
1. Vittal.P.R., *Business Mathematics*, 3rd Edition Reprint, Margham Publications, Chennai, 2012.
2. Veerarajan, .T., *Discrete Mathematics*, 7thEdition,Tata-Macgraw Hill, New Delhi, 2006

REFRENCES:
1. Vittal.P.R., Mathematica Foundation, Re-Edition(2007), Margham Publication, Chennai, 2007.
2. T.K.Manickavachagam Pillai, Matrices, S.Viswanathan Printers & Publishers, 2012.
3. A.Singaravelu, *Algebra & Trigonometry*, Vol. I & II, Meenakshi Agency, 2003.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Assignment**	**Attendance**	**Total**
	Marks	**10**	**10**	**20**	**5**	**5**	**50%**
End Semester Weightage							**50%**
Total							**100%**

SUBJECT CODE	SUBJECT TITLE	L	T	P	TOTAL L+T+P	C
UMA18E83	NUMERICAL METHODS	2	0	0	2	2

INSTRUCTIONAL OBJECTIVES		Student Outcomes				
1.	To apply Numerical methods for prediction purpose.	a				
2.	To solve problems in real life situations.	a				

UNIT - I : SOLUTION FOR SYSTEM OF LINEAR EQUATIONS
Gauss elimination method - Gauss – Seidal method

UNIT - II : SOLUTION FOR ALGEBRAIC AND TRANSCENDENTAL EQUATIONS
Bisection method - Regula-Falsi method - Newton-Raphson method

UNIT - III: INTERPOLATION

Newton's forward and backward difference tables - Newton forward - backward difference formulae for equal intervals.

UNIT - IV: NUMERICAL DIFFERENTIATION

First derivative by Newton's forward and backward method.

UNIT - V: NUMERICAL INTEGRATION

Numerical Integration by Trapezoidal rule -Simpsons 1/3 rd rule - Simpsons 3/8 rule.
Solution for first order differential equations:
Taylor's method - Euler's method - Fourth order Runge-Kutta mehod(for first order differential equations only).

TEXT BOOK:

1. Kandasamy P, Thilagavathy. K and G. Gunawathy, Numerical Methods, S.Chand & Sons, 3rd Revised Edition, 2013.
2. Balagurusamy. E, Numerical Methods, Tata Mcgraw Hill Publishing Company, 3rd Edition, 2000.

REFERENCES:

1. Sivaramakrishna Das, P,Vijayakumari, C , *A Textbook of Numerical Methods*, 3rd Edition, Dorling Kindersley (India) Pvt.Ltd, licensees of Pearson Education in South Asia, 2013.
2. Vittal. P.R , & Malini.V. *Statistical and Numerical methods,* Margham Publications, Chennai, 2003.
3. Isaacson E. and Keller, H.B., "Analysis of Numerical Methods" Dover Publication, 1994.
4. Philips G.M and Taylor P.J., "Theory and Applications of Numerical Analysis", Academic Press, 1996.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Assignment**	**Attendance**	**Total**
	Marks	**10**	**10**	**20**	**5**	**5**	**50%**
End Semester Weightage							**50%**
Total							**100%**

SUBJECT CODE	SUBJECT TITLE	L	T	P	TOTAL L+T+P	C
UMA18E84	RESOURCE MANAGEMENT	2	0	0	2	2

	TECHNIQUES					

INSTRUCTIONAL OBJECTIVES		Student Outcomes				
1.	To apply basics of Mathematical techniques for its usage in Information Technology.	a				
2.	To solve practical problems.	a				

UNIT – I:

Introduction to operation Research - Principal Components of a decision problem - Phases of Operation research- Linear programming problem – Formulation - Graphical method.

UNIT – II:

Transportation problem – North West corner rule method-Least cost method- Row minima method- Column minima method- Vogel's approximation method (Initial Basic feasible solution only).

UNIT – III:

Assignment problem - Unbalanced Assignment problem -Travelling Salesmen Problem

UNIT – IV:

Zero sum game- Strategies- two person zero sum game- minimax - maximin rule- Games with saddle point- Games without saddle point- Mixed strategies - Graphical method

UNIT – V:

Sequencing problem: Processing each of n jobs through m machines - processing n jobs through 2 machines – processing n jobs through 3 machines.

TEXT BOOK:

1. Sundaresan, V, Ganapahy Subramanian, K.S. and Ganesan,K, *Resource Management Techniques*, A.R.Publications, Nagapattinam, 2011.
2. Kanti Swarup, P. K. Gupta, Man Mohan, *Operations Research*, S. Chand & Sons Education Publications, New Delhi, 12th Revised edition, 2004.

REFERENCES:

1. Vittal. P.R., *Operations Research*, Margham Publications, Chennai, 2003.
2. Gupta P.K. and Hira D.S., *Problems in Operations Research*, S.Chand & Co.
3. V.Sundaresan, K.S.Ganapathy Subramanian & K.Ganesan, *Resource Management Techniques*, AR Publications, Chennai, 2015.

4. V.Sundaresan, K.S.Ganapathy Subramanian & K.Ganesan, *Applied Operations Research for Management*, A.R.S. Publications, Arapakkam, Tamilnadu, 2006.

Course Nature : Theory							
Assessment Method (Max.Marks: 100)							
In Semester	**Assessment Tool**	**Cycle Test I**	**Cycle Test II**	**Model Examination**	**Assignment**	**Attendance**	**Total**
	Marks	**10**	**10**	**20**	**5**	**5**	**50%**
End Semester Weightage							**50%**
Total							**100%**