SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

(An Autonomous Institution)

(Approved by AICTE, New Delhi and Affiliated to Pondicherry University)

(Accredited by NBA-AICTE, New Delhi and Accredited by NAAC with "A" Grade)

Madagadipet, Puducherry

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SCHOOL OF ARTS AND SCIENCE

BACHELOR OF SCIENCE

IN

MATHEMATICS

ACADEMIC REGULATIONS 2020

(R-2020)

CURRICULUM AND SYLLABI

B.Sc Mathematics

VISION AND MISSION OF THE INSTITUTE

Vision

To be globally recognized for excellence in quality education, innovation and research for the transformation of lives to serve the society.

Mission

M1: Quality Education:

To provide comprehensive academic system that amalgamates the cutting edge technologies with best practices.

M2: Research and Innovation:

To foster value based research and innovation in collaboration with industries and institutions globally for creating intellectuals with new avenues.

M3: Employability and Entrepreneurship:

To inculcate the employability and entrepreneurial skills through value and skill based training.

M4: Ethical Values:

To instill deep sense of human values by blending societal righteousness with academic professionalism for the growth of society.

VISION AND MISSIONOF THE DEPARTMENT

Vision

To explore value based Mathematical Education through innovative and flexible curriculum that enables to decipher and adapt in multidisciplinary academic and research environments and the society at large.

Mission

M1: Innovation

To evolve students logical thinking, analytical reasoning and problem – solving skills.

M2: Social Development

To nurture the value of overhauling the community

M3: Optimal Development

To educate and train skillfully as resourceful mathematicians

STRUCTURE FOR UNDERGRADUATE PROGRAMME

B.Sc   Mathematics

Sl. No	Course Category	Breakdown of Credits
1	Modern Indian Language (Tamil / Hindi / French)	06
2	English	06
3	Discipline Specific Core Courses (DSC)	64
4	Discipline Specific Elective Courses (DSE)	16
5	Interdisciplinary courses (IDC)	24
6	Skill Enhancement Courses (SEC)	18
7	Employability Enhancement Courses (EEC*)	-
8	Ability Enhancement Compulsory Courses (AECC)	04
9	Open Elective (OE)	04
10	Extension Activity (EA)	01
Total		**143**

SCHEME OF CREDIT DISTRIBUTION – SUMMARY

Sl.No	Course Category	Credits per Semester						Total Credits
		I	II	III	IV	V	VI	
1	Modern Indian Language (Tamil / Hindi / French)	3	3	-	-	-	-	06
2	English	3	3	-	-	-	-	06
3	Discipline Specific Core Courses (DSC)	8	8	12	12	12	12	64
4	Discipline Specific Elective Courses (DSE)	-	-	4	4	4	4	16
5	Interdisciplinary courses (IDC)	6	6	6	6	-	-	24
6	Skill Enhancement Courses (SEC)	3	3	3	3	3	3	18
7	Employability Enhancement Courses (EEC*)	-	-	-	-	-	-	-
8	Ability Enhancement Compulsory Courses (AECC)	2	2	-	-	-	-	04
9	Open Elective (OE)	-	-	2	2	-	-	04
10	Extension Activity (EA)	-	1	-	-	-	-	01
Total		**25**	**26**	**27**	**27**	**19**	**19**	**143**

EEC are not included for CGPA calculation

B.Sc Mathematics

SEMESTER – I

Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A20TAT101 / A20HNT101 / A20FRT 101	**Tamil-I / Hindi-I / French - I**	MIL	3	0	0	3	25	75	100
2	A20GET101	General English I	ENG	3	0	0	3	25	75	100
3	A20MAT101	Differential Calculus	DSC	3	1	0	4	25	75	100
4	A20MAT102	Trigonometry	DSC	3	1	0	4	25	75	100
5	A20MAD101	Allied physics	IDC	3	1	0	4	25	75	100
Practical										
6	A20MAD102	Allied Physics practical	IDC	0	0	4	2	50	50	100
Skill Enhancement Courses										
7	A20MAS101	Analytical Geometry	SEC	3	0	0	3	100	0	100
Ability Enhancement Compulsory Course										
8	A20AET101	Environmental Studies	AECC	2	0	0	2	100	0	100
Employability Enhancement Course										
9	A20MAC101	Certificate Course-I	EEC	0	0	4	-	100	0	100
							25	475	425	900

SEMESTER – II

Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A20TAT201 / A20HNT201 / A20FRT201	**Tamil-II / Hindi- II / French - II**	MIL	3	0	0	3	25	75	100
2	A20GET202	General English II	ENG	3	0	0	3	25	75	100
3	A20MAT203	Sequence and Series	DSC	3	1	0	4	25	75	100
4	A20MAT204	Ordinary Differential Equations	DSC	3	1	0	4	25	75	100
5	A20CMD201	Financial and Management Accounting - I	IDC	3	1	0	4	25	75	100
Practical										
6	A20CMD202	Accounting Software Lab	IDC	0	0	2	2	50	50	100
Skill Enhancement Courses										
6	A20MAS202	Integral Calculus	SEC	3	0	0	3	100	0	100
Ability Enhancement Compulsory Course										
7	A20AET202	Public Administration	AECC	2	0	0	2	100	0	100
Extension Activity										
8	A20EAL201	National service scheme [NSS]	EA	0	0	2	1	100	0	100
Employability Enhancement Course										
9	A20MAC202	Certificate Course-II	EEC	0	0	2	-	100	0	100
							26	525	425	1000

B.Sc   Mathematics

SI. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
		SEMESTER – III								
				L	T	P		CAM	ESM	Total
Theory										
1	A20MAT305	Partial Differential Equation	DSC	3	1	0	4	25	75	100
2	A20MAT306	Fourier Series & Fourier Transforms	DSC	3	1	0	4	25	75	100
3	A20MAT307	Mechanics I (statics)	DSC	3	1	0	4	25	75	100
4	A20MAD305	Statistics - I	IDC	3	1	0	4	25	75	100
5	A20MAE3XX	DSE I*	DSE	3	1	0	4	25	75	100
6	A20XXO3XX	Open Elective-I**	OE	2	0	0	2	25	75	100
Practical										
7	A20MAD306	Statistics – I Lab [Using MATLAB]	IDC	0	0	4	2	50	50	100
Skill Enhancement Courses										
8	A20MAS303	Numerical Method using C	SEC	3	0	0	3	100	0	100
Employability Enhancement Course										
9	A20MAC303	Certificate Course-III	EEC	0	0	2	-	100	0	100
							27	400	500	900

SI. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
		SEMESTER – IV								
				L	T	P		CAM	ESM	Total
Theory										
1	A20MAT408	Discrete Mathematics	DSC	3	1	0	4	25	75	100
2	A20MAT409	Operations Research	DSC	3	1	0	4	25	75	100
3	A20MAT410	Mechanics II (Dynamics)	DSC	3	1	0	4	25	75	100
4	A20MAD407	Statistics - II	IDC	3	1	0	4	25	75	100
5	A20MAE4XX	DSE II*	DSE	3	1	0	4	25	75	100
6	A20XXO4XX	Open Elective-II**	OE	2	0	0	2	25	75	100
Practical										
7	A20MAD408	Statistics – II Lab [Using R]	IDC	0	0	4	2	50	50	100
Skill Enhancement Courses										
8	A20MAS404	Quantitative Aptitude & Reasoning - I	SEC	3	0	0	3	100	0	100
Employability Enhancement Course										
9	A20MAC404	Certificate Course-IV	EEC	0	0	2	-	100	0	100
							27	400	500	900

B.Sc Mathematics

Discipline Specific Electives are to be selected from the list given in Annexure I
** Open electives are to be selected from the list given in Annexure II

SI. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
			SEMESTER – V							
Theory										
1	A20MAT511	Abstract Algebra	DSC	3	1	0	4	25	75	100
2	A20MAT512	Real Analysis-I	DSC	3	1	0	4	25	75	100
3	A20MAT513	Complex Analysis	DSC	3	1	0	4	25	75	100
4	A20MAE5XX	DSE III*	DSE	3	1	0	4	25	75	100
Skill Enhancement Courses										
5	A20MAS505	Quantitative Aptitude & Reasoning - II	SEC	3	0	0	3	100	0	100
Employability Enhancement Course										
6	A20MAC505	Certificate Course-V	EEC	0	0	2	-	100	0	100
							19	300	300	600

SI. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
			SEMESTER – VI							
Theory										
1	A20MAT614	Linear Algebra	DSC	3	1	0	4	25	75	100
2	A20MAT615	Real Analysis-II	DSC	3	1	0	4	25	75	100
3	A20MAT616	Graph Theory	DSC	3	1	0	4	25	75	100
4	A20MAE6XX	DSE IV*	DSE	3	1	0	4	25	75	100
Skill Enhancement Courses										
5	A20MAS606	Mathematical Modelling	SEC	3	0	0	3	100	0	100
Employability Enhancement Course										
6	A20MAC606	Certificate Course-VI	EEC	0	0	2	-	100	0	100
							18	300	300	600

Discipline Specific Electives are to be selected from the list given in Annexure I
** Open electives are to be selected from the list given in Annexure II

B.Sc Mathematics

Annexure – I

DISCIPLINE SPECIFIC ELECTIVE COURSES

Discipline Specific Elective – I (Offered in Semester III)		
SI. No.	Course Code	Course Title
1	A20MAE301	Numerical Method
2	A20MAE302	Differential Geometry
3	A20CME301	Entrepreneurship and Innovation
Discipline Specific Elective – II (Offered in Semester IV)		
SI. No.	Course Code	Course Title
1	A20MAE404	Bessel's Functions
2	A20MAE405	Number Theory
3	A20CME402	Financial and Management Accounting – II
Discipline Specific Elective – III (Offered in Semester V)		
SI. No.	Course Code	Course Title
1	A20MAE507	Machine Learning
2	A20MAE508	Artificial Intelligence
3	A20CME503	Income Tax Law and Practice
Discipline Specific Elective – IV (Offered in Semester VI)		
SI. No.	Course Code	Course Title
1	A20MAE610	Fuzzy Algebra
2	A20MAE611	Astronomy
3	A20CME604	Financial Management

B.Sc   Mathematics

Annexure – II

OPEN ELECTIVE COURSES

Open Elective – I (Offered in Semester III)				
Sl. No	Course Code	Course Title	Offering Department	Permitted Departments
1	A20BTO301	Boon and Bane of Microbes	Bioscience	Chemistry, Food Science, Physics
2	A20BTO302	Microbial Technology for Entrepreneurship	Bioscience	Chemistry, Food Science, Physics
3	A20BTO303	Origin of Life	Bioscience	Chemistry, Food Science, Physics
4	A20CHO304	Food Analysis (Practical)	Chemistry	Bioscience, Computational Studies, Food Science, Mathematics, Physics
5	A20CHO305	Molecules of Life (Practical)	Chemistry	Bioscience, Computational Studies, Food Science, Mathematics, Physics
6	A20CHO306	Water Analysis (Practical)	Chemistry	Bioscience, Computational Studies, Food Science, Mathematics, Physics
7	A20CMO307	Fundamentals of Accounting and Finance	Commerce and Management	Bioscience, Chemistry, Computational Studies, English, Food Science, Mathematics, Media Studies, Physics
8	A20CMO308	Fundamentals of Management	Commerce and Management	Bioscience, Chemistry, Computational Studies, English, Food Science, Mathematics, Media Studies, Physics
9	A20CMO309	Fundamentals of Marketing	Commerce and Management	Bioscience, Chemistry, Computational Studies, English, Food Science, Mathematics, Media Studies, Physics
10	A20CPO310	Data Structures	Computational Studies	Mathematics
11	A20CPO311	Programming in C	Computational Studies	Commerce and Management, Mathematics, Media Studies
12	A20CPO312	Programming in Python	Computational Studies	Commerce and Management, Mathematics, Media Studies

B.Sc   Mathematics

13	**A20ENO313**	Conversational Skills	English	Chemistry, Commerce and Management, Computational Studies, Media Studies, Mathematics, Physics
14	**A20ENO314**	Fine-tune your English	English	Chemistry, Commerce and Management, Computational Studies, Media Studies, Mathematics, Physics
15	**A20ENO315**	Interpersonal Skills	English	Chemistry, Commerce and Management, Computational Studies, Media Studies, Mathematics, Physics
16	**A20MAO316**	Mathematical Modelling	Mathematics	Chemistry, Commerce and Management, Computational Studies, Physics, Biotechnology, Nutrition and Dietetics
17	**A20MAO317**	Quantitative Aptitude - I	Mathematics	Chemistry, Commerce and Management, Computational Studies, Physics, Biotechnology, Nutrition and Dietetics
18	**A20MAO318**	Statistical Methods	Mathematics	Chemistry, Commerce and Management, Computational Studies, Physics, Biotechnology, Nutrition and Dietetics
19	**A20VCO319**	Event Management	Media Studies	Chemistry, Commerce and Management, Computational Studies, English, Mathematics, Physics
20	**A20VCO320**	Graphic Design	Media Studies	Chemistry, Commerce and Management, Computational Studies, English, Mathematics, Physics
21	**A20VCO321**	Role of social media	Media Studies	Chemistry, Commerce and Management, Computational Studies, English, Mathematics, Physics
22	**A20NDO322**	Basic Food Groups	Food Science	Bioscience, Chemistry, Commerce and Management, Computational Studies, English, Mathematics, Media Studies, Physics, Tamil
23	**A20NDO323**	Life Style Management	Food Science	Bioscience, Chemistry, Commerce and Management, Computational Studies, English, Mathematics, Media Studies,

B.Sc   Mathematics

				Physics, Tamil
24	**A20NDO324**	Nutritive Value of Foods	Food Science	Bioscience, Chemistry, Commerce and Management, Computational Studies, English, Mathematics, Media Studies, Physics, Tamil
25	**A20PHO325**	Astrophysics	Physics	Bioscience, Chemistry, Computational Studies, Mathematics, Media Studies
26	**A20PHO326**	Basic of Modern Communication System	Physics	Bioscience, Chemistry, Computational Studies, Mathematics, Media Studies
27	**A20PHO327**	Bio-Physics	Physics	Bioscience, Chemistry, Computational Studies, Mathematics, Media Studies
28	**A20TMO328**	அடிப்படைத்தமிழ்	Tamil	Bioscience, Chemistry, Commerce and Management, Computational Studies, English, Food Science, Mathematics, Media Studies, Physics
29	**A20TMO329**	வாழ்வியல் இலக்கணம்	Tamil	Bioscience, Chemistry, Commerce and Management, Computational Studies, English, Food Science, Mathematics, Media Studies, Physics
30	**A20TMO330**	புதுக்கவிதைப் பட்டறை	Tamil	Bioscience, Chemistry, Commerce and Management, Computational Studies, English, Food Science, Mathematics, Media Studies, Physics

B.Sc Mathematics

Open Elective – II (Offered in Semester IV)				
Sl. No.	**Course Code**	**Course Title**	**Offering Department**	**Permitted Departments**
1	**A20BTO401**	Fermented Food	Bioscience	Chemistry, Food Science, Physics
2	**A20BTO402**	Herbal Technology	Bioscience	Chemistry, Food Science, Physics
3	**A20BTO403**	Self-Hygiene	Bioscience	Chemistry, Food Science, Physics
4	**A20CHO404**	C++ Programming and its Application to Chemistry	Chemistry	Computational Studies, Mathematics, Physics
5	**A20CHO405**	Computational Chemistry Practical	Chemistry	Computational Studies, Mathematics, Physics
6	**A20CHO406**	Instrumental Methods of Analysis	Chemistry	Computational Studies, Mathematics, Physics
7	**A20CMO407**	Essential Legal Awareness	Commerce and Management	Bioscience, Chemistry, Computational Studies, English, Food Science, Mathematics, Media Studies, Physics
8	**A20CMO408**	Essentials of Insurance	Commerce and Management	Bioscience, Chemistry, Computational Studies, English, Food Science, Mathematics, Media Studies, Physics
9	**A20CMO409**	Practical Banking	Commerce and Management	Bioscience, Chemistry, Computational Studies, English, Food Science, Mathematics, Media Studies, Physics
10	**A20CPO410**	Database Management Systems	Computational Studies	Commerce and Management, Media Studies, Mathematics
11	**A20CPO411**	Introduction to Data Science using Python	Computational Studies	Chemistry, Commerce and Management, English, Media Studies, Mathematics, Physics
12	**A20CPO412**	Web Development	Computational Studies	Commerce and Management, Media Studies, Mathematics
13	**A20ENO413**	English for Competitive Exam	English	Chemistry, Commerce and Management, Computational Studies, Media Studies, Mathematics, Physics

B.Sc   Mathematics

14	**A20ENO414**	English Next-India	English	Chemistry, Commerce and Management, Computational Studies, Media Studies, Mathematics, Physics
15	**A20ENO415**	Functional English	English	Chemistry, Commerce and Management, Computational Studies, Media Studies, Mathematics, Physics
16	**A20MAO416**	Discrete mathematics	Mathematics	Chemistry, Computational Studies, Physics
17	**A20MAO417**	Operations Research	Mathematics	Chemistry, Commerce and Management, Computational Studies, Physics, Biotechnology, Nutrition and Dietetics
18	**A20MAO418**	Quantitative Aptitude - II	Mathematics	Chemistry, Commerce and Management, Computational Studies, Physics, Biotechnology, Nutrition and Dietetics
19	**A20VCO419**	Basics of News Reporting	Media Studies	Chemistry, Commerce and Management, Computational Studies, English, Mathematics, Physics
20	**A20VCO420**	Scripting for media	Media Studies	Chemistry, Commerce and Management, Computational Studies, English, Mathematics, Physics
21	**A20VCO421**	Video Editing	Media Studies	Chemistry, Commerce and Management, Computational Studies, English, Mathematics, Physics
22	**A20NDO422**	Food Labelling	Food Science	Bioscience, Chemistry, Commerce and Management, Computational Studies, English, Mathematics, Media Studies, Physics, Tamil
23	**A20NDO423**	Hygiene and Sanitation	Food Science	Bioscience, Chemistry, Commerce and Management, Computational Studies, English, Mathematics, Media Studies, Physics, Tamil
24	**A20NDO424**	Nutrition for Adolescent	Food Science	Bioscience, Chemistry, Commerce and Management, Computational Studies, English, Mathematics, Media Studies,

B.Sc   Mathematics

				Physics, Tamil
25	**A20PHO425**	Digital Electronics	Physics	Bioscience, Chemistry, Computational Studies, Mathematics, Media Studies
26	**A20PHO426**	Geo-Physics	Physics	Bioscience, Chemistry, Computational Studies, Mathematics, Media Studies
27	**A20PHO427**	Space Science	Physics	Bioscience, Chemistry, Computational Studies, Mathematics, Media Studies
28	**A20TMO428**	சிறுகதைப் பயிற்சி	Tamil	Bioscience, Chemistry, Commerce and Management, Computational Studies, English, Food Science, Mathematics, Media Studies, Physics
29	**A20TMO429**	செய்தி வாசிப்பு பயிற்சி	Tamil	Bioscience, Chemistry, Commerce and Management, Computational Studies, English, Food Science, Mathematics, Media Studies, Physics
30	**A20TMO430**	நிகழ்த்துக்கலை	Tamil	Bioscience, Chemistry, Commerce and Management, Computational Studies, English, Food Science, Mathematics, Media Studies, Physics

B.Sc   Mathematics

மொழித்தாள்

	L	**T**	**P**	**C**	**Hrs**
தமிழ் –I	3	0	0	3	45

A20TAT101

(B.A., B.Sc., B.Com., B.B.A., & B.C.A., பாடப்பிரிவுகளுக்குமான பொதுத்தாள்)

பாடத்திட்டத்தின் நோக்கம்

- இரண்டாயிரம் ஆண்டுகால தமிழின் தொன்மையையும் வரலாற்றையும் அதன் விழுமியங்களையும் பண்பாட்டையு எடுத்துரைப்பதாக இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.

- தமிழ் இலக்கியம் உள்ளடக்கத்திலும், வடிவத்திலும் பெற்ற மாற்றங்கள், அதன் சிந்தனைகள்,அடையாளங்கள் ஆகியவற்றைக் காலந்தோறும் எழுதப்பட்ட இலக்கியங்களின் வழியாகக் கூறுவதற்கு இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.

- மொழியின் கட்டமைப்பைப் புரிந்து கொள்வதாக இப்பாடத்திட்டம் வடிவமைக்கப்பட்டுள்ளது.

- வாழ்வியல் சிந்தனைகள், ஒழுக்கவியல் கோட்பாடுகள், சமத்துவம், சூழலியல் எனப் பல கூறுகளை மாணவர்களுக்கு எடுத்துரைக்கும் விதத்தில் இப்பாடத்திட்டம் உருவாக்கப்பட்டுள்ளது.

- சிந்தனை ஆற்றலைப் பெருக்குவதற்குத் தாய்மொழியின் பங்களிப்பினை உணர்த்த இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.

பாடத்திட்டத்தின் வெளிப்பாடுகள்

CO1-இலக்கியங்கள் காட்டும் வாழ்வியல் நெறிமுறைகளைப் பேணிநடத்தல்.

CO2-நமது எண்ணத்தை வெளிப்படுத்தும் கருவியாகத் தாய்மொழியைப் பயன்படுத்துதல்.

CO3-தகவல் தொடர்புக்குத் தாய்மொழியின் முக்கியத்துவத்தை உணர்த்தல்.

CO4-தாய்மொழியின் சிறப்பை அறிதல்.

CO5-இலக்கிய இன்பங்களை நுகரும் திறன்களை வளர்த்தல்.

அலகு–1   (9 Hrs)

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   (9 Hrs)

இக்காலக் கவிதைகள்–2

1. ராஜா சந்திரசேகர் – கைவிடப்பட்ட குழந்தை

2. அனார் – மேலும் சில இரத்தக் குறிப்புகள்

3. சுகிர்தராணி – அம்மா

4. நா.முத்துக்குமார் – தூர்

அலகு–3   (9 Hrs)

சிற்றிலக்கியங்கள்

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

2. அழகர்கிள்ளைவிடு தூது – இதமாய் மனிதருடனே...(பாடல்–45)

3. நந்திக் கலம்பகம் – அம்பொன்று வில்லொடிதெல்...(பாடல்–77)

4. மூக்கூடற் பள்ளு – பாயும் மருதஞ் செழிக்கவே...(பாடல்–47)

5. குற்றாலக் குறவஞ்சி – ஓடக் காண்பதுமே...(பாடல்–9)

காப்பியங்கள்

1. மணிமேகலை–உலகறவி புக்க காதை– 'மாசுஇல் வால்ஒளி! –இந்நாள் போலும் இளங்கொடி கெடுத்தனை'. (28– அடிகள்)

B.Sc Mathematics

அலகு–4 **(9 Hrs)**

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 **(9 Hrs)**

மொழிப்பயிற்சி

1. கலைச்சொல்லாக்கம்

2. அகரவரிசைப்படுத்துதல்

3. மரபுத்தொடர்/பழமொழி

4. கலை விமர்சனம்

5. நேர்காணல்

உரைநடைப் பகுதி

1. உ.வே.சாமிநாதையர் – சிவதருமோத்திரச் சுவடி பெற்ற வரலாறு.

2. தஞ்சாவூர் – கூஜாவின் கோபம்.

3. இரா. பச்சியப்பன் – மாடல்ல மற்றையவை.

உரைநடை நூல்கள்

1. சக்திவேல், சு., தமிழ் மொழி வரலாறு, மாணிக்கவாசகர் பதிப்பகம், சிதம்பரம், 1988.

2. சிற்பி பாலசுப்ரமணியம் மற்றும் நீலபத்மநாபன், புதிய தமிழ் இலக்கிய வரலாறு, தொகுதி–1, 2, 3,சாகித்திய அகாட, புதுடெல்லி,2013.

3. பாரதியார், பாரதியார் கவிதைகள், குமரன் பதிப்பகம், சென்னை, 2011.

பார்வை நூல்கள்

1. கைலாசபதி, க., தமிழ் நாவல் இலக்கியம், குமரன் பதிப்பகம், வடபழனி, 1968.

2. சுந்தரராஜன், பே.கோ. சிவபாதசுந்தரம். சோ., தமிழில் சிறுகதை வரலாறும் வளர்ச்சியும், க்ரியா, சென்னை, 1989 .

3. பரந்தாமனார், அ.கி., நல்ல தமிழ் எழுத வேண்டுமா, பாரி நிலையம், சென்னை, 1998.

4. பாக்கியமேரி, வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு, என்.சி.எச். பதிப்பகம், சென்னை, 2011.

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

இணையத்தளங்கள்

1. http://www.tamilkodal.com

2. http://www.languagelab.com

3. http://www.tamilweb.com

B.Sc Mathematics

		L	T	P	C	Hrs
FRENCH - I						
A20FRT101	(Common to B.A., B.Sc., B.Com., B.B.A. & B.C.A)	**3**	**0**	**0**	**3**	**45**

OBJECTIVES

- To enable the students read, understand, and write simplesentences.
- To grasp relevant grammar forcommunication
- To learn about the land, people and culture ofFrance.

UNITÉ - 1

LeÇon 1 : Je m'appelle Elise. Et Vous ?

LeÇon 2 : Vous Dansez ? D'accord.

LeÇon 3 : Monica, Yukiko et compagnie

LeÇon 4 : Les Voisins de Sophie

UNITÉ - 2

LeÇon 5 : Tu vas au Luxembourg ?

LeÇon 6 : Nous Venons pour l'inscription

LeÇon 7 : A Vélo, en tain, en avoin

LeÇon 8 : Pardon, monsieru,le BHV s'il vous plait ?

UNITÉ - 3

LeÇon 9   : Au marche

LeÇon10 : On déjeune ici ?

LeÇon11 : On va chez ma copine ?

LeÇon12 : Chez Susana

TextBook
PrescribedTextbook : *FESTIVAL 1* - Méthode de Français
Authors : Sylvie POISSON-QUINTON
Michèle MAHEO-LE COADIC
Anne VERGNE-SIRIEYS
Edition : CLE International, Nouvelle Édition révisée : 2009.
Portions :Unités : 1, 2, 3.

Reference Book : Festival 1

B.Sc   Mathematics

A20GET101	GENERAL ENGLISH I (Common to B.A., and BCA)	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives
- To recognize the rhythms, metrics and other musical aspects of poetry.
- To read a variety of texts critically and proficiently.
- To enable the students to enjoy the flair of literature through the work of great writer.
- To make the students to know the functions of basic grammar and frame sentences without grammatical error.
- To enable them understanding the intrinsic nuances of writing in English language.

Course Outcomes
After the completion of this course, the students will be able to
CO1–Comprehend and discuss the various facets of selected poems.
CO2–Analyze and interpret texts written in English.
CO3–Read drama with graduate-level interpretive and analytical proficiency.
CO4–Improve the fluency and formation of grammatically correct sentence.
CO5–Enhance the writing skills for specific purposes.

UNIT I POETRY   (9Hrs)
1. John Milton: On His Blindness
2. William Wordsworth: Daffodils
3. Percy Bysshe Shelly: Ozymandias
4. Emily Dickinson: Because I could not stop for Death
5. Sarojini Naidu: The Queen's Rival

UNIT II PROSE   (9Hrs)
1. Francis Bacon: Of Love
2. Charles Lamb: A Dissertation upon Roast Pig

UNIT III DRAMA   (9Hrs)
1. Oscar Wilde: Lady Windermere's Fan

UNIT IV GRAMMAR   (9Hrs)
1. Parts of Speech
2. Tenses
3. Subject-Verb Agreement

UNIT V COMPOSITION   (9Hrs)
1. Essay Writing
2. Email

Text Books
1. James Barrett, "Brookside Musings: A Selection of Poems and Short Stories: Board of Editors", OrientLongman Limited, 2009
2. Wilde Oscar, "Lady Windermere's Fan. Published in The Importance of Being Earnest and Other Plays"London: Penguin, 1940.
3. Wren & Martin, "High School English Grammar & Composition". Blackie ELT Books. 2017

B.Sc   Mathematics

Reference Books

1. LalithaNatarajan and SasikalaNatesan, "English for Excellence: Poetry",Anuradha Publications. 2015.
2. Charles Lamb, "Selected Prose", Penguin Classics. United Kingdom, 2013.
3. UshaMahadevan, "Sunbeams: Empower with English", Emerald Publishers. Chennai. 2016.

Web References

1. https://www.englishcharity.com/of-love-by-francis-bacon-explanation/
2. https://www.poetry-archive.com/n/the_queens_rival.html
3. https://www.gradesaver.com/lady-windermeres-fan/study-guide/summary-act-i

B.Sc   Mathematics

	L	T	P	C	Hrs
A20MAT101 **DIFFERENTIAL CALCULUS**	3	1	0	4	60

Course Objectives

- To learn thedifferentiation techniques.
- To gain the knowledge of Tangents and normal.
- To understandthe concept of Maxima and minima of function of two and three variables.
- To introducethe angle between the curves.
- To knowthe notion of curvatures, Evolutes& Involutes and polar co-ordinates.

Course Outcomes

After completion of the course, the students will be able to

CO1 –Know the basics of differential calculus.
CO2 – Understand the tangent and normal concepts.
CO3 – Find maxima and minima for the functions.
CO4– Solve the angle between the curves.
CO5– Sketch curves in Cartesian and polar coordinate systems.

UNIT I DERIVATIVES   (12 Hrs)

Definition of a derivative – Differentiation techniques – Differentiation of Implicit functions – n^{th} derivative –Leibnitz formula for the nth derivative and applications .

UNIT IIFUNCTIONS OF SEVERAL VARIABLES   (12 Hrs)

Total differential coefficients – Homogeneous functions and Euler's theorem – Partial differentiation – Functions of two and three variables – Jacobians– Equations of tangent and normal –Taylor's theorem.

UNIT III MULTIPLIERS AND NORMAL CURVE   (12 Hrs)

Maxima and Minima of two variables – Method of Lagrange's method of undetermined multipliers – Angle of intersection of curves – Sub tangent and Sub Normal.

UNIT IV ANGLE BETWEEN TWO CURVES   (12 Hrs)

Angle between the radius vector and tangent – Angle between the intersectionsof two curves–Polar sub tangent and subnormal.

UNIT VCALCULUS   (12 Hrs)

Curvature – Radius of curvature in Cartesian and in Polar Coordinates – Centre of curvature – Evolutes and Involutes.

Text Books

1. T. K. ManicavachagomPillai, "Calculus Volume – I", Printers and Publishers, 1992.
2. S. Narayanan and T. K. ManicavachagomPillai, "Calculus Volume I", S.Viswanathan Printers Publishers Pvt Limited, 2011.
3. P. Kandasamy, K. Thilagavathy, "Mathematics for B.Sc", Vol - I &II", S.Chand& Company Ltd., New Delhi, 2004.

Reference Books

1. S. Arumugam and Isaac, "Calculus, Volume I", New Gamma Publishing House,1991.
2.G. B. Thomas and R. L. Finney, "Calculus and Analytic Geometry",Addison Wesley, 9th Edition, 1995.
3. P. R. Vittal, "Calculus", Margham Publication, 2004.

Web References

1.https://youtu.be/Cn54abNI2TI
2. https://youtu.be/Em5EUstK8Rw
3. https://www.sakshieducation.com/Engg/EnggAcademia/CommonSubjects/M1-Curvature Evolutes& Envelopes CurveTracing.pdf

B.Sc   Mathematics

A20MAT102	TRIGONOMETRY	L	T	P	C	Hrs
		3	1	0	4	60

Course Objectives
- To familiarize the Expansions of trigonometric functions and their Applications.
- To learn the types of hyperbolic functions.
- To study the basic concept of hyperbolic functions.
- To know the DeMoivre's Property and logarithm.
- To understand the concept of series in trigonometric functions.

Course Outcomes
After completion of the course, the students will be able to
CO1 – Expand Trigonometric functions.
CO2– Apply the Basic rules of Expansions of power series.
CO3– Understand the basic concepts o Hyperbolic Functions.
CO4 – Solve the problems by using DeMoivre's Property.
CO5– Understand various methods for the summation of infinite trigonometric series.

UNIT I EXPANSION OF θ AND EQUATIONS   (12 Hrs)

Expansions of $\cos n\theta$, $\sin n\theta$ – Expansion of $\tan n\theta$ in terms of $\tan \theta$ – Expansion of $\tan(A+B+C+...)$ – Formation of Equations.

UNIT II MULTIPLES OF θ AND CIRCULAR FUNCTIONS   (12 Hrs)

Powers of sine's and cosines of θ in terms of functions of multiples of θ – Expansion of $\sin \theta$ and $\cos \theta$ in a series of ascending powers of θ – Expansion of Inverse Circular Functions.

UNIT III HYPERBOLIC FUNCTIONS   (12 Hrs)

Definition – Hyperbolic function – Relation between Circular and Hyperbolic Functions – Inverse Hyperbolic Functions.

UNIT IV PROPERTIES ON CIRCLE AND FACTORS   (12 Hrs)

Resolving into Factors – Simple Problems only – De Moivre's Property on the Circle and Cote's Property on the Circle – Logarithm of complex quantities.

UNIT V SUMMATION OF TRIGONOMETRIC SERIES   (12 Hrs)

Summation of Trigonometric Series: Method of Differences – Gregory Series – Euler Series.

Text Books
1. S. Narayanan and, T. K. ManicavachagomPillai, "Trigonometry",S.Viswanathan Printers & Publishers Pvt.Ltd. Chennai, 2004.
2. P. Kandasamy, K. Thilagavathy, "Mathematics for B.Sc. Vol.- I, II, III & IV", S. Chand & Company Ltd., New Delhi-55, 2004.
3. N. P. Bali, "Trigonometry", Krishna PrakasanMandhir, 9, ShivajiRoad, Meerut (UP),1994.

ReferenceBooks
1. S. L. Loney, "Plane Trigonometry", Part II, Cambridge University Press, London.
2. S. Duraipandian and LaxmiDuraipandian, "Trigonometry". Emerald Publishers, Chennai,1984.
3. B. S. Grewal"Higher Engineering Mathematics". Khanna Publishers, New Delhi, 2003.

Web References
1. http://web.mit.edu/jorloff/www/18.01a-esg/OCWTrig.pdf
2. https://faculty.atu.edu/mfinan/trigbook.pdf
3.https://users.auth.gr/~siskakis/GelfandSaul-Trigonometry.pdf

B.Sc   Mathematics

		L	T	P	C	Hrs
A20MAD101	**ALLIED PHYSICS** (For B. Sc. Maths Students)	3	1	0	4	60

Course Objectives

- The course presents an introduction to the physics of the objects whose sizes span from atomic dimensions to macroscopic, human scale dimensions, and beyond: atoms, molecules, gases, liquids, and solids.
- The aim is to show how the properties of macroscopic bodies can be derived from the knowledge that matter is made up from atoms.
- Recognize the difference between physical and chemical properties.
- Distinguish between extensive and intensive properties.
- To learn the mathematical formulations of dynamics problems.

Course Outcomes

On Completion successful students will be able to demonstrate an understanding of:

CO1 –To describe the various phenomenon of Kinematics, Mechanics of Solids.

CO2 – To describe the various phenomenons of Sound & Acoustics of different structures.

CO3 –The relationships between physics on the atomic scale and the properties of matter. Techniques for

finding appropriate averages to predict macroscopic behavior.

CO4 – To describe the relationship and thermal behavior of various systems.

CO5 – To describe various concepts of Optics, spectroscopy, Application of light, Fiber Optics etc.,.

UNIT I MECHANICS (12 Hrs)

Projectile –range of horizontal and inclined plane- impulse – impact – Impulsive force – laws of impact – direct and oblique impact of smooth sphere – loss in kinetic energy - impact of smooth sphere on a smooth horizontal plane -Rotational motion and moment of inertia - calculation of Moment of inertia of ring - Hollow cylinder and sphere and Fly wheel - Acceleration of a body rolling down on an inclined plane - Compound Pendulum.

UNIT II SOUND (12 Hrs)

Introduction to longitudinal waves – Sound waves in gases – Energy distribution in sound waves – Intensity of sound waves – Longitudinal waves in a solid – Example: earthquake – Doppler Effect - Reflection and transmission of sound waves at boundaries – Diffraction of sound waves- Noise and music – Limits of human audibility – The decibel unit- Reverberation time-Sabine's formula for growth and decay – Acoustics of auditoriums and halls– Introduction to acoustic transducers.

UNIT III PROPERTIES OF MATTER (12 Hrs)

Stress – Strain – Hooke's law – Relation between elastic constants – poisson's Ratio – Expression for poisson's ratio in terms of elastic constants – work done in twisting –torsional pendulum – determination of rigidity modulus – Young's modulus – determination – uniform – non-uniform bending - Bending of beam, Torsion of cylinder, Bending beam, Determination of ´Y, η and σ.

UNIT IV THERMAL PHYSICS (12 Hrs)

Thermal conductivity – good & bad conductors – Forbe's method - Lee's disc method– relationship between thermal and electrical conductivities - Wiedemann Franz's law - Radiation- Prevost's theory of heat exchanges - law of cooling – Black body radiation - Kirchhoff's law - Wien's laws of energy distribution in black body radiation - Wien's displacement law- Rayleigh-Jean's law -Plank's law – pyrometry - solar constant – sources of solar energy &applications.

UNIT V OPTICS (12 Hrs)

B.Sc   Mathematics

Snell's law of reflection and refraction, reflection and refraction at spherical surfaces: formula for refraction at single spherical surface, sign convention -Electromagnetic spectrum – spectral responds of human eye – UV and IR spectroscopy – Raman Effect – Experimental arrangement – application of Raman effect - Fiber optic communication: Introduction – optic fiber – numerical aperture – coherent bundle – fiber optic communication system and its advantage – multimode fiber optic sensors.

Text Books
1. Sound, Saigal, S. Chand& Co, 1996
2. Mechanics, D.S. Mathur, S. Chand & Co, 2000
3. Properties of Matter,BrijlalSubramaniyam, S.Chand& Co, 2002

Reference Books
1. Fundamentals of Physics, ResnickHalliday& Walker, Wiley Publishing Co,
2. Principles of Physics, ResnickHalliday& Walker, Wiley Publishing Co,
3. Concepts of Physics, HC Verma, BharatiBhavan Publisher

Web References
1. https://ocw.mit.edu/courses/physics/
2. https://www.einstein-online.info/en/category/elementary/
3. https://www.physicsclassroom.com/

B.Sc   Mathematics

A20MAD102	**ALLIED PHYSICS PRACTICAL** (For B. Sc., Maths Students)	L	T	P	C	Hrs
		0	0	4	2	40

Course Objectives

- To provide a practical understanding of some of the concepts learnt in the theory course on Physics.
- Evaluate the process and outcomes of an experiment quantitatively and qualitatively.
- Extend the scope of an investigation whether or not results come out as expected.
- Conduct an experiment collaboratively and ethically.
- Collect data and revise an experimental procedure iteratively and reflectively.

Course Outcomes

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

CO1 –Ability to characteristics the Semiconductor devices. Capable of handling screw gauge, vernier Caliperand Polarimeter to find the surface tension.

CO2 –Acquired basic knowledge about Potentiometer and magnetic field due to a current carrying coil.

CO3 –Ability to prepare formal laboratory reports describing the results of experiments and to interpret the data from the experiments

CO4 – Ability to prepare formal laboratory reports describing the results of experiments and to interpret thedata from the experiments.

CO5–Ability to know the practical knowledge to describe the experiments and to correlate the theoretical values

List of Experiments

1. Newton's Ring – Determination of focal length of convex mirror.
2. Young's Modulus – Uniform bending.
3. Non-uniform Bending – Young's modulus.
4. Spectrometer – Determination of refractive index.
5. Lee's Disc – Thermal conductivity.
6. Sonometer – verification of Laws.
7. Spectrometer – Wavelength determination using grating – normal incidence.
8. Viscosity of Liquid – Poiseuille's flow method
9. Surface tension – Drop weight method.
10. Specific capacity of a liquid by cooling.

Text Books

1. B.Sc Practical Physics, CL Arora, S Chand & Co, 2010
2. Practical Physics M.N. Srinivasan, Sultan son Pub.
3. V Y Rajopadhye and V L Purohit, Textbook of experimental Physics.

Reference Books

1. Practical Physics C.C Ouseph, V.J.Rao and V.Vijayendran
2. D P Khandelwal, Laboratory Manual of Physics for UG classes (Vani Pub. House, New Delhi)
3. Physics for Degree Students, CL Arora, S.Chand& Co, 2010

B.Sc   Mathematics

Web References

1. http://www.iiserpune.ac.in/~bhasbapat/phy221_files/Gratings%20and%20Prism%20Spectrometer.pdf
2. https://www.tec-science.com/thermodynamics/heat/experimental-setup-for-determining-the-thermal-conductivity/
3. https://spark.iop.org/interference-air-wedge#gref

B.Sc   Mathematics

	L	T	P	C	Hrs
A20MAS101 **ANALYTICAL GEOMETRY**	3	0	0	3	45

Course Objectives

- To learn analytical geometry in two dimensions
- To acquire knowledge of planes and its properties as 3-dimensional objects
- To understand the concepts of skew lines and spheres
- To know the concept related to geometry of three dimension
- Tofamiliarizethe basics of conicoid.

Course Outcomes

After completion of the course, the students will be able to

CO1 – Gain a good knowledge about conic sections.
CO2 – Study more about straight lines using coplanar and shortest distance between the lines.
CO3 – Analyze the concept associated with spheres and solve problems using sphere.
CO4 – Analyzemore about three dimensions using cone and cylinder.
CO5 – Familiarize the congruent conic.

UNIT I TWO DIMENSIONS (9 Hrs)

Analytical geometry of 2D – polar coordinates equation of a conic – directrix – chord – tangent – normal – simple problems – only in deriving equation of a conic.

UNIT II THREE DIMENSIONS (9 Hrs)

Analytical Geometry 3D – straight lines – coplanarity of straight line – shortest distance (S.D) and equation of S.D between two lines – simple problems.

UNIT III SPHERE (9 Hrs)

Sphere: standard equation sphere – results based on the properties of a sphere – tangent plane to a sphere – equation of a circle.

UNIT IV CONE AND CYLINDER (9 Hrs)

Cone and Cylinder: Cone whose vertex is at the origin – envelope cone of a sphere – right circular cone – equation of a cylinder – right circular cylinder.

UNIT V CONICOIDES (9 Hrs)

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

Text Books

1. P. DuraiPandian& others, "Analytical Geometry", United Kingdom Publication, 1968.
2. Thomas Grenfell Vivian*, "*Analytical Geometry for Beginners: Part I. the Straight Line and Circle" Nabu Press, 2010*.*
3. T. K. ManicavachagomPillai& T. Natrajan, "Analytical Geometry, Part II -Three dimensions", S.Viswanathan, Printers & Publishers Pvt. Ltd. Chennai, 2011.

Reference Books

1. T.K. M. Pillai& Others, "Analytical Geometry of 2D", Viswanathan Publications, 2006.
2. M. L. Khanna, "Solid Geometry" Jainath& Co Publishers, Meerut, 2015.
3. D. Chatterjee, *"*Analytical Geometry: Two and Three Dimensions", Alpha Science International Limited, 2009.

Web References

1. https://www.coursera.org/lecture/fe-exam/analytic-geometry-and-trigonometry-straight-lines-SV8UL
2. https://www.askiitians.com/iit-jee-3d-geometry/
3. http://paulbourke.net/geometry/circlesphere/

B.Sc   Mathematics

A20AET101	**ENVIRONMENTAL STUDIES** (For all UG Degree Courses)	**L**	**T**	**P**	**C**	**Hrs**
		2	0	0	2	30

Course Objectives
- To gain knowledge on the importance of natural resources and energy.
- To know the structure and function of an ecosystem.
- To imbibe an aesthetic value with respect to biodiversity, understand the threats and its conservation and appreciate the concept of interdependence.
- To know the causes of types of pollution and disaster management.
- To observe and discover the surrounding environment through field work.

Course Outcomes
After completion of the course, the students will be able to
CO1 – Understand about the various resources.
CO2 – Learn about the biodiversity.
CO3 – Learn the different types of pollution and to prevent the pollution.
CO4 – Know about the pollution Act.
CO5 – Observe various environmental issues in surroundings.

UNIT I INTRODUCTION TO ENVIRONMENTAL SCIENCES:NATURAL RESOURCES (6 Hrs)
Environmental Sciences - Relevance - Significance - Public awareness - Forest resources - Water resources - Mineral resources - Food resources - conflicts over resource sharing - Exploitation - Land use pattern - Environmental impact - fertilizer - Pesticide Problems - case studies.

UNIT II ECOSYSTEM, BIODIVERSITY AND ITS CONSERVATION (6 Hrs)
Ecosystem - concept - structure and function - producers, consumers and decomposers - Food chain - Food web - Ecological pyramids - Energy flow - Forest, Grassland, desert and aquatic ecosystem. Biodiversity - Definition - genetic, species and ecosystem diversity - Values and uses of biodiversity - biodiversity at global, national (India) and local levels - Hotspots, threats to biodiversity - conservation of biodiversity –Insitu&Exsitu.

UNIT III ENVIRONMENTAL POLLUTION AND MANAGEMENT (6 Hrs)
Environmental Pollution - Causes - Effects and control measures of Air, Water, Marine, soil, solid waste, Thermal, Nuclear pollution and Disaster Management - Floods, Earth quake, Cyclone and Landslides. Role of individuals in prevention of pollution - pollution case studies.

UNIT IV SOCIAL ISSUES - HUMAN POPULATION (6 Hrs)
Urban issues - Energy - water conservation - Environmental Ethics - Global warming - Resettlement and Rehabilitation issues - Environmental legislations - Environmental production Act. 1986 - Air, Water, Wildlife and forest conservation Act - Population growth and Explosion - Human rights and Value Education - Environmental Health - HIV/AIDS - Role of IT in Environment and Human Health - Women and child welfare - Public awareness - Case studies.

UNIT V FIELD WORK (6 Hrs)
Visit to a local area / local polluted site / local simple ecosystem - Report submission REFERENCES

Text Books
1. BharuchaErach, "Textbook of Environmental Studies for Undergraduate Courses", Telangana, India: Orient Black Swan, Second edition, 2013,
2. BasuMahua, Savarimuthu Xavier, "SJ Fundamentals of Environmental Studies". Cambridge, United Kingdom: Cambridge University Press ,2017.
3.Agarwal, K.C "Environmental Biology", Nidi Publ. Ltd. Bikaner,2001 .

B.Sc   Mathematics

Reference Books

1. Kumarasam.K., A. Alagappa Moses AND M.Vasanthy, "Environmental studies", Bharathidasan university pub, 1, trichy2004.
2. Rajamannar, "Environmental studies", EVR College PUB, Trichy2004
3. Kalavathy, S. (ED.) ,"Environmental Studies", Bishop Heber College PUB., Trichy 2004.

Web References

1. https://www.youtube.com/watch?v=78prsPYm98g
2. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2792934/
3. https://www.frontiersin.org/articles/505570

B.Sc   Mathematics

	மொழித்தாள் – 2	L	T	P	C	Hrs
A20TAT202	(B.A., B.Sc., B.Com., B.B.A., & B.C.A., பாடப்பிரிவுகளுக்குமான பொதுத்தாள்)	3	0	0	3	45

பாடத்திட்டத்தின் நோக்கம்

- இரண்டாயிரம் ஆண்டுகால தமிழின் தொன்மையையும் வரலாற்றையும் அதன் விழுமியங்களையும் பண்பாட்டையும் எடுத்துரைப்பதாக இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.

- தமிழ் இலக்கியம் உள்ளடக்கத்திலும், வடிவத்திலும் பெற்ற மாற்றங்கள், அதன் சிந்தனைகள், அடையாளங்கள் ஆகியவற்றைக் காலந்தோறும் எழுதப்பட்ட இலக்கியங்களின் வழியாகக் கூறுவதற்கு இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.

- மொழியின் கட்டமைப்பைப் புரிந்து கொள்வதாகவும் பாடத்திட்டம் வடிவமைக்கப்பட்டுள்ளது.

- வாழ்வியல் சிந்தனைகள், ஒழுக்கவியல் கோட்பாடுகள், சமத்துவம், சூழலியல் எனப் பல கூறுகளை மாணவர்களுக்கு எடுத்துரைக்கும் விதத்தில் இப்பாடத்திட்டம் உருவாக்கப்பட்டுள்ளது.

- சிந்தனை ஆற்றலைப் பெருக்குவதற்குத் தாய்மொழியின் பங்களிப்பினை உணர்த்த இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.

பாடத்திட்டத்தின் வெளிப்பாடுகள்

CO1-இலக்கியங்கள் காட்டும் வாழ்வியல் நெறிமுறைகளைப் பேணிநடத்தல்.

CO2-நமது எண்ணத்தை வெளிப்படுத்தும் கருவியாகத் தாய்மொழியைப் பயன்படுத்துதல்.

CO3-தகவல் தொடர்ப்புக்குத் தாய்மொழியின் முக்கியத்துவத்தை உணர்தல்.

CO4-தாய்மொழியின் சிறப்பை அறிதல்.

CO5-இலக்கிய இன்பங்களை நுகரும் திறன்களை வளர்த்தல்.

அலகு–1 **(9 Hrs)**

எட்டுத்தொகை:

1. குறுந்தொகை (பாடல்–130).

2. நற்றிணை (பாடல்–27).

3. அகநானூறு (பாடல்–86)

4. ஐங்குறுநூறு (பாடல்–203)

5. கலித்தொகை– பாலைத்திணை (பாடல்–9)

6. புறநானூறு (பாடல்–235)

பத்துப்பாட்டு:

1. சிறுபாணாற்றுப்படை (அடிகள்–126–143)

2. முல்லைப்பாட்டு (6–21)

அலகு–2 **(9 Hrs)**

பதினெண் கீழ்க்கணக்கு:

1. திருக்குறள்– வெகுளாமை (அதிகாரம்–31), காதல் சிறப்புரைத்தல் (அதிகாரம்–113)

2. நாலடியார் – நல்லார் எனத்தான் (221)

3. திரிகடுகம்– கோலஞ்சி வாழும் குடியும் (33)

4. இனியவை நாற்பது– குழவி தளர்நடை (14)

5. கார் நாற்பது– நலமிகு கார்த்திகை (26)

6. களவழி நாற்பது–கவளங்கொள் யானை (14)

அலகு–3 **(9 Hrs)**

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)

B.Sc   Mathematics

T. ௬௨

5. திருமூலர் – அன்பு சிவம் இரண்டு (திருமந்திரம்)

வைணவம் – நாலாயிரத் திவ்வியப் பிரபந்தம்

1. பேயாழ்வார் – திருக்கண்டேன் பொன்மேனி....

2. பெரியாழ்வார் – கருங்கண் தோகை மயிற் பீலி....

3. தொண்டரடிப்பொடிஆழ்வார் – பச்சைமாமலை போல்....

4. ஆண்டாள் – கருப்பூரம் நாறுமோ? கமலப்பூ....

5. திருமங்கையாழ்வார் – வாடினேன் வாடி வருந்தினேன்....

இஸ்லாமியம்

சீறாப்புராணம்– பாடல் நின்ற பிணை மானுக்குப்...5 பாடல்கள் (பாடல் எண்கள் 61–65)

கிறித்துவம்

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

அலகு – 4   **(9 Hrs)**

தமிழ் இலக்கிய வரலாறு

1. சங்க இலக்கியங்கள்

2. நீதி இலக்கியங்கள்

3. பக்தி இலக்கியங்கள்

4. காப்பியங்கள்

அலகு–5   **(9 Hrs)**

சிறுகதைகள்

1. புதுமைப்பித்தன் – அகலிகை

2. நா. பிச்சமூர்த்தி – வேப்பமரம்

3. அகிலன் – ஒரு வேளைச்சோறு

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. பாரதேதேவி – மாப்பிள்ளை விருந்து

பார்வை நூல்கள் :

1. அரசு, வீ., இருபதாம் நூற்றாண்டு சிறுகதைகள் நூறு, அடையாளம் பதிப்பகம், திருச்சி, 2013.

2. அருணாச்சலம், பா., பக்தி இலக்கியங்கள், பாரி நிலையம், சென்னை, 2010.

3. தமிழண்ணல், புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு, மீனாட்சி புத்தக நிலையம், மதுரை, 2000.

4. பாக்கியமேரி, வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு, என்.சி.பி.எச். பதிப்பகம், சென்னை, 2011.

5. பசுபதி, மா. வே., செம்மொழித் தமிழ் இலக்கண இலக்கியங்கள், தமிழ்ப் பல்கலைக்கழகம், 2010 .

உரைநடை நூல்கள் :

1. அன்பு, பா., மா.பொ.சி யின் ஒரு இலக்கிய நூல்கள் ஒரு மதிப்பீடு, உலகத் தமிழ் ஆராய்ச்சி நிறுவனம், சென்னை, 1983.

2. பிள்ளை, கே.கே., தமிழக வரலாறும் மக்களும் பண்பாடும், உலகத் தமிழ் ஆராய்ச்சி நிறுவனம், சென்னை, 2000.

3. ஜெயமோகன், நவீன இலக்கிய அறிமுகம், உயிர்மெய் பதிப்பகம், சென்னை, 1995.

இணையத்தளங்கள் :

1. http://www.tamilkodal.com

2. http://www.languagelab.com

3. http://www.tamilweb.com

B.Sc Mathematics

FRENCH – II	**L**	**T**	**P**	**C**	**Hrs**
A20FRT202 (Common to B.A., B.Sc., B.Com., B.B.A. & B.C.A)	**3**	**0**	**0**	**3**	**45**

OBJECTIVES

- To enable the students read, understand, and write simplesentences.
- To grasp relevant grammar forcommunication
- To learn about the land, people and culture ofFrance.

UNITÉ - 4

Leçon 13 : Qu'est -ce qu'on leur offre ?

Leçon 14 : On solde !

Leçon 15 : Découvrir Paris en bus avec l'open Tour

Leçon 16 : Si vous gagne vous ferez quoi

UNITÉ - 5

Leçon 17 : Parasol ou parapluie ?

Leçon 18 : Quand il est midi á Paris

Leçon 19 : Vous allez Vivre

Leçon 20 : L'avenir du Français

UNITÉ - 6

Leçon 21 : Souvenirs d'enfance

Leçon 22 : j'ai fait mes études á Lyon 2

Leçon 23 : Retour des Antilles

Leçon 24 : Au voleur ! Au voleur

TextBooks

PrescribedTextbook : *FESTIVAL 1* - Méthode de Français
Authors : Sylvie POISSON-QUINTON
Michèle MAHEO-LE COADIC
Anne VERGNE-SIRIEYS
Edition : CLE International, Nouvelle Édition révisée : 2009.

Reference Book

Festival 1

B.Sc   Mathematics

		L	**T**	**P**	**C**	**Hrs**
A20GET202	**GENERAL ENGLISH- II** **(Common to B.A, B.Sc. and BCA)**	3	0	0	3	45

Course Objectives

- To recognize poetry from a variety of cultures, languages and historic periods
- To develop the intensive study of language by critical reading
- To identify the various genres and analyze the works of writers in English
- To expand the basic understanding of targeted grammatical structures
- To understand the conventions of writing in English

Course Outcomes

After completion of the course, the students will be able to

CO1-Understand and appreciate poetry as a literary art form

CO2-Comprehend and recognize relationship between ideas, events and facts

CO3-Learn to explore characters and their conflicts, dilemmas and extend their response to stories

CO4-Apply grammatical structures meaningfully and appropriately in oral and written form

CO5-Write effectively and coherently

UNIT I POETRY (9 Hrs)
1. Lord Byron - She Walks in Beauty
2. Robert Frost - Stopping by Woods on a Snowy Evening
3. Nissim Ezekiel - Night of the Scorpion
4. Rabindranath Tagore - Where the Mind is Without Fear

UNIT II PROSE (9 Hrs)
1. Ernest Hemingway - A Day's Wait
2. Anton Chekhov - The Lottery Ticket

UNIT III FICTION (9 Hrs)
1. Jane Austen-Pride and Prejudice

UNIT IV GRAMMAR (9 Hrs)
1. Voice , Conditionals , Coherence

UNIT V COMPOSITION (9 Hrs)
1. Letter Writing
2. Report Writing

Text Books

1. Sharma, O.C "The Approach to Life: A Selection of English Prose", Orient Longman Publication, 1st Edition, 2009.
2. DipankarPurkayastha&Dipendu Das &JaydeepChakrabarty,"Brookside Musings: A Selection of Poems and Short Stories", Orient Longman Publication, 1st Edition, 2009.
3. Wren & Martin, "English Grammar and Composition", Chand Publication, 18th Edition, 2017.

Reference Books

1. LalithaNatarajan&SasikalaNatesan, "English for Excellence: Poetry", Anuradha Publications, 1st Edition, 2015.
2. Ernest Hemingway, "The Complete Short Stories of Earnest Hemingway", Simon and Schuster Publication, 1st Edition, 1998.
3. S.C.Gupta, "English Grammar & Composition", Arihant Publication, Old Edition, 2003.

Web References

1. https://www.litcharts.com/poetry/lord-byron/she-walks-in-beauty
2. https://americanliterature.com/author/anton-chekhov/short-story/the-lottery-ticket
3. https://www.cliffsnotes.com/literature/p/pride-and-prejudice/book-summary

B.Sc   Mathematics

	L	**T**	**P**	**C**	**Hrs**
A20MAT203 **SEQUENCE AND SERIES**	**3**	**1**	**0**	**4**	**60**

Course Objectives
- To learn about the types of sequences.
- To know the nature of sequence by using various test.
- To understand sequence and series of real valued functions.
- To learn the types of series.
- To study the behavior, the series using Cauchy test.

Course Outcomes
After completion of the course, the students will be able to
CO1 – Recognize bounded, convergent, divergent, Cauchy and monotonic sequences.
CO2 – Understandbehavior of monotone sequences and its applications.
CO3– Know the limits of the sequence and Cauchy sequence.
CO4– Understandthe concept of series and its various types with examples.
CO5–Understand the types of seriestests with examples.

UNIT I TYPES OF SEQUENCES (12 Hrs)
Sequences – Bounded sequences – Monotonic sequences – Convergent sequences – Divergent sequences – Oscillating sequences.

UNIT II TEST OF CONVERGENTSEQUENCES (12 Hrs)
Algebra of limits – Behavior of Monotonic functions – Logarithmic test – Leibnitz's test

UNIT III LIMITS OF SEQUENCE (12 Hrs)
Some theorems on limits – Sub sequences – limit points: Cauchy sequences.

UNIT IV TEST OF SERIES (12 Hrs)
Series – Infinite series – Cauchy's general principle of convergence – Comparison test theorem and test of convergence using comparison test.

UNIT V CONVERGENCE AND ABSOLUTE CONVERGENCE (12 Hrs)
Test of convergence using D'Alebert's ratio test – Cauchy's root test – Cauchy Integral test – Alternating series – Absolute convergence.

Text Books
1. S. Arumugam, A. Thangapandi and Isaac, "Sequences and Series", New Gamma Publishing house, 2015.
2. EllinaGrigorieva, "Methods of solving sequence and series Problems", Birkhäuser; 1st Edition, 2016.
3. Charles H.C.Little, KeeL.Teo, Bruce van Brunt, "Real Analysis via Sequence and series", Springer, 2015.

Reference Books
1.KonradKnopp, "Infinite Sequences and Series", Dover Publications, 2012.
2. S.C. Malik, SavitaArora, "Mathematical Analysis", New age International Publishers,4th edition, 1992.
3. P. Siva Ramakrishna Das, E. Rukmangadachari, "Engineering Mathematics", Pearson India Education Services Pvt. Ltd., 2016.

Web References
1. https://www.youtube.com/watch?v=tHy3TXmZpF0
2. http://sakshieducation.com/Engg/EnggAcademia/CommonSubjects/MathematicsUnit-I.pdf
3. http://homepages.math.uic.edu/~saunders/MATH313/INRA/INRA_Chapter2.pdf

B.Sc Mathematics

A20MAT204	ORDINARY DIFFERENTIAL EQUATIONS	L	T	P	C	Hrs
		3	1	0	4	60

Course Objectives

- To identify an ordinary differential equation and its order.
- To evaluate first order differential equations.
- To find solutions of exact equations.
- To know about the particular integral.
- To solve differential equations using variation of parameter.

Course Outcomes

After completion of the course, the students will be able to

CO1 – Understand the order, degree of differential equation.
CO2 – Determine solutions to first order linear differential equations.
CO3 – Familiarize the orthogonal trajectory of the system of curves on a given surface.
CO4 – Solving linear differential equation with constant coefficient.
CO5 – Find the complete solution of a differential equation with constant coefficients by variation of Parameter.

UNIT I FIRST ORDER DIFFERENTIAL EQUATIONS (12 Hrs)

Differential Equation, Order and Degree of a Differential equation – Formation of a differential equation – Wronskian – definition – linearly dependent and independent set of functions.

UNIT II EXACT DIFFERENTIAL EQUATIONS (12 Hrs)

Equation of first order and first degree – separation of variables – Necessary and sufficient conditions for a differential equation of first order and first degree to be exact – integrating factor – linear Differential equation – Equation reducible to linear form (Bernoulli's equation).

UNIT III DIFFERENTIAL EQUATIONS (12 Hrs)

Trajectories – orthogonal trajectories (cartesian and polar co-ordinates) – Equation solvable for p – Equation solvable for x and y – Equation in Clairaut's form - General and singular solution.

UNIT IV DIFFERENTIAL EQUATIONS (HIGHER ORDER) (12 Hrs)

Linear differential equations with constant coefficients – finding complementary function and Particular Integrals of the form $e^{mx}, \sin mx, x^m, e^{ax} X$ where X is a function of x - Solving Homogeneous linear equations (Cauchy- Euler Equations).

UNIT V DIFFERENTIAL EQUATIONS WITH VARIABLE COEFFICIENTS (12 Hrs)

Equation reducible to Homogeneous linear form (Legendre's linear equations) –Method of variation of parameters – Solving ordinary simultaneous differential equation with constant coefficients.

Text Books

1. M. D. Raisinghania, "Ordinary and Partial Differential Equations", S. Chand & Company Ltd, 2020.
2. E. A. Coddington, " An Introduction to Ordinary Differential Equations", Prentice Hall of India,1991.
3. S. C. Deo, Y. Lakshmi Nathan and V. Raghavendra, "Text Book of Ordinary Differential Equation", Tata McGraw Hill, New Delhi, 2nd Edition, 2002.

Reference Books

1.S.Narayanan, T.K. ManickavachagomPillaI,"Differential Equations and its Applications" ,Viswanathan Printers& Publishers Pvt. Ltd., 2015.
   2. Dr. Arumugam and Mr. A. ThangapandiIssac, "Differential Equations and its Applications",New Gamma Publishing House,2014.
   3.E. A. Coddington and H. Davinson, "Theory of Ordinary Differential Equations", McGraw Hill, 1955.

B.Sc   Mathematics

Web References

1. https://mathworld.wolfram.com/OrdinaryDifferentialEquation.html
2. https://nptel.ac.in/courses/111/106/111106100/
3. https://www.youtube.com/watch?v=FU-7xJLpoWg

B.Sc   Mathematics

		L	T	P	C	Hrs
A20CMD201	**FINANCIAL AND MANAGEMENT ACCOUNTING-I**	4	0	0	4	60

(Common to B.C.A. & B.Sc. Mathematics)

Course Objectives

- To develop a deeper understanding of the Fundamentals of Accounting
- To appreciate the role and significance of subsidiary books in accounting system
- To learn the preparation of basic financial statements of small business entities.
- To gain knowledge about the preparation of cash flow statements.
- To develop the knowledge of accounting in computerised environment.

Course Outcomes
After completion of the course, the students will be able to
CO1 –Explain the concepts of accounting and solve simple problems on fundamentals of accounting
CO2 –Prepare various subsidiary books including different types of cash books.
CO3 –Prepare the basic financial statements of various business entities
CO4 –Handle the preparation and understanding of cash flow statements
CO5 – Explain the role of computers in Accounting and Automation.

UNIT I THEORETICAL FRAMEWORK OF ACCOUNTING (10 Hrs)
Meaning and Scope of Accounting – Nature and Objectives of Accounting – Distinction between Book-Keeping and Accountancy – Accounting Transactions – Principle of Double Entry – Branches of Accounting: Financial, Cost and Management Accounting – Accounting Equation – Significant Accounting Concepts and Conventions: Business Entity, Money Measurement, Going Concern, Materiality, and Conservatism.

UNIT II ACCOUNTING PROCESS (16 Hrs)
Business Transactions – Recording of Business Transactions in Accounting – Book of Prime Record: Journal, Steps in Journalising – Book of Main Record: Ledger – Posting to Ledger. Extracting Trial Balance from Ledger Accounts.Simple Problems in Journal, Ledger and Trial Balance.
Subsidiary Books – Meaning and Importance – Types of Subsidiary Books – Types of Cash Book – Simple Problems in Sales Book, Purchases Book, and Simple Cash Book.

UNIT III BASIC FINANCIAL STATEMENTS (16 Hrs)
Profit and Loss Account or Income Statement – Meaning, Contents, and Preparation – Balance Sheet or Position Statement – Meaning, Contents and Preparation – Adjustments in Final Accounts (Closing Stock, Expenses and Income Outstanding, Expenses paid and Income received in advance, Depreciation, Provision for Bad and Doubtful Debts, Provision for Discount on Creditors, Interest on Capital and Interest on Drawings). Practical Problems on Financial Statements with basic adjustments. Vertical Form of Financial Statements – Income Statement and Balance Sheet.

UNIT IVCASH FLOW STATEMENT (12 Hrs)
Concept of Funds and Cash in Accounting – Importance of Cash Flow in Business – Meaning and Need of Cash Flow Statement – Use of Accounting Standard 3 in the preparation of Cash Flow Statement – Classification of Cash Flow based on activities: Operating, Investing and Financing. Preparation of Cash Flow Statements.Simple Problems.

UNIT V ACCOUNTING IN COMPUTERISED ENVIRONMENT (6 Hrs)
Role of Computer in Accounting and Automation – Accounting as an Information System – Accounting Process under Manual and Computerised Accounting – Software for Accounting.

B.Sc Mathematics

Framework of Accounting Software – Grouping of Accounts – Data Entry in Accounting Software – Generation of Reports – Use of Spreadsheets in Accounting Analysis.

Text Books

1. K.L. Nagarajan, N. Vinayagam& P.L. Mani, "Principles of Accountancy", S. Chand & Sons, 4th Edition, 2016.
2. T.S. Reddy & Y. Hari Prasad Reddy, "Financial and Management Accounting", Margham Publications, 4th Edition, 2018.
3. S.N. Maheswari, Suneel K. Maheswari&Sharad K. Maheswari, "An Introduction to Accountancy", Vikas Publishing House, 12th Edition, 2019.

Reference Books

1. N. Ramachandran& Ram Kumar Kakani, "Financial Accounting for Management", McGraw Hill, 5th Edition, 2020.
2. Hanif& Mukherjee, "Financial Accounting", Tata McGraw Hill, 2nd Edition, 2019.
3. S.P. Jain & K.L. Narang, "Financial Accounting", Kalyani Publishers, 12th Edition, 2014.

Web References

1. https://www.civilserviceindia.com/subject/Management/notes/financialaccounting.html
2. https://www.taxmann.com/blogpost/2000001622/accounting-principles-andconcepts.aspx
3. https://courses.lumenlearning.com/sac-finaccounting/chapter/ledgers-journals-andaccounts/

B.Sc   Mathematics

	ACCOUNTING SOFTWARE LAB	L	T	P	C	Hrs
A20CMD202	(Common to B.C.A. & B.Sc. Mathematics)	0	0	4	2	60

Course Objectives
- To develop a deeper knowledge in fundamentals of accounting software.
- To understand the working of business transactions.
- To learn the importance of MIS.
- To gain knowledge about GST and TDS.

Course Outcomes
After completion of the course, the students will be able to
CO1 – Work with chart of accounts in accounting software.
CO2 – Prepare various business transactions in software.
CO3 – Generate various reports including customized reports
CO4 – Handle the preparation and understanding of GST and TDS

UNIT I CHART OF ACCOUNTS (15 Hrs)
An Overview of Accounting Fundamentals – Double Entry Book keeping – Types of Accounts – Golden Rules of Accounts – Source Documents for Accounting – Accounting Equation – Recording Business Transactions – Journal – Ledger – Trial Balance – Subsidiary Books – Financial Statements: Profit and Loss Account – Balance Sheet.
Getting Started with Accounting Software – Company Creation and Management – Company Features and Configuration – Chart of Accounts – Ledger – Grouping – Creation, Display and Deletion.
Inventory Masters – Creating Inventory Masters: Stock Group, Units of Measure, Stock Items, Godown/Warehouse – Stock Category Reports.

UNIT II RECORDING DAY-TO-DAY TRANSACTIONS (20 Hrs)
Business Transactions – Source Document for Voucher – Recording Transactions in Accounting Software – Accounting Vouchers: Receipt Voucher, Contra Voucher, Payment Voucher, Purchase Voucher, Sales Voucher, Debit Note Voucher, Credit Note Voucher, Journal Voucher.
Accounts Payables and Receivables – Maintaining Bill-wise details – Stock Category Report – Changing Financial Year.

UNIT III MIS REPORTS (5 Hrs)
Management Information System (MIS) – MIS Reports in Accounting Software – Trial Balance – Balance Sheet – Profit and Loss Account – Cash Flow Statement – Accounting Ratios. Books and Reports: Day Book – Receipts and Payments – Purchase Register – Sales Register – Bills Receivable and Bills Payable.

UNIT IV HANDLING GST AND TDS (20 Hrs)
Goods and Services Tax (GST) – Recording GST in Accounting Software – Generating GST Reports.
Tax Deducted at Source (TDS) – TDS in Accounting Software – TDS Activation – Statutory Masters – Configuring TDS – Booking of Expenses in Purchase Voucher – TDS Reports.

Text Books
1. Tally Education, Tally Essential Level 1, Sahaj Enterprises, 1st Edition, 2021.
2. Tally Education, Tally Essential Level 2, Sahaj Enterprises, 1st Edition, 2021.
3. Tally Education, Tally Essential Level 3, Sahaj Enterprises, 1st Edition, 2021.

Reference Books

B.Sc   Mathematics

1. DT Editorial Services, "Tally ERP 9 with GST", DreamTech Press, 1st Edition, 2020.
2. Tally Education, "Tally ERP 9 with GST", BPB Publishers, 1st Edition, 2018.
3. Vikas Gupta, "Comdex Tally ERP 9 with GST and MS Excel", DreamTech Press, 1st Edition, 2018.

Web References
1. https://www.youtube.com/watch?v=rG_eHA3vN1I
2. https://www.youtube.com/watch?v=Sw2H56aMe-g
3. https://www.youtube.com/watch?v=eA8oK3wn1p4

B.Sc   Mathematics

	L	T	P	C	Hrs
A20MAS202 **INTEGRAL CALCULUS**	3	0	0	3	45

Course Objectives
- To introduce Rational and Irrational Functions.
- To know about definite integrals.
- To learn about some reduction formulae.
- To know about difference between Area and Volume Integral.
- To introduce Beta and Gama Functions.

Course Outcomes
After completion of the course, the students will be able to
CO1 – Understand various integration functions.
CO2 – Find Solution to various Integral problems.
CO3 – Know the different types of Reduction formulae.
CO4 – Solve Double and triple Integrals.
CO5 – Understand the Relation between Beta and Gamma Functions.

UNIT I INTEGRALS OF RATIONAL AND IRRATIONAL FUNCTIONS (9 Hrs)
Revision of all Integral Models including Integration of Rational and Irrational Functions.

UNIT II PROPERTIES OF INTEGRALS (9 Hrs)
Properties of Definite Integrals – Integration by parts – Bernoulli's Formula – Integration as Summation.

UNIT III REDUCTION FORMULAE (9 Hrs)
Reduction Formulae for $x^n e^{ax}, \sin^n x, \cos^n x, \sin^n x \cos^n x, \tan^n x, \ x^m (\log x)^n, \ e^{ax} \cos bx, e^{ax} \sin bx.$

UNIT IV AREA OF INTEGRATION (9 Hrs)
Area under Plane Curves - Area of a closed curves – Length of a curve – Area of Surface of revolution – Multiple Integrals – Evaluation of Double and Triple Integrals (Cartesian Co-ordinates only).

UNIT V BETA AND GAMMA FUNCTIONS (9 Hrs)
Improper Integrals – Beta and Gamma Functions – Recurrence formula of Gamma Functions – Properties of Beta Functions – Relation between Beta and Gamma Functions – Evaluation of Definite Integrals Using Gamma Functions.

Text Books
1. S. Narayanan and T. K. ManicavachagomPillay, "Calculus (Major), Volume II", S. Viswanathan Printers & Publishers, 2007.
2.DipakChatterjee, "Integral Calculus and differential equations", TATA McGraw Hill Publishing company Ltd, 2000.
3.P. Duraipandian and LaxmiDuraipandian,"Content and treatment as in Vector Analysis", Emerald Publishers,2017.

Reference Books
1. Dr. M. K. Venkataraman, "Engineering Mathematics, Volume 2", The National Publishing Company, 2001.
2. Thomas and Finney, "Calculus", Pearson Education, 9th Edition, 2006.
3. N. P. Bali, "Integral Calculus", Laxmi Publications, 2011.

Web References
1. https://www.khanacademy.org/math/integral-calculus
2. https://nptel.ac.in/courses/111/105/111105122/#
3. https://nptel.ac.in/courses/111/104/111104025/

B.Sc Mathematics

		L	T	P	C	Hrs
A20AET202	**PUBLIC ADMINISTRATION**	2	0	0	2	30

(Compulsory Course designed as per the directions issued by Government of India, MHRD,Department of Higher Education (Central University Bureau)

F.No.19-6.2014-Desk U Dated 19-05-2014)

Course Objectives

- To introduce the elements of public administration.
- To help the students obtain a suitable conceptual perspective of public administration.
- To introduce them the growth of institution devices to meet the need of changing times.
- To instill and emphasize the need of ethical seriousness in contemporary Indian Public Administration.

Course Outcomes

After completion of the course, the students will be able to

CO1– Understand the concepts and evolution of Public Administration.
CO2– Be aware of what is happening in the Public Administration in the country.
CO3– Explain the Territory Administration in the State and the Centre.
CO4– Appreciate emerging issues in Indian Public Administration.

UNIT I INTRODUCTION TO PUBLIC ADMINISTRATION (7 Hrs)

Meaning, nature and Scope of Public Administration and its relationship with other disciplines- Evolution of Public Administration as a discipline – Woodrow Wilson, Henry Fayol , Max Weber and others - Evolution of Public Administration in India – Arthashastra – Colonial Administration upto 1947

UNIT II PUBLIC ADMINISTRATION IN INDIA (8 Hrs)

Enactment of Indian Constitution - Union Government – The Cabinet – Central Secretariat -– All India Services – Training of Civil Servants – UPSC – NitiAyog – Statutory Bodies: The Central Vigilance Commission – CBI - National Human Rights Commission – National Women's Commission –CAG

UNIT III STATE AND UNION TERRITORY ADMINISTRATION (8 Hrs)

Differential Administrative systems in Union Territories compared to States Organization of Secretariat: - Position of Chief Secretary, Functions and Structure of Departments, Directorates – Ministry of Home Affairs supervision of Union Territory Administration – Position of Lt.Governor in UT – Government of Union Territories Act 1963 – Changing trend in UT Administration in Puducherry and Andaman and Nicobar Island

UNIT IV EMERGING ISSUES IN INDIAN PUBLIC ADMINISTRATION (7 Hrs)

Changing Role of District Collector – Civil Servants – Politicians relationship – Citizens Charter - Public Grievance Redressal mechanisms –— The RTI Act 2005 – Social Auditing and Decentralization – Public Private partnership.

Text Books

1. Avasthi and Maheswari, "Public Administration", Lakshmi NarainAgarwal, 1st Edition, 2016.
2. Ramesh K.Arora, "Indian Public Administration: Institutions and Issues", New Age International Publishers, 3rd Edition, 2012.

B.Sc   Mathematics

3. RumkiBasu, "Public Administration: Concept and Theories", Sterling, 1st Edition, 2013.

Reference Books

1. SiuliSarkar, "Public Administration in India", Prentice Hall of India, 2nd Edition, 2018.
2. M. Laxmikanth, "Public Administration", McGraw Hill Education, 1st Edition, 2011.
3. R.B.Jain, "Public Administration in India,21st Century Challenges for Good Governance",Deep and Deep Publications,2002.

Web References

1. http://cic.gov.in/
2. http://www.mha.nic.in/
3. http://rti.gov.in/
4. http://www.cvc.nic.in/

B.Sc Mathematics

A20EAL201	**NATIONAL SERVICE SCHEME**	L	T	P	C	Hrs
		0	0	2	1	15

Course Objectives

- To introduce about various activities carried out by national service scheme.
- To gain life skills through community service.
- To gain awareness about various service activities performed in higher educational institutions.
- To give exposure about the use of technology to uplift the living standards of rural community.
- To induce the feeling of oneness through harmony of self and society.

Course Outcomes

After the completion of this course, the students will be able to

CO1 – recognize the importance of national service in community development.

CO2 – convert existing skills into socially relevant life skills.

CO3 – differentiate various schemes provided by the government for the social development

CO4 – identify the relevant technology to solve the problems of rural community.

CO5 – associate the importance harmony of nation with long term development

UNIT I INTRODUCTION TO NATIONAL SERVICE SCHEME (6Hrs)

History and objectives, NSS symbol, Regular activities, Special camping activities, Village adaptation programme, Days of National and International Importance, Hierarchy of NSS unit in college. Social survey method and Data Analysis.NSS awards and recognition. Importance of Awareness about Environment, Health, Safety, Gender issues, Government schemes for social development and inclusion policy etc.,

UNIT IILIFE SKILLS AND SERVICE LEARNING OF VOLUNTEER (6Hrs)

Communication and rapport building, problem solving, critical thinking, effective communication skills, decision making, creative thinking, interpersonal relationship skills, self- awareness building skills, empathy, coping with stress and coping with emotions. Understanding the concept and application of core skills in social work practice, Team work, Leadership, Event organizing, resource planning and management, time management, gender equality, understanding rural community and channelizing the power of youth.

UNIT IIIEXTENSION ACTIVITIES FOR HIGHER EDUCATIONAL INSTITUTIONS (6Hrs)

Objective and functions of Red Ribbon Club, SwatchhBharathAbhiyan, Unnat Bharat Abhiyan, JalShakthiAbhiyan, Road Safety Club, Environmental club and Electoral literacy club.

UNIT IV USE OF TECHNOLOGY IN SOLVING ISSUES OF RURAL INDIA (6Hrs)

Understanding community issues, economic development through technological development. Selection of appropriate technology, Understanding issues in agriculture, fishing, artisans, domestic animals, health and environment.

UNIT VNATIONAL INTEGRATION AND COMMUNAL HARMONY (6Hrs)

The roleof Youth organizations in national integration, NGOs, Diversity of Indian Nation, Importance of National integration communal harmony for the development of nation , Indian Constitution, Building Ethical human Relationships, Universal Human Values, Harmony of self and Harmony of nation.

Reference Books

1. Joseph, Siby K and Mahodaya Bharat (Ed.), (2007), Essays on Conflict Resolution, Institute of Gandhian Studies, Wardha

B.Sc Mathematics

2. Barman Prateeti and GoswamiTriveni (Ed.), (2009), Document on Peace Education, Akansha Publishing House, New Delhi
3. Sharma Anand, (2007), Gandhian Way, Academic Foundation, New DelhiMyersG.Davi (2007). Social Psychology. New Delhi: Tata Mc.Graw Hill.
4. Taylor E.Shelly et.al (2006), Social Psychology (12th Edn.), New Delhi, Pearson Prentice Hall Singh.
5. Madhu (2003), Understanding Life Skills, background paper prepared for education for all: The leap to equality, Government of India report, New Delhi.
6. Sandhan (2005), Life Skilss Education, Training Module, Society for education and development, Jaipur. Radakrishnan Nair and SunithaRajan (2012), Life Skill Education: Evidences form the field, RGNIYD publication, Sriperumbudur
7. National Service Scheme Manual (Revised) , Government of India, Ministry of Youth Affairs and Sports, New Delhi.
8. National Service Scheme in India: A Case study of Karnataka, M. B. Dishad, Trust Publications, 2001

Web References

1. http://www.thebetterindia.com/140/national-service-scheme-nss/
2. http://en.wikipedia.org/wiki/national-service-scheme 19=http://nss.nic.in/adminstruct
3. http://nss.nic.in/propexpan
4. http://nss.nic. in
5. http://socialworknss.org/about.html

B.Sc   Mathematics

A20MAT305	**PARTIAL DIFFERENTIAL EQUATION**	L	T	P	C	Hrs
		3	1	0	4	60

Course Objectives

- To know the general solution, singular solution & complete solution.
- To solve the simultaneous linear partial differential equation.
- To gain knowledge in application of Partial Differential equation.
- To learn the nature of one dimensional heat flow equation.
- To learn the nature of two-dimensional heat equation in Cartesian form.

Course Outcomes

After completion of the course, the students shall have able to

CO1 –Classify the Solution of partial differential equations.
CO2 –Know the linear partial differential equations.
CO3 –Know the Transformation of wave and heat equation.
CO4 –Solve one dimensional heat equation.
CO5 –Solve two dimensional heat equation.

UNIT I SOLUTION OF PARTIAL DIFFERENTIAL EQUATION　　　　　(12 Hrs)

Introduction – Formation of partial differential equations – Elimination of Arbitrary constants and Functions – Solution of PDE – General Solution – Singular solution – Complete solution - General Solution of PDE.

UNIT II LINEAR PARTIAL DIFFERENTIAL EQUATION　　　　　(12 Hrs)

Lagrange's Linear Equation – solution of simultaneous equation – Linear PDE of Higher order with constant coefficient – complementary function for a non- homogeneous linear equation – Method of separation of variables

UNIT III ONE DIMENSIONAL WAVE EQUATION　　　　　(12 Hrs)

Introduction – Transverse vibration of stretched string – One dimensional wave equation – Transmission Line Equation – Variable Separable solution of the wave equation – Solution of Damped vibrating string equation

UNIT IV ONE DIMENSIONAL HEAT EQUATION　　　　　(12 Hrs)

Introduction – Equation of Variable Heat flow in one dimension – Variable separable solutions of the Heat equation

UNIT V TWO DIMENSIONAL HEAT EQUATION　　　　　(12 Hrs)

Introduction – Equation of variable heat flow in two dimensions in Cartesian form – variable separable solution of Laplace equation

Text Books

1. T.Veerarajan, "Transforms and Partial Differential Equation", Tata McGraw Hill, 2011
2. C. Zachmanoglou, Dale W. Thoe, "Introduction to Partial Differential Equations with Applications", Dover Publication, New York, 1986.
3. MaciejBorodzik, Paweł Goldstein, PiotrRybka, Anna Zatorska-Goldstein, "Problems on Partial Differential Equation", Springer publications, 1986.

Reference Books

1. K. S. Rao, "Introduction to Partial Differential Equations", PHI Learning Pvt Ltd, New Delhi, 2010
2. T. Amaranath, "An Elementary Course in Partial Differential Equations", 2nd Edition, Narosa Publishing House, New Delhi, 2014.

B.Sc   Mathematics

3. Amaranath.T, "An Elementary Course in Partial Differential Equations", 2nd edition, Narosa Publishing House, 2012

Web References

1. https://www.youtube.com/watch?v=ly4S0oi3Yz8
2. https://nptel.ac.in/courses/111/103/111103021/
3. https://ocw.mit.edu/courses/mathematics/18-152-introduction-to-partial-differential-equations-fall-2011/lecture-notes/

B.Sc   Mathematics

A20MAT306	FOURIER SERIES & FOURIER TRANSFORMS	L	T	P	C	Hrs
		3	1	0	4	60

Course Objectives
- To learn the concept of periodic functions.
- To understand the rules of Fourier series.
- To analyze the asymptotic performance of half range Fourier series.
- To understand the fundamental concept of Fourier Transform.
- To analyze various problems in Fourier Transform.

Course Outcomes
After completion of the course, the students will be able to

CO1 –Know the different types of functions.
CO2 –Calculate the Fourier coefficients.
CO3 –Find the Half range Fourier series.
CO4 –Familiarize the basics of Fourier Transform.
CO5 –Know the applications of inverse Fourier Transform.

UNIT I PERIODIC FUNCTION AND SPECIAL WAVE FORMS   (12 Hrs)
Introduction, Periodic functions- Properties, Even & Odd functions- Properties, Special wave forms-Square wave, Half wave Rectifier, Full wave Rectifier, Saw-toothed wave, Triangular wave.

UNIT II FOURIER SERIES   (12 Hrs)
Euler's Formulae for Fourier Series, Fourier Series for functions of period 2π, Fourier Series for functions of period 2l, Dirichlet's conditions, Sum of Fourier Series– Problems.

UNIT III HALF RANGE FOURIER SERIES   (12 Hrs)
Half Range Fourier series - Construction of Half range Sine Series, Construction of Half range Cosine Series. Parseval's identity, examples.Harmonic Analysis.

UNIT IV FOURIER TRANSFORM   (12 Hrs)
Fourier Integral Theorem, Fourier Transform of a function, Fourier Sine and Cosine Integral Theorem, Fourier Cosine and Sine Transforms.Fourier Cosine and Sine Transforms of elementary functions.Properties of Fourier Transform- Linearity, Shifting, Change of scale, Simple problems.

UNIT V INVERSE FOURIER TRANSFORM   (12 Hrs)
Fourier Transform of Derivatives, examples – Convolution Theorem (statement only), inverse of Fourier Transform, examples.

Text Books
1. Dr. A. Singaravelu, "Transforms and Partial Differential Equations", 18th reprint, Meenakshi Agency, 2011.
2. A. NeelArmstrong, "Transforms and Partial Differential Equations" Third edition, D.D.Publications,2012
3. Elias M. Stein, "Fourier Analysis: An Introduction ", published by Princeton University Press, New Jersey 2003

Reference Books
1. R. Harding, "Fourier Series and Transforms", Taylor and Francis Group, New York, 1985
2. Ronald N. Bracewell, "The Fourier Transform and Its Applications", McGraw-Hill International Editions - Paperback – July 1, 1986.

B.Sc   Mathematics

3. Javier Duoandikoetxe, "Fourier analysis", McGraw-Hill International Editions - Paperback – January 2012.

Web References

1. https://mathworld.wolfram.com/FourierSeries.html
2. https://mathworld.wolfram.com/FourierTransform.html
3. https://see.stanford.edu/materials/lsoftaee261/book-fall-07.pdf

B.Sc   Mathematics

	L	T	P	C	Hrs
A20MAT307 **MECHANICS I (STATICS)**	3	1	0	4	60

Course Objectives

- To know about the concurrent forces.
- To acquire the knowledge of moments and couples.
- To Understand the concepts of Centre of gravity.
- To expose the students to the basic of equilibrium.
- To get formalized with common catenary suspension.

Course Outcomes

After completion of the course, the students will be able to
CO1 –Define and recognize the system of forces.
CO2 – Gain Knowledge pertaining to parallel forces, moments and couples.
CO3 –Improves their ability in the concept of Centre of gravity.
CO4 –Analyze and solve the conditions of equilibrium.
CO5 –Attains knowledge of virtual work and stability.

UNIT I CONCURRENT SYSTEM OF FORCES (12 Hrs)

Forces acting on a particle – concurrent forces –equilibrium of forces acting at a point –parallelogram law of forces – triangle law of forces –Lami'stheorem –polygon of forces –conditions of equilibrium in three dimensional cases with problems related to the plane**.**

UNIT II PARALLEL FORCES, MOMENTS AND COUPLES (12 Hrs)

Moments –parallel forces – couples –moments of a force about a point and line –theorems on moments –resultant of like and unlike parallel forces –couples –reduction of a force and couple in a plane to a single force –Varignon'sTheorem on moments, Centre of parallel force.

UNIT III CENTRE OF GRAVITY (12 Hrs)

Centre of gravity of curves, areas, surfaces and volumes of solids of revolution –location of the centre of gravity of standard configurations.

UNIT IV PRINCIPLE OF VIRTUAL WORK AND STABILITY (12 Hrs)

Conditions of equilibrium – virtual work – simple problems –equilibrium of bodies –stability of a body with one point fixed – stability of a body rolling over a fixed body.

UNIT V CATENARY (12 Hrs)

Equilibrium of strings and chains –common catenary suspension bridge –flexible cable resting on a plane curve.

Text Book

1. S.L.Loney, The elements of Statics and Dynamics, ArihantPrakashan , January 2014
2. K.V. Naik and M.S. Kasi, Statics, Emerald publishers, First Edition,1992
3. M.K.Venkataraman, *Statics*, Agasthiyar Publications, 17th edition, 2014.

Reference Book

1. D. S. Kumar, Statics & Dynamics, S.k. Kataria& sons, 2013.
2. Engineering mechanics Statics, Russele.Hibbeler, Publisher Cram 101, 12 edition, e - Book, 2013.
3. T. Veerarajan, Probability, Statistics and Random process, Tata Major CoreGraw Hill, 1st reprint, 2004

Web References

1. https://people.csail.mit.edu/bkph/articles/Kinematics_Statics_Dynamics_2.pdf
2. http://ruina.tam.cornell.edu/Book/RuinaPratap1-15-13.pdf
3. https://www.slideshare.net/AhmedMomtaz3/lecture-notes-on-engineering-statics

B.Sc Mathematics

	L	T	P	C	Hrs
A20MAD305 **STATISTICS - I**	3	1	0	4	60

Course Objectives

- To impart skills in various applications of statistical methods.
- To analyze the given data by using statistical methods.
- To understand the basic concepts of probability and related results.
- To use the different probabilistic methods for solving problems.
- To know the concepts of discrete distributions and moments.

Course Outcomes

After completion of the course, the students will be able to

CO1 – Understand the various types of deviations and coefficients.
CO2 – Define and recognize the basic properties of the probabilities.
CO3 – Knowledge pertaining to continuous probability distributions.
CO4 – Gain their ability in the concept of mathematical expectation.
CO5 – Analyze and solve problems using theoretical discrete distribution.

UNIT I MEASURES OF DISPERSION (12 Hrs)

Dispersion – range, quartile deviation – mean deviation – standard deviation – root mean square deviation – Relation between standard deviation and root mean square deviation – effect of change of origin and scale on moments – Karl Pearson's beta and gamma co-coefficient – measures of Skewness – Kurtosis.

UNIT II THEORY OF PROBABILITY (12 Hrs)

Definition of various terms – Law of addition of probabilities for two events – statement of general law of addition of probabilities – Bayes Theorem.

UNIT III CONTINUOUS RANDOM VARIABLE (12 Hrs)

Probability density function – various measures of central tendency, dispersion, Skewness and Kurtosis for continuous probability distribution.

UNIT IV MATHEMATICAL EXPECTATION (12 Hrs)

Addition and Multiplication Theorem – covariance – Expectation and variance of a linear combination of random variables – Expectation of continuous random variable – Moment generating function and its properties – uniqueness Theorem on Characteristic function- Chebyshev 's inequality – weak law and Bernoulli's law of large numbers.

UNIT V THEORETICAL DISCRETE DISTRIBUTION (12 Hrs)

Bernoulli Distribution and its moments – Binomial Distribution – moments, mean deviation about mean, mode, M.G.F and Characteristic function – recurrence relation for the moments – additive property of independent Poisson variants – recurrence formula for the probability of the Binomial Distribution and Poisson Distribution.

Text Books

1. S.C Gupta and V.K. Kapoor, "Elements of Mathematical Statistics ", Sultan Chand Publishers, New Delhi. 2009.
2. Aliaga, Gunderson, "Interactive Statistics", 2nd Edition – Pearson/Prentice Hall
3. Hamilton, "Statistics with STATA", 8thEdition, Duxbury 2004.

B.Sc Mathematics

Reference Books

1. P.R.Vittal, "Mathematical Statistics ‖", Margham Publications -2002- Reprint 2012.
2. Weisberg, S, "Applied Linear Regression", John Wiley and Sons, New York - 1980.
3. Kokoska, "Introductory Statistics: A Problem-Solving Approach", Review copy, Freeman2011.

Web References

1. http://onlinestatbook.com/Online_Statistics_Education.pdf
2. http://www.stats.ox.ac.uk/student-resources/bammath/course-materials/
3. https://nptel.ac.in/courses/111/105/111105041/

B.Sc   Mathematics

	L	**T**	**P**	**C**	**Hrs**
A20MAE301 NUMERICAL METHODS	3	0	0	3	45

Course Objectives

- To know the solution of algebraic and transcendental equations.
- To learn the techniques of solving simultaneous equations.
- To introduce the numerical techniques of differentiation and integration.
- To solve ordinary differential equations by using numerical methods.
- To know the solution of partial differential equations by using numerical methods.

Course Outcomes

After completion of the course, the students will be able to
CO1–Use numerical techniques to solve algebraic and transcendental equations.
CO2–Find the solution of simultaneous equations.
CO3– Analyze and apply the knowledge of differentiation and integration by using numerical methods.
CO4– Solve the solution of ordinary differential equations by RungeKutta methods.
CO5–Solve the partial differential equations in iterative methods.

UNIT I SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS   (9 Hrs)

Introduction to numerical analysis –The solution of algebraic and transcendental equations – Bisection method – False Position Method – Newton-Raphson method – Power Method.

UNIT II LINEAR SIMULTANEOUS EQUATIONS   (9 Hrs)

Solution of simultaneous linear algebraic equations – Direct methods – Gauss elimination method – Gauss-Jordan method – Iterative methods – Jacobi method – Gauss-Seidal method.

UNIT III INTERPOLATION   (9 Hrs)

Finite differences – Differences of a polynomial – Factorial polynomial – Interpolation for equal intervals – Gregory-Newton interpolation formulae – Interpolation with unequal intervals – Lagrange's interpolation formula – Inverse interpolation.

UNIT IV SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS   (9 Hrs)

Single step methods –Taylor series method Picard's method –Euler method and Improved Euler method –RungeKutta method of fourth order only.

UNIT V SOLUTION OF PARTIAL DIFFERENTIAL EQUATIONS   (9 Hrs)

Solution of Laplace and Poisson equations –Leibmann's iterative method –Diffusion equation: Bender-Schmitt method and Crank-Nicholson.

Text Books

1. P. Kandasamy, K. Thilagavathy, K. Gunavathy, "Numerical Methods", S. Chand & Company limited, New Delhi, 2009.
2. Rajesh Kumar Gupta, "Numerical Methods - Fundamentals and Applications", Cambridge University Press, 2019.
3. Grewal B.S., "Numerical Methods in Engineering and Science", Mercury learning and Information, Kindle Edition, 2018.

B.Sc   Mathematics

Reference Books

1. C. Xavier, "C Language And Numerical Methods", New Age International, 2007.
2. P. Siva Ramakrishna Das, "Numerical Analysis", Kindle Edition, 2016.
3. Timo Heister, Leo G. Rebholz, FeiXue, "Numerical Analysisan Introduction", Publisher De Gruyter, 2019.

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1. http://www.bdu.ac.in/academics/equivalent-papers/courses/pg_science/MCA/RQG28.pdf
2. https://www.youtube.com/watch?v=Gkit1hUTsX8
3. https://www.lkouniv.ac.in/site/writereaddata/siteContent/202004032250571912siddharth_bhatt_engg_Numerical_Differentation_and_Integration.pdf

B.Sc   Mathematics

	L	T	P	C	Hrs
A20MAE303 **DIFFERENTIAL GEOMETRY**	3	0	0	3	45

Course Objectives
- To provide the basic knowledge of types of curve and curvature.
- To familiar about Surfaces.
- To have knowledge about Gaussian curvature.
- To know about surfaces and its applications.
- To learn the concept of geodesics.

Course Outcomes
After completion of the course, the students will be able to

CO 1 – Know the application of curve.
CO 2 – Know the concept of Surfaces.
CO 3 – Analyze and apply the knowledge of curvature.
CO 4 – Compute the problems in surfaces and its applications.
CO 5 – Understand various types of geodesics.

UNIT I SPACE CURVES   (9Hrs)
Theory of Space Curves: Space curves, Planer curves, Curvature, torsion and Serret-Frenet formulae. Osculating circles, Osculating circles and spheres. Existence of space curves.

UNIT II SURFACES   (9 Hrs)
Evolutes and involutes of curves. Theory of Surfaces: Parametric curves on surfaces, surfaces of revolution, helicoids, Direction coefficients. First and second Fundamental forms.

UNIT III CURVATURE   (9 Hrs)
Principal and Gaussian curvatures.Lines of curvature, Euler's theorem.Rodrigue's formula, Conjugate and Asymptotic lines.

UNIT IV DEVELOPABLES   (9 Hrs)
Developable associated with space curves and curves on surfaces, Minimal surfaces.

UNIT V GEODESICS   (9 Hrs)
Canonical geodesic equations.Nature of geodesics on a surface of revolution.Clairaut'stheorem.Normal property of geodesics.Torsion of a geodesic.Geodesiccurvature.Gauss-Bonnet theorem.Surfaces of constant curvature.

Text Books
1. T.J. Willmore, "An Introduction to Differential Geometry", Dover Publications, 2012.
2. A. Pressley, "Elementary Differential Geometry", Springer,1st Edition, 2014.
3. O'Neill, "Elementary Differential Geometry", Academic Press,2nd edition, 2006.

Reference Books
1. C.E. Weatherburn, "Differential Geometry of Three Dimensions", Cambridge University Press, 2003.
2. D.J. Struik, "Lectures on Classical Differential Geometry", Dover Publications, 1988.
3. Kobayashi.S and Nomizu. K, "Foundations of Differential Geometry", Inter science Publishers, 1963.

Web References
1. https://www.researchgate.net/publication/264871899_Lecture_Notes_Introduction_to_Differential_Geometry_MATH_442
2. https://mysite.science.uottawa.ca/rossmann/Differential%20Geometry%20book_files/Diffgeo.pdf
3. https://www.maths.tcd.ie/~zaitsev/ln.pdf

B.Sc   Mathematics

A20CME301	ENTREPRENEURSHIP	L	T	P	C	Hrs
	AND INNOVATION	3	0	2	4	75

Course Objectives
- To develop the knowledge of basic concepts in the area of entrepreneurship.
- To generate innovative business ideas in the emerging industrial scenario.
- To be familiar with the key steps in the elaboration of business idea.
- To help students to develop personal creativity and entrepreneurial initiative.
- To acquire requisite knowledge and skills for becoming successful entrepreneurs.

Course Outcomes
After completion of the course, the students will be able to

CO1 – Familiarize with the concepts of entrepreneurship.
CO2 – Analyse the business environment in order to identify business opportunities.
CO3 – Understand the institutional support to entrepreneurial development.
CO4 – Understand the ethical challenges and social responsibility in a business setting.
CO5 – Demonstrate the ability to create business plan and interpret their own business plan.

UNIT I ENTREPRENEUR AND ENTREPRENEURSHIP (15 Hrs)
Introduction - Entrepreneurship - concept, growth, characteristics, types - Functions of an entrepreneur - Entrepreneurship in India - Entrepreneurship in developing countries - Intrapreneurs - Women Entrepreneurs - problems and prospects - Rural Entrepreneurs - problems and prospects - Social Entrepreneurs.
Entrepreneurship in Practice: Field Study on Rural Entrepreneurs or Women Entrepreneurs.

UNIT II ENTREPRENEURIAL DEVELOPMENT (15 Hrs)
Factors influencing Entrepreneurship - Entrepreneurial process - development and motivation - EDP - Need, objective, relevance and role of EDP, phases of EDP - Institutions for Industrial Entrepreneurs - Small scale and Export Entrepreneurs.
Creativity and Innovation in an Entrepreneurial Organisation – Tools for Environmental Scanning: SWOT Analysis – PESTLE Analysis – Michael Porter's Approach to Industry Analysis. Environmental Screen Process – Types of Environmental Scanning – Assessment of Business Opportunities.

UNIT III ENTREPRENEURSHIP IN ACTION (15 Hrs)
Concept and Definition of MSME - Scope, Role of Government in promoting SSI - Business idea generation techniques - Registration of Industries and licencing - Identification of business opportunities - Marketing, Financial, Technical, Legal feasibility - Locational feasibility - Government rules and regulations. Simple Case Studies on Entrepreneurial Challenges.
Entrepreneurship in Practice: Field Study on in one of the MSMEs in your locality.

UNIT IV INSTITUTIONAL FINANACE TO ENTREPRENEURS (15 Hrs)
Central Government store purchase program - National small Industrial corporation - SIDBI, IDBI, TCO, IIFT, IFCI, ICICI, IRBI, Export Import Bank, Trade Development Authority, ECGC, MDA, EDII, IRDP, DIC, SSIB, SISI, SFC, Seed capital. Start-ups and Mudra Banks.
Entrepreneurship in Practice: Field Study in District Industries Centre or Financing Institution.

B.Sc   Mathematics

UNIT V EMERGING TRENDS IN ENTREPRENEURSHIP **(15 Hrs)**

Introduction - Venture capital financing concept and features - Strategic role of venture capital - Venture capital in India - Social and Ethical responsibility of Entrepreneurs – Fillip to Indian Entrepreneurs: Make in India Scheme.

Franchising and acquisition - Marketing mix strategies - Production planning - Manpower planning and Industrial relations - Successful Entrepreneurs.

Entrepreneurship in Practice: Field Study on Successful Entrepreneurs in your locality.

Text Books

1. C.B.Gupta&N.P.Srinivasan, "Entrepreneurial Development", Sultan Chand & Sons, 1st Edition, 2013.
2. S.S. Khanka, "Entrepreneurial Development", Sultan Chand & Sons, 1st Edition, 1999.
3. E. Gordon & K. Natarajan, "Entrepreneurship Development", Himalaya Publishing house, 5th Edition, 2015.

Reference books

1. AbhijitChatterjee& V. Sharma, "Entrepreneurship Development", Vayu Education of India, 1st Edition, 2020.
2. Vasant Desai, "Dynamics of entrepreneurial development", Wiley Eastern limited, 2nd Edition, 2016.
3. Lall, M &Sahai. S, "Entrepreneurship", Excel Book Publishers, 2nd Edition, 2013.

Web References

1. https://www.crectirupathi.com/entrepreneurialdevelopment-notes/
2. http://simplynotes.in/entrepreneurialdevelopment
3. https://lecturenotes.in/subject/35/entrepreneurship-development-ed

B.Sc   Mathematics

		STATISTICS – I [Using MATLAB]	**L**	**T**	**P**	**C**	**Hrs**
A20MAD306			0	0	4	2	30

Course Objectives

- To familiarize the concept of Descriptive Statistics.
- To know Correlation and Regression analysis.
- To learn the concept of Special Random Variables.
- To understand Skewness and Kurtosis.
- To introduce the concepts of Conditional Probability.

Course Outcomes

After completion of the course, the students will be able to

CO1 – Gain knowledge in the concepts of Random Variables and Expectation.
CO2 – Trained for data collection on various fields of survey enabling them to classify them statistically.
CO3 – Familiarized in various statistical software.
CO4 – Find the correlation between two variables.
CO5 – Compute regression.

LIST OF EXERCISES

1. Mean
2. Median
3. Mode
4. Quartile Deviation
5. Standard deviation
6. Mean deviation
7. Skewness
8. Kurtosis
9. Correlation
10. Regression

Text Books

1. S.C Gupta and V.K. Kapoor, "Elements of Mathematical Statistics ", Sultan Chand Publishers, New Delhi. 2009.
2. Aliaga, Gunderson, "Interactive Statistics", 2nd Edition – Pearson/Prentice Hall
3. Hamilton, "Statistics with STATA", 8thEdition, Duxbury 2004.

Reference Books

1. P.R.Vittal, "Mathematical Statistics ‖", Margham Publications -2002- Reprint 2012.
2. Weisberg, S, "Applied Linear Regression", John Wiley and Sons, New York - 1980.
3. Kokoska, "Introductory Statistics: A Problem-Solving Approach", Review copy, Freeman2011.

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1. https://www.mccormick.northwestern.edu/documents/students/undergraduate/introduction-to-matlab.pdf
2. https://www.mn.uio.no/astro/english/services/it/help/mathematics/matlab/getstart.pdf
3. https://www.mathworks.com/videos/introduction-to-matlab-81592.html

B.Sc   Mathematics

A20MAS303	**NUMERICAL METHOD USING C**	**L**	**T**	**P**	**C**	**Hrs**
		3	**0**	**0**	**3**	**45**

Course Objectives

- To know the solution of algebraic and transcendental equations.
- To learn the techniques of solving simultaneous equations.
- To introduce the numerical techniques of differentiation and integration.
- To solve ordinary differential equations by using numerical methods.
- To know the solution of partial differential equations by using numerical methods.

Course Outcomes

After completion of the course, the students will be able to

CO1 –Use Numerical techniques to solve algebraic and transcendental equations.
CO2 –Find the solution of simultaneous equations.
CO3 –Analyze and apply the knowledge of differentiation and integration by using numerical methods.
CO4–Know the solution of ordinary differential equations by using various methods.
CO5–Know the application of partial differential equations in numerical methods.

List of Methods

1**.**Bisection Method
2.NewtonRaphson Method
3.RegulaFalsi Method
4. Eigen value and Eigen vector using Power Method
5.Jacobi using Power Method
6.Gauss Elimination Method
7.Gauss Jordan Method
8.Gauss Seidel Method
9.Gauss Jacobi Method
10. Integrations by Trapezoidal Method
11. Integration by Simpson's 1/3 Method
12.Taylors series Method
13.RuneKutta Method of fourth order
14.Bender Schmidt Method
15.Crank- Nicholson Method

Text Books

1. Grewal B.S., "Numerical Methods in Engineering and Science", Mercury learning and Information, Kindle Edition, 2018
2. Rajesh Kumar Gupta, "Numerical Methods, Fundamentals and its applications", Cambridge University Press, April 2019
3. M.K. Jain, R.K. Jain, S.R.K. Iyengar "Numerical Methods for Scientific and Engineering Computation", (Seventh Edition) Published by New Age International Pvt. Ltd.,2019

Reference Books

1. Steven Chapra, "Applied Numerical Methods W/Mat lab", Tata McGraw Hill, 4[th]Edition, July 2017
2. Siva Ramakrishna Das, "Numerical Analysis", Kindle Edition, April 2016
3. Timo Heister, Leo G. Rebholz, FeiXue, "Numerical Analysis an Introduction", Publisher De Gruyter March 2019

B.Sc   Mathematics

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1. http://www.bdu.ac.in/academics/equivalent-papers/courses/pg_science/MCA/RQG28.pdf
2. https://www.youtube.com/watch?v=Gkit1hUTsX8
3. https://www.lkouniv.ac.in/site/writereaddata/siteContent/202004032250571912siddharth_bhatt_engg_Numerical_Differentation_and_Integration.pdf

B.Sc   Mathematics

			L	T	P	C	Hrs
A20MAT408	**DISCRETE MATHEMATICS**		3	1	0	4	60

Course Objectives
- To learn inference theory.
- To Understand the concept of Permutations and combinations.
- To Knowthe basic concepts of Boolean algebra.
- To learn formal languages in automata.
- To familiarize the concept of finite state automata.

Course Outcomes
After completion of the course, the students will be able to
CO1 – Gainknowledge of theapplications of inference theory.
CO2 – Known the applications of Permutations and combinations.
CO3 – Understand the concept Of Boolean Algebra.

CO4 –Write the language according to grammars.

CO5 – Convert nonfinite automata to finite automata**.**

UNIT I MATHEMATICAL LOGIC   (12Hrs)
Propositional logic–Propositional equivalences – Predicates and quantifiers–Nestedquantifiers–Rules of inference–Introduction to proofs–Proof methods and strategy.

UNIT II COMBINATORICS `   (12 Hrs)
Mathematical induction–Strong induction and well ordering– The basics of counting– The pigeonhole principle– Permutations and combinations–Recurrence relations–Solving linear recurrence relations–Generating functions–Inclusion and exclusion principle and its applications

UNIT III LATTICES AND BOOLEAN ALGEBRA   (12 Hrs)
Partial ordering–Poset–Lattices as poset–Properties of lattices –Lattices as algebraic systems–Sub lattices–Direct product and homomorphism–Some special lattices–Boolean algebra.

UNIT IV FORMAL LANGUAGES   (12 Hrs)

Languages and grammars – Phrase structure,grammar–Classification of grammars – Pumping lemma for regular languages –Context free languages.

UNIT V FINITE STATE AUTOMATA   (12Hrs)

Finite state automate– Deterministic finite state automate (DFA) – Nondeterministic finite state automata (NFA) – Equivalence of DFA and NFA –Equivalence of NFA and Regular Languages**.**

Text Books
1.Tremblay,J.P.andManohar.R,"DiscreteMathematical Structures with Applications to Computer Science",TataMcGraw Hill Pub.Co. Ltd, New Delhi, 30th Reprint, 2011.
2. Rosen, K.H., "Discrete Mathematics and its Applications", Tata McGraw Hill Pub.Co.Ltd.,NewDelhi, Special IndianEdition, 7th Edition, 2011.
3. T.veerarajan , "Discrete Mathematics" , McGraw Hill Education , 2017.

B.Sc   Mathematics

Reference Books

1. Grimaldi,R.P."Discrete and Combinatorial Mathematics:An Applied Introduction", 4thEdition, Pearson Education Asia, Delhi, 2007.
2. Lipschutz.Sand Mark Lipson,"Discrete Mathematics",Schaum'sOutlines,TataMcGraw Hill Pub.Co. Ltd., New Delhi, 3rdEdition, 2010.
3. Koshy. "Discrete Mathematics with Applications" Elsevier Publications, 2006.

Web Resources

1. https://nptel.ac.in/courses/111/107/111107058/
2. https://nptel.ac.in/courses/111/104/111104026/
3. https://nptel.ac.in/courses/106/106/106106183/

B.Sc   Mathematics

	L	T	P	C	Hrs
A20MAT409 **OPERATIONS RESEARCH**	3	1	0	4	60

Course Objectives
- To Learn LPP using different techniques.
- To impart knowledge in concepts and tools of Operations Research.
- To understand queuing models.
- To gain knowledge in Game theory.
- To study the networks of project activities PERT – CPM.

Course Outcomes
After completion of the course, the students will be able to

CO1 – Solve Linear Programming Problems.
CO2 – Solve Transportation and Assignment Problems.
CO3 – Understand the application of queuing models.
CO4 – Understand the usage of game theory and Simulation for Solving Business Problems.
CO5 – Understand the network planning techniques of PERT and CPM.

UNIT I LINEAR PROGRAMMING PROBLEM (12 Hrs)
Formulation and Graphical Method – Simplex Method – Artificial Variable Techniques – Big-M Method – Duality

UNIT II TRANSPORTATION AND ASSIGNMENT PROBLEM (12 Hrs)
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.

UNIT III QUEUEING THEORY (12 Hrs)
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); Models.

UNIT IV GAME THEORY (12 Hrs)
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 PROJECT MANAGEMENT (12 Hrs)
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 Books
1. KantiSwarup, P. K. Gupta, Man Mohan, *Operations Research*, S. Chand & Sons Education Publications, New Delhi, 12th Revised edition, 2014.
2. Gupta P.K. and Hira D.S., *Problems in Operations Research*, S.Chand& Co.
3. R.Paneerselvam, "Operation Research", Prentice Hall iindia Pvt. Ltd., 2004.

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.

B.Sc Mathematics

3. Ravindran A., Phillips D.T. and Solberg J.J., Operations research, John wiley& Sons.

Web References
1. https://www.researchgate.net/publication/313880623_Introduction_to_Operations_Research_Theory_ and_Applications
2. https://easyengineering.net/operations-research-p-ramamurthy/
3. https://examupdates.in/operation-research-notes/

B.Sc   Mathematics

	L	T	P	C	Hrs
	3	1	0	4	60

A20MAT410   **MECHANICS II(DYNAMICS)**

Course Objectives
- To study Relative motion. Inertial and non-inertial reference frames
- To develop the concept of the Projectile.
- To introduce variety of motion problems.
- To describe basic ideas of central orbits.
- To study the concept of Moment of Inertia.

Course Outcomes
After completion of the course, the students will be able to

CO1 –Understand Mass geometry: Center of mass and moment of inertia tensor.
CO2 –Understand and work with practical problems of Projectile in dynamics.
CO3 –Apply physical principles to the analysis of motion problems.
CO4 –Apply laws,principles,postulates governing the dynamics in physical reality.
CO5 –Identify the reason for dynamic changes in the body.

UNIT I LAWS OF MOTION   (12 Hrs)
Momentum-Newton's laws of motion-illustration of Newton's laws of motion-conservation of linear momentum-motion of a particle on a rough horizontal plane under the action of a constant force- motion of a particle up a rough inclined plane under the action of a constant force-pressure of body resting on a moving horizontal plane- motion of connected particles.

UNIT II PROJECTILE   (12 Hrs)
Forces on a Projectile, Displacement as a combination of vertical and horizontal displacements, Nature of trajectory, Results Pertaining to the motion of the Projectile, Maximum Horizontal range, Two Trajectories with a given speed and range, Projectile Projected Horizontally-Projectile projected on an inclined plane – Maximum range on an inclined plane.

UNIT III SIMPLE HARMONIC MOTION   (12 Hrs)
Simple Harmonic Motion: Amplitude, periodic time, phase-composition of two simple harmonic motions of the same period in a straight line and in two perpendicular lines.

UNIT IV CENTRAL ORBITS   (12 Hrs)
Central force, Examples, Central Orbit, Differential equation of a central orbit, Law of a central force, nature of orbit, Examples.

UNIT V MOMENT OF INERTIA   (12 Hrs)
Moment of Inertia of circular ring, Right circular hollow cylinder, circular lamina, solid right circular cylinder, solid sphere, solid right circular cone, spherical shell, Rectangular lamina, Elliptic lamina, perpendicular and parallel axis theorems, Examples.

Text Books
1. Dr.M.K.Venkataraman, Dynamics, Agasthiar Publications- (2014)
2. I. Rajeswari,"Mechanics",Saras Publication, 2015
3. S.L.Kakani, "Mechanics", Viva Publication, IstEdition ,2005

B.Sc   Mathematics

Reference Books

1. D. S. Kumar, Statics & Dynamics, S.k.Kataria& sons, 2013.
2. Mechanics, J.P. Den Hartog, Dover Publication, e–Book, 2013.
3. An Introduction to Mechanics, DawielKeleppker, Robert J.Kolenkow, Cambridge University Press, e – Book, 2010.

Web References

1. https://people.csail.mit.edu/bkph/articles/Kinematics_Statics_Dynamics_2.pdf
2. http://ruina.tam.cornell.edu/Book/RuinaPratap1-15-13.pdf
3. https://www.slideshare.net/AhmedMomtaz3/lecture-notes-on-engineering-statics

B.Sc   Mathematics

	L	T	P	C	Hrs
A20MAD407 **STATISTICS II**	3	1	0	4	60

Course Objectives

- To introduce the concept of discrete distribution.
- To learn the concept of continuous distribution.
- To understand the concept of testing of hypothesis using statistical analysis.
- To gain the knowledge about chi-square distribution.
- To apply the sampling distribution.

Course Outcomes

After completion of the course, the students will be able to

CO1 – Solve the concept of discrete distribution.
CO2 – Analyze and apply the knowledge of normal and gamma distribution.
CO3 – Apply the concept of testing of hypothesis for small and large samples.
CO4 – Understand the derivation of chi-square distribution.
CO5 – Know the applications of t-distribution and F-distribution.

UNIT I DISCRETE DISTRIBUTION (12 Hrs)

Bernoulli distribution – Binomial distribution – Poisson distribution –Geometric distribution.

UNIT II CONTINUOUS DISTRIBUTION (12 Hrs)

Normal distribution – Gamma distribution – Beta distributions of first and second kind - Exponential distribution – Weibull distribution

UNIT III TESTING OF HYPOTHESIS (12 Hrs)

Introduction – Types of Sampling – Parameter and Statistic – Tests of significance – Test of significance – Procedure for testing of hypothesis –Test of significance for large samples – Sampling of attributes – Sampling of variables.

UNIT IV EXACT SAMPLING DISTRIBUTION – I (12 Hrs)

Introduction – Derivation of the chi-square distribution – MGF of chi-square distribution – Application of chi-square distribution.

UNIT V EXACT SAMPLING DISTRIBUTION – II (12 Hrs)

Introduction – Student's t- distribution – Applications of t-distribution – Distribution of sample correlation coefficient when population correlation coefficient is zero, F-distribution – Applications of F-distribution.

Text Books

1. S.C. Gupta, V.K.Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand &Sons, Educational Publishers, 3rd Edition, New Delhi, Reprint 2017.
2. Gupta. S. P., "Statistical Methods", Sultan Chand & Sons, 32nd Edition, New Delhi, 2012.
3. William Mendenhall, Robert J. Beaver, Barbara M. Beaver: "Introduction to Probability & Statistics", Cengage Learning, 15th Edition, 2019.

Reference Books

1. A. M. Mood, F. A. Gray bill and O. C. Boses, "Introduction to Theory of Statistics", McGraw Hill, 2017.
2. Rahatgi U. K., "An Introduction to Probability Theory and Mathematical Statistics", Wiley Eastern, 2015
3. P.R. Vittal, "Mathematical Statistics", Margham Publications, Chennai, 2016.

B.Sc   Mathematics

Web References

1. https://online.stat.psu.edu/stat414/book/export/html/711
2. http://www.nptel.ac.in/courses/111105035
3. http:// www.probabilitycourse.com.

B.Sc Mathematics

			L	T	P	C	Hrs
A20MAE402		**BESSEL'S FUNCTION**	3	0	0	3	45

Course Objectives
- To identify Bessel's equation of first kind.
- To obtain Bessel functions of second kind and integration of Bessel equations.
- To relate Bessel functions with Recurrence relations.
- To learn the concept of Generating function for the Bessel's function using Trigonometric expansions.
- To learn the concept of Bessel series or Fourier Bessel expression.

Course Outcomes
After completion of the course, the students will be able to
CO 1–Apply the concept of Bessel equations.
CO 2–Apply the Basic rules of Bessel equation in integration.
CO 3–Understand the basic concepts of Recurrence relations.
CO 4– Solve the problem of Trigonometric expressions involving Bessel functions.
CO 5–Solve the problems related to Orthogonality and Fourier series expansion.

UNIT I BESSEL FUNCTION OF FIRST KIND (9 Hrs)
Bessel's Equations and its solution – Bessel function of the first kind of order n – List of important results of Gamma and Beta functions – Relation between $J_n(x)$ and $J_{-n}(x)$, n be an integer

UNIT II BESSEL FUNCTION OF SECOND KIND (9 Hrs)
Bessel function of the second kind of order n – Integration of Bessel equation in series for n=0 – Bessel function for zeroth order – Some problems.

UNIT III RECURRENCE PROBLEMS (9 Hrs)
Recurrence Relations – Problems – Problems involving integration and recurrence relations.

UNIT IV TRIGNOMETRY RELATION OF BESSEL FUNCTION (9 Hrs)
Generating function for the Bessel's function – Trigonometric expressions involving Bessel functions – some problems.

UNIT V BESSEL SERIES (9 Hrs)
Orthogonality of Bessel functions –Bessel series or Fourier Bessel expression for f(x) – Some problems

Text Books
1. N.W Mc Lachlan , Bessel function for engineers , Oxford engineering science series 2010
2. Bowman, F., Introduction to Bessel Functions, Dover New York, 1958
3. Rainville, E.D., Special Functions, MacMillan, New York, 1960

ReferenceBooks
1. G. N. Watson, Bessel Functions, Cambridge Univ, 2010
2. George Ballard Mathews, "A Treatise on Bessel Functions and Their Applications to Physics , 2009
3. Wheelon, A. D., Tables of Summable Series and Integrals Involving Bessel Functions, Holden-Day, San Francisco, 1968

Web References
1. http://egyankosh.ac.in/bitstream/123456789/19442/1/Unit-15.pdf
2.https://www.youtube.com/watch?v=6n5QyYMe9U0&t=1584
3. https://www.youtube.com/watch?v=HpvRsiPltOo

B.Sc   Mathematics

	L	**T**	**P**	**C**	**Hrs**
A20MAE403 **NUMBER THEORY**	**3**	**0**	**0**	**3**	**45**

Course Objectives

- To acquire knowledge of basic concepts of number theory.
- To understand various types of functions.
- To know the primitive roots.
- Apply the theorems to study the numbers.
- To know the Triples and Fermat's numbers.

Course Outcomes

After completion of the course, the students shall have ability to

CO1 – Find the Binomial coefficient.
CO2 – Solve system of linear congruence's.
CO3 – Solve the Multiplicative arithmetic functions.
CO4 – Find the primitive roots.
CO5 – Find the Fermat Numbers.

UNIT I FUNDAMENTAL THEOREM OF ARITHMETIC (9 Hrs)

Well – Ordering Principle(WOP) – Principle of Finite Induction – The Division Algorithm – Basis Representation Theorem- Binomial Coefficients – Divisibility Theory : Greatest Common Divisor –Least common Multiple – Linear Diophantine Equations – Fundamental Theorem of Arithmetic – Some Question Regarding Primes.

UNIT II CONGRUENCES (9 Hrs)

Definition – Residue System – Test of Divisibility – Linear congruences - Solving Polynomial congruences – An Application of Congruences to Diophatine Equations – Fermat 's Little theorem – Euler's Generalisation of FLT

UNIT III ARITHMETIC FUNCTIONS (9 Hrs)

Wilson's Theorem- Euler's $\emptyset$ Function – Arithmetic Functions: The Function τ and σ – The Möbius Function – Multiplicative Arithmetic Functions – Inversion Formula – Greastest Integer Function.

UNIT IV PRIMITIVE ROOTS (9 Hrs)

Exponents – Primitive roots Modulo a Prime – Determination of Integers having Primitive roots – Indices – Euler's Criterion – Legendre Symbol and its Properties – Gauss Lemma.

UNIT V TRIPLES AND FERMATS NUMBERS (9 Hrs)

Quadratic Reciprocity Law and its applications – Jaccobi Symbol – Perfect Numbers – Mersenne Primes- Fermat Numbers – Pythagorean Triples – Fermat's Last Theorem

Text Books

1. S.B.Malik ,‖ Basic Number Theory‖,Second Revised Edition, Vikas Publishing House PVT LTD, 2009
2. Kumaravelu and SuseelaKumaravelu, Elements of Number Theory, Raja sankar offset Printers, 2002.
3.T.MApostol, Introduction to Analytic Number theory, Springer Verlag, 8th reprint 1998

Reference Books

1. Ivan Niven and Herbert S Zuckerman, ―An Introduction to the theory of Numbers‖, 3rd Edition,

B.Sc   Mathematics

Wiley Eastern Ltd., New Delhi, 2000.

2. Neville Robinns, Beginning Number Theory, 2nd Ed., Narosa Publishing House Pvt. Ltd., Delhi, 2007.
3. Kenneth H.Rosen, Momentory Number Theory Applications, Addition-Wesely Publications company,1993

Web References

1. https://resources.saylor.org/wwwresources/archived/site/wp-content/uploads/2013/05/An-Introductory-in-Elementary-Number-Theory.pdf
2. https://www.youtube.com/watch?v=XSCNLPyoKrk
3. https://nptel.ac.in/courses/111103020

B.Sc   Mathematics

		L	T	P	C	Hrs
A20CME402	**FINANCIAL AND MANAGEMENT ACCOUNTING-II**	4	0	0	4	60

(Common to B.C.A. & B.Sc. Mathematics)

Course Objectives

- To develop a deeper understanding on financial statement analysis.
- To make them understand the accounting ratios.
- To learn the preparation of cost sheet.
- To be familiar with marginal costing and break-even analysis.
- To develop the knowledge of budgeting

Course Outcomes

After completion of the course, the students will be able to

CO1 – Work with the tools of financial analysis

CO2 – Compute Accounting Ratios from financial statements

CO3 – Prepare the cost sheet with unit cost details

CO4 – Work with marginal costing and break-even analysis

CO5 – Prepare the Sales, Production, Cash and Flexible Budgets.

UNIT I FINANCIAL STATEMENTS ANALYSIS   (10 Hrs)

Financial Statements – Significance – Users of Financial Statements – Analysis of Financial Statements – Tools of Financial Analysis: Horizontal Analysis, Vertical Analysis, Trend Analysis, and Ratio Analysis. Preparation of Comparative Financial Statements and Common-size Financial Statements.Simple Problems.

UNIT II ACCOUNTING RATIOS   (12 Hrs)

Accounting Ratios – Classification of Ratios – Basis of Origin and Functional Classification.Ratios to test Solvency, Profitability, Liquidity, Efficiency and Performance of the business – Computation of Accounting Ratios and Interpretation.Problems on Computation of Ratios from given Financial Statements and other information.

UNIT III COST CONCEPTS AND COST SHEET   (12 Hrs)

Cost – Concept and Meaning – Classification of Costs – Elements of Cost – Statement of Cost – Unit Costing – Problems on Cost Sheet.

UNIT IVMARGINAL COSTING AND BREAK-EVEN ANALYSIS   (14 Hrs)

Marginal Cost and Marginal Costing – Concept of Contribution – Profit-Volume Ratio – Margin of Safety – Break-Even Analysis: Preparation of Break-Even Chart – Problems on Break-Even Analysis.

Uses of Marginal Costing in decision-making – Pricing Decisions – Make or Buy Decisions – Accepting a Foreign Offer – Sales Mix Decisions.

UNIT V BUDGETING   (12 Hrs)

Budget and Budgeting – Types of Budgets – Functional Budgets: Sales Budget, Production Budget, Materials Purchase Budget, Cash Budget. Concept of Flexible Budgeting – Concept of Zero Base Budgeting.Problems on preparation of Sales, Production, Cash and Flexible Budgets.

B.Sc   Mathematics

Text Books

1. P. Periyasamy, "Financial, Cost and Management Accounting", Himalaya Publishing House, 1st Edition, 2011.
2. T.S. Reddy & Y. Hari Prasad Reddy, "Financial and Management Accounting", Margham Publications, 4th Edition, 2018.
3. R.S.N. Pillai& B.N. Bagavathi, "Management Accounting", S. Chand & Sons, 5th Edition, 2010.

Reference Books

1. N. Ramachandran& Ram Kumar Kakani, "Financial Accounting for Management", McGraw Hill, 5th Edition, 2020.
2. M.N. Arora, "Cost and Management Accounting", Vikas Publishing House, 10th Edition, 2019.
3. I.C. Jain, "Management Accounting", Vikas Publishers House, 6th Edition, 2018.

Web References

1. https://www.civilserviceindia.com/subject/Management/notes/financialaccounting.html
2. https://www.taxmann.com/blogpost/2000001622/accounting-principles-andconcepts.aspx
3. https://www.dynamictutorialsandservices.org/2018/10/management-accounting-notes.html

B.Sc   Mathematics

A20MAD408	STATISTICS II LAB	L	T	P	C	Hrs
	[Using R]	0	0	4	2	30

Course Objectives

- To familiarize the concept of Mean and Standard deviation.
- To know Statistical Inferences -Continuous Probability Distribution.
- To learn the concept of Frequency Distribution.
- To understand Poisson distribution.
- To introduce the concepts of Hypothesis Testing.

Course Outcomes

After completion of the course, the students will be able to

CO1– Gain knowledge in the concepts of Continuous Probability Distribution.
CO2– Trained for data collection on various fields of survey enabling them to classify them Statistically.
CO3– Familiarized in various statistical software.
CO4 – Find the Mean and Standard Deviation.
CO5 – Compute Hypothesis Testing.

LIST OF EXERCISES

1. Binomial Distribution
2. Poisson distribution
3. Geometric Distribution
4. Normal Distribution
5. GammaDistribution
6. Beta Distribution
7. Weibull Distribution
8. Exponential Distribution
9. φ^2 Distribution
10. t - Test

Web References

1. https://spia.uga.edu/faculty_pages/rbakker/pols4150/RLabManual.pdf
2. https://www.lbrce.ac.in/SP%20with%20R%20Lab%20syllabus.pdf
3. https://www.youtube.com/watch?v=_V8eKsto3Ug

B.Sc   Mathematics

A20MAS404	QUANTITATIVE APTITUDE AND REASONING - I	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To enhance holistic development of students and improve their employability skills

Course Outcomes

After completion of the course, the students will be able to
CO1 – To improve aptitude, problem solving skills and reasoning ability of the student.
CO2 –To help them qualify the written test of competitive exams, campus placements and PSUs.
CO3 –To collectively solve problems in teams and group.
CO4 –To adopt new techniques in solving problems.
CO5 – To analysis the various problem using data's.

UNIT I   (9 Hrs)

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

UNIT II   (9 Hrs)

Simple interest and compound interest – Word problems

UNIT III   (9 Hrs)

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

UNIT IV   (9 Hrs)

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

UNIT V   (9 Hrs)

Problems related to clocks and calendar – Time & Work Problems

Reference Books

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. AbhijitGuha, Quantitative Aptitude for Competitive Examinations, Tata Mcgraw Hill, 3rd Edition
4. Edgar Thrope, Test Of Reasoning for Competitive Examinations, Tata Mcgraw Hill, 4th Edition

Web References

1. http://fw.freshersworld.com/placementweek/papers.asp
2. https://www.youtube.com/watch?v=rHzggZDdtc4
3. https://www.youtube.com/watch?v=HEGYvcAiAsk

B.Sc   Mathematics