P.K.R ARTS COLLEGE FOR WOMEN

(Accredited with 'A' Grade by NAAC)

An Autonomous Institution-Affiliated to Bharathiar University

Gobichettipalayam-638476

Department of Mathematics

PROGRAMME: B.Sc Mathematics

Scheme of Examinations and Syllabus

For the candidates admitted during 2017-2018 and onwards

Under CBCS PATTERN

CONTENTS

P.K.R ARTS COLLEGE FOR WOMEN

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An Autonomous Institution-Affiliated to Bharathiar University

Gobichettipalayam-638476

Department of Mathematics (B.Sc)

MEETING OF BOARD OF STUDIES IN MATHEMATICS

Date: 07.04.2018 Time: 10.00 a.m. Venue: Mathematics Department

AGENDA

1. Confirmation of the minutes of the first meeting of the Board of studies held on 12.08.2017

2. Consideration and approval of the Action taken report on the resolutions passed in the previous meeting held on 30.08.2017

3. Ratification of revision on the Course scheme and scheme of examinations of the Academic Year 2017-18

4. To approve the syllabi for all the courses (Subjects) of semester 3 to 6 offered to the UG Students admitted during the Academic year 2017-18 & recommend to Academic Council

5. To approve the syllabi for all the courses (Subjects) of semester 1 to 6 offered to the UG students admitted during the Academic year 2018-19 & recommend to Academic Council

6. To approve the Question Paper pattern for both CIA tests and ESE – Theory and practical / project/ Institutional training etc courses.

7. To recommend panel of members of QP setting and panel of examiners for practical examinations and central valuation.

8. Any other item

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DEPARTMENT OF MATHEMATICS

MEMBERS IN BOARD OF STUDIES

S.No	CATEGORIES	NAME & DESIGNATION	SIGNATURE
1	Chairperson	Ms.R.Jayalakshmi, Associate Professor and Head, Department of Mathematics, P.K.R. Arts College for Women, Gobichettipalayam – 638476. Mobile: 9486640983 Mail ID : jaipranikaa@gmail.com	
2	Subject Expert-1	Dr. A.Anguraj, Associate Professor, Department of Mathematics, PSG College of Arts and Science (AUTONOMOUS), Coimbatore- 641014. Mobile: 9443737620 Mail ID: angurajpsg@yahoo.com	
3	Subject Expert-2	Dr.R.Parvathi, Associate Professor and Head, Department of Mathematics, Vellalar College for Women (AUTONOMOUS), Erode- 638012. Mobile: 9487323070 Mail ID: paarvathiskaar@gmail.com	

4	**University Nominee**	**1. Dr.S.Narayanamoorthy,** **Assistant Professor,** **Department of Mathematics,** **Bharathiar University,** **Coimbatore – 641 046.** **Phone: 0422 – 2422222** **Mobile: 9884588610** **Mail ID: snm_phd@yahoo.co.in,** **snmphd@gmail.com**	
5	**Industry Representative**	**Ms.S.Keerthana,** **Assistant Consultant,** **Tata Consultancy services LTD,** **Special Economic Zone – Siruseri,** **Plot No. 1/G1, SIPCOT IT Park,** **Navalur Post,** **Siruseri, Chennai – 603103.** **Mail ID: Keerthana.Selvaraju@gmail.com** **Mobile :9940992364.**	
6	**PG Meritorious Alumnus**	**Ms.S.Shantha Kumari,** **Assistant Professor,** **Science and Humanities (Mathematics) Department,** **Adithya Institute of Technology,** **Karubampalayam,** **Coimbatore – 641107.** **Mobile: 9688839950** **Mail ID: sshanthakumari87@gmail.com**	
7	**Member-1**	**Ms. S.A.Dhanalakshmi,** **Dean, Department of Mathematics,** **P.K.R. Arts College for Women,** **Gobichettipalayam – 638476.** **Mobile:9842420006** **Mail ID:dhanagobu@gmail.com**	

8	**Member-2**	**Ms. M.Kasthuri,** **Associate Professor in Mathematics,** **P.K.R. Arts College for Women,** **Gobichettipalayam - – 638476.** **Mobile : 9443951244** **Mail ID:joevarshini@gmail.com**	
9	**Member-3**	**Ms.N.R.Neelavathi,** **Assistant Professor in Mathematics,** **P.K.R. Arts College for Women,** **Gobichettipalayam – 638476.** **Mobile: 9715095438** **Mail ID: neelaalogu@gmail.com**	
10	**Member-4**	**Ms. P.Sampoornam,** **Assistant Professor in Mathematics,** **P.K.R. Arts College for Women,** **Gobichettipalayam – 638476.** **Mobile:9600609694** **Mail ID:ammusiva85@gmail.com**	

RULES AND REGULATIONS FOR THE STUDENTS ADMITTED FROM 2018 – 2019 AND ONWARDS

P.K.R. ARTS COLLEGE FOR WOMEN
(Accredited with 'A' Grade by NAAC)
An autonomous institution – Affiliated to Bharathiar University
No.:21 Pariyur Road, GOBICHETTIPALAYAM – 638476.
Ph.: 04285-222128, 221569 Email:pkroffice@gmail.com Website pkrarts.org

RULES AND REGULATIONS FOR STUDENTS ADMITTED FROM 2017-18 & ONWARDS

P.K.R. Arts College founded in the year 1994 with the vision to make the college a "**Centre of Excellence"** in higher education by imparting value based quality education to rural women, to empower and make them economically independent and socially committed to the task of building a strong nation. Ever since its inception the college took steps to inculcate the core values of truth and righteousness through right kind of teaching and learning methods and grown to leap and bounds.

As per the expectations of UGC on the Autonomous colleges, our college has initiated the following measures for the quality improvement of its functioning:

1. To Re-structure and design the course curricula;
2. To Inculcate research culture amongst the students and teachers;
3. Promote healthy practices such as community service, extension services, projects, etc. for the benefit of the society

The P.K.R. Arts College for Women follows the UGC, TANSCHE and Bharathiar University guidelines of CBCS pattern in framing Course Scheme and scheme of examinations for the students admitted in various UG and PG Programmes from the Academic year 2017-18 and onwards.

DEFINITION OF TERMS:

Choice Based Credit System (CBCS):

CBCS is a flexible system of learning that permits students to,

- Learn at their own pace,
- Choose electives from a wide range of elective courses offered by the departments
- Adopt an inter-disciplinary approach in learning, and
- Undergo additional courses and acquire more than the required number of credits
- Make best use of the expertise of available faculty

Programme:

The term ***"Programme"*** is used to refer to the Bachelor or Master level of study offered in P.K.R. Arts College for Women. For e.g. B.A. Programme indicates Bachelor of Arts and B.Sc Programme indicates, Bachelor of Science and M.Sc Programme indicates, Master of Science.

Branch:

The term ***"branch"*** is used to refer to the subject specialization under the Bachelors or Masters Level of study offered in P.K.R. Arts College for Women. For e.g. B.A. Tamil Literature indicates, the Bachelor of Arts, specializing Tamil Literature and M.Sc - Mathematics, indicates Master of Science, specializing in Mathematics.

Duration:

The total study periods of various programmes are:

- Undergraduate (Bachelors) programmes : (B.A. or B.Sc or B.Com or BCA or BBA) :Three years (Six semesters)
- Postgraduate (Masters) programme (M.A. or M.Sc, M.Com & M.B.A): Two years (Four semesters) and M.C.A. Regular stream (Three years – Six Semesters), Lateral entry stream (Two years – Four Semesters).

Curriculum:

The term "Curriculum" indicates the various components of the programme and branch

of study.

Course:

The term "Course" is used to refer to the specific subject or the paper of the particular Programme and branch of study.

Course Scheme:

Course scheme denotes the course outline or the components of the particular Programme and branch of study.

Scheme of examinations:

Scheme of examination indicates the contact hours allotted for each course, the duration of End Semester Examination, marks details for CIA and ESE and the credit score specified for each course.

Syllabus:

The subject content of each course is referred to as "Syllabus".

Semester:

The term "semester" denotes the start and the end of teaching period of the Academic year. The college adopts two semester pattern of an Academic Year. The duration of each semester is roughly around six months period but not less than 90 working days. The semester is subdivided as (ODD and EVEN) spanning six months (odd semester is from June to November) and Even semester (December to May).

Credit system:

It is a system of assigning weightage to each one of the courses and components of the curriculum of a programme and branch of study in terms of the weightage of the teaching learning process of that particular course. The weightages are given in terms of credit points.

Credit point:

Credit point is the numerical weightage given to the particular course of study. The student learner should obtain the mandatory minimum credit points specified for each programme and branch of study to earn her degree. The student learner may also earn additional credits by the way of completing extra courses (subjects).

Credits to be earned:

All Undergraduate Programmes : **150** credits

COMPONENTS: FOR UG PROGRAMMES

Part: I : Tamil/Hindi/French/Malayalam/Kannada/Sanskrit

Part: II : English

Part: III : This part consists of…

a) Core courses
b) Core: Allied courses
c) Elective courses
d) Core Optional

Part: IV: Following are the components coming under Part: IV

A: Foundation curses:

i) Environmental studies - offered during I semester

ii) Yoga and value education - offered during II semester

B: Skill Enhancement Courses:

i) Information security - offered during III semester

ii) Courses offered by the respective departments - offered during IV to VI semesters

C: Non-Major Electives:

i) Indian Women and Society / Basic Tamil - offered during III semester

ii) Career Enhancement (Online examination)/ Consumer Rights -offered during III & IV semester (Annual Pattern)

Part V : Following are the components coming under Part: V

i) Extension Activity:

a) NSS / YRC / RRC / CCC / PHYSICAL EDUCATION

b) Department Extension activity

ii) Proficiency enhancement: Self Study

iii) Extra credit course

ADMISSION NORMS:

The eligibility conditions and the Guidelines issued by the Bharathiar University in admitting students are followed for all the Programmes offered in P.K.R. Arts College for Women.

EXAMINATION AND EVALUATIONS:

Requirement for appearing End Semester Examinations:

Attendance: (as per the norms and guidelines of Bharathiar University)

i) A candidate is eligible to appear for the End Semester examinations in any semester if:

- She secures not less than 75% of attendance in the number of working days during the semester.
- Her progress has been satisfactory
- Her conduct has been satisfactory

ii) Candidates who earn attendance between 65% to 75% are not eligible to appear for the current semester examinations. However, the Principal may condone the lack of attendance of those students on the following grounds and permit them to write End

Semester Examinations, after the payment of condonation fee:

* Prolonged illness
* Major Surgery
* Accident which demands a long rest

The cause of the long period of absence should be informed with supportive documents to the Principal within a week's time and get the leave sanctioned.

iii). Candidates who earn attendance between 55% and 64% are not eligible to appear for the current semester examinations. However, they can write arrear subjects, if any. They are permitted to continue their studies in the next semester; while continuing in the next semester, they have to compensate and earn combined attendance of 75% or more by taking the average of the attendance earned in the current and the previous semester.

iv). Candidates who earn attendance below 55% are not eligible to appear for the current semester examinations and also have to discontinue the course and rejoin in the same semester in the next academic year, if vacancy is available, with proper approval from the Bharathiar University and the Principal through the Head of the Department concerned. These candidates are eligible to write arrear subjects, if any.

v). Students having a minimum of 75% of attendance in the Practical classes alone will be eligible to submit their record note books and appear for CIA and ESE practical examinations.

vi). Students shall be permitted to appear for the practical examinations only with the submissions of bonafide records.

Scheme of examinations:

i). All End Semester Examinations (theory and practical) shall be conducted twice a year, in November / December and in April / May. All failed candidates shall be governed by the regulations and syllabus in force at the time of their subsequent appearances.

ii). Additional supplementary End Semester Examinations in final semester subjects and Special Supplementary End Semester Examinations for students who have failed in only one subject up to V semester (UG Programs) and up to III semester (PG Programs)

are conducted in June / July every year to facilitate the final year failed students to go for higher studies or seek job early.

RULES TO BE FOLLOWED BY STUDENTS DURING EXAMINATION

1. A candidate entering the examination hall must possess hall-ticket and identity card issued by the Principal; else she will be denied admission to write the examination.
2. Candidates have to occupy their allotted seats 10 minutes before the commencement of examination and maintain discipline and silence inside the examination hall. They have to give due attention to the instructions given by the Hall Superintendent before the commencement and also during the examination.
3. No candidate will be permitted to enter examination hall after 30 minutes from the commencement of examination. Similarly, no candidate will be permitted to leave the hall before 30 minutes from the commencement of examination.
4. A candidate who leaves the examination hall will not be permitted to re-enter the hall under any account.
5. Candidates are expected to bring their own pens, pencils, eraser, geometrical instruments, non-programmable calculators etc. and will not be allowed to borrow from others.
6. Candidates should use only blue or black ink or ball pen while answering their papers. Only for drawing diagrams or chart colour pens/sketch pens are allowed.
7. Clark's mathematical table, Statistical table and Compound present value table will be supplied to candidates on request and the same should be returned immediately after use, without any scribbling. However, the candidates will be allowed to use their own mathematical and statistical tables / data sheets /graph sheets which are uncommon and specifically required to answer a particular paper after obtaining permission from Chief/Hall Superintendent. Such sheets or tables with any scribbling will not be permitted.
8. Candidates are prohibited from possessing study material in any form or mobile phone or and any such Electronics / Communication instruments inside the examination hall. Mere possession of such materials inside the examination hall itself will be considered as the material meant for malpractice and will lead to disciplinary actions.

9. Candidates must verify and satisfy themselves that they have received correct question paper before they start answering for questions. Question paper not relevant should be returned to the hall superintendent at once.
10. Candidates are not allowed to write beyond the time prescribed for the examinations.
11. Rough work, if any, must be done by the candidates on the bottom of the page itself. Candidates can reserve, if necessary, one fourth of the page at the bottom exclusively for the purpose. No separate answer book for rough work will be supplied to candidates. Rough work carried out of by a candidate will become part and parcel of the answer paper.
12. Candidates are forbidden from asking questions or clarifications of any kind from the fellow student or Hall Superintendent during the examination.
13. Candidates should not detach any sheet from the main answer book or smuggle out additional sheet or main book.
14. Candidates should handover the answer books personally to the Hall superintendent, before leaving the examination hall.
15. Candidates should not write their Register number anywhere else (except in the specified space) on the first page of Answer Book. Writing the name or making any appeal in the answer book or any other identifiable marking will be treated as an attempt to influence the examiner. Hence, any such act will attract disciplinary measures.
16. The students who indulge in any malpractice while writing examination will be immediately referred to the Chief Superintendent for the initiation of appropriate disciplinary action.
17. In case of impersonation, the accused will be handed over to police authorities for investigation and necessary action.
18. In the event of public holiday being declared after the publication of timetable, the examinations will not be postponed or cancelled. The examinations will be conducted as scheduled unless otherwise notified.
19. Any letter or telegram or phone call to a candidate shall not in any case be delivered / informed to the candidate until he/she completes examination.
20. The differently abled candidates who could not write examination by themselves shall submit a request to the Principal in the beginning of the Academic Year with the support of documentary evidences for alternate arrangements.

Transitory positions:

The candidate who have completed the course of study but have arrears will be permitted to take up the examinations only under the regulations in force at the time.

Facility to appear in an examination already passed:

The Candidates who have passed examinations may be permitted to appear again (Only once) for the end semester examinations of that course or courses under the regulations and syllabi in force then, with a view to improve their performances (s). If they do not show improvement their previous marks shall be the final marks in all records (such candidates should not have applied for their Degree certificate in Convocations held in between). Also such reappearances shall be permitted to appear only once at the examination / examinations conducted in the college in the next two semesters only.

Provision to re-total the answer book:

Candidates who desire to have their answer books re-totaled shall apply to the controller of Examinations, remitting the prescribed fees within 10 calendar days from the date of publication of results. Where the marks obtained in the re-totaling are higher than the marks awarded earlier, the Controller of Examinations shall issue the revised mark sheets after withdrawing the previous one.

Provision to appeal for re-evaluation of End Semester Examination Marks:

Candidates who desire to have their answer books revalued shall apply to the Controller of Examinations, remitting the prescribed fees within 10 calendar days from the date of publication of results (The date mentioned in the Mark sheet). If the revalued marks are higher to the extent of getting a passing minimum and more than the marks awarded earlier, then the COE shall issue the revised mark sheet after withdrawing the mark sheet issued previously. If the revalued marks are higher than the marks awarded earlier but not to the extent of getting a passing minimum, then the first valuation marks shall be the final marks. The principles of moderation formulated in the Results Passing Board for the respective examination shall be applied for the revaluation cases also.

Transparency system:

Under this system, the photo copy of the answer script written by the student is issued on request. The procedure is that the candidate who desires to get the Photo copy of her answer script shall apply to the COE, remitting the prescribed fee within 10 calendar days from the date (noted in the mark sheet) of publication of results. On a specific day, the candidates who have applied for this facility will be given with the photo copy of the answer script and would be directed to discuss the issues with the subject expert who are specially appointed for the purpose. The students may scrutinize the answers script, discuss with the subject expert, get clarifications and if they are not convinced with the marks awarded then they may go for applying for revaluation. Such a request shall be made within 3 calendar days. The procedure followed for the revaluation is applied to this category also.

Facility to qualify in Extra subjects:

The candidates desirous of qualifying themselves in course (subjects) other than those Prescribed for the programmes can appear for the ESE in those courses (subjects) as an additional (Extra) course paper in Part-III with prior permission. Attendance is not compulsory and therefore the candidate shall study independently and appear for the examination. The marks awarded for this will not be counted for classification of Part: III courses. However it will be considered for the completion of Part: V, if opted as an optional course under Part: V.

Passing Minimum:

A candidate who secures not less than 40% marks in ESE of various components shall be declared to have passed the examination in that course (subject).

Classification of successful candidates and grading system:

No candidate shall be eligible for classification or grading unless…

- The candidate has undergone the prescribed course of study for the prescribed period
- Has passed / completed all the subjects / components prescribed for the programme

- Has earned the credit points prescribed for the course.

Part: I & II

Candidates who have passed Part: I (Tamil / Hindi / French / Kannada / Malayalam Sanskrit) and Part: II English Course (subject) and securing 60% and above and 50% to 59.99% within three years from the date of admission, shall be declared to have passed in I & II classes respectively and all other successful candidates shall be declared to have passed the examinations in III class**.**

Part: III

Candidates who have passed all the Part: III examinations in FIRST ATTEMPT within the study period of the respective semester and securing 75% and above in aggregate of Part: III shall be declared to have passed the Part: III examination in first class with distinction. All other candidates who have passed Part: III subjects and securing 60% to 69.9% & above, 50% to 59.9% and 40% to 49.9% shall be declared to have passed the Part: III examinations in First, Second and Third class respectively.

GRADING SYSTEM

Based on the guidelines of Bharathiar University on grading system the following grading System for the students admitted from 2017-18 & onwards.

Conversion of Marks to Grade Points and Letter Grade:

RANGE OF MARKS	GRADE POINT	LETTER GRADE	DESCRIPTION
90 - 100	9.0 -10.0	O	Outstanding
80 - 89	8.0 – 8.9	D+	Excellent
75 - 79	7.5 – 7.9	D	Distinction
70 - 74	7.0 – 7.4	A+	Very Good
60 - 69	6.0 – 6.9	A	Good
50 - 59	5.0 – 5.9	B	Average
40 - 49#	4.0 – 4.9	C	Satisfactory
00-39	0.0	U	Reappear
Absent	0.0	AAA	Absent

Classification:

CGPA	GRADE	CLASSIFICATION OF FINAL RESULT
9.5 – 10.0	O+	First class – Exemplary*
9.0 and above but below 9.5	O	
8.5 and above but below 9.0	D++	First class with Distinction
8.0 and above but below 8.5	D+	
7.5 and above but below 8.0	D	
7.0 and above but below 7.5	A+	First Class
6.5 and above but below 7.0	A+	
6.0 and above but below 6.5	A	
5.5 and above but below 6.0	B+	Second Class
5.0 and above but below 5.5	B	
4.5 and above but below 5.0	C+ #	Third Class
4.0 and above but below 4.5	C #	
0.0 and above but below 4.0	U	Re-appear

 # Applicable only to U.G. Programme

*** Applicable for the students who have passed the Part: III examinations in FIRST APPEARANCE within the study period of the respective semesters.**

- Cumulative Grade Point Average (CGPA) and final classifications are to be made for the students who have passed all subjects / completed all components prescribed for the programme
- Part-III components alone are considered for CGPA
- Part-I, Part-II, Part-IV & Part-V are not to be considered for finding the CGPA or for the classification of Part—III
- The maximum marks per course (subject) are to be fixed at 100. (if it is less or more than 100 it should be converted to 100)
- Grade point average – For a semester: (GPA): = $\sum$**CGP / C**

Where C= Credits earned for the course in any semester

G= Grade Point obtained for the course in any semester

$$GPA = \frac{\text{Sum of the multiplication of grade points by the credits of the courses}}{\text{Sum of the credits of the courses in a semester}}$$

- Cumulative Grade Point Average – For the entire programme: (CGPA) is calculated by using the formula:

$$CGPA = \frac{\sum CGP}{\sum C}$$

Where C= Credit Point GP= Grade Point

$$CGPA = \frac{\text{Sum of the multiplication of grade points by the credits of the entire programme}}{\text{Sum of the credits of the courses of the entire programme}}$$

- **CGPA is given only in Consolidated mark / Grade sheet**

Ranking:

- Candidates who have passed all the courses (subjects) or completed all the components prescribed for the programme within the period of study are only eligible for Ranking
- Ranking is based on the marks scored in Part-III subjects only.
- Candidates passing the Part-III subjects in First Attempt within the study period of respective semesters are only eligible for ranking.
- In case of Reappearance, the first appearance mark is only considered for ranking
- Candidates absenting for the courses (subjects) prescribed in Part-III and getting higher marks in the subsequent appearances will not be considered for Ranking.

MALPRACTICE AND PUNISHMENT

Punishment for malpractice committed during End Semester Examinations.

The students, who indulge in any malpractice, while writing examination, will be directed to report to Chief Superintendent. The chief superintendent will review and forward the case to Controller of Examinations and the Coe in turn will submit the details to Examination Committee for the initiation of appropriate disciplinary proceedings.

NATURE OF MALPRACTICE	NATURE OF PUNISHMENT	LEVEL OF PUNISHMENT
Making an appeal in any form inside the answer script	**Warning** may be given and if repeated the examination taken by the candidate will be cancelled	LEVEL: I
Possession of mobile phone	The **particular examination** taken by the	LEVEL: II

/ study materials / incriminating materials in any form	candidate will be **cancelled**	
Aiding / Passing / Referring / Copying from mobile phone / study material	The **particular examination** and a**ll t**he **examinations** written already in this semester including Arrear will be **cancelled and** may be permitted to write subsequent semester examinations	LEVEL: III
Insubordinate behavior or threatening the Invigilator	The **particular examination** and a**ll t**he **examinations** written already in this semester will be **cancelled** and also will be **debarred** from appearing for the **ONE subsequent semester examinations**	LEVEL:IV
Inserting previously written answers	The **particular examination** and a**ll t**he **examinations** written already in this semester will be **cancelled** and also will be **debarred** from appearing for the **TWO subsequent semester examinations**	LEVEL: V
Case of **Impersonation**	The **particular examination** and a**ll t**he **examinations** written already in this semester will be **cancelled** and will be **expelled** **From the college and the matter will be referred to the Police if necessary for further action.**	LEVEL: VI

PROGRAMME OUTCOMES

- Have strong foundation in the principles and practices of the main and subfields of mathematics.
- Conceptualize, inquire and communicate mathematically to apply problem solving and logical skills in handling real life situations.
- Investigate mathematical problems and apply solutions in a variety contexts related to science and technology.
- Develop the knowledge of mathematical skills and attitude necessary for further academic exercise in mathematics.
- Maintain a core of mathematical and technical knowledge that is adaptable to changing technologies and provides a solid foundation for future learning.
- To compete successfully for internship and employment positions in government, industry, and non-profit organizations.

PROGRAMME SPECIFIC OUTCOMES

After completion of UG programme the students will be able

- To be a good teacher in mathematics at school level.
- To succeed in all competitive examinations.
- To pursue higher studies in mathematics and professional programme like chartered Accountancy and cost and Management Accountancy.

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COURSE STRUCTURE

CBCS : 2017-2018

Parts	No. of Courses	Credit(s) / Course	Total Credits	Proposed Semester
Part – I : Tamil/Hindi/French/Kanada/Malayalam/Sanskrit	4	4	16	I – IV
Part – II : English	4	4	16	I – IV
Part - III : Core Courses	20	1/2/3/4/5	69	I-VI
Part – III: Elective Courses	03	4	12	V- VI
Part – III: Allied Courses	04	3/4	14	I – IV
Part – III: Allied Practical	01	3	03	I – II
Part – IV : **A. Foundation Courses :**				

Parts	No. of Courses	Credit(s) / Course	Total Credits	Proposed Semester
i. Environment Studies	1	2	4	I
ii. Yoga and Value Education	1	2		II
B. Skills Enhancement Courses :				
i. Information Security	1	2		III
ii. Course offered by the respective department	1	2	8	IV
iii. Course offered by the respective department	1	2		V
iv. Course offered by the respective department	1	2		VI
C. Non-Major Electives :	1	2	4	III
i. Women's Rights / Advanced Tamil	1	2		IV
ii. Career Enhancement				
Part - V :				
Extension Activities :				
i. NSS/YRC/RRC/CCC/PHY.EDU	1	1		
ii. Department Activity	1	1	4	II to VI semester
iii. Proficiency Enhancement (self study)	1	2		V semester
		Total Marks : 3900		
		Total Credits : 150		

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No.:21 Pariyur Road, GOBICHETTIPALAYAM – 638476.

Ph.: 04285-222128, 221569 **Email:pkroffice@gmail.com**
Website: pkrarts.org

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BACHELOR OF SCIENCE - MATHEMATICS

Course Scheme and Scheme of Examinations

(For students admitted from 2017-2018 and onwards)

Part	Category	Course Code	Title of the Course	Contact Hrs/ week	Exam Duration Hrs.	Max.Marks			Credits
						CIA	ESE	Total	
SEMESTER-I									
I	Language: I	17LTU01/ 17LFU01/ 17LKU01/	Tamil- I/ French-I/ Kannada-I	6	3	25	75	100	4
II	English: I	17LEU01	English- I	6	3	25	75	100	4
III	Core: I	17MAU01	Classical Algebra	4	3	25	75	100	4
III	Core :II	17MAU02	Calculus	5	3	25	75	100	5
III	Allied : I	17MAU03	Physics – I	4	3	25	75	100	4
III	Allied **Practical**	17MAU04	Physics	3	-	-	-	-	-

IV	Foundation Course: I	17FCU01	Environmental studies	2	3	-	50	50	2
			TOTAL	30				**550**	**23**
SEMESTER-II									
I	Language: II	17LTU02/ 17LFU02/ 17LKU02/	Tamil- II/ French-II/ Kannada-II	6	3	25	75	100	4
II	English: II	17LEU02	English- II	6	3	25	75	100	4
III	Core: III	17MAU05	Analytical Geometry	5	3	25	75	100	4
III	Core : IV	17MAU06	Differential Equations and Laplace transforms	4	3	25	75	100	3
III	Allied : I	17MAU07	Physics - II	4	3	25	75	100	4
III	Allied **Practical**: I and II	17MAU04	Physics	3	3	40	60	100	3
IV	Foundation Course : II	17FCU02	Yoga & Value Education	2	3	-	50	50	2
			TOTAL	30				**650**	**24**

SEMESTER - III									
I	Language: III	17LTU03/ 17LFU03/ 17LKU03/	Tamil- III/ French-III / Kannada-III	6	3	25	75	100	4
II	English: III	17LEU03	English- III	6	3	25	75	100	4
III	Core : V	17MAU08	Statics	3	3	25	75	100	3
III	Core : VI	17MAU09	Trigonometry, Vector Calculus and Fourier Series	3	3	25	75	100	3
III	Core : VII	17MAU10	Comprehension in Mathematics – I (Online Exam)	-	$1\frac{1}{2}$	-	50	50	1
III	Allied : II	17MAU11	Statistics - I	5	3	25	75	100	3
IV	Skill Enhancement course : I	17SEU01	Information Security	2	3	100	-	100	2
IV	Non - Major Elective - I	17NMU01A/ 17NMU01B	Indian Women and society / Basic Tamil	2	3	-	50	50	2
IV	Non - Major Elective - II	17NMU02A/ 17NMU02B	Career Enhancement / Consumer Rights	3	-	-	-	-	-
			TOTAL	30				**700**	**22**

SEMESTER - IV									
I	Language: IV	17LTU04/ 17LFU04/ 17LKU04/	Tamil- IV/ French-IV/ Kannada-IV	6	3	25	75	100	4
II	English: IV	17LEU04	English - IV	6	3	25	75	100	4
III	Core : VIII	17MAU12	Dynamics	3	3	25	75	100	3
III	Core : IX	17MAU13	Numerical Methods	5	3	25	75	100	4

III	Core : X	17MAU14	Comprehension in Mathematics – II (Online Exam)	-	$1\frac{1}{2}$	-	50	50	1
III	Allied : II	17MAU15	Statistics - II	5	3	25	75	100	3
IV	Skill Enhancement course : II	17SEUMA2	Basics of Internet - **Practical**	2	3	40	60	100	2
IV	Non - Major Elective - II	17NMU02A/ 17NMU02B	Career Enhancement / Consumer Rights (Online Exam)	3	$1\frac{1}{2}$	50	-	50	2
			TOTAL	30				**700**	**23**

SEMESTER – V									
III	Core : XI	17MAU16	Abstract Algebra	7	3	25	75	100	5
III	Core : XII	17MAU17	Real Analysis - I	6	3	25	75	100	5
III	Core : XIII	17MAU18	Complex Analysis - I	7	3	25	75	100	6
III	Core : XIV	17MAU19	Comprehension in Mathematics – III (Online Exam)	-	$1\frac{1}{2}$	-	50	50	1
III	Core Optional : XV	***	Core Optional	3	3	25	75	100	3
V	Proficiency Enhancement (Self Study)	17PEUMA1	Financial Mathematics	-	3	100	-	100	2
III	Core : XVI	17MAU20	Institutional Training	-	3	100	-	100	1
III	Elective : I	17MAU21A/ 17MAU21B	Operations Research-I / Discrete Mathematics - I	5	3	25	75	100	4

IV	Skill Enhancement course: III	17SEUMA3	Web Programming HTML and PHP - Practical	2	3	40	60	100	2
			TOTAL	30				**850**	**29**
SEMESTER – VI									
III	Core : XVII	17MAU22	Linear Algebra	6	3	25	75	100	5
III	Core : XVIII	17MAU23	Real Analysis - II	6	3	25	75	100	5
III	Core : XIX	17MAU24	Complex Analysis – II	6	3	25	75	100	6
III	Core : XX	17MAU25	Comprehension in Mathematics - IV (Online Exam)	-	$1\frac{1}{2}$	-	50	50	1
III	Elective : II	17MAU26A/ 17MAU26B	Operations Research –II / Discrete Mathematics - II	5	3	25	75	100	4
III	Elective : III	17MAU27A/ 17MAU27B	Latex / Graph Theory	5	3	25	75	100	4
IV	Skill Enhancement course : IV	17SEUMA4	Latex– **Practical**	2	3	40	60	100	2
			TOTAL	30				**650**	**27**
V	Extension Activity		NSS / YRC / RRC / CCC / PHYSICAL EDUCATION		II – VI SEMESTER				1
			Department Extension Activity		II – VI SEMESTER				1
Total Marks - 4100 Total credit - 150									150

LIST OF ALLIED COURSES

S. No	COURSE CODE	COURSE	Weekly Contact Hours	Credits
1	17MAU03	Physics – I	4	4
2	17MAU07	Physics – II	4	4
3	17MAU04	Physics Practical	3	3
4	17MAU11	Statistics -I	5	3
5	17MAU15	Statistics -II	5	3

LIST OF ELECTIVE COURSES

S. No	ELECTIVE	COURSE CODE	COURSE	Weekly Contact Hours	Credits
1	Elective – I	17MAU21A/ 17MAU21B	Operations Research – I / Discrete Mathematics - I	5	4
2	Elective – II	17MAU26A/ 17MAU26B	Operations Research – II / Discrete Mathematics - II	5	4
3	Elective – III	17MAU27A/ 17MAU27B	Latex / Graph Theory	5	4

LIST OF SKILL BASED COURSES:

S. NO	COURSE CODE	COURSE	Weekly Contact Hrs	Credits
1	17SEU01	Information Security	2	2
2	17SEUMA02	Basis of INTERNET - Practical	2	2
3	17SEUMA03	Web Programming – HTML and PHP - Practical	2	2
4	17SEUMA04	Latex - Practical	2	2

P.K.R ARTS COLLEGE FOR WOMEN

(Accredited with 'A' Grade by NAAC)

An Autonomous Institution-Affiliated to Bharathiar University

Gobichettipalayam-638476

DEPARTMENT OF MATHEMATICS

I SEMESTER

CLASSICAL ALGEBRA	CATEGORY	L	P	CREDIT
	CORE	48	-	4

Preamble

To enable the students to learn about the convergence and divergence of the series and to find the roots for the different types of the equations.

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	understand the concept of Binomial and Exponential theorems, Convergency and Divergency of series, and multiple roots of an equation.	K_2
CO2	gain the knowledge about the concept of sequence, series and Theory of equations.	K_1
CO3	identify the concept of convergence and divergence through different types of test.	K_4
CO4	learn how to use reciprocals and transformations to solve equations.	K_2 & K_3
CO5	evaluate the problems by using Newton's and Horner's method and by different types of test.	K_5

UNIT I: Binomial and Exponential Theorems (10 Hours)

Binomial & exponential theorems (statements only)-their immediate application to summation and approximation only.

UNIT II: Logarithmic Series (10 Hours)

Logarithmic series theorem - Statement and proof - Immediate application to summation and approximation only. Convergency and divergency of series –Definitions, Elementary results- Comparison tests-De Alemberts and Cauchy's tests.

UNIT III: Convergence and Divergence of Series (10 Hours)

Absolute convergence- series of positive terms-Cauchy's condensation test-Raabe's test.

UNIT IV: Theory of Equations (10 Hours)

Roots of an equation-Relations connecting the roots and coefficients-Transformations of equations-Character and position of roots-Descarte's rule of signs-Symmetric function of roots-Reciprocal equations.

UNIT V: Multiple Roots (8 Hours)

Multiple roots-Roll's theorem -position of real roots of f(x) =0 - Newton's method of approximation to a root –Horner's method.

TEXT BOOK

Manicavachagam Pillai,T.K., Natarajan.T,Ganapathy.K.S. (2013)– "Algebra", S. Viswanatham Printers & Publishers Private Ltd.

Unit - I	**Chapter III** **Chapter IV**	**Page: 99-152** **Page: 188-212**
Unit – II	**Chapter IV** **Chapter II**	**Page: 213-245** **Page: 20-72**
Unit –III	**Chapter II**	**Page: 73-89**
Unit -IV&V	**Chapter VI**	**Page: 282-382**

REFERENCE BOOKS

1. Kandasamy.P. Thilagavathy .K (2004) – " Mathematics for B.Sc. Branch I -Vol. I. (For B.Sc -I semester) S. Chand and Company Ltd, New Delhi.
2. Bali.N.P. – " Algebra" - Laxmi publications.

CALCULUS	CATEGORY	L	P	CREDIT
	CORE	48	-	5

Preamble

To enable the students to learn and gain knowledge about curvatures, integrations and its geometrical applications.

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	gain the idea of curvature & integrals	**K_1 & K_2**
CO2	apply integration to compute arc lengths, volumes of revolution and surface areas of revolution.	**K_3**
CO3	determine convergence / divergence of improper integrals.	**K_4**
CO4	evaluate double and triple integrals by using Beta and Gama functions.	**K_5**

UNIT I: Curvature **(10 Hours)**

Curvature-Radius of curvature in Cartesian and polar forms-Evolutes and envelopes-Pedal equations-Total differentiation-Euler‟s theorem on homogeneous functions.

UNIT II: Integration **(10 Hours)**

Integration of f‟(x)/f(x), f‟(x)√f(x) ,(px+q)/√(ax2+bx+c)], [√(x-a)/(b-x)], [√(x-a)(b-x),1/[√(x-a)(b-x),1/(acosx+bsinx+c), 1/(acos2x+bsin2x+c),Integration by parts.

UNIT III: Double and Triple Integral **(10 Hours)**

Reduction formulae-problems-Evaluation of double and triple integrals-Applications to calculations of areas and volumes-Areas in polar coordinates.

UNIT IV: Change of order of integration **(10 Hours)**

Change of order of integration in double integral-Jacobions-Change of variables in double and triple integrals.

UNIT V: Multiple Integrals **(8 Hours)**

Beta and Gamma integrals-their properties, relation between them-Evaluation of multiple integrals using Beta and Gamma functions.

TEXT BOOK

Narayanan.S. and Manicavachasam Pillai.T.K (2013) – " Calculus vol 1 and vol 2"- Viswanathan Publishers.

Vol – I	**Unit - I**	**Chapter X**	**Page: 280 - 323**
Vol – II	**Unit – II**	**Chapter I**	**Page: 1 - 79**
Vol – II	**Unit –III**	**Chapter I** **Chapter V**	**Page: 79-97** **Page: 213 – 243**
Vol – II	**Unit -IV**	**Chapter VI** **Chapter VI**	**Page: 204 – 210** **Page: 251-269**
Vol – II	**Unit – V**	**Chapter VII**	**Page: 278-300**

REFERENCE BOOK

Kandasamy. P & Thilagavathy (2004) - " Mathematics for B.Sc –Vol I and. II", S.Chand and Co.

II SEMESTER

ANALYTICAL GEOMETRY	CATEGORY	L	P	CREDIT
	CORE	60	-	4

Preamble

To enable the students to learn and visualize the fundamental ideas about co-ordinate geometry.

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	understand the concepts of conic,Straight line,Sphere, cone and cylinder	**K_1 & K_2**
CO2	to apply the concepts of analytic geometry to technical problems	**K_3 & K_4**
CO3	translate descriptive problems into mathematical formulae and solve them	**K_2 & K_5**
CO4	describe mathematical ideas from cone, cylinder, sphere and conic	**K_1 & K_4**
CO5	evaluate the nature of geometrical coordinates	**K_5**

UNIT I: Conic **(10 Hours)**

Polar coordinates equation of a conic - Directrix-chord- Tangent-normal- Simple problems.

UNIT II: Straight Lines **(14 Hours)**

Straight lines - Coplanarity of straight-line-Shortest distance (S.D) and equation of S.D between two lines-Simple problems.

UNIT III: Sphere **(12 Hours)**

Sphere-Standard equation of sphere-Results based on the properties of a sphere-Tangent plane to a sphere- Equation of a circle.

UNIT IV: Cone and Cylinder **(12 Hours)**

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 **(12 Hours)**

Nature of a conicoid- Standard equation of central conicoid –Enveloping cone tangent plane- Condition for tangency – Director Sphere- Director plane.

Note: Distribution of Marks: Theory 20% Problem 80%.

TEXT BOOKS

1. DuraiPandian.P & others (1989) – "Analytical Geometry", Emerald Publishers,135 Anna Salai,Madras – 600 002.
2. Manickavasagam Pillai.T. K. and Natarajan.T, (2011) - "Analytical Geometry of 2D" , S. Viswanathan Printers and Publishers Pvt. Ltd, Chennai.

Unit - I	**Book - 2**	**Chapter VI** **Chapter IX**	**Section - 1 - Page : 162 only** **Page: 325-330 Results without proof & Page 331-363**
Unit – II	**Book - 1**	**Chapter IV**	**Section 4.1-4.9**
Unit – III	**Book - 1**	**Chapter V**	**Section 5.1-5.8**
Unit – IV	**Book - 1**	**Chapter V I**	**Section 6.1-6.7**
Unit - V	**Book - 1**	**Chapter VI**	**Section 6.9-6.11**

REFERENCE BOOK

Bali.N.P.(1991) – "Solid Geometry", Laxmi Publications (P) Ltd.

DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS	CATEGORY	L	P	CREDIT
	CORE	48	-	3

Preamble

To enable the students to learn the method of solving Differential Equations.

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	understand the basic concepts and recognize certain basic types of first order ODE, PDE,laplace and inverse laplace transforms.	K_1 ,K_2 & K_4
CO2	evaluate the general and complete solutions for second order linear ODEs with constant coefficients	K_5
CO3	apply laplace and inverse laplace transforms to compute solutions of second order linear differential equations	K_3

UNIT I: Ordinary Differential Equations (8 Hours)

Equations of First Order and of Degree Higher than one – Solvable for p, x, y – Clairaut's Equation.

UNIT II: Linear Differential Equations (10 Hours)

Finding the solution of second and higher order with constant coefficients with Right Hand Side is of the form Ve^{ax} where V is a function of x – Euler's Homogeneous Linear Differential Equations- Methods of variation of parameters.

UNIT III: Partial Differential Equations **(10 Hours)**

Formation of equations by eliminating arbitrary constants and arbitrary functions – Solutions of P.D Equations – Solutions of Partial Differential Equations by direct integration – Methods to solve the first order P.D. Equations in the standard forms - Lagrange's Linear Equations.

UNIT IV: Laplace Transforms **(10 Hours)**

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

UNIT V: Inverse Laplace Transforms **(10 Hours)**

Inverse Laplace Transforms – Applications to solutions of First Order and Second Order Differential Equations with constant coefficients.

Note: Distribution of Marks: Theory 20% Problem 80%.

TEXTBOOK

Kandasamy. P, Thilagavathi. K (2004) "Mathematics for B.Sc– Volume III", S. Chand and Company Ltd,New Delhi.

Unit - I	**Chapter I**	**Page: 1-15**
Unit – II	**Chapter II ,IV,V**	**Page: 16-40, 48-65**
Unit - III	**Chapter I**	**Page: 117 – 142, 150 – 162**
Unit - IV	**Chapter I**	**Page: 187-202**
Unit - V	**Chapter I**	**Page: 202-246**

REFERENCE BOOK

Narayanan. S and Manicavachagom Pillai. T. K.(1991) - " Calculus" , S. Viswanathan (Printers and Publishers) Pvt. Ltd, Chennai.

SEMESTER III

CATEGORY	COURSE CODE	TITLE OF THE COURSE	C	P	CREDIT
CORE	17MAU08	STATICS	36	-	3

Preamble

To enable the students to realize the nature of parallel forces, resultant forces and coplanar forces.

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	understand the concept of forces acting on a body	K_2
CO2	gain the knowledge about parallel forces,coplanar forces,moment of a force, couple and conditions of equilibrium of forces.	K_1
CO3	analyze problems in a systematic and logical manner and to evaluate resultant of a couple and force.	$K_{4\&}$ K_5
CO4	apply the triangle law, parallelogram law and polygon law of forces to find the resultant force.	$K_{3\ \&}$ K_5
CO5	construct free-body diagrams and to calculate the reactions necessary to ensure static equilibrium.	K_5

UNIT I: FORCES ACTING AT A POINT (7 Hours)

Parallelogram law-triangle law –Converse of Triangle Law-Polygon Law of Forces-Lami's Theorem.

UNIT II: RESOLUTION OF FORCES (7 Hours)

(λ,μ) theorem –Resolution of forces- Components of a force- Resultant of any number of forces acting at a point- Conditions of equilibrium.

UNIT III: PARALLEL FORCES AND MOMENTS (8 Hours)

Parallel Forces – Moments- Varignon's Thorem of moments- Generalised theorem of moments-Couples- Equilibrium of two couples-Equivalence of two couples-Resultant of a couple and a force .

UNIT IV: COPLANAR FORCES (7 Hours)

Coplanar forces acting on a rigid body- Theorem on three co-planar forces- Reduction of coplanar forces- Equation to the line of action of the resultant

UNIT V: CATENARY (7 Hours)

Equilibrium of strings and chains – Equation of the common catenary – Definitions – Tension at any point – Geometrical properties of the common catenary.

TEXT BOOK

Venkataraman M.K., (2005) – "Statics", Eleventh edition, Agasthiar Publications, Trichy.

Unit	Chapter	Page
I	II	06-26
II	II	28-33,36-41, 43-50
III	III IV	52-75 84-87, 91-97
IV	V VI	98 & 99 143-167
V	XI	375-391

REFERENCE BOOKS

1. Dharmapadam A.V.(2011) –" Statics" , S.Viswanathan Printers and Publishing Pvt., Ltd.

2. Duraipandian. P. and Laxmi Duraipandian(1988) –" Mechanics" , S.Chand and Company Ltd, Ram Nagar, New Delhi -55.

3.Prof.Khanna.M.L.(1995) –" Statics" , Fifteenth edition,Jai Prakash Nath & Co., Meerut.

CATEGORY	COURSE CODE	TITLE OF THE COURSE	C	P	CREDIT
CORE	17MAU09	TRIGONOMETRY, VECTOR CALCULUS AND FOURIER SERIES	36	-	3

Preamble

To enable the students to gain knowledge about expansion in series of trigonometric functions and its applications ,vector field and Fourier series.

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	gain the knowledge about the series	K_2
CO2	gain the knowledge about summation of series and Logarithm of complex quantities.	K_1
CO3	apply the concept of Scalar and vector fields to find the magnitude and direction.	K_3
CO4	analyze how to use line & surface integral.	K_4
CO5	evaluate the problems by using Gauss divergence theorem, Strokes theorem and Periodic functions.	K_5

UNIT I: EXPANSION IN SERIES (8 Hours)

Expansion in Series – Expansion of $\cos^n\theta$, $\sin^n\theta$, in a series of cosines and sines of multiples of θ – Expansions of $\cos n\theta$ and $\sin n\theta$ in powers of sines and cosines – Expansion of $\sin\theta$, $\cos\theta$ and $\tan\theta$ in powers of θ.

UNIT II: SUMMATION OF SERIES (7 Hours)

Logarithm of complex quantities - Summation of series – C + iS method of summation- Exponential series-Trigonometric and Hyperbolic series- Gregory's series .

UNIT III: DIFFERENTIATION OF VECTORS (7 Hours)

Scalar and vector fields –Differentiation of vectors – Gradient, Divergence and Curl.

UNIT IV: INTEGRATION OF VECTORS (7 Hours)

Integration of vectors – Line integral – Surface integral – Green's theorem in the plane – Gauss divergence theorem – Strokes theorem – (Statements only) - Verification of the above said theorems.

UNIT V: FOURIER SERIES (7 Hours)

Periodic functions – Fourier series of periodicity 2π – Even and Odd functions - Half range series.

TEXT BOOK:

Kandasamy. P, Thilagavathi. K - " Mathematics for B.Sc. Branch I", Volume I, II (2004) and Volume IV(2005), S.Chand and Company Ltd, New Delhi.

UNIT	VOLUME	CHAPTER	PAGE NUMBER
I	I	II	122 – 139
II	II	I	242 – 247
		II	248 – 276
III	IV	I	1-7
		II	8-23
IV	IV	III	24 – 92
V	IV	I	93-145

REFERENCE BOOKS:

1. Manichavasagam Pillai T.K and Narayanan S.(2012) - " Trigonometry " , Viswanathan Publishers and Printers Pvt. Ltd.
1. Manichavasagam Pillai T.K and Narayanan S., Hanumantha Rao (2011) – " Ancillary Mathematics", Volume II, Viswanathan Publishers and Printers Pvt. Ltd.

CATEGORY	COURSE CODE	TITLE OF THE COURSE	C	P	CREDIT
ALLIED	17MAU11	STATISTICS - I	60	-	3

Preamble

To enable the students to understand mathematical aspects of statistics

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	understand the basic concepts of one dimensional and two dimensional random variables, probability distribution functions and moments.	K_1&K_2
CO2	analyze and apply the concept of mathematical expectations, probability distributions, transformation of variables in real life problems.	K_3&K_4
CO3	analyze the properties of binomial, Poisson, normal distributions.	K_4
CO4	evaluate the coefficient of correlation and regression.	K_5
CO5	solve the problems based on different types of distributions.	K_5

UNIT I : RANDOM VARIABLES (12 Hours)

Random variables - Discrete and continuous random variables - Distribution function -Properties - Probability mass function, probability density function - Simple problems.

UNIT II : MATHEMATICAL EXPECTATION (12 Hours)

Mathematical expectation- Addition and multiplication theorems on expectations - Moment generating and cumulating generating and characteristic functions and their properties.

UNIT III : TRANSFORMATION OF VARIABLES (12 Hours)

Joint probability distributions - Marginal and conditional probability distributions- independence of random variables - Transformation of variables (one and two dimensional only)- Tchebychev's inequality.

UNIT IV : PROBABILITY DISTRIBUTIONS (14 Hours)

Binomial, Poisson and Normal distributions and their properties

UNIT V: CORRELATION AND REGRESSION ANALYSIS (10 Hours)

CORRELATION: Meaning - Definition –Scatter diagram, Karl Pearson's co-efficient of correlation, Spearman's Rank correlation, advantages and limitations of correlation.

REGRESSION ANALYSIS: Meaning of regression and linear prediction – Regression in two variables – Uses of regression.

TEXT BOOK:

1.Guptha, S.C & Kapoor, V.K.,(2007) "Fundamentals of Mathematical statistics", Sultan Chand & Sons, New Delhi.

UNIT	CHAPTER	SECTION	PAGE
I	V	5.1 – 5.4	5.1 – 5.31
II	VI, VII	6.1 – 6.5, 7.1 – 7.3	6.1 – 6.10, 7.1 – 7.14
III	V, VII	5.5 – 5.7, 7.5	5.32-5.60, 7.24 – 7.26
IV	VIII, IX	8.4 – 8.5, 9.2	8.4 – 8.19, 8.28 – 8.35, 9.3 – 9.10

2.Navnitham. PA.(2012) - **"**Business Mathematics and Statistics**"**, Jai publishers, Trichy.

UNIT	CHAPTER	SECTION	PAGE
V	XII & XIII	-	503-554

REFERENCE BOOKS

1. Guptha ,C.B and Vijay Guptha.,(2008) "Introduction to Statistical methods", Vikas Publishing house Pvt,Ltd.
2. Guptha, S.P. (2014), "Statistical methods", Sultan Chand & Sons,.

CATEGORY	COURSE CODE	TITLE OF THE COURSE	C	P	CREDIT
SKILL ENHANCEMENT	17SEU01	INFORMATION SECURITY	24	-	2

Preamble

To learn about the basics of Information Security.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Obtain fundamental knowledge of Information Security	K1,K2
CO2	Learn basic concepts of Risks in Information Security	K1,K2
CO3	Familiarize the ideas of security planning and policies	K2,K3
CO4	Understand with Privacy and Ethical Issues in Information Security	K3,K4
CO5	Learn about Cryptography	K4, K5

UNIT – I: INTRODUCTION TO INFORMATION SECURITY (5 HOURS)

Information Security: Principles, Concepts and definitions - The need for Information Security - Benefits of information security. The Security Problem in Computing: The meaning of computer Security - Computer Criminals.

UNIT – II: INFORMATION RISK (5 HOURS)

Information Risk: Threats and vulnerabilities of Information systems – Introduction to Risk management. Information security management Policy, standards and procedures.

UNIT – III: SECURITY PLANNING (5 HOURS)

Administering Security: Security planning - Security planning team members - Assuring Commitment to a security plan - Business Continuity Plan - Incident response plan - Organizational Security policies, Physical Security.

UNIT – IV: PRIVACY AND ETHICAL ISSUES IN INFORMATION SECURITY

(5 HOURS)

Legal Privacy and Ethical Issues in Information Security: Protecting Programs and data - Information and the law - Rights of Employees and Employers - Software failures - Computer Crime - Ethical issues in Information Security.

UNIT – V: CRYPTOGRAPHY **(4 HOURS)**

Cryptography: Introduction to Cryptography - What is Cryptography – Plain text – Cipher text – Substitution Ciphers - Transposition Ciphers.

TEXT BOOK:

Sumitra Kisan and D.Chandrasekhar Rao,Information Security Lecture Notes, Department of Computer Science and Engineering & Information Technology, Veer Surendra Sai University of Technology (Formerly UCE, Burla) urla, Sambalpur, Odisha .

REFERENCE BOOK:

Andy Taylor (Editor) ,David Alexander, Amanda Finch & David Sutton, Information Security Management Principles An ISEB Certificate , The British Computer Society. 2008

CATEGORY	COURSE CODE	TITLE OF THE COURSE	C	P	CREDIT
NON- MAJOR ELECTIVE	17NMU01A	INDIAN WOMEN AND SOCIETY	24	-	2

Preamble

To familiarize students with the specific cultural contexts of women in India.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate knowledge of the history of women's studies as an academic discipline	K1,K2
CO2	Analyze the various roles of women and the challenges faced by them in the society	K3
CO3	Assimilate and evaluate the importance of women health	K3,K5
CO4	Identify the different issues related to women in general	K4
CO5	Assessing the Women Empowerment and the role of Central & State Government in developing Women	K5

UNIT I: HISTORICAL BACKGROUND (5 HOURS)

History of Women's status from Vedic times, Women's participation in India's Pre and Post Independence movement and Economic Independence, fundamental rights and importance of women in Modern Society

UNIT II: ROLE OF WOMEN (CHALLENGES & REMEDIES) (5 HOURS)

Women in Family, Agriculture, Education, Business, Media, Defense, Research and Development, Sports, Civil Services, Banking Services, Social Work, Politics and Law

UNIT III: WOMEN AND HEALTH (5 HOURS)

Women and health issues, Malnutrition, Factors leading to anemia, Reproductive maternal health and Infant mortality, Stress.

UNIT IV: ISSUES OF WOMEN (5 HOURS)

Women's issues, Dowry Related Harassment and Dowry Deaths, Gender based violence against women, Sexual harassment, Loopholes in Practice to control women issues.

UNIT V: WOMEN EMPOWERMENT (4 HOURS)

Meaning, objectives, Problems and Issues of Women Empowerment, Factors leading to Women Empowerment, Role and Organization of National Commission for Women, Central and State Social Welfare Board for Women Empowerment, Reality of women empowerment in the era of globalization.

REFERENCE BOOKS:

S.No	Authors	Title	Publishers	Year of Publication
1	Mala Khullar	Writing the Women's Movement: A Reader	Zubaan	2005
2	IAWS	The State and the Women's Movement in India	IAWS, Delhi	1994
3	Kosambi, Meera	Crossing Thresholds: Feminist Essays in Social History	Permanent Black	2007
4	T Rowbotham, Sheila	Hidden from History: Women's Oppression and the Fight against It	Pluto Press, London	1975
5	Susheela Mehta	Revolution and the Status of Women	Metropolitan Book co.pvt ltd, New Delhi	1989

CATEGORY	COURSE CODE	TITLE OF THE COURSE	C	P	CREDIT
NON- MAJOR ELECTIVE	17NMU01B	BASIC TAMIL	24	-	2

CATEGORY	COURSE CODE	TITLE OF THE COURSE	C	P	CREDIT
NON- MAJOR ELECTIVE	17NMU02A	CAREER ENHANCEMENT (ONLINE EXAM)	36	-	2

UNIT I: GENERAL SCIENCE

Physics: Universe-General Scientific laws-Scientific instruments-Inventions anddiscoveries-National scientific laboratories-Science glossary-Mechanics and properties of matter-Physical quantities, standards and units-Force, motion and energy-Electricity and Magnetism, Electronics and Communication -Heat, light and sound-Atomic and nuclear physics-Solid State Physics – Spectroscopy-Geophysics - Astronomy and space science

Chemistry: Elements and Compounds-Acids, bases and salts-Oxidation and reduction-Chemistry of ores and metals-Carbon, nitrogen and their compounds-Fertilizers, pesticides, insecticides-Biochemistry and biotechnology- Electrochemistry - Polymers and plastics

Botany: Main Concepts of life science-The cell-basic unit of life-Classification of living organism-Nutrition and dietetics-Respiration-Excretion of metabolic waste-Bio-communication

Zoology: Blood and blood circulation-Endocrine system-Reproductive system-Genetics the science of heredity-Environment, ecology, health and hygiene, Biodiversity and its conservation-Human diseases-Communicable diseases and noncommunicable diseases-prevention and remedies- Alcoholism and drug abuse-
Animals, plants and human life

UNIT II: CURRENT EVENTS

History: Latest diary of events – National--National symbols-Profile of States-Defence, national security and terrorism-World organizations-pacts and summits-Eminent persons & places in news-Sports & games-Books & authors - Awards & honours-Cultural panorama-Latest historical events-- India and its neighbours-- Latest terminology- Appointments-who is who?

Political Science1: India’s foreign policy-2. Latest court verdicts – public opinion-3. Problems in conduct of public elections-4. Political parties and
political system in India-5. Public awareness & General administration-6. Role of

Voluntary organizations & Govt.,-7. Welfare oriented govt. schemes, their utility

Geography: Geographical landmarks-Policy on environment and ecology—

Economics: Current socio-economic problems-New economic policy & govt.sector

Science: Latest inventions on science & technology-Latest discoveries in Health Science-Mass media & communication 111

UNIT III: GEOGRAPHY

Earth and Universe-Solar system-Atmosphere hydrosphere, lithosphere-Monsoon, rainfall, weather and climate-Water resources --- rivers in India-Soil, minerals & natural resources-Natural vegetation-Forest & wildlife-Agricultural pattern, livestock & fisheries-Transport including Surface transport & communication-Social geography – population-density and distribution-Natural calamities – disaster management-Climate change - impact and consequences - mitigation measures-Pollution Control

UNIT IV: HISTORY AND CULTURE OF INDIA

Pre-historic events--Indus valley civilization-Vedic, Aryan and Sangam age-Maurya dynasty-Buddhism and Jainism-Guptas, Delhi Sultans, Mughals and Marathas-Age of Vijayanagaram and the bahmanis-South Indian history-Culture and Heritage of Tamil people-Advent of European invasion-Expansion and consolidation of British rule-Effect of British rule on socio-economic factors-Social reforms and religious movements-India since independence-Characteristics of Indian culture-Unity in diversity –race, colour, language, custom-India-as secular state-Organizations for fine arts, dance, drama, music-Growth of rationalist, Dravidian movement in TN-Political parties and populist schemes- Prominent personalities in the various spheres – Arts, Science, literature and Philosophy – Mother Teresa, Swami Vivekananda, Pandit Ravishankar , M.S.Subbulakshmi, Rukmani Arundel and J.Krishnamoorthy etc.

Unit V: INDIAN POLITY

Constitution of India-. Preamble to the constitution- Salient features of constitution- Union, State and territory- Citizenship-rights amend duties-Fundamental rights- Fundamental duties- Human rights charter- Union legislature – Parliament- State executive- State Legislature – assembly- Status of Jammu & Kashmir- Local government – panchayat raj – Tamil Nadu- Judiciary in India – Rule of law/Due process of law- Indian federalism – center – state relations-. Emergency provisions- Civil services in India- Administrative

challenges in a welfare state- Complexities of district administration- Elections - Election Commission Union and State. Official language and Schedule-VIII Amendments to constitution- Schedules to constitution-. Administrative reforms & tribunals- Corruption in public life- Anti-corruption measures – Central Vigilance Commission, lok-adalats, Ombudsman, - Comptroller and Auditor General of India- Right to information - Central and State Commission- Empowerment of women- Voluntary organizations and public grievances Redressal- Consumer protection forms

UNIT VI: INDIAN ECONOMY

Nature of Indian economy-Need for economic planning-Five-year plan models-anassessment-Land reforms & agriculture-Application of science in agriculture-Industrial growth-Capital formation and investment-Role of public sector & disinvestment-Development of infrastructure- National income- Public finance

112 & fiscal policy- Price policy & public distribution- Banking, money & monetary policy- Role of Foreign Direct Investment (FDI)- WTO-globalization & privatization- Rural welfare oriented programmes- Social sector problems – population, education, health, employment, poverty-HRD – sustainable economic growth- Economic trends in Tamil Nadu -Energy Different sources and development- Finance Commission -Planning Commission- National Development Council

UNIT VI: INDIAN NATIONAL MOVEMENT

National renaissance-Early uprising against British rule-1857 Revolt- Indian National Congress-Emergence of national leaders-Gandhi, Nehru, Tagore, Nethaji-Growth of militant movements -Different modes of agitations-Era of different Acts & Pacts-World war & final phase struggle-Communalism led to partition- Role of Tamil Nadu in freedom struggle - Rajaji, VOC, Periyar, Bharathiar & Others-Birth of political parties /political system in India since independence-

Unit VII: APTITUDE & MENTAL ABILITY TESTS

Conversion of information to data-Collection, compilation and presentation of data - Tables, graphs, diagrams-Parametric representation of data-Analytical interpretation of data -Simplification-Percentage-Highest Common Factor(HCF)-Lowest Common Multiple (LCM)-Ratio and Proportion-Simple interest-

Compound interest-Area-Volume-Time and Work-Behavioral ability -Basic terms, Communications in information technology-Application of Information and Communication Technology (ICT)- Decision making and problem solving-Logical Reasoning-Puzzles-Dice-Visual Reasoning-Alpha numeric Reasoning-Number Series-Logical Number/Alphabetical/Diagrammatic Sequences-

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CATEGORY	COURSE CODE	TITLE OF THE COURSE	C	P	CREDIT
NON- MAJOR ELECTIVE	17NMU02B	CONSUMER RIGHTS	24	-	2

Preamble

This paper seeks to familiarize the students with their rights and responsibilities as a consumer, the social framework of consumer rights and legal framework of protecting consumer rights.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the procedure of redress of consumer complaints, and the role of different agencies in establishing product and service standards	K2, K3
CO2	To provide a comprehensive introduction to the Consumer Protection Law in India	K1,K2
CO3	Have a conceptual knowledge about the Grievance Redressal Mechanism under the Indian Consumer Protection Law	K3
CO4	Evaluate the regulations and legal actions that helps to protect consumers	K5
CO5	Evaluate the Contemporary Issues in Consumer Affairs	K4,K5

Unit 1: Conceptual Framework **13 Lectures**

Consumer and Markets: Concept of Consumer, Nature of markets: Liberalization and Globalization of markets with special reference to Indian Consumer Markets, E-Commerce with reference to Indian Market, Concept of Price in Retail and Wholesale, Maximum Retail Price (MRP), Fair Price, GST, labeling and packaging along with relevant laws, Legal

Metrology. **Experiencing and Voicing Dissatisfaction**: Consumer buying process, Consumer Satisfaction/dissatisfaction-Grievances-complaint, Consumer Complaining Behaviour: Alternatives available to Dissatisfied Consumers; Complaint Handling Process: ISO 10000 suite

Unit 2: The Consumer Protection Law in India **13 Lectures**

Objectives and Basic Concepts: Consumer rights and UN Guidelines on consumer protection, Consumer goods, defect in goods, spurious goods and services, service, deficiency in service, unfair trade practice, and restrictive trade practice.

Organizational set-up under the Consumer Protection Act: Advisory Bodies: Consumer Protection Councils at the Central, State and District Levels; Adjudicatory Bodies: District Forums, State Commissions, and National Commission: Their Composition, Powers, and Jurisdiction (Pecuniary and Territorial), Role of Supreme Court under the CPA with important case law.

Unit 3: Grievance Redressal Mechanism under the Indian Consumer Protection Law

13 Lectures

Who can file a complaint? Grounds of filing a complaint; Limitation period; Procedure for filing and hearing of a complaint; Disposal of cases, Relief/Remedy available; Temporary Injunction, Enforcement of order, Appeal, frivolous and vexatious complaints; Offences and penalties. **Leading Cases decided under Consumer Protection law by Supreme Court/National Commission**: Medical Negligence; Banking; Insurance; Housing & Real Estate; Electricity and Telecom Services; Education; Defective Products; Unfair Trade Practices.

Unit 4: Role of Industry Regulators in Consumer Protection **13 lectures**

i. Banking: RBI and Banking Ombudsman

ii. Insurance: IRDA and Insurance Ombudsman

iii. Telecommunication: TRAI

iv. Food Products: FSSAI

v. Electricity Supply: Electricity Regulatory Commission

vi. Real Estate Regulatory Authority

Unit 5: Contemporary Issues in Consumer Affairs **13 Lectures**

Consumer Movement in India: Evolution of Consumer Movement in India, Formation of consumer organizations and their role in consumer protection, Misleading Advertisements and sustainable consumption, National Consumer Helpline, Comparative Product testing, Sustainable consumption and energy ratings.

Quality and Standardization: Voluntary and Mandatory standards; Role of BIS, Indian Standards Mark (ISI), Ag-mark, Hallmarking, Licensing and Surveillance; Role of International Standards: ISO an Overview

Note: Unit 2 and 3 refers to the Consumer Protection Act, 1986. Any change in law would be added appropriately after the new law is notified

Suggested Readings:

1. Khanna, Sri Ram, Savita Hanspal, Sheetal Kapoor, and H.K. Awasthi. (2007) *Consumer Affairs,* Universities Press.

2. Choudhary, Ram Naresh Prasad (2005). *Consumer Protection Law Provisions and Procedure,* Deep and Deep Publications Pvt Ltd.

3. G. Ganesan and M. Sumathy. (2012). *Globalisation and Consumerism: Issues and Challenges*, Regal Publications

4. Suresh Misra and Sapna Chadah (2012). Consumer Protection in India: Issues and Concerns, IIPA, New Delhi

5. Rajyalaxmi Rao (2012), *Consumer is King,* Universal Law Publishing Company

6. Girimaji, Pushpa (2002). *Consumer Right for Everyone* Penguin Books.

7. E-books :- www.consumereducation.in

8. Empowering Consumers e-book,

9. ebook, www.consumeraffairs.nic.in

10. *The Consumer Protection Act, 1986 and its later versions.* www.bis.org

Articles

1. Misra Suresh, (Aug 2017) "Is the Indian Consumer Protected? One India One People.

2. Raman Mittal, Sonkar Sumit and Parineet Kaur (2016) Regulating Unfair Trade Practices: An Analysis of the Past and Present Indian Legislative Models, Journal of Consumer Policy.

3. Chakravarthy, S. (2014). MRTP Act metamorphoses into Competition Act. CUTS Institute for Regulation and Competition position paper. Available online at www.cuts-international.org/doc01.doc.

4. Kapoor Sheetal (2013) "Banking and the Consumer" Akademos (ISSN 2231-0584)

5. Bhatt K. N., Misra Suresh and Chadah Sapna (2010). Consumer, Consumerism and Consumer Protection, Abhijeet Publications.

6. Kapoor Sheetal (2010) "Advertising-An Essential Part of Consumer's Life-Its Legal and Ethical Aspects", Consumer Protection and Trade Practices Journal, October 2010.

7. Verma, D.P.S. (2002). Regulating Misleading Advertisements, Legal Provisions and Institutional Framework. Vikalpa. Vol. 26. No. 2. pp. 51-57.

Periodicals

1. Consumer Protection Judgments (CPJ) (Relevant cases reported in various issues)

2. Recent issues of magazines: International Journal on consumer law and practice, National Law School of India University, Bengaluru

3. '*Consumer Voice*', Published by VOICE Society, New Delhi.

Websites:

www.ncdrc.nic.in

www.consumeraffairs.nic.in

www.iso.org.

www.bis.org.in

www.consumereducation.in

www.consumervoice.in

www.fssai.gov.in

www.cercindia.org

SEMESTER IV

CATEGORY	COURSE CODE	TITLE OF THE COURSE	C	P	CREDIT
CORE	17MAU12	DYNAMICS	36	-	3

Preamble

To enable the students to gain the knowledge about projectiles, simple harmonic motion, central orbits.

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	understand the reason for dynamic changes in the body.	K_2
CO2	gain the knowledge about the field Kinematics, projectile,simple harmonic motion and impact of a particle on a surface.	K_1
CO3	analyze the theoretical relations that exist between force,solid matter and motion.	K_4
CO4	apply the fundamental laws and principles to solve the problems	K_2 & K_3
CO5	evaluate the behaviour of objects in motion	K_5

UNIT I: PROJECTILES (7 Hours)

Path of a projectile-Greatest height-Time of filght-Range on an inclined plane through the point of projection-Maximum range.

UNIT II: SIMPLE HARMONIC MOTION (7 Hours)

Geometrical representation of simple harmonic motions -Composition of two simple harmonic motions of the same period in a straight line and in two perpendicular lines.

UNIT III: CENTRAL ORBITS **(8 Hours)**

Radial and transverse components of velocity and acceleration - Differential equation of central orbit - Pedal equations- Two-fold problems in central orbits.

UNIT IV: IMPACT ON A FIXED SURFACE **(7 Hours)**

Fundamental laws of impact: Newton's Experimental Law-Principle of conservation of Momentum -Impact on a smooth fixed plane.

UNIT V: IMPACT OF SMOOTH ELASTIC SPHERES **(7 Hours)**

Direct impact of two smooth spheres – Oblique impact of two smooth spheres - Loss of kinetic energy due to impact of two smooth spheres.

TEXT BOOK

M.K.Venkataraman.M.K., (2014) – "Dynamics", 16th edition , Agasthiar Publications, Trichy.

Unit	Chapter	Page	Section
I	**VI**	**139-160, 172-182**	**6.1-6.8, 6.12-6.16**
II	**X**	**309-330**	**10.1-10.7**
III	**XI**	**356-359, 371-383**	**11.1-11.3, 11.5-11.11**
IV&V	**VIII**	**215-228, 232-241, 244-248**	**8.1-8.4, 8.5-8.8**

REFERENCE BOOKS

1. Dharamapadam.A.V. (2011) – "Dynamics", S.Viswanathan Printers and Publishers Pvt., Ltd, Chennai.

2. Naryanamurthi.M.&Nagaratnam.N(2008) - " Dynamics", National Publishers, New Delhi.

CATEGORY	COURSE CODE	TITLE OF THE COURSE	C	P	CREDIT
CORE	17MAU13	NUMERICAL METHODS	60	-	4

Preamble

To enable the students to learn and gain knowledge about linear algebraic and transcendental equations and system of linear equations.

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	define the Numerical Algebraic and Transcendental Equations and gain the knowledge about the Interpolation.	K_1 & K_2
CO2	analyze and apply the various methods to solve the Algebraic and Transcendental Equations and the system of Simultaneous linear algebraic equations.	K_4 & K_3
CO3	analyze the different kinds of difference operators.	K_4
CO4	learn and analyze the convergence conditions of Iteration and Newton – Raphson method.	K_2 & K_4
CO5	evaluate the problems by using different types of methods.	K_5

UNIT I: THE SOLUTION OF NUMERICAL ALGEBRAIC AND TRANSCENDENTAL EQUATIONS (10 Hours)

Introduction – The Bisection Method – Method of Successive Approximations or the Iteration Method – Convergence condition of Iteration Method – The Method of False Position (Regula Falsi Method).

UNIT II: NEWTON-RAPHSON METHOD (12 Hours)

Newton's Iteration Method or Newton-Raphson Method - Convergence condition of Newton-Raphson Method – Order of Convergence of Newton-Raphson Method.

UNIT III: SIMULTANEOUS LINEAR ALGEBRAIC EQUATIONS (12 Hours)

Introduction – Gauss Elimination Method – Gauss Jordan Method – Method of Triangularisation - Iterative Methods – Gauss Jacobi Method of Iteration – Gauss-Seidal Method of Iteration.

UNIT IV: FINITE DIFFERENCES (12 Hours)

Introduction – First Differences – Higher Differences – Difference Tables – Forward Differences - Backward Differences - Properties of the operator Δ - Simple Problems – Diffrences of a Polynomial – The Operator E .

UNIT V: INTERPOLATION (14 Hours)

Introduction – Linear Interpolation - Gregory – Newton Forward Interpolation Formula - Gregory –Newton Backward Interpolation Formula . Divided Differences – Properties of Divided Differences – Newton's interpolation formula for unequal intervals.

TEXT BOOK:

Dr.Venkataraman.M.K.(2013) – "Numerical Methods in Science and Technology", The National Publishing Company, Chennai.

UNIT	CHAPTER	PAGE NUMBER
I	III	81 – 97
II	III	97 – 100, 102-106
III	IV	113 – 120, 126 – 130, 140 - 146
IV	V	153 – 165,177 - 184
V	VI VIII	193 – 209, 244 – 253.

REFERENCE BOOK:

Kandasamy. P, Thilagavathi. K and Gunavathi. K (2010) - "Numerical methods" – S. Chand and Company Ltd, New Delhi.

CATEGORY	COURSE CODE	TITLE OF THE COURSE	C	P	CREDIT
ALLIED	17MAU15	STATISTICS - II	60	-	3

Preamble

To enable the students to understand mathematical aspects of applied statistics

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	understand the basic concepts of population, sample, point estimation, moments, type – I and type – II errors.	**K_1&K_2**
CO2	analyze the concepts of different types of estimation.	**K_4**
CO3	apply the methods of estimation and its characteristics to solve problems .	**K_3**
CO4	analyze the concept of test of significance, non sampling, simple random sampling, stratified random sampling, and systematic sampling.	**K_4**
CO5	evaluate the testing of significance for standard deviation, proportions, difference of means, difference of propotion by using exact test.	**K_5**

UNIT I : ESTIMATION (12 Hours)

Concept of population, sample, statistics, parameter - Point estimation - Concept of point estimation - Consistency, unbiasedness, efficiency - Sufficiency – Cramer Rao inequality - Simple problems.

UNIT II : METHODS OF ESTIMATION AND CONFIDENCE LIMITS (12 Hours)

Methods of estimation - Maximum likelihood, moments, and minimum chi-square – Properties - Interval estimation - Confidence interval and confidence limits.

UNIT III : TEST OF HYPOTHESIS (12 Hours)

Type-I error and II errors - Power test – Neymann-Pearson Lemma - Concept of most powerful test (statements and results only).

UNIT IV : TEST OF SIGNIFICANCE (14 Hours)

Standard error - Large sample tests with respect to mean, standard deviaton, proportion, difference between means, standard deviations and proportions - Exact tests based on t and F distributions - Simple problems.

UNIT V: SAMPLING (10 Hours)

Sampling from finite population - Simple random sampling, stratified random sampling and systematic sampling - Estimation of mean, total and their standard errors. Sampling and non sampling errors (concepts only).

TEXT BOOK:

Guptha, S.C & Kapoor, V.K.,(2007) - "Fundamentals of Mathematical statistics", Sultan chand & Sons.

UNIT	CHAPTER	SECTION	PAGE
I	**XVII**	**17.1 – 17.3**	**17.1- 17.20**
II	**XVII**	**17.6 – 17.7**	**17.30 – 17.52**
III	**XVIII**	**18.1 – 18.5**	**18.2 – 18.10**
IV	**XIV,XVI**	**14.4 – 14.8, 16.3, 16.6**	**14.6 – 14.23, 14.25 – 14.36, 16.12 – 16.16, 16.36 – 16.39**
V	**XIV**	**14.1 – 14.3**	**14.2 – 14.6**

REFERENCE BOOKS

1. Guptha ,C.B and Vijay Guptha (2008) "Introduction to Statistical methods",Vikas publishing house pvt Ltd .
2. Guptha, S.P.(2014) "Statistical methods", Sultan Chand & Sons.

CATEGORY	COURSE CODE	TITLE OF THE COURSE	C	P	CREDIT
SKILL ENHANCEMENT	17SEUMA02	BASICS OF INTERNET - PRACTICAL	-	24	2

LIST OF PROGRAMS

All the following listed programs have to be executed and recorded.

1. To create an email-id.
2. To compose and send a mail.
3. To forward a mail and to reply for a mail.
4. To send a mail with an attachment.
5. To download the attached document of a mail received.
6. To send a mail to a large number of recipients using cc and bcc options.
7. To search a thing using a search engine.
8. To open and read newspaper sites, TV program schedules using Internet.
9. To verify a university /college details by opening their websites.
10. To upload your resume with any one job portal.

SEMESTER V

CATEGORY	COURSE CODE	TITLE OF THE COURSE	C	P	CREDIT
CORE	17MAU16	ABSTRACT ALGEBRA	84	-	5

Preamble :

To enable the students to learn and gain knowledge about Sets , Groups and Rings.

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	gain the knowledge about Sets , Mappings, Groups, Rings and Ideals and Quotient Rings.	K_1
CO2	understand the basic concepts of Abstract Algebra.	K_2
CO3	analyze Cauchy's theorem and Sylow's theorem for Abelian groups.	K4
CO4	apply the concepts of set theory and group theory to analyze some basic theorems.	K_3
CO5	evaluate the features of set theory.	K_5

UNIT I: SETS AND GROUPS (18 Hours)

Sets – Mappings – The integers.

Groups: Abelian group, Symmetric group Definitions and Examples – Basic properties.

UNIT II: SUB GROUPS (18 Hours)

Subgroups – Cyclic subgroup - Index of a group – Order of an element – Fermat theorem - A Counting Principle - Normal Subgroups and Quotient Groups.

UNIT III: HOMOMORPHISMS OF GROUPS (18 Hours)

Homomorphisms – Cauchy's theorem for Abelian groups – Sylow's theorem for Abelian groups Automorphisms – Inner automorphism - Cayley's theorem, permutation groups.

UNIT IV: RINGS (16 Hours)

Rings: Definition and Examples –Some Special Classes of Rings – Commutative ring – Field – Integral domain - Homomorphisms of Rings.

UNIT V: IDEALS AND QUOTIENT RINGS (14 Hours)

Ideals and Quotient Rings – More Ideals and Quotient Rings – Maximal ideal - The field of Quotients of an Integral Domain.

TEXT BOOK

Herstein.I.N (2014)—"Topics in Algebra", 2nd edition, John Wiley & Sons, New York

Unit	Chapter	Page Number
I	I,II	1.1-1.3, 2.1-2.3
II	II	2.4-2.6
III	II	2.7-2.10
IV	III	3.1-3.3
V	III	3.4-3.6

REFERENCE BOOKS

1.Fraleigh John .B (1986) - "An First course in Abstract Algebra",Narosa Publishing House , New Delhi Madras Bombay Calcutta.

2.Arumugam and Issac A.T (2003) - "Scitech Publishing (India) Pvt Ltd.

3. Vasishtha A.R(1994 – 95) - "Modern Algebra", Krishna Prakashan Mandir, Meerut.

CATEGORY	COURSE CODE	TITLE OF THE COURSE	C	P	CREDIT
CORE	17MAU17	REAL ANALYSIS - I	72	-	5

Preamble

To enable the students to learn and gain knowledge about Real number system , Point set topology and limits.

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	define and recognize the basic notations of set theory, convergence, element of points set topology, derivatives and limits .	K_1 & K_2
CO2	apply standard results about closures, intersections, and unions of open and closed sets;	K_3
CO3	analyze various theorems like Bolzano – Weierstrass theorem and to emphasize the proofs development.	K_4
CO4	prove the theorems in element of points set topology, Euclidean space and Metric space.	K_5
CO5	prove the theorems in convergence criteria, derivatives and limits.	K_5

UNIT I: THE REAL AND COMPLEX NUMBER SYSTEMS (15 Hours)

The Real and Complex number systems : Introduction - The field axioms, the order axioms – Integers –The unique Factorization theorem for integers –Rational numbers –Irrational numbers –Upper bounds, maximum Elements, least upper bound –The completeness axiom – Some properties of the supremum – The Archimedian property of the real number system – Absolute values and the triangle inequality –The Cauchy-Schwarz inequality .

UNIT II: BASIC NOTIONS OF SET THEORY (15 Hours)

Basic notions of set theory : Introduction - Relations and functions - Further terminology concerning functions –One –one functions and inverses –Composite functions –Sequences – Similar sets-Finite and infinite sets –Countable and uncountable sets –Uncountability of the real number system –Set algebra - Countable collection of countable sets.

UNIT III: ELEMENTS OF POINT SET TOPOLOGY (15 Hours)

Elements of point set topology: Introduction - Euclidean space R^n –Open balls and open sets in R^n. The structure of open Sets in R^1–Closed sets - Adherent points- Accumulation points - closed sets and adherent points -The Bolzano Weierstrass theorem – The Cantor intersection Theorem.

UNIT IV: ELEMENTS OF POINT SET TOPOLOGY (15 Hours)

Covering –Lindelof covering theorem –the Heine Borel covering theorem – Compactness in R^n –Metric Spaces –Point set topology in metric spaces –Compact subsets of a metric space – Boundary of a set.

UNIT V: LIMITS (12 Hours)

Limits: Introduction - Convergent sequences in a metric space –Cauchy sequences – Complete metric Spaces. Limit of a function - Limit of a vector valued functions.

TEXTBOOK

APOSTOL.T.M – (2002) "Mathematical Analysis", 2^{nd} edition, 20^{th} Reprint., Addison-Wisely, Narosa Publishing Company, Chennai.

UNIT	CHAPTER	SECTION
I	1	1.1-1.3, 1.6-1.12, 1.14, 1.18, 1.19
II	2	2.1, 2.5-2.15.
III	3	3.1-3.9.
IV	3	3.10-3.16
V	4	4.1- 4.5, 4.7.

REFERENCE BOOKS

1. Goldberg.R.R –(1990), “Methods of Real Analysis”, NY, John Wiley, New York.

2. Simmons.G.F – (1963), “Introduction to Topology and Modern Analysis”, McGraw – Hill, New York.

3. Birkhoff.G and MacLane – (1965),” A survey of Modern Algebra”, 3rd Edition, Macmillian, New York.

4. Sharma.J.N and VasisthaA.R - (1997),” Real Analysis”, Krishna Prakashan Media (P) Ltd.

CATEGORY	COURSE CODE	TITLE OF THE COURSE	C	P	CREDIT
CORE	17MAU18	COMPLEX ANALYSIS – I	84	-	6

Preamble

To enable the students to learn complex number system, complex functions and complex integration.

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	understand the definitions of Analytic functions, linear transformations , limits and continuity.	K_1 & K_2
CO2	gain the knowledge about differentiability, analyticity and circle of convergence	K_1
CO3	apply the theorems and results to solve a variety of problems arising in Analytic functions	K_3
CO4	analyze power series , control mappings and analytic function	K_4
CO5	evaluate the integral of a complex functions.	K_5

UNIT I: COMPLEX NUMBER SYSTEM (18 Hours)

Complex number –Field of Complex numbers – Conjugation –Absolute value -Argument – Simple Mappings.

i) $w = z + \alpha$ ii) $w = az$ iii) $w = 1/z$ invariance of cross-ratio under bilinear transformation – Definition of extended complex plane – Stereographic projection.

UNIT II: ANALYTIC FUNCTIONS (18 Hours)

Limit of a function –Continuity –Differentiability – Analytical function defined in a region – Necessary conditions for differentiability –Sufficient conditions for differentiability – Cauchy-Riemann equation in polar coordinates –Complex function as a function of z and $\overline{z}$

UNIT III: POWER SERIES AND ELEMENTARY FUNCTIONS (18 Hours)

Absolute convergence –Circle of convergence –Analyticity of the sum of power series in the Circle of convergence (term term differentiation of a series) Exponential, Logarithmic, Trigonometric and Hyperbolic functions.

UNIT IV: ELEMENTARY AND CONFORMAL MAPPING (16 Hours)

Conjugate Hormonic functions: Definition and determination, Conformal Mapping: Isogonal mapping –Conformal mapping-Mapping $z \rightarrow f(z)$, where f is analytic, particularly the Mappings: $w= e^z$; $w = z^{1/2}$; w=sin z, w=cos z

UNIT V: COMPLEX INTEGRATION (14 Hours)

Simply and Multiply connected regions in the complex plane. Integration of f(z) from definition along a curve joining z_1 and z_2. Proof of Cauchy's Theorem (using Goursat's lemma for a simply connected region). Cauchy's integral formula for higher derivatives (statement only)-Morera's theorem.

TEXT BOOK:

Duraipandian.P and Kayalal Pachaiyappa (2014) ," Complex analysis", S.Chand & Company PVT.LID. New Delhi.

UNIT	CHAPTER	SECTION
I	1	1.1 to 1.3, 1.6 to 1.9
	2	2.1 to 2.2, 2.6 to 2.10,
	7	7.1& 7.10
II	4	4.1 to 4.10
III	6	6.1 to 6.11
IV	6	6.12 to 6.13
	7	7.5 to 7.9
V	8	8.1 to 8.9 & 8.13

REFERENCE BOOKS:

1. Pillai.T.K.M. & Narayanan.S (1997) " Complex Analysis ", S.Viswanathan pvt ltd – Chennai.
2. Sharma.J.N. (2016), "Complex Analysis", Krishan Prakashan Media – Meerut.

CATEGORY	COURSE CODE	TITLE OF THE COURSE	C	P	CREDIT
PROFICIENCY ENHANCEMENT	17PEUMA01	FINANCIAL MATHEMATICS (SELF STUDY)	-	-	2

Preamble

To enable the students to gain the knowledge about Financial Mathematics.

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	understand and gain knowledge about Measures of Central tendency.	K_1 & K_2
CO2	apply different methods to solve problems on Bankers Discount and Bankers Gain.	K_3
CO3	learn how to apply the various techniques of Transportation problems	K_3
CO4	analyze simple and compound Interest.	K_4
CO5	evaluate Forecasting method problems	K_5

UNIT I : MATHEMATICS OF FINANCE

Simple Interest.- Compound Interest.

UNIT II : MATHEMATICS OF FINANCE

Annuities- Present value of annuities- Sinking Fund –Discounting

UNIT III : MEASURE OF CENTRAL TENDENCY

Arithmetic Mean - Median – Mode

UNIT IV : TRANSPORTATION PROBLEM

Transportation problem – North west corner method- Least cost method – Vogel's approximation method

UNIT V : FORECASTING

Forecasting methods- Moving averages- Weighted moving Averages-Exponential smoothing .

TEXT BOOKS

1.Navnitham. P.A.(2012) - "Business mathematics and statistics", Jai publishers, Trichy.

2. Manmohan, P.K. Gupta, Kanthiswarup, S(2016) –"Operations Research", Chand & sons.

UNIT	BOOK	CHAPTER	PAGE
I	I Part-I	2	43-64
II	I Part-I	2	65-88
III	I Part-II	7	159-181, 196-227
IV	II	10	247-258
V	II	31	915-923

REFRENCE BOOKS

1. Gupta. S.P.(2016-17) - "Statistical Methods", Sultan Chand & Sons, New Delhi.
2. Guptha ,C.B and Vijay Guptha (1988) - "Introduction to Statistical methods".
3. 1. Hamdy A Taha (2002) – "Operations Research", 7th edition ,Pearson Education.

CATEGORY	COURSE CODE	TITLE OF THE COURSE	C	P	CREDIT
ELECTIVE	17MAU21A	OPERATIONS RESEARCH-I	60	-	4

Preamble

To enable the students to learn decision making problems based on deterministic and parabolistic models.

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	understand the meaning, purpose, and tools of operations research.	K_2
CO2	gain the knowledge about LPP.	K_1
CO3	apply the concepts of queuing theory to solve real life problem	K_3
CO4	analyze the use of decision analysis	K_4
CO5	evaluate the problems by using various methods such as Gomory's fractional cut Method, Branch Bound Method.	K_5

UNIT I: LINEAR PROGRAMMING PROBLEM (12 HOURS)

Linear Programming -Mathematical Model assumption of linear Programming – Graphical method -Principles of Simplex method, Big-M Method.

UNIT II: DUALITY (10 HOURS)

Two-phase method- Duality, Dual simplex method.

UNIT III: INTEGER PROGRAMMING PROBLEM (12 HOURS)

Integer Programming Problem – Gomory's fractional cut Method – Branch Bound Method.

UNIT IV: QUEUING THEORY (14 HOURS)

Queuing Theory -Definition of waiting line model -Queue discipline -Traffic intensity -Poisson arrival –Birth death process -Problem from single server: finite and infinite population model .

UNIT V: DECISION ANALYSIS (12 HOURS)

Decision Making environment – Decisions under uncertainty – Decision under risk – Decision – Tree Analysis.

Text Book:

Kantiswarup, P. K. Gupta, Man Mohan (2017) –" Operations Research", 18th Revised edition, S. Chand & Sons Education Publications, New Delhi,

UNIT	CHAPTER	PAGE
I	2 4	39-63 87-114
II	4,5	107-108,109 129-133,138-142
III	7	177-191
IV	21	589-621
V	16	415-435

REFERENCE BOOKS

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

CATEGORY	COURSE CODE	TITLE OF THE COURSE	C	P	CREDIT
ELECTIVE	17MAU21B	DISCRETE MATHEMATICS - I	60	-	4

Preamble :

To enable the students to learn and gain knowledge about the mathematical logic and algebraic structures, Lattices and Boolean Algebra.

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	define the basic terms of logical operations, relations, functions.	K_1
CO2	apply the rules of inference and tests for validity in predicate calculus.	K_3
CO3	analyze the types of functions.	K_4
CO4	evaluate boolean functions and simplify expression using the properties of boolean algebra.	K_5
CO5	understand the concepts of Lattices and boolean algebra	K_2

UNIT I: MATHEMATICAL LOGIC (12 HOURS)

Connections well formed formulas – Tautology - Equivalence of Formulas - Tautological implications - Duality law - Normal forms.

UNIT II: THEORY OF INFERENCE (12 HOURS)

Theory of inference - predicate calculus - Variables – Quantifiers - Free and bound Variables - Theory of inference of predicate calculus.

UNIT III: RELATIONS AND FUNCTIONS (12 HOURS)

Composition of relations - Composition of functions - Inverse functions - Hashing functions - Permutation function.

UNIT IV: ALGEBRA STRUCTURES (12 HOURS)

Semi groups - Free semi groups – Monoids – Groups - Cosets - Sets - Normal subgroups - Homomorphism.

UNIT V: LATTICES AND BOOLEAN ALGEBRA (12 HOURS)

Partial ordering - Poset – Lattices - Boolean algebra - Boolean functions - Theorems - Minimisation of Boolean functions.

TEXT BOOK

Veerarajan.T(2014) - " Discrete Mathematics with Graph theory and Coimbinatorics", McGraw Hill Education (India) Pvt. Ltd, New Delhi.

UNIT	CHAPTER	PAGE NUMBER
I	I	1-24
II	I	27-45
III	II, IV	66-68, 182-210,217
IV	V	232-242, 261-268
V	II	96-109, 114-117, 121-137

REFERENCE BOOK:

J.P Tremblay and R.P Manohar (1975)-"Discrete Mathematical Structures with applications to computer science", Mc.Graw Hill.

CATEGORY	COURSE CODE	TITLE OF THE COURSE	C	P	CREDIT
SKILL ENHANCEMENT	**17SEUMA03**	**WEB PROGRAMMING – HTML and PHP - PRACTICAL**	**-**	**24**	**2**

LIST OF PROGRAMS

All the following listed programs have to be executed and recorded

HTML

1. A Program to illustrate body, pre tags, text formatting tags
2. A Program to illustrate text Font tag, comment, h1….h6, and div tag
3. A Program to illustrate all types of list tag
4. A Program to illustrate img tag, Hyper Link tag (Anchor tag)
5. A Program to illustrate image map

PHP

1. Create a simple HTML form and accept the user name and display the name through PHP echo statement
2. Write a PHP script, which changes the color of the first character of a word
3. Write a PHP script to redirect a user to a different page
4. Write a PHP program to swap two variables
5. Write a PHP program to remove duplicates from a sorted list

SEMESTER VI

CATEGORY	COURSE CODE	TITLE OF THE COURSE	C	P	CREDIT
CORE	**17MAU22**	**LINEAR ALGEBRA**	**72**	**-**	**5**

Preamble :

To enable the students to learn and gain knowledge about linear algebra and linear transformations.

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	gain the knowledge about Vector space, Basis, Dual spaces, Inner product spaces.	$\mathbf{K_1}$
CO2	understand the basic concepts of Linear Algebra	$\mathbf{K_2}$
CO3	apply Linear Algebra concepts to find the dimensions	$\mathbf{K_3}$
CO4	analyze the concepts of basic theorems and inequalities.	$\mathbf{K_4}$
CO5	evaluate the characterization of linear vectors, linear transformations and linear functional.	$\mathbf{K_5}$

UNIT I: VECTOR SPACES AND SUBSPACES (15 Hours)

Group-Field-External and Internal compositions-Linear Algebra-Definition-Subspaces-Linear Combination-Linear Span-Linear Sum-Internal Direct Sum-Complementary Subspaces-Disjoint Spaces-External Direct Sum-Quotient Space-Elementary Properties-Theorems related to vector spaces, Subspaces and Linear Span

UNIT II: LINEAR DEPENDENCE OF VECTORS AND BASIS (15 Hours)

Vector-Zero vector -Operation on vector –Vectors in C^n and R^n-Linearly dependent and Linearly independent-Basic theorems regarding linear dependent of vectors-Cauchy Schwarz's inequality-Minkowski's inequality.

Basis–Finitely generated spaces-Dimension co-ordinates-Existence theorem–Replacement theorem-Invarience of number of elements in a basis-Extension theorem-Theorems related to basis and dimension.

UNIT III: LINEAR TRASFORMATIONS (15 Hours)

Trasformations-Onto and into maps-One –one and many-one maps-Products of functions-Linear transformation-Isomorphisms-Kernal and range space of a linear map-Nulity and rank-Singular and non-singular transformation-linear operator-Invertible operator-Some theorems.

UNIT IV:LINEAR FUCTIONALS AND THE DUAL SPACE (15 Hours)

Linear functional and its examples-Dual space- Dual basis-Reflexivity-Annihilator-Transpose of a linear map-Theorems and solved examples.

UNIT V:INNER PRODUCT SPACES (12 Hours)

Inner product-Norm-orthogonality-orthogonal and orthonormal sets-Angle between two vetors-Adjoint operator-Complete orthonormal set-Symmetric operator-T-invariant-Theorem and solved examples-Bessel's inequality-Grahm Schmidt orthogonalization process-Theorems and problems related to linear operators.

TEXT BOOK

Gupta.K. P.(1988) "Linear algebra", Pragathi Prakashan Publishers , Meerut India limited.

UNIT	CHAPTER	PAGE NUMBER
I	II	6-47
II	III & IV	48-57 , 73-95
III	V	111-143
IV	VII	207- 238
V	X	273-340

REFERENCE BOOKS

1.Herstein.I.N(2014)—"Topics in Algebra", Second Edition, John Wiley & Sons, New York.

2.Sharama S.D - "Linear algebra" Kedarnath ramnath Publishers, Meerut.

3.Vasishtha A.R(1994 – 95)—"Modern Algebra", Krishna Prakashan Mandir, Meerut.

CATEGORY	COURSE CODE	TITLE OF THE COURSE	C	P	CREDIT
CORE	17MAU23	REAL ANALYSIS II	72	-	5

Preamble

To enable the students to learn and gain knowledge about Continuity, Derivatives, Functions of Bounded variation and Riemann Stieltjes integral.

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	define and understand the basic notations of continuity, Derivatives, Functions of Bounded variation	K_1 & K_2
CO2	apply the use of limits of continuous functions, including the fact that continuous functions attain extreme values on compact sets;	K_3
CO3	analyze the concepts of continuity criteria, derivatives and Riemann-Stieltjes integral.	K_4
CO4	prove the theorems in, Continuity, Derivatives, and Functions of Bounded variation	K_5
CO5	prove the theorems in Riemann-Stieltjes integral.	K_5

UNIT I: CONTINUITY **(15 Hours)**

Continuous functions –Continuity of composite functions– Examples of continuous functions - Continuity and inverse images of open or closed sets – Functions continuous on compact sets.

UNIT II: CONTINUITY **(12 Hours)**

Connectedness –Components of a metric space – Uniform continuity : Uniform continuity and compact sets –Fixed point theorem for contractions – Monotonic functions.

UNIT III: DERIVATIVES **(15 Hours)**

Introduction - Definition of derivative –Derivatives and continuity –Algebra of derivatives – the chain rule —Rolle's theorem –The mean value theorem for derivatives – Intermediate value theorem for derivatives - Taylor's formula with remainder.

UNIT IV: FUNCTIONS OF BOUNDED VARIATION **(15 Hours)**

Introduction -Properties of monotonic functions –Functions of bounded variation –Total Variation –Additive properties of total variation - Total variation on [a, x] as a function of x – Functions of bounded variation expressed as the difference of increasing functions.

UNIT V: RIEMANN – STIELTJES INTEGRAL **(15 Hours)**

The Riemann - Stieltjes integral : Introduction –Notation –The definition of Riemann – Stieltjes integral –Linear properties –Integration by parts –Change of variable in a Riemann – Stieltjes integral –Reduction to a Riemann integral.

TEXTBOOK

Apostol T.M – (2002) "Mathematical Analysis", 2nd edition, 20th Reprint., Addison-Wisely, Narosa Publishing Company, Chennai.

UNIT	CHAPTER	SECTION
I	**4**	**4.8 - 4.9, 4.11 - 4.13**
II	**4**	**4.16 , 4.17, 4.19 - 4.21,4.23.**
III	**5**	**5.1 - 5.5, 5.9 - 5.12.**
IV	**6**	**6.1- 6.7.**
V	**7**	**7.1 - 7.7**

REFERENCE BOOKS

1. Goldberg.R.R –(1990), "Methods of Real Analysis", NY, John Wiley, New York.
2. Simmons.G.F – (1963), "Introduction to Topology and Modern Analysis", McGraw – Hill, New York.
3. Birkhoff.G and MacLane – (1965)," A survey of Modern Algebra", 3rd Edition, Macmillian, New York.
4. Sharma.J.N and VasisthaA.R - (1997)," Real Analysis", Krishna Prakashan Media (P) Ltd.

CATEGORY	COURSE CODE	TITLE OF THE COURSE	C	P	CREDIT
CORE	17MAU24	COMPLEX ANALYSIS – II	72	-	6

Preamble

To enable the students to learn analytic functions, meromorphic functions , contour integration and real definite integrals.

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	understand the definitions of Analytic functions and singularities	K_2
CO2	gain the knowledge about Taylor's series , Laurent's series and definite integrals	K_1
CO3	apply the theorems and results to solve a variety of problems involving Analytical function	K_3
CO4	identify and analyze the singularities, residues, Taylor and Laurent series	K_2 & K_4
CO5	evaluate the complicated real definite integrals	K_5

UNIT I : RESULTS BASED ON CAUCHY'S THEOREM (I) (15 Hours)

Zeros of a function -Cauchy's Inequality – Lioville's theorem –Fundamental theorem of algebra –Maximum modulus theorem –Gauss mean value theorem –Gauss mean value theorem for a harmonic function on a circle .

UNIT II: RESULTS BASED ON CAUCHY'S THEOREM (II) (15 Hours)

Taylor's series –Laurent's series .

UNIT III: SINGULARITIES AND RESIDUES (15 Hours)

Singular point - Isolated singularities (Removable Singularity, pole and essentialsingularity) –Residues –Residue theorem.

UNIT IV: REAL DEFINITE INTEGRALS **(15 Hours)**

Evaluation using the calculus of residues – Integration on the unit circle –Integral with - ∞ and + ∞ as lower and upper limits with the following integrals:

i) P(x) /Q(x) where the degree of Q(x) exceeds that of P(x) at least by 2.

ii) (sin ax).f(x), (cos ax).f(x), where a>0 and f(z) →0 as z→ ∞ and f(z) does not have a pole on the real axis.

iii) f(x) where f(z) has a finite number of poles on the real axis.

Integral of the type $\int_x^{a-1} \frac{x}{1+x}\, dx$; 0< a <1;

UNIT V: MEROMORPHIC FUNCTIONS **(12 Hours)**

Theorem on number of zeros minus number of poles –Principle of argument: Rouche's theorem – Theorem that a function which is meromorphic in the extended plane is a rational function.

TEXT BOOK:

Duraipandian.P and Kayalal Pachaiyappa(2014), "Complex Analysis", S.Chand and Company pvt.ltd, New Delhi.

UNIT	CHAPTER	SECTION
I	8	8.10, 8.11
II	9	9.1 to 9.3, 9.13.
III	9 10	9.5 to 9.12, 9.13. 10.1, 10.2 and 10.4.
IV	10	10.3 and 10.4.
V	11	11.1 to 11.3 (Omit theorems 11.5 and 11.6)

REFERENCE BOOKS:

1. Pillai.T.K.M. & Narayanan.S (1997) " Complex Analysis ", S.Viswanathan pvt ltd – Chennai.

2. Sharma.J.N. (2016), "Complex Analysis", Krishan Prakashan Media – Meerut.

CATEGORY	COURSE CODE	TITLE OF THE COURSE	C	P	CREDIT
ELECTIVE	17MAU26A	OPERATIONS RESEARCH-II	60	-	4

Preamble

To enable the students to understand various mathematical applications in industries-Decision making for real time environment.

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	understand the basic concepts, models and statements of the operations research.	K_2
CO2	gain the knowledge about quantitative models.	K_1
CO3	apply the various method to solve a linear programming problems.	K_3
CO4	analyze the use of different types of quantitative decision making processes	K_4
CO5	evaluate and develop mathematical arguments in a logical manner	K_5

UNIT-I: REPLACEMENT (14 Hours)

Introduction - Replacement of equipment / assets that deteriorates gradually - Replacement of equipment that fails suddenly and problems, reliability.

UNIT-II: NON-LINEAR PROGRAMMING PROBLEMS (12 Hours)

Non-linear Programming Problems – General NLPP – Lagrange multiplier – Hessian bordered Matrix – Kuhn Tucker Condition – Problems.

UNIT-III: INVENTORY CONTROL (12 Hours)

Introduction – Types of inventories – Inventory costs – EOQ Problem with no shortages – Production problem with no shortages – EOQ with shortages – Production problem with shortages – EOQ with price breaks.

UNIT-IV: SEQUENCING PROBLEMS (12 Hours)

Introduction-Problem of sequencing - Basic terms used in sequencing- Processing n-jobs through 2 machines - Processing n –jobs through k machines - Processing 2 jobs through k machines(Problems only).

UNIT-V: DYNAMIC PROGRAMMING PROBLEM (10 Hours)

Dynamic Programming Problem – Recursive equation approach – D.P.P Algorithm – Solution of L.P.P by D.P.P.

TEXT BOOK:

Kandiswarup, P. K. Gupta, Man Mohan (2017) –" Operations Research", 18th Revised edition, S. Chand & Sons Education Publications, New Delhi.

UNIT	CHAPTER	PAGE
I	18	477-495, 500-503
II	27	823-840
III	19	507-539
IV	12	327-341
V	13	347-353

REFERENCE BOOKS:

1. Dharani Venkata Krishnan .S – " Operations Research Principles and Problems" Keerthi publishing house PVT Ltd.

2.Prem Kumar Gupta D. S. Hira – "Operations Research " , S. Chand & Company Ltd, Ram Nagar, New Delhi.

CATEGORY	COURSE CODE	TITLE OF THE COURSE	C	P	CREDIT
ELECTIVE	17MAU26B	DISCRETE MATHEMATICS -II	60	-	4

Preamble :

To enable the students to learn and gain knowledge about the Formal languages Automata Theory and Graph Theory **.**

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	understand the basic concepts of graph theory and finite state automata	K_2
CO2	gain the knowledge about different types of grammars.	K_1
CO3	apply the concepts of graph theory to solve problems in computer networks.	K_3
CO4	analyze and design finite automata, formal languages and grammars.	K_4
CO5	construct finite state machines and the equivalent regular expressions	K_5

UNIT-I: FORMAL LANGUAGES AND AUTOMATA (15 HOURS)

Formal languages and Automata: Regular expressions - Types of grammar - Regular Grammar - Context free and sensitive grammars - Finite state automata.

UNIT-II: CLOSURE OPERATIONS (10 HOURS)

Closure operations

UNIT – III: CONTEXT FREE LANGUAGES (9 HOURS)

Context free languages

UNIT – IV: GRAPH THEORY (13 HOURS)

Graph Theory: Directed and undirected graphs - Paths - Reachability – Connectedness - Matric representation - Eular paths - Hamiltonean paths - Warshall's Algorithm.

UNIT – V: TREES (13 HOURS)

Trees - Binary trees simple theorems and applications.

TEXT BOOK

1.Veerarajan.T(2014) - "Discrete Mathematics with Graph theory and Coimbinatorics", McGraw Hill Education (India) Pvt. Ltd, New Delhi.

2.Rani Sironmoney(1984)-"Formal Languages and Automata",The Christian Literature Society, Madras 600 003.

BOOK	UNIT	CHAPTER	PAGE
1	I	VIII	448-460, 462-469
2	II	III	20-28
2	III	IV	29-52
1	IV	VII	366-394, 396-398
1	V	VII	415-416, 418-426

REFERENCE BOOKS:

1.P. Tremblay and R.P Manohar (1975) -"Discrete Mathematical Structures with applications to computer science", Mc.Graw Hill.

2. J.K. Sharma (2005) - "Discrete Mathematics", Second Edition, Macmillan India Ltd.

CATEGORY	COURSE CODE	TITLE OF THE COURSE	C	P	CREDIT
ELECTIVE	17MAU27A	LATEX	60	-	4

Preamble :

To enable the students to learn and gain knowledge about the concepts of LaTex and the LaTex commands to write programs.

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	learn the environment of LaTex.	K_1
CO2	understand the basics of LaTex .	K_2
CO3	apply LaTex concepts in creating tables.	K_3
CO4	analyze the concepts of LaTex to write programs.	K_4
CO5	determine the LaTex commands .	K_5

UNIT I: COMMANDS AND ENVIRONMENTS (12 Hours)

Commands and Environments : Command names and arguments – Environments – Declarations – Lengths – Special Characters – Fragile Commands.

UNIT II: DOCUMENT LAYOUT AND ORGANIZATION (12 Hours)

Document Layout and Organization : Document class – Page style – Parts of the document – Table of contents – Fine-Tuning text – Word division.

UNIT III: DISPLAYED TEXT (12 Hours)

Displayed Text: Changing font – Centering and indenting – Lists – Generalized lists – Theorem-like declarations –Tabulator stops – Boxes.

UNIT IV: TABLES (12 Hours)

Tables – Printing literal text – Footnotes and marginal notes.

UNIT V: MATHEMATICAL FORMULAS (12 Hours)

Mathematical Formulas: Mathematical environments – Main elements of math mode – Mathematical symbols – Additional elements – Fine-tuning mathematics.

TEXT BOOK:

Kopka .H and P.W. Daly (1999) – "A Guide to LATEX", Third Edition, Addison – Wesley, London.

UNIT	CHAPTER	SECTION
I	**2**	**2.1 - 2.6**
II	**3**	**3.1 - 3.6**
III	**4**	**4.1 - 4.7**
IV	**4**	**4.8 - 4.10**
V	**5**	**5.1 - 5.5.**

REFERENCE BOOK:

Fundamentals of Latex for Mathematicians, Physicists and Engineers by Velusamy Kavitha and Mani Mallika Arjunan Lap Lambert Academy Publishing, Germany, 2013

CATEGORY	COURSE CODE	TITLE OF THE COURSE	C	P	CREDIT
ELECTIVE	17MAU27B	GRAPH THEORY	60	-	4

Preamble :

To enable the students to learn and gain knowledge about Graph Theory.

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	gain the knowledge about various types of Graphs and understand the basic concepts of Graph Theory	K_1 &K_2
CO2	apply Euler's theorem on planar Graphs	K_3
CO3	analyze the difference between Eulerian and Hamiltonian graphs and apply Fleury's algorithm to solve the problems.	K_3&K_4
CO4	evaluate the characterization of the graphs	K_5
CO5	understand the concepts of Connectivity, Eulerion Digraphs and Tournaments.	K_2

UNIT I:BASICS OF GRAPHS (12 Hours)

Graphs –Sub graphs – Degree of a vertex walks, paths and cycles in a Graphs – connectedness- cut vertex and cut edge.

UNIT II: EULERIAN, HAMILTONION AND BIPARTITE GRAPHS (12 Hours)

Euler and Hamiltonion Graphs – Algorithm for Eulerian circuits –Weighed graphs- Bipartite Graphs –Trees.

UNIT III: MATRICES AND VECTOR SPACES ASSOCIATED WITH GRAPHS (12 Hours)

Matrix representation of a graph – Vector spaces associated with a graph – Cycle spaces and cut set space.

UNIT IV: PLANAR GRAPHS (12 Hours)

Planar graphs – Euler's theorem on planar graphs – Characterization of planar graphs (no proof) of the difficult part of the characterization.

UNIT V: DIRECTED GRAPHS (12 Hours)

Directed graphs – Connectivity – Eulerion Digraphs – Tournaments.

TEXT BOOK

Choudum.S. A.(1987) "A First Course in Graph Theory", Macmillan Publishers India limited

UNIT	CHAPTER	SECTIONS
I	I	1.1- .7
II	II,III	2.1-2.4, 3.1&3.3
III	IV	4.1- 4.4
IV	V	5.1, 5.2 & 5.5
V	VII	7.1, 7.2, 7.4& 7.5

REFERENCE BOOKS

1.Narasingh Deo,(1995) -"Graph Theory", Prentice Hall of India.

2. Harary(1988) -"Graph Theory", Narosa Publishing HQCK.

CATEGORY	COURSE CODE	TITLE OF THE COURSE	C	P	CREDIT
SKILL ENHANCEMENT	17SEUMA04	LATEX – PRACTICAL	-	24	2

LIST OF PROGRAMS

All the following listed programs have to be executed and recorded

1. Type the following paragraph in LaTex, using the {quote} environment. Format the paragraph with the following: Text height 9.5 inches, Text width 6.30 inches, Left margin 0.10 inches, Right margin 0.120 inches, Top margin -0.6 inch, Line space 1.5 inches. Also, include a foot note.

2. Produce a document in LATEX, using two-columns, Insert a title centered for the two columns.

3. Produce a title page in LATEX, with the following:

(i)Title of the page,(ii)Name and Addresses of two authors,(iii)Footnotes for the corresponding author; e-mail address and telephone numbers of the each author,(iv)Date.

4. Create a document in LATEX to produce the bibliographic information, using the {bibliography} environment.

5. Create the following table using LATEX:

S.No.	Register Number	Name of the Student	Percentage of Marks	Rank
1	XXXXXX	XXXXXX	XXXXX	XXXX
2	XXXXXX	XXXXXXX	XXXX	XXXX
3	XXXXXX	XXXXXX	XXXX	XXXXX

6. Using LaTex, generate the following formula:

$$a_0+\cfrac{1}{a_1+\cfrac{1}{a_2+\cfrac{1}{a_3+\cfrac{1}{a_4}}}}+\begin{pmatrix} a & b \\ c & d \end{pmatrix}+\sum_{\alpha=0}^{\infty}(\beta^{\alpha}+\Gamma^{\alpha})$$

7. Using LaTex, generate the following with the { eqnarray } environment:

$$
\begin{aligned}
(x + y)\,(x - y) &= x^2 - xy + xy - y^2 \\
&= x^2 - y^2 \qquad (1.1) \\
(x + y)^2 &= x^2 + 2xy + y^2 \qquad (1.2) \\
X_n u_1 + \ldots\ldots\ldots + x_{n+t-1}\, u_t &= x_n u_1 + (a\, x_n + c)u_2 + \ldots\ldots \\
&\quad + a^{t-1}\, x_n + c(a^{t-2} + \ldots\ldots + 1)u_t \\
&= (u_1 + a\, u_2 + \ldots\ldots + a^{t-1}\, u_t)x_n + h(u_1, \ldots\ldots\ldots u_t)
\end{aligned}
$$

8. Using LaTex, draw the following diagram:

9.Using LaTex, create a minipage or parbox environment with the following properties.

i) to push the text to the top of the box.

ii) to center the text within the box.

iii)to shove it to the bottom of the box.

[NOTE: All the contents should be placed within the box itself.]

10.Using LaTex, create a paragraph with parbox inside a \fbox command, which should brings the effect that the entire parbox is framed.

SYLLABUS FOR CORE OPTIONAL OFFERED BY DEPARTMENT OF MATHEMATICS

CATEGORY	COURSE CODE	TITLE OF THE COURSE	C	P	CREDIT
CORE OPTIONAL	***	MATHEMATICS FOR BUSINESS	36	-	3

Preamble

To enable the students to learn Business Mathematics.

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	gain the knowledge about set theory and matrix.	K_1
CO2	apply different quantitative models in solving business problems.	K_3
CO3	understand the different types of matrices.	K_2
CO4	determine simple and compound Interest.	K_4
CO5	evaluate Sequence and series.	K_5

UNIT I: SERIES (10 Hours)

Sequence and series - Arithmetic progression –Geometric progression – Arithmetic mean - Geometric mean – Harmonic mean.

UNIT II: MATRICES (6 Hours)

Fundamental ideas about Matrices and their operational rules- Matrix Multiplication- Inverse of a matrix (2x2 matrix) - Rank of a matrix (2x2 matrix only).

UNIT III: SET THEORY (6 Hours)

Introduction- Types of sets- Set operation- Venn diagrams, Inconsistency of data.

UNIT IV: MATHEMATICS OF FINANCE (7 Hours)

Simple Interest.

UNIT V: MATHEMATICS OF FINANCE (7 Hours)

Compound Interest.

NOTE: No derivation and proof, simple problems only.

TEXT BOOK

Navnitham P.A (2012) – "Business Mathematics and Statistics", Sultan Chand & Sons, New Delhi.

UNIT	CHAPTER	PAGE
I	I	1 - 33.
II	IV	147-184.
III	III	104-136.
IV	II	43-51.
V	II	51-61.

REFERENCE BOOK

Vittal.P.R (2002) - "Business Mathematics and Statistics, Margham publishers, Chennai.

SYLLABUS FOR ALLIED COURSES

P.K.R ARTS COLLEGE FOR WOMEN

(Accredited with 'A' Grade by NAAC)

An Autonomous Institution-Affiliated to Bharathiar University

BBA DEGREE PROGRAMME

I SEMESTER

BUSINESS MATHEMATICS	CATEGORY	L	P	CREDIT
	ALLIED	60	-	4

Preamble

To enable the students to gain the knowledge about the set theory, matrix, simple and compound interest, linear programming problem.

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	gain and understand about set theory, matrix, simple interest, and compound interest.	K_1 & K_2
CO2	apply different quantitative models in solving business problems.	K_3
CO3	analyze the difference between Simple and Compound Interest.	K_4
CO4	calculate the present value of a simple interest investment at a given time within the term of the investment.	K_5
CO5	evaluate the solution of simultaneous linear equations	K_5

UNIT - I: SERIES **(12 Hours)**

Sequence and series - Arithmetic progression –Geometric progression – Geometric means – Harmonic Progression.

UNIT - II: SET THEORY **(12 Hours)**

Introduction- Types of sets- Set operation- Venn diagrams.

UNIT - III : MATHEMATICS Of FINANCE **(12 Hours)**

Bsic concepts - Simple Interest and Compound Interest: Simple Interest – Formulae and problems – Compound Interest – Formulae and problems.

UNIT - IV: MATRICES, DETERMINANTS **(12 Hours)**

Definition of a matrix- Order of a matrix – Types of a matrix– Matrix operations I :A System of Linear Equations – Determinants- Cramer's Rule – Matrix Operation II: Inverse of a matrix –Rank of matrix .

UNIT - V: LINEAR PROGRAMMING PROBLEM **(12 Hours)**

Introduction-meaning and scope -Limitations -Linear Programming Problem – Formulation of LPP – Solution by Graphical Method Solution.

NOTE: Distribution Of Marks: Theory 20%, Problem 80%.

TEXT BOOK

Navnitham. P.A.(2012) - "Business mathematics and statistics", Jai publishers, Trichy.

Unit - I	**Chapter I**	**Page: 1-33**
Unit - II	**Chapter III**	**Page: 104-126**
Unit -III	**Chapter II**	**Page: 43-60**
Unit -IV	**Chapter IV**	**Page: 147-188**
Unit -V	**Chapter IX**	**Page: 328-345**

REFERENCE BOOKS:

1. Sundaresan and Jayaseelan, (2013)- " Introduction to Business Mathematics ", Sultan chand Co& Ltd, Newdelhi.
2. Sanchetti, D.C and Kapoor, V.K. (2011)- " Business Mathematics" , Sultan chand Co& Ltd, Newdelhi.
3. G.K.Ranganath, C.S.Sampamgiram and Y.Rajan (1998)-"A Text book Business Mathematics-Himalaya Publishing House.

P.K.R ARTS COLLEGE FOR WOMEN

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B.Sc (CS) / B.Sc (IT) / BCA DEGREE PROGRAMME

I SEMESTER

MATHEMATICAL STRUCTURE FOR COMPUTER SCIENCE	CATEGORY	L	P	CREDIT
	ALLIED	60	-	4

Preamble

To enable the students to learn Matrices, Newton's differential equations and Measures of central tendency.

Course Outcome

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	gain and understand about Matrix, Numerical Differentiation and Integration, Measures of central tendency.	K_1 &K_2
CO2	solve the system of simultaneous linear algebraic equations numerically by using various methods.	K_3
CO3	analyze the Relationship among mean, median and mode.	K_4
CO4	analyze and apply the concepts of Differentiation and Integration numerically.	K_3 & K_4
CO5	evaluate the problems under Matrices, Linear equation, Numerical Differentiation and Integration, Measures of central tendency.	K_5

UNIT I: MATRIX **(15 Hours)**

Matrices – Introduction –Addition , Subtraction and Multiplication of Matrix – Determination – Inverse of a matrix – Rank of a Matrix .

UNIT II: SIMULTANEOUS LINEAR ALGEBRAIC EQUATION (10 Hours)

System of Simultaneous Linear algebraic Equation . Gauss Elimination, Gauss Jordon, Gauss Seidel Methods.

UNIT III: NUMERICAL DIFFERENTIATION (10 Hours)

Newton's forward Difference Formula - Backward Difference Formula – Stirling's formula.

UNIT IV: NUMERICAL INTEGRATION (10 Hours)

Introduction- Newton's cotes formula - Trapezoidal Rule - Simpson's 1/3 rule – Simpson's 3/8 rule.

UNIT V: MEASURES OF CENTRAL TENDENCY (15 Hours)

Mean, Median and Mode – Relationship among mean median and mode.

Note: Distribution of Marks: Theory 20% Problem 80%

TEXT BOOKS:

1. P.A.Navanitham (Revised Edition -2012) "Business Mathematics and Statistics", Jai Publishers, Trichy-21, April 2012.
   (Unit I & V)
2. P.Kandasamy , K.Thilagavathy,K.Gunavathi. (Revised Edition -2005) "Numerical Methods " S.Chand & Company Ltd,Ram Nagar, New Delhi-110 055.
   (Unit II & III & IV)

UNIT	BOOK	CHAPTER	PAGE
I	1	Part I	147-190 .
II	2	4	113-121 ,147-159.
III	2	9	280-290.
IV	2	9	299-317.
V	1	Part II	159-181,196-227.

REFERENCE BOOKS:

1. E. Balagurusamy –(2007) "Numerical Methods", 22nd Edition ,Tata McGraw Hill, New Delhi.
2. S. C. Gupta, V. K. Kapoor – (2007)"Fundamental of Mathematical Statistics", 12th Edition, Sultan Chand & Sons, New Delhi.

P.K.R ARTS COLLEGE FOR WOMEN

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An Autonomous Institution-Affiliated to Bharathiar University

B.Com (PA), B.Com (CA) DEGREE PROGRAMME

I SEMESTER

MATHEMATICS FOR BUSINESS	CATEGORY	L	P	CREDIT
	ALLIED	52	-	4

Preamble

To enable the students to gain knowledge about the set theory, matrices, differentiation, integration and linear programming problems.

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	gain the knowledge about set theory, matrix, differentiation, and integration.	K_1 &K_2
CO2	apply different quantitative models in solving business problems, graphical solution by simplex method.	K_3
CO3	determine simple and compound Interest, indefinite and definite Integrals of simple functions.	K_4
CO4	evaluate the first and second order derivatives and determine the solution of Simultaneous Linear Equations	K_5

UNIT I: SET THEORY (12 Hours)

Set Theory – Arithmetic and Geometric Series – Simple and Compound Interest – Effective rate of Interest –Sinking Fund – Annuity - Present Value – Discounting of Bills – True Discount – Banker's Gain.

UNIT II: MATRIX (**10 Hours)**

Matrix: Basic Concepts – Addition and Multiplication of matrices – Inverse of a matrix –Rank of matrix - Solution of simultaneous linear equations.

UNIT III: DIFFERENTIATION (**10 Hours)**

Variables, Constants and Functions – Limits of Algebraic Functions – Simple Differentiation of Algebraic Functions – Meaning of Derivations – Evaluation of First and Second Order Derivatives – Maxima and Minima – Application to Business Problems.

UNIT IV: INTEGRATION (**10 Hours)**

Elementary Integral Calculus – Determining Indefinite and Definite Integrals of simple Functions – Integration by Parts.

UNIT V: LINEAR PROGRAMMING PROBLEM (**10 Hours)**

Linear Programming Problem – Formation – Solution by Graphical Method Solution by Simplex Method.

TEXT BOOK

Navnitham. P.A.(2012) - "Business mathematics and statistics", Jai publishers, Trichy.

UNIT	CHAPTER	PAGE NO
I	I, II, III	1-33, 43-88, 104-138
II	IV	147-200
III	V, VI, VII	222-245 247-275 282-296
IV	VIII	303-322
V	IX	328-366

REFERENCE BOOKS:

1. Sundaresan and Jayaseelan, (2013)-“ Introduction to Business Mathematics ”, Sultan chand Co& Ltd, Newdelhi.
2. Sanchetti D.C and Kapoor V.K.(2011)- “ Business Mathematics” , Sultan chand Co& Ltd, Newdelhi.
3. G.K.Ranganath, C.S.Sampamgiram and Y.Rajan(2015)-“A Text book of Business Mathematics-Himalaya Publishing House.

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B.Sc (PHY) DEGREE PROGRAMME

I SEMESTER

ALLIED MATHEMATICS-I	CATEGORY	L	P	CREDIT
	ALLIED	84	-	

Preamble

To enable the students to learn about expansion in series of Trigonometry functions, to find the root for the different types of equations, Laplace transforms and Fourier series.

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	gain and understand about the different types of roots namely irrational roots, complex roots	**K_1& K_2**
CO2	gain the knowledge about Eigen values and Eigen vectors	**K_1**
CO3	apply shift theorem to compute the laplace transform and inverse laplace transform.	**K_3**
CO4	analyze hyperbolic functions.	**K_4**
CO5	evaluate the problems in Laplace transforms, inverse Laplace transforms and Fourier series.	**K_5**

UNIT I: THEORY OF EQUATIONS **(20 Hours)**

Polynomial Equations with real coefficients - Irrational roots, complex roots - Reciprocal Equations - Newton's method to find a root approximately**.**

Eigen Values and Eigen vectors, Cayley-Hamilton theorem **(without proof)**

UNIT II: TRIGONOMETRY **(15 Hours)**

Expansion in Series – Expansion of cosnθ, sinn θ in a series of cosines and sines of multiples of θ – Expansions of $\cos^n\theta$ and $\sin^n\theta$ in powers of sines and cosines – Hyperbolic Functions.

UNIT III: LAPLACE TRANSFORMS **(20 Hours)**

Definition – Laplace Transform of Standard functions – Linearity property – First shifting theorem – Transform of $(t), f(t)/t$.

UNIT-IV: INVERSE LAPLACE TRANSFORMS **(15 Hours)**

Inverse Laplace transforms of standard functions – First shift theorem - Laplace Transform of derivatives and integrals.

UNIT V: FOURIER SERIES **(14 Hours)**

Fourier series of functions in (0, 2π) and (-π, π).

NOTE: Distribution of Marks: Theory 20%

Problem 80%.

TEXT BOOKS

1. Kandasamy. P, Thilagavathi. K(2012) - "ALLIED MATHEMATICS", Paper-I, S.Chand and Company Ltd, New Delhi.
2. Kandasamy. P, Thilagavathi. K "MATHEMATICS for B.Sc– Volume III(2004) and Volume IV(2005)", S. Chand and Company Ltd,New Delhi.

UNIT	CHAPTER	VOLUME	PAGE NO
I	I, II, III I	I I	39-47,56-71 114-128
II	I	I	196-217
III	I	III	187-201
IV	I	III	202-225
V	I	IV	93-134

REFERENCE BOOKS

1. Manickavasagam Pillai.T.K.and Narayanan.S(2012) – "Trigonometry" - Viswanathan Publishers and Printers Pvt. Ltd.

2. Manickavasagam Pillai.T.K.and Narayanan.S.,Hanumantha Rao.R(2011) - "Ancillary Mathematics", Volume-II Viswanathan Publishers and Printers Pvt. Ltd.

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BBA DEGREE PROGRAMME

II SEMESTER

BUSINESS STATISTICS	CATEGORY	L	P	CREDIT
	ALLIED	60	-	4

Preamble

To enable the students to gain the knowledge about the measures of central tendency, correlation, regression and time series.

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	gain the knowledge about Measures of Central tendency, Correlation and Regression, Time Series.	K_1
CO2	understand the wide variety of specific statistical tools.	K_2
CO3	apply statistical methods for estimating measures of central tendency.	K_3
CO4	analyze the difference between correlation and regression.	K_4
CO5	evaluate the simple problems based on measures of central tendency, correlation and Regression. .	K_5

UNIT – I : INTRODUCTION TO BUSINESS STATISTICS (12 Hours)

Meaning and Scope: Meaning and Definitions – Functions – Characteristics – Scope and uses - Limitations and distrust of statistics - Collection of data: primary and secondary data – Methods of collection of primary data – Sources of secondary data.

UNIT – II : MEASURES OF CENTRAL TENDENCY (12 Hours)

Meaning and definition-Types of averages - Arithmetic mean – Median – Mode – Relationship between mean, median and mode.

UNIT – III : CORRELATION (12 Hours)

Correlation: Correlation Analysis – Meaning of correlation; Types of correlation - Scatter Diagram - Karl Pearson's coefficient of correlation - Spearman's rank correlation coefficient – Concurrent Deviation Method.

UNIT – IV : REGRESSION (12 Hours)

Regression: Simple linear regression- Meaning and uses - Differences between Correlation and regression - Two regression lines -Properties of Regression lines and Co-efficients.

UNIT – V : ANALYSIS OF TIME SERIES (12 Hours)

Analysis of Time Series: Definition – Uses - Methods of Secular Trend – Graphical Method – Method of Semi Averages – Method of Moving Averages – Method of Least squares.

NOTE: No derivation and proof, simple problems only.

TEXT BOOK

Navnitam. PA(2012) – "Business Mathematics and Statistics", Jai Publishers, Trichy.

UNIT	CHAPTER	PAGE
I	I,III	1-20, 28 - 41
II	VII	159 – 250
III	XII	503-539
IV	XIII	540-553,563-571
V	XIV	579-600

REFERENCE BOOKS:

1. Gupta S.P(2014) – "Statistical Methods" , Sultan Chand & Sons, New Delhi.
2. Vittal. P.R(2002) - Business Mathematics and Statistics, Margham publishers, Chennai.

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B.Sc (CS) / B.Sc (IT) / BCA DEGREE PROGRAMME

II SEMESTER

DISCRETE MATHEMATICS	CATEGORY	L	P	CREDIT
	ALLIED	60	-	4

Preamble

To enable the students to gain knowledge about the set theory, languages and graph theory.

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	define the basic terms of set operations, logical operations, relations and graphs	K_1
CO2	apply laws of set theory, rules of logical operations, and evaluate problems	K_3 & K_5
CO3	analyze languages, grammar and its types	K_4
CO4	understand how to represent a graph in computer memory	K_2
CO5	evaluate the problems using logical operations	K_5

UNIT I: SET THEORY (12 Hours)

Introduction-Set and its elements-Set description-Types of sets-Venn-Euler Diagrams- Set operations and laws of set theory.

UNIT II: RELATIONS (12 Hours)

Binary relations – Cartesian product of sets - Set operations on relations-Types of relations – Partial order relations – Equivalence relation – Composition of relations .

UNIT III: GRAPH THEORY (12 Hours)

Introduction – Basic terminology – Paths, cycles and connectivity – Sub graphs - Types of graphs – Isomorphic graphs-Homeomorphic graphs-Representation of graphs in computer memory.

UNIT IV: MATHEMATICAL LOGIC (12 Hours)

Introduction- Prepositional calculus –Basic logical operations- Tautologies-Contradiction-Contingency-Argument-Method of proof- Equivalence and implication.

UNIT V: LANGUAGE,GRAMMAR AND AUTOMATA (12 Hours)

Introduction-Languages – Operations on languages – Regular expressions and regular languages – Grammar – Types of grammars – Finite state machine.

TEXT BOOK

Sharma.J.K. (2010) – "Discrete Mathematics", Macmillan publishers India Ltd.

UNIT	CHAPTER	PAGE NUMBER
I	I	1-16
II	III	77-85,92-93
III	IX	221-247
IV	XII	333-341,352-364
V	XV	440-467

REFERENCE BOOKS:

1.Tremblay.J.P.,Manohar.R.(1997) – "Discrete Mathematical Structures with Applications to Computer Science", Mc Graw Hill Education (India) Pvt.Ltd.

2. Venkataraman.M.K., Sridharan.N, Chandarasekaran.N.(2001) – "Discrete Mathematics", National Publishing Company, Chennai.

P.K.R ARTS COLLEGE FOR WOMEN

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B.Com DEGREE PROGRAMME

II SEMESTER

BUSINESS MATHEMATICS	CATEGORY	L	P	CREDIT
	ALLIED	60	-	4

Preamble

To enable the students to gain knowledge about the set theory, matrices, differentiation, integration and linear programming problems.

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	gain the knowledge about set theory, matrix, derivatives, and integration.	K_1 &K_2
CO2	apply different quantitative models in solving business problems,Graphical Solution by Simplex Method.	K_3
CO3	determine Simple and Compound Interest, Indefinite and Definite Integrals of simple functions.	K_4
CO4	Evaluate the First and Second Order Derivatives and determine the Solution of Simultaneous Linear Equations	K_5

UNIT I: SET THEORY (**15 Hours)**

Set Theory – Arithmetic and Geometric Series – Simple and Compound Interest – Effective rate of Interest –Sinking fund – Annuity - Present Value – Discounting of bills – True discount – Banker's gain.

UNIT II: MATRIX (**15 Hours)**

Matrix: Basic Concepts – Addition and Multiplication of matrices – Inverse of a Matrix –Rank of Matrix - Solution of simultaneous linear equations – Input-Output analysis.

UNIT III: DIFFERENTIATION (**10 Hours)**

Variables, Constants and Functions – Limits of Algebraic Functions – Simple Differentiation of Algebraic Functions – Meaning of Derivations – Evaluation of First and Second Order Derivatives – Maxima and Minima – Application to Business Problems.

UNIT IV: INTEGRATION (**10 Hours)**

Elementary Integral Calculus – Determining Indefinite and Definite Integrals of simple Functions – Integration by Parts.

UNIT V: LINEAR PROGRAMMING PROBLEM (**10 Hours)**

Linear Programming Problem – Formation – Solution by Graphical Method Solution by Simplex Method.

TEXT BOOK

Navnitham. P.A.(2012) - "Business mathematics and statistics", Jai publishers, Trichy.

Unit - I :	**Chapter I**	**: (Page: 1-33)**
	Chapter II	**: (Page: 43-78)**
	Chapter III	**: (Page: 104-138)**
Unit - II :	**Chapter IV**	**: (Page: 147-210)**
Unit -III :	**Chapter V**	**: (Page: 222-245)**
	Chapter VI	**: (Page: 247-275)**
	Chapter VII	**: (Page: 288-294)**
Unit -IV :	**Chapter VIII**	**: (Page:303-318)**
Unit - V :	**Chapter IX**	**: (Page: 328-366)**

REFERENCE BOOKS:

1. Sundaresan and Jayaseelan, (2013)- "Introduction to Business Mathematics", Sultan chand Co& Ltd, Newdelhi.
2. Sanchetti, D.C and Kapoor, V.K.(2011)- " Business Mathematics" , Sultan chand Co&
   Ltd, Newdelhi.
3. G.K.Ranganath, C.S.Sampamgiram and Y.Rajan(1998)-"A Text book Business Mathematics-Himalaya Publishing House.

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B.Com (PA), B.Com (CA) DEGREE PROGRAMME

II SEMESTER

STATISTICS FOR BUSINESS	CATEGORY	L	P	CREDIT
	ALLIED	48	-	4

Preamble

To enable the students to learn the Statistical methods and their applications in Commerce

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	gain deep knowledge about Measures of Central tendency, Correlation and Regression ,Time Series, Index Numbers and Interpolation.	K_1 & K_2
CO2	apply statistical methods for estimating trend on time series, measures of central tendency, measures of dispersion.	K_4
C03	analyze the concept of probability under addition and multiplication theorems and apply the same.	K_3
CO4	analyze the method of correlation and regression .	K_3
CO5	evaluate the simple problems based on measures of central tendency, measures of dispersion, correlation and Regression, probability addition and multiplication theorems.	K_5

UNIT I (**10 Hours)**

STATISTICS: Introduction to statistics- Meaning - Definition – Methods of collecting data – Primary and Secondary data- Classification and tabulation – Diagrammatic and graphical representation.

MEASURES OF CENTRAL TENDENCY: Mean Median, Mode, Geometric Mean and Harmonic Mean.

UNIT II (**10 Hours)**

MEASURES OF DISPERSION: Range, Quartile deviation, Mean deviation, Standard deviation – Variance Importance and limitations-Co-efficient of variation. (No derivation, Simple problems only)

UNIT III (**10 Hours)**

CORRELATION: Meaning - Definition –Scatter diagram, Karl Pearson's co-efficient of correlation, Spearman's Rank correlation, advantages and limitations of correlation.

REGRESSION: Regression Analysis – Meaning of regression and linear prediction – Regression in two variables – Uses of regression.

UNIT IV (**10 Hours)**

TIME SERIES: Definition of Time Series - Components of Time Series-Methods of estimating trend – Graphic, Semi-average, Moving average and Method of Least squares – Advantages and Disadvantages.

UNIT V (**8 Hours)**

PROBABILITY: Definition – Concept – Addition and Multiplication theorems.

(No derivation and proof, Simple Problems only).

TEXT BOOK

Navnitham. PA.(2012) - **"**Business Mathematics and Statistics**"**, Jai publishers, Trichy.

UNIT	CHAPTER	PAGE
I	**I,** **II & III** **IV,** **V,** **VI** **VII**	**1-19,** **21-40,** **42-58,** **60-91,** **98-147,** **159-270**
II	**VIII**	**301-373**
III	**XII & XIII**	**503-554**
IV	**XIV**	**579-601**
V	**XVI**	**654-680**

REFERENCE BOOKS

1. Gupta. S.P. (2016) - "Statistical Methods", Sultan Chand & Sons, New Delhi.
2. Vittal. P.R. (2013) - "Mathematical Statistics", Margham Publishers, Chennai.

P.K.R ARTS COLLEGE FOR WOMEN

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An Autonomous Institution-Affiliated to Bharathiar University

B.Sc (PHYSICS) DEGREE PROGRAMME

II SEMESTER

ALLIED	CATEGORY	L	P	CREDIT
MATHEMATICS-II	ALLIED	84	-	4

Preamble

To enable the students to learn and gain the knowledge and ideas about curvature, multiple integrals, Ordinary and Partial differential equations.

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	gain the knowledge about the curvature ,differentiation and integration .	K_1& K_2
CO2	apply Beta - Gamma functions to solve the integral	K_3
CO3	analyze the types of differential equations and solve the equations.	K_4
CO4	solve the second order linear differential equations with constant coefficients and variable coefficients.	K_5
CO5	Solve the problems based on partial differential equations.	K_5

UNIT I: CURVATURE **(20 Hours)**

Curvature – Radius of curvature – Center of curvature – Circle of curvature

UNIT II: INTEGRATION **(20 Hours)**

Evaluation of double integrals - Change of order of integration in double integrals - Evaluation of triple integrals .

UNIT III: BETA AND GAMMA FUNCTIONS **(20 Hours)**

Beta and Gamma functions – Relations between Beta and Gamma functions – Evaluation of multiple integrals using Beta and Gamma functions.

UNIT IV: ORDINARY DIFFERENTIAL EQUATIONS **(10 Hours)**

Solving second order linear differential equations with constant coefficients whose R.H.S is of the form ve^{mx}, where v is any function of x - Linear equations with variable coefficients.

UNIT V: PARTIAL DIFFERENTIAL EQUATIONS **(14 Hours)**

Formation of partial differential equations by elimination of arbitrary constants and functions -Definitions of general, particular and complete solutions - Solving standard forms $f(p, q) = 0$, $f(x,p,q) = 0$, $f(y,p,q) = 0$, $f(z, p, q) = 0$, $f(x,p) = f(y,q)$, $z = px + qy + f(p,q)$.

Note: Distribution of Marks: Theory 20% Problem 80%

TEXT BOOK

Kandasamy. P, Thilagavathi.K.(2004) - "Mathematics for B.Sc. Branch I", 1st edition, Volume II and III, S.Chand and Company Ltd, New Delhi.

Unit - I	**Volume - II**	**Chapter II**	**Page : 324-344**
Unit – II	**Volume - II**	**Chapter VI**	**Page : 432-444**
Unit –III	**Volume - II**	**Chapter V**	**Page : 397-425**
Unit – IV	**Volume - III**	**Chapter II** **Chapter IV**	**Page : 16-40** **Page : 48-56**
Unit - V	**Volume - III**	**Chapter I**	**Page : 117-142**

REFERENCE BOOK:

Narayan.S and Manicavachagam Pillay.T.K. (1993) - "Ancillary Mathematics", Viswanathan Publishers and Printers Pvt. Ltd.

P.K.R ARTS COLLEGE FOR WOMEN

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An Autonomous Institution-Affiliated to Bharathiar University

B.Sc (C/S), B.C.A. DEGREE PROGRAMME

III SEMESTER

OPERATIONS RESEARCH	CATEGORY	L	P	CREDIT
	ELECTIVE	48	-	4

Preamble

To enable the students to understand how to formulate a real-world problem into a LPP.

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	understand the mathematical tools that are needed to solve optimization problems.	K_2
CO2	gain the knowledge about basic methodology for the solution of linear programming problems.	K_1
CO3	identify operational research models from the verbal description of the real system.	K_4
CO4	learn how to use the various techniques of operations research	K_2 & K_3
CO5	evaluate operation research models to solve real life problem	K_5

UNIT-I: LINEAR PROGRAMMING PROBLEM (10 HOURS)

Linear Programming -Mathematical Model assumption of linear Programming – Graphical method -Simplex method (Simple Problems only).

UNIT-II: TRANSPORTATION AND ASSIGNMENT PROBLEM (10 HOURS)

Transportation problem-NWC method-Least cost method-VAM method-assignment problem.

UNIT-III: GAME THEORY (10 HOURS)

Game Theory -Concept of Pure and Mixed Strategies –Solving 2 x 2 matrix with and withoutsaddle point -n x 2 -2 x m games.

UNIT-IV: REPLACEMENT (10 HOURS)

Replacement models -Elementary replacement models -Present value -Rate of return -Depreciation -Individual replacement –Group replacement.

UNIT-V: CPM (8 HOURS)

Network representation - CPM -Backward pass -Forward pass.

TEXT BOOKS:

1. Manmohan, P.K. Gupta, Kanthiswarup, S(2017) –"Operations Research" Chand & sons.

UNIT	CHAPTER	PAGE
I	**2,3,4**	**39-78, 87, 99-106**
II	**10,11**	**247,252-258, 298-314**
III	**17**	**443-457**
IV	**18**	**477-495**
V	**25**	**763-780**

REFERENCE BOOKS:

1. Hamdy A Taha (2002) – "Operations Research" Pearson Education, 7th edition,

2. P.K. Gupta, D.S. Hira-"Problems in Operations Research",S. Chand Publishers.

GUIDELINES FOR THE COURSES

GUIDELINES:

Institutional / Industrial Training:

A student shall visit an institution / organisation and learn its operations according to the nature of her discipline of study after approval from the Department for a period of 15 days during her summer vacation between IV and V semesters. Work carried out during this period will have to be recorded in a work diary provided by the department. An institutional training report should be submitted by the student at the end of the fifth semester (ESE) to complete the programme.

Core Optional

A student shall take up one **CORE OPTIONAL** course offered by other departments under Part: III to complete the programme. The score obtained in this course will be accounted for CGPA calculation. The enrollment is based on first come first served basis depending upon the available strength. The following is the list of optional papers offered by each department.

UG PROGRAMME 2017-18 AND ONWARDS

S.No.	Course Code	Department	Course
1.	17COU01	English	English for Effective Communication
2.	17COU02	Tamil	Literature of self - confidence
3.	17COU03	Mathematics	Mathematics for Business
4.	17COU04	Physics	Physics in day to day life
5.	17COU05	Computer Science	Desktop Publishing Practicals
6.	17COU06A 17COU06B 17COU06C 17COU06D	Commerce : B.Com B.Com (CA) B.Com (PA) B.Com (A&F)	Basics of Accounting Elements of Taxation Investment Portfolio Accounting for Decision Making
7.	17COU07	Management	Start up Business

Extension Activity:

Participation of a student in the extension activities conducted by the department between I and VI semesters evaluated under Part :V is mandatory for completion of the programme.

Proficiency Enhancement - Self Study: (Part: V)

No lecture hours are provided for self study courses and the students are expected to prepare the courses on the prescribed syllabi by their own. Students have to appear for the ESE that would be conducted as per the curriculum specification of each department and scoring a passing minimum is mandatory for completion of the programme. The score obtained in this course will not be accounted for CGPA calculation.

Extra Credit Course(s):

A student shall take up a minimum of ONE Extra Credit Course which is /are offered by other departments under Part: III. Also, a student will be permitted to appear for any number of Extra Credit Course(s) during her tenure of study. On passing an extra course, a student will earn 2 extra credits which will be mentioned in her mark sheet but failing to score a passing minimum will not be reflected in her mark sheet as an arrear. The score obtained in this (these) course(s) will not be accounted for CGPA calculation. No lecture hours are provided for extra credit course(s). The student has to take up end semester exam.

DISTRIBUTION OF MARKS AND QUESTION PAPER PATTERN

DISTRIBUTION OF MARKS AND QUESTION PAPER PATTERN FOR ALL UG PROGRAMMES

CATEGORY	TOTAL MARKS	DISTRIBUTION OF MARKS		PASSING MINIMUM FOR (ESE)	OVERALL PASSING MINIMUM FOR (CIA & ESE)
		CIA*	ESE**		
Theory(Only ESE) (Foundation & Non-Major Elective)	50	--	50	20	20
Theory (Self Study Course)	100	--	100	40	40
Theory (Both CIA and ESE)	100	25	75	30	40
Practical & Skill Enhancement	100	40	60	24	40
Institutional Training	100	--	100	40	40
Project	100	20	80	32	40
Comprehension (Self-Study / Online Exam)	50	--	50	20	20
Skill Enhancement (Information Security)	100	100	-	40	40

***Appearance for CIA is mandatory to take up the ESE.**

****Bloom's Taxonomy based assessment pattern.**

Breakup of Marks for (Only ESE) Theory Courses – (Fondation &Non-Major Elective)

Course	Sections	Assessment Domain	Marks and Unit Weightage	Total ESE
Foundation Course I & II AND Non-Major Elective I & II (Consumer Rights)	**Section A**	K1: Remember Level K2: Understand Levels	4 X 5 = 20 Four out of Six *(Open choice)* *(At least one question from each unit)*	50*
	Section B	K3: Apply Level K4: Analyze Level K5: Evaluate Level	3 X 10 = 30 Three out of Five *(Open choice)* *(At least one question from each unit)*	

***ESE – Written exams will be conducted**

Career Enhancement (Online Examination):

This course in one of the compulsory courses stipulated under Part- IV. This course is offered to facilitate the students to know and get prepared for the public service commission related examinations and other similar examinations. A Question bank in the format of MCQs would be uploaded in the computer and the candidate would be given $1\ ^{1}/_{2}$ Hours with randomly selected 50 questions for a maximum of 50 marks. The passing minimum is 40% of 50 marks ie. 20 marks.

Course	No. of Questions	Marks	Total Marks
Non-Major Elective II Career Enhancement (Online Exam)*	50	50 X 1 = 50	50

Components and Breakup marks for – Proficiency Enhancement (Self study)

SPLIT - UP	COMPONENTS	MARKS	TOTAL
ESE*	5x20=100 (5 out of 8 Questions)	100	100

*100% External

Breakup of Marks for Theory Courses (With CIA and ESE) under Part I, II, III & IV of UG program

SPLIT – UP	COMPONENTS	MARKS	TOTAL
CIA	Attendance	5	25
	Assignment /Quiz/Seminar	5	
	Consolidation of CIA Test Marks	10	
	Model Exam	5	
Model Exam and ESE	**Section A: (10X2=20)** K1: Remember Level K2: Understand Level Two questions from each unit *(No Choice)*	20	75
	Section B: (5X5=25) K3: Apply Level K4: Analyze Level K5: Evaluate Level One question from each unit *(Either / or)*	25	

	Section C : (3X10=30) **Any three out of five** K3: Apply Level K4: Analyze Level K5: Evaluate Level One question from each unit *(Open choice)*	30	

Marks for Attendance:

A student is expected to put in 75% of attendance during her course of study in the programme for all semesters to be eligible for appearing the ESE. To encourage a student's regularity and active participation in the classroom activities, her attendance shall be given marks in every course during the semester as per the following distribution:

PERCENTAGE OF ATTENDANCE	MARKS
95.1 – 100	5
90.1 – 95.0	4
85.1 – 90.0	3
80.1 – 85.0	2
75.1 – 80.0	1

Marks for Assignment/ Quiz/ Seminar:

A student will be evaluated during the semester on her participation in surprise and informed quizzes from the respective courses and the marks be allotted thereon based on her participation.

A student shall handle a seminar on any topic relevant to her course as per the prescribed syllabi or as directed by her course instructor for which marks shall be awarded based on concept clarification and justification on the task.

Components and Breakup of Marks for Practical Courses

Courses under Part - III & IV respectively:

SPLIT - UP	COMPONENTS *	MARKS	TOTAL
CIA	Conduct of Experiments *(Minimum 10 experiments to be conducted/practical course/semester)*	10	40
	Class Test : 10 Marks	25	
	Model Test : 15 Marks		
	Record Work	5	
ESE	**Record Work**	10	60
	Experiment / Activity: 1 Algorithm/Steps/Procedure/Logic Input/Execution/Observations/Output/Result	10 15	
	Experiment / Activity: 2 Algorithm/Steps/Procedure/Logic Input/Execution/Observations/Output/Result	10 15	

*There shall be change in the components measured depending on the nature of the course and is left to the discretion of the department.

Components and Breakup of Marks for Theory in Skill Enhancement Courses

SPLIT – UP	COMPONENTS	MARKS	TOTAL
CIA	Attendance	5	25
	Assignment /Quiz/Seminar	5	
	Consolidation of CIA Test Marks	10	
	Model Exam	5	
Model Exam and ESE	**Section A: (10X2=20)** K1: Remember Level K2: Understand Level Two questions from each unit *(No Choice)*	20	75
	Section B: (5X5=25) K3: Apply Level K4: Analyze Level K5: Evaluate Level One question from each unit *(Either / or)*	25	
	Section C : (3X10=30) **Any three out of five**	30	

	K3: Apply Level K4: Analyze Level K5: Evaluate Level One question from each unit *(Open choice)*		

Components and Breakup of Marks for Institutional Training course under Part - III

Institutional Training reports are evaluated at the end of semester- V by the **Internal Examiners** only as appointed By COE. Following weightages shall be used to evaluate the institutional training report:

COMPONENTS*	MARKS	TOTAL MARKS
Understanding and articulation of concepts	30	**100**
Clarity and comprehensiveness of presentation in the report	30	
Structure and neatness of the report	40	

***Different metrics may be evaluated depending on the nature of the work carried out during the training period and is left to the discretion of the department.**

Components and Breakup of Marks for evaluation of Project (ESE) of under Part III:

Departments encouraging project work may adopt the following structure for evaluation of reports else, they shall define their own rubrics as per need **The project reports** are evaluated at the end of semester by the **Internal & External Examiners** as appointed By COE. Following weightages shall be used to evaluate the Project report:

SPLIT - UP	COMPONENTS		TOTAL MARKS (100)
CIA	Regularity	10	20
	Review / Presentation	10	
ESE*	Knowledge about the organisation / theme of study	20	80
	Nature of Work / Logic behind the study	20	
	Learning Outcome	20	
	Viva – Voce	20	

***ESE Viva-Voce for projects will be jointly conducted by internal and external examiners.**

Part III - COMPREHESHION IN MATHEMATICS (III, IV,V & VI)

(For those admitted in June 2017-18 & onwards)

The Comprehension in Mathematics examination will be conducted at the end of each semester III, IV, V, VI for a maximum of 50 marks which consists of

Comprehension (Multiple Choice Questions) (50x1=50) 50 marks

The students are examined on Core, Core Allied, Core Elective papers studied in III, IV, V & VI Semester. In the comprehension component, the students are tested on their grasping ability of the subjects of study.

Course	No. of Questions	Marks	Total Marks
Part : III Core (Online Exam)*	50	50 X 1 = 50	50

* Online Exams are conducted in the computer laboratory at the end of each semester

With one credits each.

Components and Breakup marks for - Information Security

SPLIT - UP	COMPONENTS	MARKS	TOTAL
CIA Question Paper Pattern	Test I : 4 **X 5 = 20** 1 Hour	20	40
	Test II: **4X5=20** 1 Hour	20	
	Test III : (Model) 2 Hours (5 out of 8 essay type questions)	50	50
Assignments	Two assignments **2 X 5 = 10** (Meaning, definition and concept clarification from various sources)	10	10

Note : 100% Internal Paper

PANEL OF EXAMINERS

Chairperson

Mrs.R.Jayalakshmi M.Sc.,M.Phil.,PGDCA.,
Associate Professor & Head,
Department of Mathematics,
P.K.R. Arts College for Women,
Gobichettipalayam – 638476