KANNUR UNIVERSITY
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(Abstract)

Five Year Integrated Programme in Master of Computer Applications at the Information Technology Education Centre (ITEC) , Dr . Janaki Ammal Campus , Palayad- Scheme and Syllabus of First semester - Approved and Implemented w .e .f 2025 Admission -Orders issued.

ACADEMIC C SECTION

ACAD/ACAD C1/17099/2025 Dated: 16.09.2025

Read:-1. ACAD D/ ACAD D5/4513/2024 dated 28.03.2025

2. E mail dated 07.08.2025 from the Head , Dept of Information Technology.
3. Orders of the Vice Chancellor, dated 07.08.2025
4. Minutes of the meeting of Standing Committee of Academic Council held on 08.08.2025
5. Orders of the Vice Chancellor, in file of even no. dated 01.09.2025

ORDER

1. The proposal to start Five Year Integrated Programme in Master of Computer Applications at the Information Technology Education Centre (ITEC), Dr Janaki Ammal Campus, Palayad w .e .f 2025 admission year was approved, vide paper read (1) above.
2. Subsequently, the Head, Dept. of Information Technology had forwarded the Scheme and Syllabus of the Programme (up to sixth semesters) for approval , along with the minutes of the Department Council .
3. Considering the above , the Vice Chancellor had ordered to place the Scheme and Syllabus (up to sixth semesters) of the Five Year Integrated Programme in Master of Computer Applications, before the Standing Committee of the Academic Council.
4. The Standing Committee of Academic Council, vide the paper read as 4 above, recommended to approve the first semester scheme and syllabus of Five Year Integrated Programme in Master of Computer Applications .
5. The Vice Chancellor, after considering the recommendations of the Standing Committee of Academic and in exercise of the powers of the Academic Council conferred under Section 11(1) Chapter III of Kannur University Act, 1996 and all other enabling provisions read together with, has approved the first semester scheme and Syllabus of the Five Year Integrated Programme in Master of Computer Applications and accorded sanction to implement the same at the Information Technology Education Center (ITEC), Dr . Janaki Ammal Campus, Palayad, wef 2025 admission.
6. The first semester Scheme and Syllabus of the Five Year Integrated Programme in Master of Computer Applications at the Information Technology Education Center (ITEC), Dr . Janaki Ammal Campus , Palayad w e f 2025 admission under Kannur University is appended with this U.O. and uploaded in the University website.

Orders are issued accordingly.

Sd/-

Bindu K P G

DEPUTY REGISTRAR (ACADEMIC)

For REGISTRAR

To: 1. Head, Dept of Information Technology
2. Nodal Officer , FYIMP

Copy To: 1. PS TO VC , PA TO R, PA TO CE
2. JR (Exam)
3. DR / AR (Academic)
4. EPIV /EGI /EXC I (Exam)
5. IT Cell (to publish in the website)
6. Computer Programmer
7. SF/DF/FC

Forwarded / By Order

SECTION OFFICER

KANNUR UNIVERSITY
CIVIL STATION P.O.
KANNUR
Pin-670 002
THAVAKKARA

SCHOOL OF INFORMATION SCIENCE & TECHNOLOGY

INFORMATION TECHNOLOGY EDUCATION CENTRE

(Extension centre -Janaki Ammal Campus Palayad)

KANNUR UNIVERSITY

DEGREE OF

FIVE YEAR INTEGRATED PROGRAMME IN

MASTER OF COMPUTER APPLICATIONS

B.C.A leading to B.C.A (Honours) & M.C.A

(Choice Based Credit System)

SCHEME & SYLLABUS

SCHEME AND SYLLABUS FOR THE DEGREE OF

FIVE YEAR INTEGRATED PROGRAMME IN MASTER OF COMPUTER APPLICATIONS

WITH MULTIPLE PATHWAYS

FOR THE STUDENTS ADMITTED FROM THE ACADEMIC YEAR 2025 – 26 ONWARDS

1 PROGRAMME SPECIFIC OUTCOMES

SL #	Outcome
PSO1	Familiar with the entrenched concepts of Computer Science and Applications
PSO2	Enhance the knowledge and skills about System Software and Application Software
PSO3	Attain skills to design Algorithms and Programs
PSO4	Acquire the knowledge in the building, designing and managing IT and IT enabled infrastructure
PSO5	Design, build, and test software systems to meet the given specifications by following the principles of Software Engineering

DEFINITIONS

- Department / School is the department / school established in the Kannur University as per the statute of Kannur University.
- Information Technology Education Center is an extension center of Department /School of Information Technology.
- Academic programs offered through this extension center is fully controlled and monitored by the Department/School of Information Technology.
- All the programs offered through this extension center is approved by the council of Department/School of Information Technology.

- Head of the Department/one of the senior faculty appointed by the Vice Chancellor shall monitor all the activities conducted through this extension center. He/ She shall the responsibility all academic activities in the extension center and also regularly evaluate the status of all faculties and academic curriculums in the center.
- Academic programme is an entire course of study comprising the details such as the programme structure, course details, and evaluation schemes designed to be taught and evaluated in the teaching department / IT education center or jointly under more than one such department / center.
- Course is a segment of a programme limited to one semester subject.
- Programme Structure is a list of courses (Discipline specific Core Courses (DSC), Discipline specific Elective Courses (DSE), Ability Enhancement Courses (AEC) , Value Added Courses (VAC), Skill Enhancement Courses (SEC), and MOOC) that makes up an academic programme, specifying its details such as the syllabus, credits, hours of teaching, evaluation and examination schemes, and the minimum number of credits required for successful completion of the program prepared in conformity with the NEP 2020/AICTE/regulations-2024 of Kannur University.
- Discipline Specific Core (DSC) is a course that is to be compulsorily completed by a student admitted to a particular programme to receive the degree and which cannot be substituted by any other course.
- Discipline Specific Elective (DSE) is an optional course to be selected by a student out of such courses offered in the same department or other departments.
- Wherever in this document "the University" is mentioned, it should be taken as the Kannur University and wherever "the Department" is mentioned, it should be taken as the School of Information Technology/Information Technology Education Center where the respective course is offered.

2 SCOPE

1) This regulation shall apply to Five Year Integrated Programme in Master of Computer Applications with multiple pathways, conducted either by school of information technology or Information technology Education Centre working as an extension centre, Kannur University.

2) Choice Based Credit Semester System presupposes academic autonomy, cafeteria approach in academic environment, semester system, course credits, alphabetical grading. The course may be either offered by the Department of Information Technology, Mangattuparamba Campus or an extension centre setup by the university in other campuses. In such case the programme offered is strictly under the monitoring of the Department of Information Technology and all course related activities are done by the extension centre, and all these activities are monitored by the senior faculty of the department deputed by the Hon. Vice Chancellor of the University.

3) The Name of degree awarded when a student take exit at 3rd /4th/5th year is specified in the different pathways mentioned as part of this regulation. "*The Name "Five Year Integrated Programme in Master of Computer Application" is only for indicating the five year span of the program according to NEP2020/AICTE/Kannur University regulation"*.

4) Students enrolled in the Five-Year Integrated Programme in Master of Computer Applications (MCA) at the Information Technology Education Centre (ITEC), Janaki Ammal Campus, Thalassery shall complete the first three years of their study at ITEC, Janaki Ammal Campus, Thalassery Campus. On successful completion of the third year, the student has the option to exit the program with a BCA degree or continue to the fourth year for a BCA (Honours) with an exit /and to proceed fifth year to complete the MCA at the Department of Information Technology, Mangattuparamba Campus.

3 ADMISSION

1) Admission to the Five Year Integrated Programme in Master of Computer Applications (Bachelor degree of Computer Application (BCA) leading to BCA (Honours) and MCA with multiple pathways with different specialization) will be done as the regulations prescribed by the university from time to time.

Eligibility for Admission:

Basic qualifications: Candidate must possess

1) Pass with 50% marks/equivalent grade at 10+2 level or equivalent

AND

2) Mathematics/statistics/computer science/computer application/ informatics practices as one of the subjects at 10+2 level.

Admission to the Five-Year Integrated Programme in Master of Computer Applications programme shall be made purely based on the entrance examination conducted by the university. Notification in this regard shall be made well in advance. If the number of candidates admitted based on the entrance examination is less than the sanctioned strength, the department can fill the vacancy by advertising the vacancy through press releases. Admission to these seats should be granted based on the marks obtained by the candidates in the qualifying examination. Reservation norms followed by the university should be adhered to in the admission process.

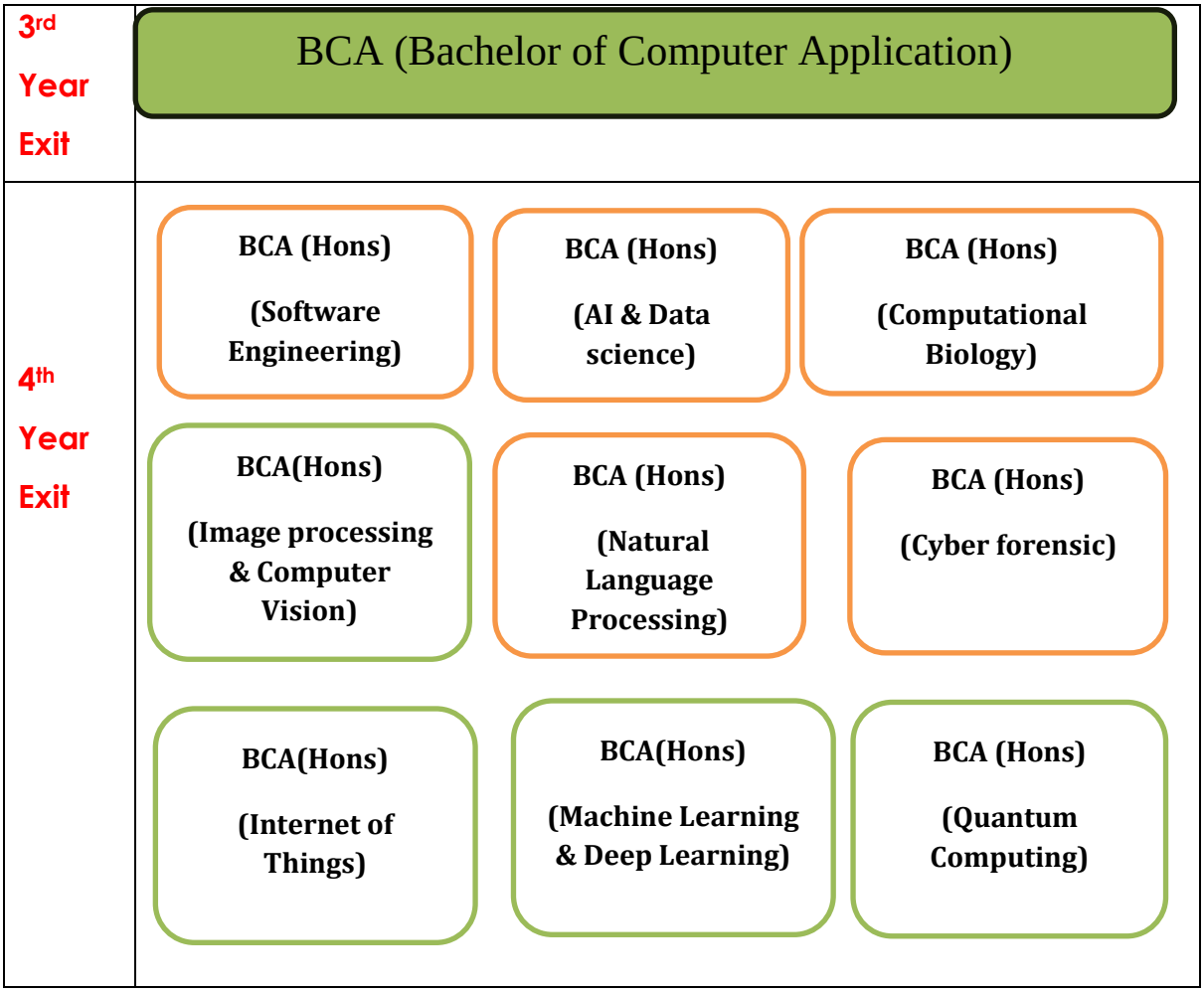
4 REGISTRATION

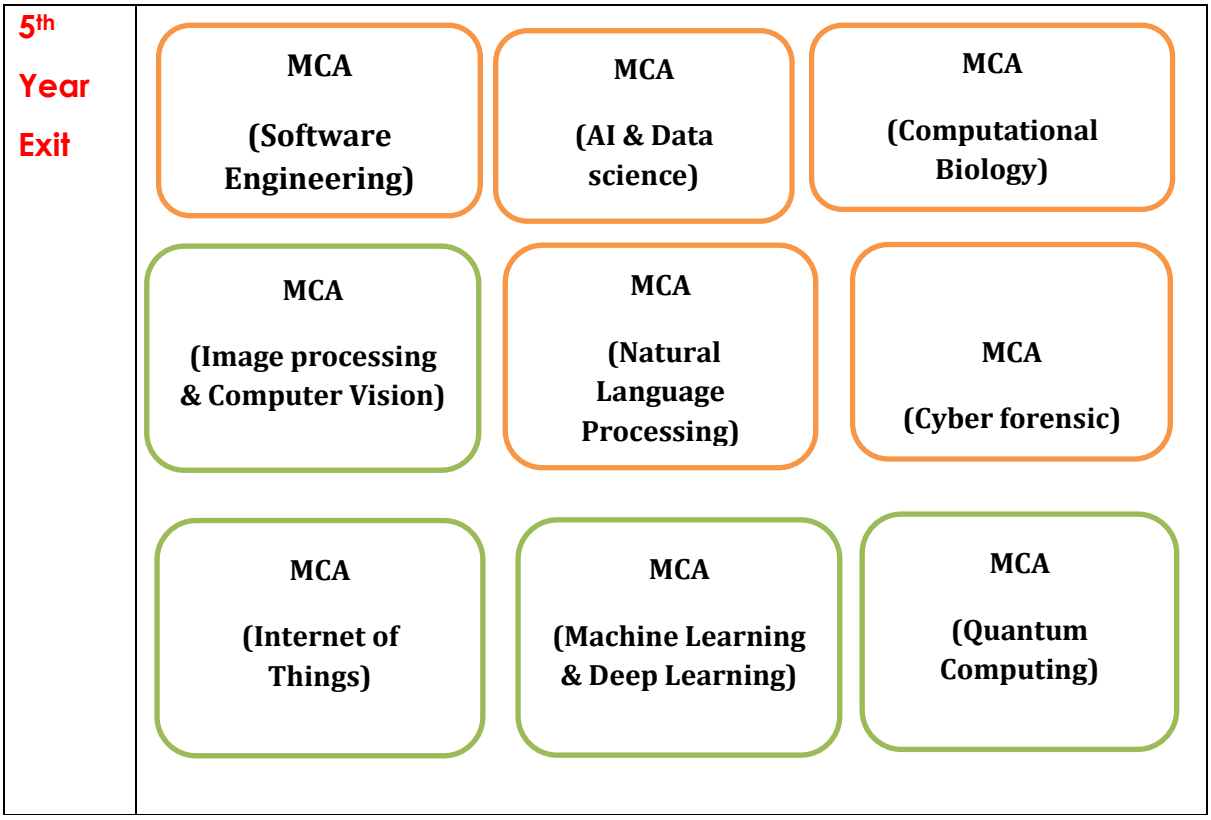
Since students have flexibility to choose various courses and pathways, every student should register for a course for the next semester by the end of the previous semester (except the first semester). Any changes in the selection of the courses are permitted up to the 5 working days of the start date of the new semester. The offering department can decide on the minimum / maximum number of

registrations for a course depending on the instructional facilities and teachers' availability for the listed courses. While choosing the courses students are advised to discuss with semester coordinator/ faculty advisor and also ensure that, the credit requirement for awarding the degree in various pathways as per FYIMP-2024 regulations are satisfied. Student can register for additional courses including MOOCs from second semester onwards, provided the total number of courses registered for that semester is not more than 30.

5 PROGRAMME STRUCTURE

1) Duration of the Five Year Integrated Program in Master of Computer Applications program shall be 5 years, divided into 10 semesters. Each semester shall have 18 weeks. Students can take exit at 3rd / 4th /5th year as mentioned in FYIMP regulations-2024-25. The Name of the degree awarded to each student will be depending on the pathway courses opted by the students while taking exit at above mentioned years. Different Pathways and corresponding names of degree awarded is mentioned in the below diagram.





2) Minimum and maximum duration for completing the courses will be based on the FYIMP-2024 regulations of the University.

3) Degree may be awarded after securing the minimum required credits for the programme after the 3rd / 4th or 5th year exit as Bachelor Degree in Computer Applications (BCA)/ Bachelor Degree in Computer Applications in Hons with respective specialization or Master of Computer Applications with respective specialization chosen by the students according to the pathway mentioned in the regulations based on the FYIMP 2024 regulations/AICTE norms.

6 MOOC

In addition to the courses specified as part of the programme, all students should mandatorily complete 2 MOOC courses of at least 3 credits to complete the requirements of getting BCA (Hons) degree in any of the specialization. The credits earned also will be considered for the computation of GPA and CGPA.

7 EVALUATION

The Continuous and Comprehensive Evaluation (CCE) and the End semester Evaluation (ESE) will be conducted as per the Kannur University FYIMP/AICTE Regulations for all theory and practical courses unless it is specifically mentioned in the respective courses. The ratio of Continuous and Comprehensive Evaluation and End semester Evaluation shall be 50:50.

End Semester Evaluation

End semester Evaluation will be conducted as per FYIMP Regulations-2024.

The courses offered under these programs have either 3 credits or 4 credits courses such as, DSC, DSE, AEC, SEC, VAC, MOOC and Internship. The credit for a given course is typically distributed as follows

Distribution Teaching / Learning hours for 4 Credit Course

1. 4 Credit Lecture session
2. 3 Credit Lecture Sessions and 1 Credit Practical session
3. 2 Credit Lecture Session and 2 Credit Practical session
4. 1 Credit Lecture Session and 3 Credit Practical session
5. 4 Credit Practical Sessions

Similarly, Distribution Teaching / Learning hours for 3 Credit Course

1. 3 Credit Lecture session
2. 2 Credit Lecture Session and 1 Credit Practical Session
3. 1 Credit Lecture Session and 2 Credit Practical Session
4. 3 Credit Practical Session

End Semester Examination for all these different combinations are as Follows

ESE Scheme for 4 Credit courses		
1	4Credit Theory	Theory Examination of 50 marks. Duration of Examination 2 Hours
2	3 credit Lecture and 1 Credit Practical	ESE (Theory) Maximum marks: 50 marks Duration:2 hours. The obtained Marks will be scaled to 37.5 ESE(Practical) Maximum marks: 50 marks. Duration: 3 hours. Marks obtained will be scale down to 12.5 Total marks obtained for the course will be the sum of scaled ESE marks obtained for theory and practical. i.e. 50 marks
3	2 credit Lecture and 2 Credit Practical	ESE (Theory) Maximum marks: 50 marks Duration:2 hours. The obtained Marks will be scaled to 25 ESE(Practical) Maximum marks: 50 marks. Duration: 3 hours. Marks obtained will be scale down to 25 Total marks obtained for the course will be the sum of scaled ESE marks obtained for theory and practical. i.e. 50 marks
	1 credit Lecture and 3 Credit Practical	ESE(Theory) Maximum marks: 50 marks Duration:2 hours. The obtained Marks will be scaled to 12.5 ESE(Practical) Maximum marks: 50 marks. Duration: 3 hours. Marks obtained will be scale down to 37.5 Total marks obtained for the course will be the sum of scaled ESE

		marks obtained for theory and practical. i.e. 50 marks
	4 Credit Practical	Practical Examination of 50 marks. 3 hours Duration
ESE Scheme for 3 Credit courses (SEC/MDC/VAC)		
	3 Credit Theory	ESE will be conducted for 50 marks
	2 Credit theory and 1 Credit Practical	ESE (Theory) Max marks: 50; Duration: 2 Hours scaled to 30 marks ESE (Practical) Max marks: 50; Duration 2 Hours scaled to 20 marks Total marks obtained for the course will be the sum of scaled ESE marks obtained for theory and practical. i.e. 50 marks
	1 Credit for Theory and 2 Credit for Practical	ESE (Theory) Max marks: 50; Duration: 2 Hours scaled to 20 marks ESE (Practical) Max marks: 50; Duration 2 Hours scaled to 30 marks Total marks obtained for the course will be the sum of scaled ESE marks obtained for theory and practical. i.e. 50 marks
	3 Credit Practical	ESE will be conducted for 50 marks

If any changes in the evaluation patten for any courses it can be mentioned in the assessment rubrics of the corresponding course. Otherwise it will be followed the above rubrics corresponding to their credit.

Continuous and Comprehensive Evaluation (CCE).

CCE for all courses shall follow the FYIMP- Computational Science -Scheme and syllabus -2024 unless it is specifically mentioned in the course syllabus. Where ever there is a practical component associated with a course; Lab test will be conducted as part of CCE, in addition to the other evaluation methods mentioned in FYIMP-Regulations 2024 for CCE. The division of CCE marks for different courses structure shall be as follows.

Course structure	Continuous Assessment
4 Credit course	**Total Marks: 50** Test paper 1: 10 Test Paper 2: 10 Attendance:10 Assignment: 10 Case study/Seminar /Viva: 10
4 Credit course (3 Lecture+ 1 Lab)	**Total Marks: 50** Test 1: 10 Test 2: 10 Attendance: 10

	Lab Test and viva : 10 Record: 05 Assignments/case study/ seminar: 05
4 Credit (2 Credit Lecture and + 2 Credit Practical)	**Total Marks: 50** Test 1: 10 Test 2: 10 Attendance:10 Lab Test and viva: 10 Record: 05 Assignments/ case study/ seminar: 05
4 Credit (1 Credit Lecture + 3 Credit Practical)	**Total Marks 50** Test paper 1: 05 Test Paper 2: 05 Attendance: 05 Lab test 1 and viva: 10 Lab Test 2 and viva: 10 Lab record: 5 Seminar/ Assignments / Case Study: 10
4 Credit Practical	Total Marks Lab test 1 and viva: 15 Lab test 2 and viva: 15 Attendance :10 Record: 10
3 Credit Courses (MDC/SEC/VAC) offered by the IT/Maths/Statistics	
3 credit Lecture	**Total Marks 50** Test 1: 15 Test 2: 15 Attendance:10 Seminar /Assignment/ Case Study: 10
2 Credit Lecture + 1 Credit practical	**Total Marks 50** Test 1: 10 Test 2: 10 Lab test: 10

	Attendance:10 Record: 05 Seminar/Assignment / Case study: 05
1 Credit Lecture and 2 Credit Practical	**Total Marks 50** Test 1: 05 Test 2: 05 Attendance:10 Lab test with Viva: 20 Record: 5 Assignment / Case study/ Seminar: 05
3 Credit Lab	**Total Marks 50** Lab test 1 and viva: 15 Lab test 2 and viva: 15 Attendance:10 Record: 10

The end semester practical examination will be conducted by a board of examiners constituted by the Head of the department/Assistant Director of the extension centre where the course is offered. The board of examiners consist of 2 faculty members and one should be the faculty in charge of the respective course. Total minimum requirement for every CCE component for a pass shall follow the minimum requirement mentioned in FYIMP-2024 regulations. If any other mode of assessment is proposed for a specific course; the assessment rubrics should be mentioned in the syllabus separately associated with that course. Otherwise, evaluation scheme mentioned in the regulations shall be applicable for both CCE and ESE.

Evaluation criteria for the Research, Internship components will follow the criteria mentioned in FYIMP-2024 regulations.

8 COMPLIANCES WITH FYIMP- REGULATIONS -2024

In general, FYIMP – Five Year Integrated Programme in Master of Computer Applications follows the FYIMP-regulations approved by university/AICTE norms. Department council have the sole right to revise the scheme and syllabus based on the feedback and input from various stake holders of the program.

CREDIT DISTRIBUTION AND EXIT PATHWAYS

Semester	Major/Minor DSC	Major DSE	AEC	SEC	MDC	VAC	Internship	MOOC	Total	
1	12		06		03				21	
2	16		03		03				22	
3	16				03	03			22	
4	12	04		03		03			22	
5	16	04		03					23	
6	12	04		03			04		23	
Total BCA	**84**	**12**	**09**	**09**	**09**	**06**	**04**		**133**	**3rd Year Exit**
7	12	08						04	24	
8	04	08					04	04	20	
Total BCA(Hon)	**100**	**28**	**09**	**09**	**09**	**06**	**12**	**08**	**177**	**4th Year Exit**
9										
10										
Total MCA										**6th Year Exit**

INTEGRATED MASTER OF COMPUTER APPLICATIONS

(BCA LEADING TO BCA WITH HONS & MCA)

Semester I

No	Level	Course Code	Course Name	Total Hours	C	Hrs./wk.			Assessment Weightage (%)		
						L	P	Tt	ESE	CCE	T
1.1	100	KU01DSCMCA101	Introduction to Computational Informatics	60	4	4	0	1	50	50	100
1.2	100	KU01DSCMCA102	Principles of Programming	90	4	2	4	2	50	50	100
1.3	100	KU01DSCMCA103	Mathematical foundations for computer application	60	4	4	0	1	50	50	100
1.4	100		MDC-1-	60	3	2	2	1	50	50	100
1.5	100		AEC 1- English 1	45	3	3	0	1	50	50	100
1.6	100		AEC 2-English 2	45	3	3	0	1	50	50	100
				360	21	18	6	6	300	300	600

Semester II

No	Level	Course Code	Course Name	Total Hours	C	Hrs./wk.			Assessment Weightage (%)		
						L	P	Tt	ESE	CCE	T
2.1	100	KU02DSCMCA104	Object Oriented Programming using C++	90	4	2	4	2	50	50	100
2.2	100	KU02DSCMCA105	Digital Electronics and Computer Organization	60	4	4	0	1	50	50	100
2.3	100	KU02DSCMCA106	Statistical Foundations for Computer Applications	60	4	4	0	1	50	50	100
2.4	100	KU02DSCMCA107	Database Management Systems	90	4	2	4	2	50	50	100
2.5	100		MDC-2	60	3	2	2	1	50	50	100
2.6	100		AEC-3 Additional Language	45	3	0	0	1	50	50	100
				390	22	14	08	08	300	300	600

Semester III

No	Level	Course Code	Course Name	Total Hours	C	Hrs./wk.			Assessment Weightage (%)		
						L	P	Tt	ESA	CE	T
3.1	200	KU03DSCMCA201	Java Programming	90	4	2	4	1	50	50	100
3.2	200	KU03DSCMCA202	Introduction to Data Structure	90	4	2	4	1	50	50	100
3.3	200	KU03DSCMCA203	Web Technology	90	4	2	4	1	50	50	100
3.4	200	KU03DSCMCA204	Data communication and computer Networks	60	4	4	0	1	50	50	100
3.5	200		MDC-3	60	3	2	2	1	50	50	100
3.6	200		VAC-1	45	3	3	0	0	50	50	100
				375	22	19	6	5	300	300	600

Semester IV

No	Level	Course Code	Course Name	Total Hours	C	Hrs./wk.			Assessment Weightage (%)		
						L	P	Tt	ESA	CE	T
4.1	200	KU04DSCMCA205	System Software and Operating System	60	4	4	0	1	50	50	100
4.2	200	KU04DSCMCA206	Software Engineering	60	4	4	0	1	50	50	100
4.3	200	KU04DSCMCA207	Artificial Intelligence	90	4	2	4	1	50	50	100
4.4	200	KU04DSEMCA20.x	DSE-1*	60	4	4	0	1	50	50	100
4.5	200		SEC-1	60	3	2	2	1	50	50	100
4.6	200		VAC-2	45	3	3	0	0	50	50	100
				365	22	19	6	5	300	300	600

	S4 - List of Discipline Specific Electives (DSE-1)										
No	**Level**	**Course Code**	**Course Name**	**Total Hours**	**C**	**Hrs./wk.**			**Assessment Weightage (%)**		
						L	**P**	**Tt**	**ESA**	**CE**	**T**
4E.1	200	KU04DSEMCA208	Python Programming	60	4	4	0	1	50	50	100
4E.2	200	KU04DSEMCA209	Discrete Mathematics	60	4	4	0	1	50	50	100
4E.3	200	KU04DSEMCA210	Mobile Computing	60	4	4	0	1	50	50	100
4E.4	200	KU04DSEMCA211	Operating System Security	60	4	4	0	1	50	50	100
4E.5	200	KU04DSEMCA212	Design Thinking	60	4	4	0	1	50	50	100

Semester V

No	**Level**	**Course Code**	**Course Name**	**Total Hours**	**C**	**Hrs./wk.**			**Assessment Weightage (%)**		
						L	**P**	**Tt**	**ESA**	**CE**	**T**
5.1	300	KU05DSCMCA301	Formal Language & Automate Theory	60	4	4	0	0	50	50	100
5.2	300	KU05DSCMCA302	Analysis and Design of Algorithms	60	4	4	0	1	50	50	100
5.3	300	KU05DSCMCA303	Introduction to IoT	75	4	3	2	0	50	50	100
5.4	300	KU05DSCMCA304	Machine Learning Techniques	75	4	3	2	1	50	50	100
5.5	300	KU05DSEMCA30.x	DSE-2 *	60	4	4	0	1	50	50	100
5.6	300	KU05SECMCA30.x	SEC-2	60	3	2	2	1	50	50	100
				390	23	20	6	4	300	300	600

	S5 - List of Discipline Specific Electives (DSE)										
No	**Level**	**Course Code**	**Course Name**	**C**	**Hrs./wk.**			**Assessment Weightage (%)**		
					L	**P**	**Tt**	**ESA**	**CE**	**T**
5E.1	300	KU05DSEMCA305	Computer Graphics	4	3	2	1	50	50	100
5E.2	300	KU05DSEMCA306	Data and Business Analytics	4	3	2	1	50	50	100
5E.3	300	KU05DSEMCA307	Wearable Computing and sensors	4	3	2	1	50	50	100
5E.4	300	KU05DSEMCA308	High Performance Computing	4	4	0	1	50	50	100
5E.5	300	KU05DSEMCA309	Game Development	4	3	2	1	50	50	100

Semester VI

No	Level	Course Code	Course Name	Total Hours	C	Hrs./wk.			Assessment Weightage (%)		
						L	P	Tt	ESA	CE	T
6.1	300	KU06DSCMCA305	Big Data Analytics	60	4	4	0	0	50	50	100
6.2	300	KU06DSCMCA306	Quantum computing	60	4	4	0	0	50	50	100
6.3	300	KU06DSCMCA307	Generative AI	60	4	4	0	0	50	50	100
6.4	300	KU06DSEMCA310	DSE-3- Technology Specific Elective	60	4	4	0	0	0	100	100
6.5	300	KU05SECMCA30.x	SEC-3	60	3	2	2	1	50	50	100
6.6	300	KU06INTMCA301	Internship	60	4	-	9	5	50	50	100
					23	16	9	5	250	350	600

***DSE-3 Technology Specific Elective is meant to foster the students with tools and technologies that they need to know and make use in the design and development of software applications. Seminar Report / Case study report of a specific technology should be submitted by each student for the evaluation. The mode of evaluation of this course shall be based on the presentation, report and viva. It is evaluation is completely under CE component.**

S6 - List of Discipline Specific Electives (DSE-3)											
No	Level	Course Code	Course Name	C	Hrs./wk.			Assessment Weightage (%)		
					L	P	Tt	ESA	CE	T
6E.1	300	KU06DSEMCA314	Information Security	4	4	0	1	50	50	100
6E.2	300	KU06DSEMCA315	Data and Information visualization	4	4	0	1	50	50	100
6E.3	300	KU06DSEMCA316	Virtual and Augmented Reality	4	4	0	1	50	50	100
6E.4	300	KU06DSEMCA317	Game Development	4	4	0	1	50	50	100
6E.5	300	KU06DSEMCA318	Computer Vision	4	4	0	1	50	50	100
6E.6	300	KU06DSEMCA319	Computational Photography	4	4	0	1	50	50	100
6E.7	300	KU06DSEMCA320	High performance computing	4	4	0	1	50	50	100
6E.8	300	KU06DSEMCA321	Green Computing	4	4	0	1	50	50	100

SKILL ENHANCEMENT COURSES (SEC)

	Semester 4 SEC POOL 1										
No	**Level**	**Course Code**	**Course Name**	**Total Hours**	**C**	**Hrs./wk.**			**Assessment Weightage (%)**		
						L	**P**	**Tt**	**ESA**	**CE**	**T**
4SE.1	200	KU04SECMCA201	Python Programming	60	3	2	2	0	50	50	100
4SE.2	200	KU04SECMCA202	Fundamentals of Digital Skilling using Google Workspace for Education	60	3	2	2	0	50	50	100
4SE.3	200	KU04SECMCA203	Web Technologies	60	3	2	2	0	50	50	100
4SE.4	200	KU04SECMCA204	R Programming	60	3	2	2	0	50	50	100
4SE.5	200	KU04SECMCA205	Digital Marketing	60	3	2	2	0	50	50	100

	Semester 5 SEC POOL 2										
No	**Level**	**Course Code**	**Course Name**	**Total Hours**	**C**	**Hrs./wk.**			**Assessment Weightage (%)**		
						L	**P**	**Tt**	**ESA**	**CE**	**T**
5SE.1	300	KU05SECMCA301	The Art of E - Documentation using Latex	60	3	2	2	0	50	50	100
5SE.2	300	KU05SECMCA302	Data Processing with Python	60	3	2	2	0	50	50	100
5SE.3	300	KU05SECMCA303	Data Science Fundamentals	60	3	2	2	0	50	50	100
5SE.4	300	KU05SECMCA305	Swift Programming	60	3	2	2	0	50	50	100
5SE.5	300	KU05SECMCA306	Application Development using React JS	60	3	2	2	0	50	50	100
5SE.6	300	KU05SECMCA307	Application Development using Flutter	60	3	3	3	0	50	50	100

	Semester 6 SEC POOL 3										
No	**Level**	**Course Code**	**Course Name**	**Total Hours**	**C**	**Hrs./wk.**			**Assessment Weightage (%)**		
						L	**P**	**Tt**	**ESA**	**CE**	**T**
6SE.1	300	KU06SECMCA308	Artificial Intelligence in Daily Life	60	3	2	2	0	50	50	100
6SE.2	300	KU06SECMCA309	Fundamentals of Big Data	60	3	2	2	0	50	50	100
6SE.3	300	KU06SECMCA310	Optimization Techniques	60	3	2	2	0	50	50	100
6SE.4	300	KU06SECMCA311	Web Application Security and Ethical Hacking	60	3	2	2	0	50	50	100
6SE.5	300	KU06SECMCA312	Mobile Application Security and Privacy	60	3	2	2	0	50	50	100

MULTI DISCIPLINARY COURSES

Semester 1/Semester 2 MDC POOL 2											
No	Level	Course Code	Course Name	Total Hours	C	Hrs./wk.			Assessment Weightage (%)		
						L	P	Tt	ESA	CE	T
1MD.1	100	KU01MDCMCA101	Introduction to Computational Informatics	60	3	2	2	0	50	50	100
1MD.2	100	KU01MDCMCA102	Principles of Programming	60	3	2	2	0	50	50	100
2MD.1	100	KU02MDCMCA201	Foundations of Data Science	60	3	2	2	0	50	50	100
2MD.2	100	KU02MDCMCA202	Object Oriented Programming using C++	60	3	2	2	0	50	50	100
3MD.1	200	KU03MDCMCA301	Cyber Forensics	60	3	2	2	0	50	50	100
3MD.2	200	KU03MDCMCA302	Scientific Computing	60	3	2	2	0	50	50	100

Semester I

KU01DSCMCA101 INTRODUCTION TO COMPUTATIONAL INFORMATICS

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
1	DSC	100	KU01DSCMCA101	4	60

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	0	1	50	50	100	2

Course Description: This course provides a comprehensive overview of computing, covering historical milestones, hardware components, software systems, and computational thinking principles. Students will explore the evolution of computing systems, from early pioneers to modern processors and quantum units. The curriculum delves into hardware intricacies, software distinctions, and essential concepts in computer science, emphasizing problem-solving skills and algorithmic thinking. Practical aspects include hands-on experiences with hardware assembling, operating system installation, algorithm and flowchart visualization.

Course Objectives:

- To become aware about the evolution and generation computer system and familiarises various components of computer systems
- To become familiar with various computer hardware components
- To understand different software components and its types and the installation and configuration of operating systems

  selection

- To familiarise different methodologies of problem solving using the computational thinking concept.

Course Outcomes:

At the end of the Course, the Student will be able to:

SL #	Course Outcomes
CO1	Develop a foundational knowledge of computing systems, encompassing their historical development, evolutionary milestones, and the notable contributions of key figures in the field.
CO2	Acquire familiarity with diverse hardware components constituting a computer system.
CO3	Attain the knowledge of computer software and the activities focused on the installation and configuration of diverse hardware components within a computer system including operating systems
CO4	Develop a foundational understanding of computer science as a discipline, examining problems through the lens of computational thinking and inducing the analytical skills to address challenges in the field.

Mapping of COs to PSOs

CO - PSO Mapping					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	✔	✔	✔	✔	
CO2	✔	✔	✔	✔	
CO3	✔	✔	✔	✔	
CO4	✔	✔	✔	✔	✔

COURSE CONTENTS

UNIT 1 15 Hours	**Evolution of Computers:** History, Generations. Overview of Computer System- Von Neumann Model, Number Systems (Binary, Hexa, Octal, Decimal) , Digital Codes (Gray, Excess-3, BCD). Pioneers and Contributors of Computing Systems - First Mechanical computer - Charles Babbage, Stored-Program Architecture - John von Neumann, Turing machine - Alan Turing, First General-Purpose Electronic Digital Computer - John Mauchly and J. Presper Eckert, Artificial Intelligence- John McCarthy (Contributions only). Computing Systems: Past to Present - Single Core, Dual-Core and Multi-Core Processors, GPU, TPU, APU, and QPU.
UNIT 2 15 Hours	**Hardware:** Electronic Components – Active Components - Diode, Transistor, Integrated Circuits (Definition, Symbol and Function), Electronic Components - Passive Components – Resistors, Capacitors, Inductors (Definition, Symbol and Function). Motherboard Components – CPU and Cooling Fan, RAM, Expansion Slots (PCIe), Input/Output Ports, Chipset. Motherboard Components – BIOS/UEFI Chip, SATA/NVMe Slots, Network Interface, Ports- Ethernet, VGA, HDMI, USB . Computer Components – SMPS, Motherboard, Storage Devises (HDD, SSD, NVMe). Computer Components – RAM (DRAM, SRAM, DDR SDRAM), ROM, Cache.
First series examination including theory + Laboratory if any	
UNIT 3 15 Hours	**Software:** System Software, Examples. Operating System – Need of OS, Types – Proprietary and Open Source, Hardware Software Compatibility, POST, Booting. OS Installation – Bootable Media, UEFI/Legacy BIOS, Disk Partitioning, Dual Booting, Boot Manager – BOOTMGR, Grub, File Systems- FAT, NTFS, ext4. Device Drivers – Need of Device Drivers, Driver Interactions (Basic).
UNIT 4 15 Hours	**Module 4: Computational Thinking:** Problem Solving - Defining the Problem, Systematic Approach. Computational Thinking – Problem Decomposition, Pattern Identification, Abstraction, Generalization. Logical Thinking – Inductive and Deductive Reasoning, Logical Expressions. Algorithmic Thinking – Intuition vs Precision, Defining algorithms. Algorithm – Need of Algorithm, Qualities of a Good Algorithm, Examples. Flowchart - Flowchart Symbols, Examples. Raptor.
Second series internal examination including theory + Laboratory if any	

Books/References

1. Gary B. Shelly, Thomas J. Cashman, and Misty E. Vermaat. “Introduction to Computers”, Cengage Learning, 2008.

2. Pradeep K. Sinha and Priti Sinha, Computer Fundamentals: Concepts, Systems & Applications. BPB Publications.

3. Kevin Wilson, Computer Hardware: The Illustrated Guide to Understanding Computer Hardware. Amazon Digital Services LLC – KDP, 2018.

4. John Hanna, OS Installation 101: A Step-by-Step Approach for Newbies.

5. David Riley and Kenny Hunt, Computational thinking for modern solver, Chapman & Hall/CRC, 2014.

6. R.G. Dromey, How to solve it by Computer, PHI, 2008.

TEACHING LEARNING STRATEGIES

- Lecturing, case study/mini projects, Team Learning, presenting seminars on selected topics, Digital Learning

MODE OF TRANSACTION

- Lecture, Seminar, Discussion, Demonstration, Questioning and Answering, Video tutorial

ASSESSMENT RUBRICS

Refer to section 7.

KU01DSCMCA102 PRINCIPLES OF PROGRAMMING

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
1	DSC	100	KU01DSCMCA102	4	90

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
2	4	1	50	50	100	2

*** ESE duration: 2 hours for theory and 3 hours for Lab**

Course Description: Computer Science is all about developing correct and efficient solutions for our day-to-day problems. The process of developing solutions is not centered on learning a programming language and doing coding straight away. Instead, a blueprint of the proposed solution should be outlined and tested for correctness. Once a proposed blueprint leads to a correct solution, it can be implemented using a suitable programming language. The objective of this course is to impart knowledge to the learner about building the blueprint of a solution. Learners are also exposed to implementing the solutions using the C programming language.

Course Objectives:

- To impart knowledge about various constructs for developing solutions
- To become familiar with using the various constructs to develop solutions
- To compare and contrast various constructs for solution development for selection
- To compare and contrast various constructs for solution development for iteration
- To implement solutions using C programming language

Course Outcomes:

At the end of the Course, the Student will be able to:

SL #	Course Outcomes
CO1	Illustrate the foundations of developing solutions using flowcharts and algorithms
CO2	Develop solutions using various selection constructs and implement them in the C programming language
CO3	Develop solutions using various iteration constructs and implement them in the C programming language
CO4	Understand advanced concepts in direct memory handling, file handling and functions.

Mapping of COs to PSOs

CO - PSO Mapping					
	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	✔	✔	✔	✔	✔
CO2	✔	✔	✔	✔	✔
CO3	✔	✔	✔	✔	✔
CO4	✔	✔	✔	✔	✔

COURSE CONTENT

UNIT 1 05 Hours Theory + 05 Hours Lab	Problem-Solving: Preparing Solutions using Flowcharts: Conventions - Structure - Symbols. Preparing Solutions using Algorithms - Conventions - Top-Down and bottom-up approach. Program**:** Characteristics - Modular Approach - Style - Documentation and Maintenance - Compilers and Interpreters - Preparing, Running and Debugging Programs - Types of Errors. Fundamentals of C Language: Evolution and Features - Program Structure - Elements - Constructs. Character Set, Tokens, Keywords, Identifier. Data Types, Constants, Symbolic Constants, Variables, Data Input and Output, Statements - Assignment statements. Operators in C: arithmetic, relational, logical, assignment, auto increment, auto decrement, conditional, comma operators. Precedence of operators - expressions – evaluation of expressions, type conversion in expressions – precedence and associativity
UNIT 2 05 Hours Theory + 15 Hours Lab	Selection Constructs: Simple if - if else - if else if ladder - switch. Branching statements: break, goto. Case study: Developing solutions (flowcharts and algorithms) for problems using various selection constructs - Comparative Study of various Selection Constructs - Converting a solution using one selection construct with other selection constructs.
First series internal examination including theory + Laboratory if any	
UNIT 3 07 Hours Theory + 15 Hours Lab	Iteration Constructs: Top Tested Vs Bottom Tested - while - for - do while - Nesting of loops - skipping breaking loops. Arrays - 1D and 2D, 3 D - Case study: Developing solutions (flowcharts and algorithms) for problems using various iteration constructs - Comparative Study of various iteration constructs - Converting a solution using one iteration construct with other iteration constructs. Functions and function calling mechanisms.
UNIT 4 13 Hours Theory + 25 Hours Lab	Advanced concepts in C: Concepts of memory allocation for variables- Direct memory accessing - Pointers- pointer arithmetic's- structures- files and file operations- preprocessor directives- preparing customized header files.
Second series internal examination including theory + Laboratory if any	

Books/References

1. J.B Dixit, Computer Fundamentals and Programming in C, Firewall Media
2. Anil Bikas Chaudhuri, The Art Of Programming Through Flowcharts Algorithms, Laxmi Publications, New Delhi.
3. Maureen Spraknle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson
4. E Balagruswamy, Programming in ANSI C, TMH, 5th Edition
5. R G Dromey, How to Solve by Computer, Pearson Education, 5th Edition
6. Brian W. Kernighan and Dennis M. Ritchie, C Programming Language, PHI
7. Kanetkar, Let Us C, BPB Publications, 8th Edition

TEACHING LEARNING STRATEGIES

- Lecturing, case study/mini projects, Team Learning, presenting seminars on selected topics, Digital Learning

MODE OF TRANSACTION

- Lecture, Seminar, Discussion, Demonstration, Questioning and Answering, Video tutorial

ASSESSMENT RUBRICS

Refer to section 7.

KU01DSCMCA103: MATHEMATICAL FOUNDATIONS FOR COMPUTER APPLICATION

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
1	DSC	100	KU01DSCMCA103	4	60

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	0	1	50	50	100	2

Course Description: This course provides a fundamental exploration of mathematical concepts essential for computer science. Students will explore into key topics including Linear Algebra, Differential and Integral Calculus. The course aims to equip students with the mathematical tools and reasoning skills necessary for creating and analyzing algorithms, understanding and solving computational problems in various areas of computer science like Data science, Artificial Intelligence.

Course Objectives:

- To impart knowledge propositional logic
- To become familiar with set theory and its applications.
- To acquaint with different matrix operations and arithmetic related to computer related problems

selection

- To familiarise different types of linear equations and solving and interpreting the solutions

Course Outcomes:

At the end of the Course, the Student will be able to:

SL #	Course Outcomes
CO1	Reflect the concept of proportional logic , predicative logic and inference rule for solving computational problems
CO2	Understand the concept and use set theory for solving computational problems using reasoning and approximation.
CO3	Reflect the concept of matrices and determinants as a way to depict and streamline mathematical ideas to perform basic operations.
CO4	Acquire proficiency in solving linear equations using different techniques and understanding the geometric interpretation of solutions.

Mapping of COs to PSOs

CO - PSO Mapping					
	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	✔	✔	✔	✔	✔
CO2	✔	✔	✔	✔	✔
CO3	✔	✔	✔	✔	✔
CO4	✔	✔	✔	✔	✔

COURSE CONTENT

UNIT 1 10 Hours	**Propositional Logic**: Basic logical operations, conditional statement, bi-conditional statement, converse, inverse and contrapositive statement, well-formed formula, tautology, contradiction, equivalence of formula. laws to determine equivalence, tautological implication. duality law,

	normal forms- (CNF, DNF, PCNF, PDNF), Predicate calculus- rules of inference, valid arguments, types of quantifiers, properties of quantifier**.**
UNIT 2 10 Hours	**Set Theory**: Set, types of set operations and laws. algebra of sets and duality, inclusion and exclusion principle, Cartesian product- Relations: Definition. properties of relation, types of relation, equivalence class, relation matrix and graph of relation, partition and covering of set, poset, composition of relation**.**
First series internal examination including theory + Laboratory if any	
UNIT 3 20 Hours	**Matrices and Determinants** -Matrices: Definition, Order of a matrix, Types of matrices Operations on matrices: Addition, Subtraction, Multiplication Properties of matrix: Various kind of Matrices, Transpose of a matrix . Elementary Transformations of Matrices and Rank of Matrices Symmetric and Skew Symmetric Matrices . Determinants, Minors, Cofactors, Inverse of a matrix.
UNIT 4 20 Hours	**Linear Algebra and Vector Operations**. Linear Independence: Characteristic equations, Eigenvalues, Eigenvector. Solving system of linear equations: Gauss Elimination Method, Gauss Jordan method, Gauss Siedel Methods. Vectors: Definition Magnitude of a vector, Types of Vectors, Vector addition. Dot products and Cross products. Vectors in 2- and 3-space 2.
Second series internal examination including theory + Laboratory if any	

Books/References

1. J.P. Tremblay, R. Manohar- Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw Hill
2. Kenneth H Rosen - Discrete Mathematics and its Applications with Combinatorics ad graph Theory, Seventh Edition, McGraw Hill
3. Skills in Mathematics: Algebra, S.K.Goyal
4. Higher Engineering Mathematics, B S Grewal, Khanna Publishers
5. Higher Engineering Mathematics, Ramana, Tata McGraw Hill
6. Mathematics, P Kandasamy, S. Chand Group
7. Gilbert Strang, “Introduction to Linear Algebra”, Wellesley-Cambridge Press, 2023.
8. Kenneth Hoffman, Ray Kunze, “ Linear Algebra”, Prentice Hall India Learning, 2015.
9. Gilbert Strang, “Calculus”, Wellesley-Cambridge Press, 2023.
10. Joseph Edwards, “Differential Calculus for Beginners”, Arihant Publications, 2016.
11. Joseph Edwards, “ Integral Calculus for Beginners”, Arihant Publications, 2016.

TEACHING LEARNING STRATEGIES

- Lecturing, case study/mini projects, Team Learning, presenting seminars on selected topics, Digital Learning
- **MODE OF TRANSACTION**
- Lecture, Seminar, Discussion, Demonstration, Questioning and Answering, Video tutorial **ASSESSMENT RUBRICS**
- Refer to section 7