



KANNUR UNIVERSITY
കണ്ണൂർ സർവകലാശാല

(Abstract)

FYUG B.Sc. Data Analytics Programme – Scheme (Revised) and Syllabus for the Third Semester
– Approved and Implemented for 2025 admission for 2026 - 27 academic year – Orders Issued

ACADEMIC C SECTION

ACAD C/ACAD C3/8508/2019

Dated: 28.09.2026

- Read:-1. U.O. No. ACAD A/ ACADA2/13731/2024 dated: 18/06/2025
2. U.O No. ACAD/ACAD C3/8508/2019 dated: 04/07/2025
3. U.O No. ACAD/ACAD C3/8508/2019 dated 24/12/2025
4. U.O No. ACAD/ACAD C3/8508/2019 dated: 30/04/2026
5. U.O No. ACAD/ACAD C3/8508/2019 dated: 09/06/2026
6.Minutes of the meeting of the Expert Committee held on 06/08/2026
7.Minutes of the online meeting of the Board of studies in Computer science (UG)
held on 03/09/2026
8.Email dated, 17.09.2026 of the Dean, Faculty of Technology
9.Orders of Vice Chancellor in the even file dated 18.09.2026

ORDER

1. As per paper read (1) above, provisional affiliation was granted to the FYUG B.Sc. Data Analytics Programme at Don Bosco Arts and Science College, Angadikadavu, during the academic year 2024–25, with permission to admit students to the programme during the academic year 2025–26.
2. As per paper read (2) above, an Expert Committee was constituted for the preparation of the syllabi and for fixing the eligibility criteria for the FYUG B.Sc. Cyber Security and B.Sc. Data Analytics Programmes.
3. Vide paper read (3) above, the full Scheme and Syllabus for Semesters I and II of the FYUG B.Sc. Data Analytics Programme were approved and implemented for the 2025 admission.
4. Vide paper read (4) above, the Expert Committee was reconstituted for the preparation of the syllabi and for fixing the eligibility criteria for the FYUG B.Sc. Cyber Security and B.Sc. Data Analytics Programmes.
5. Vide paper read (5) above, the Expert Committee was further reconstituted, appointing Prof. Rajkumar K. K., Professor, Department of Information Technology, as the Convenor.
6. Vide paper read (6) above, the Expert Committee submitted the revised Scheme and Syllabus for the Third Semester of the FYUG B.Sc. Data Analytics Programme and



recommended that the same be placed before the Board of Studies in Computer Science (UG) for consideration.

7. Vide paper read (7) above, the Board of Studies in Computer Science (UG) recommended approval of the Third Semester Scheme and Syllabus of the FYUG B.Sc. Data Analytics Programme only for the academic year 2026-27.
8. The Scheme and Syllabus, together with the minutes of the meeting of the Board of Studies in Computer Science (UG), were forwarded to the Dean, Faculty of Technology, for remarks. The Dean, vide paper read (8) above, recommended approval of the same.
9. The Vice Chancellor, after considering the recommendation of the Dean, Faculty of Technology, and in exercise of the powers of the Academic Council conferred under Section 11(1), Chapter III of the Kannur University Act, 1996, and all other enabling provisions read together, **has approved the Scheme (revised) and Syllabus for the Third Semester of the FYUG B.Sc. Data Analytics Programme and accorded sanction to implement the same for students admitted in 2025 for the academic year 2026 -27** , subject to reporting to the Academic Council.
10. The approved Scheme (revised) and Syllabus for the Third Semester of the FYUG B.Sc. Data Analytics Programme for the academic year 2026 -27 are appended to this U.O. and shall be uploaded on the University website.

Orders are issued accordingly.

Sd/-

Bindu K P G

Joint Registrar (Acad)

For REGISTRAR

- To:
1. The Controller of Examinations (Through PA)
 2. The Principals of Affiliated colleges offering the FYUG B.Sc.Data Analytics Programme
 - 3.The Convenor, Expert Committee
 4. The Chairperson, Board of Studies in Computer Science (UG)

- Copy To:
1. PA to CE (to circulate the same among the sections concerned under Examination Branch)
 2. PS to VC/PA to R
 3. JR II /EXC I/ EG I/ AR VII (Exam)
 4. DR/AR (Academic)
 5. Web Manager (to upload on the website)
 6. Computer Programmer
 7. SF/DF/FC



Forwarded / By Order

[Signature]
SECTION OFFICER



Kannur University

Re-accredited by NAAC with 'B++' Grade



FOUR-YEAR UNDER GRADUATE PROGRAMME (KU-FYUGP)

B. Sc. DATA ANALYTICS

CURRICULUM & SYLLABUS

Effective from 2025 Admission onwards



POGRAMME OUTCOME

PO1	Critical Thinking and Problem-Solving -Apply critical thinking skills to analyze information and develop effective problem-solving strategies for tackling complex challenges.
PO2	Effective Communication and Social Interaction -Proficiently express ideas and engage in collaborative practices, fostering effective interpersonal connections.
PO3	Holistic Understanding -Demonstrate a multidisciplinary approach by integrating knowledge across various domains for a comprehensive understanding of complex issues.
PO4	Citizenship and Leadership -Exhibit a sense of responsibility, actively contribute to the community, and showcase leadership qualities to shape a just and inclusive society
PO5	Global Perspective -Develop a broad awareness of global issues and an understanding of diverse perspectives, preparing for active participation in a globalized world.
PO6	Ethics, Integrity and Environmental Sustainability -Uphold high ethical standards in academic and professional endeavours, demonstrating integrity and ethical decision-making. Also acquire an understanding of environmental issues and sustainable practices, promoting responsibility towards ecological well-being
PO7	Lifelong Learning and Adaptability - Cultivate a commitment to continuous self-directed learning, adapting to evolving challenges, and acquiring knowledge throughout life.

PROGRAMME SPECIFIC OUTCOMES

PSO1	Abstract Thinking - Develop the ability to understand and apply abstract concepts in Computer Science and Data Analytics that form the foundation of various data-driven theories and technologies.
PSO2	Problem Solving Approach - Develop the skill to identify the problem, formulate a hypothesis and draw conclusions involving large, diverse data sets from different application domains.
PSO3	Analytical and Design Ability - Perform data analysis using the concepts and interpret them to design effective solutions and systems.
PSO4	Computational & Programming Proficiency - Demonstrate proficiency in programming languages such as C, Python, R, and Java along with tools for database management, web technologies, cloud, and big data platforms to solve real-world problems.
PSO5	Domain-Specific Analytics : Apply data analytics techniques in specialized domains such as IoT, social media, business, marketing, recommender systems, and network analysis to provide practical solutions.



MAPPING MATRIX

PO-PSO Mapping Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
PSO1	3	1	3	1	1	2	2
PSO2	3	2	2	1	2	2	2
PSO3	3	2	2	1	2	2	2
PSO4	3	2	2	1	2	2	3
PSO5	3	2	3	2	3	2	2

Eligibility for Admission:

Basic qualifications: Candidate must possess

- 1) Pass with 50% marks or 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.



STRUCTURE OF THE PROGRAMME

The Programme of instruction will consist of Lecture courses, Practical Courses, Comprehensive Viva-Voce, Seminar, Internship/ Industrial Visit, and Project Work.

1. **Lecture Courses:** Courses involving lectures relating to a field or discipline by a faculty member.
2. **Tutorial Courses:** Courses involving problem-solving and discussions relating to a field or discipline under the guidance of qualified personnel in a field of learning.
3. **Laboratory Work:** A course requiring students to participate in a project or practical or lab activity that applies previously learned/studied principles/theory related to the chosen field of learning, work/vocation, or professional practice under the supervision of an instructor.
4. **Comprehensive Viva-Voce:** This is an essential assessment included in the Programme to evaluate the student's grasp of the subject matter and their ability to apply their knowledge as defined in the course outcomes. It also provides an opportunity for the student to engage in academic discussions and receive valuable feedback from experts in the field.
5. **Seminar:** A course requiring students to participate in structured discussion/conversation or debate focused on assigned tasks/readings, current or historical events, or shared experiences guided or led by an expert or qualified personnel in a field of learning
6. **Internship/ Industrial/ Institutional Visit:** All students shall undergo a Field Trip/Summer Internship/Apprenticeship in a Firm, Industry or Organization; or Training in labs with faculty and researchers or other Higher Education Institutions (HEIs) or research institutions.

Departments can actively promote internships that can eventually lead to research project work. Institutional visit incorporating institutional or industrial visits in the programme brings immense value to the students, making their learning journey more enriching and preparing them for successful careers in Data Analytics-related fields.

Research Project: Students who have opted for Honours with Research should complete a research project under the guidance of the mentor and submit a research report for evaluation. They must successfully defend the research project to obtain 12 credits under the supervision of a faculty member of the University/College. The research shall be in the major discipline.

COURSE AND CREDIT STRUCTURE FOR DIFFERENT



PATHWAYS

SEMESTER-WISE COURSE DISTRIBUTION

(SEMESTERS I–VIII)

SEMESTER I

Sl. No.	Course	Hours/ Week	Credits	Total Marks
1	AEC1 (English)	4	3	75
2	AEC2 (Additional Language)	3	3	75
3	MDC 1	3	3	75
4	DSC- Major 1- Fundamentals of IT and Computers	4	4	100
5	DSC – Minor 1	4/5	4	100
6	DSC – Minor 2	4/5	4	100
Total			21	525

SEMESTER II

Sl. No.	Course	Hours/ Week	Credits	Total Marks
1	AEC3 (English)	4	3	75
2	AEC4 (Additional Language)	3	3	75
3	MDC 2	3	3	75
4	DSC -Major 2 - Python Programming	5	4	100
5	DSC - Minor 3	4/5	4	100
6	DSC - Minor 4	4/5	4	100
Total			21	525

SEMESTER III

Sl. No.	Course	Hours/ Week	Credits	Total Marks
1	MDC 3 -KS	3	3	75
2	VAC 1	3	3	75
3	DSC - Major 3 - Fundamentals of Data Analytics	4	4	100
4	DSC – Major 4 - Data Structures Using Python	5	4	100
5	DSC - Minor 5	4/5	4	100
6	DSC - Minor 6	4/5	4	100
Total			22	550



Consolidated List of Semester-Wise Major Courses

			CREDITS				
Sl. No.	Course Code	Course Name	Lecture/ Tutorial	Practical	Total Credit	Hours/Week	Total Marks
SEMESTER I							
1	KU1DSCDAS101	Fundamentals of IT and Computers	4	0	4	4	100
SEMESTER II							
2	KU2DSCDAS104	Python Programming	3	1	4	5	100
SEMESTER III							
3	KU3DSCDAS201	Fundamentals of Data Analytics	3	1	4	5	100
4	KU3DSCDAS202	Data Structures Using Python	3	1	4	5	100

Consolidated List of Semester-Wise Minor Courses Offered

			CREDITS				
Sl. No.	Course Code	Course Name	Lecture/ Tutorial	Practical	Total Credit	Hours/Week	Total Marks
SEMESTER I							
1	KU1DSCDAS102	Emerging Technologies in Information Technology	4	0	4	4	100
2	KU1DSCDAS103	Multimedia and Software Applications	3	1	4	5	100
SEMESTER 2							
3	KU2DSCDAS105	Fundamentals of Web Programming	3	1	4	5	100
4	KU2DSCDAS106	Content Management System and WordPress	3	1	4	5	100
5	KU2DSCDAS107	Internet Technology	4	0	4	4	100
SEMESTER 3							
6	KU3DSCDAS203	Operating System	3	1	4	5	100
7	KU3DSCDAS204	Computer Networks	4	0	4	4	100



Consolidated List of Semester-Wise Multi-Disciplinary Courses (MDC) Offered

			CREDITS				
Sl. No .	Course Code	Course Name	Lecture/ Tutorial	Practical	Total Credit	Hours/ Week	Total Marks
SEMESTER I							
1	KU1MDCDAS101	Computer Fundamentals	3	0	3	3	75
SEMESTER 2							
3	KU2MDCDAS102	Data Analysis Using Excel	2	1	3	4	75
4	KU2MDCDAS103	Introduction to Digital Marketing	3	0	3	3	75

Consolidated List of Semester-Wise Value-Added Courses (VAC) Offered

			CREDITS				
Sl. No	Course Code	Course Name	Lecture/ Tutorial	Practical	Total Credit	Hours/ Week	Total Marks
SEMESTER III							
1	KU3VACDAS201	Introduction to Data Science	3	0	3	3	75
2	KU3VACDAS202	Data Analysis and Visualization Using Excel	2	1	3	4	75

ASSESSMENT AND EVALUATION

- The assessment shall be a combination of Continuous Comprehensive Assessment (CCA) and an End Semester Evaluation (ESE).
- As per the regulation of Kannur University, one credit corresponds to 25 marks. Hence a 3-credit course must be evaluated for 75 marks and 4 credit courses for 100 marks. The ratio of continuous comprehensive assessment (CCA) to End semester examination (ESE) for theory/lecture courses is 30:70 and for the practical courses, it is 35:65.



- The 4-credit courses (Major and Minor courses) and 3 credit (Foundational Courses) are of two types:
 - (i) courses with only theory
 - (ii) courses with 3-credit theory and 1-credit practical.
- In 4-credit courses with only theory component, out of the total 5 modules of the syllabus, one teacher specific module with 20% content is designed by the faculty member teaching that course, and it is internally evaluated.
- In 4-credit courses with 3-credit theory and 1-credit practical components, out of the total 5 modules of the syllabus, 4 modules are for theory and the fifth module is for practical.
- The 3 credit courses (Foundational Courses) are of two types:
 - (i) courses with only theory
 - (ii) courses with 2-credit theory and 1-credit practical.
- In 3-credit courses with only theory component, out of the total 5 modules of the syllabus, one teacher specific module with 20% content is designed by the faculty member teaching that course, and it is internally evaluated.
- In 3-credit courses with 2-credit theory and 1-credit practical components, out of the total 5 modules of the syllabus, 4 modules are for theory and the fifth module is for practical.
- Continuous Evaluation includes assignments, seminars, periodic written examinations, or other measures as proposed in the syllabus and approved by the university.

Practical exams

- The end-semester practical examination and viva voce, along with the evaluation of practical records, shall be conducted by the course in-charge and an internal examiner appointed by the Department Council. The duration of the ESE may be 2 to 2.5 hours.
- There shall be a Continuous Evaluation of practical courses conducted by the Course-In- Charge.
- The process of continuous evaluation of practical courses shall be completed before 10 days from the commencement of the end-semester examination.
- Only those who have passed the continuous evaluation will be permitted to appear for the end-semester examination and viva voce.



Mark Distribution for Discipline Specific Courses and Foundation Courses

COURSE CREDIT	CREDIT		MARK		L		P		
	L	P	L	P	CCA (30%)	ESE (70%)	CCA (40%)	ESE (60%)	TOTAL MARK
4									
	4	0	100	0	30	70	0	0	100
	3	1	75	25	25	50	10	15	100
3									
	3	0	75	0	25	50	0	0	75
	2	1	50	25	15	35	10	15	75

L – Lecture/Theory, P – Practical/Practicum components, CCA – Continuous Comprehensive Assessment, ESE – End Semester Evaluation.

The detailed distribution table with the components

4 Credit Course (Theory only)

EVALUATION TYPE		MARKS
ESE		70
CCA		30
a)	Test Paper - 1	5
b)	Model Examination	10
c)	Assignment - 2 Numbers	10
d)	Seminar/Viva-Voce/ Case Study/ Book/ Article Review	5
TOTAL		100

4 Credit Course (3 Credit Theory + 1 Credit Practical)

EVALUATION TYPE		MARKS	EVALUATION TYPE		MARKS	TOTAL
LECTURE		75	PRACTICAL		25	100
a)	ESE	50	a)	ESE	15	
			i	Program code and	8	



					execution		
				ii	Output	3	
				iii	Viva	2	
				iv	Modification	2	
b)	CCA		25	b)	CCA		10
	i	Test Paper	5		i	Punctuality	3
	ii	Model Exam	10		ii	Model Exam	4
	ii	Assignment	5		ii	Record	3
	i v	Seminar/ Viva-Voce / Case Study/ Book /Article Review	5		ii i		

3 Credit Course (Theory Only)

EVALUATION TYPE		MARKS
ESE		50
CCA		25
a)	Test Paper - 1	5
b)	Model Examination	10
c)	Assignment	5
d)	Seminar/Viva-Voce/ Case Study/ Book /Article Review	5
TOTAL		75

3 Credit Course (2 Credit Theory + 1 Credit Practical)

EVALUATION TYPE		MARKS	EVALUATION TYPE		MARKS	TOTAL
LECTURE		50	PRACTICAL		25	
a)	ESE	35	a)	ESE	15	100
			i	Program Code and Execution	8	
			ii	Output	5	
			iii	Viva	2	
b)	CCA	15	b)	CCA	10	
	i	Test Paper	5	i	Punctuality	3
	ii	Model Examination	5		and Lab	



					Performance		
	ii	Assignment/ Viva-Voce	5		Model Exam	5	
	i				Record	2	

* Best out of two test papers

** Or any other evaluation technique like quiz, open book exam, group activity.

INTERNSHIP

- All students should undergo Internship of 2-credits during the first six semesters in a firm, industry or organization, or training in labs with faculty and researchers of their own institution or other Higher Educational Institutions (HEIs) or research institutions.
- Internship can be for enhancing the employability of the student or for developing the research aptitude.
- Internship can involve hands-on training on a particular skill/ equipment/ software. It can be a short project on a specific problem or area. Attending seminars or workshops related to an area of learning or skill can be a component of Internship.
- A faculty member/ scientist/ instructor of the respective institution, where the student does the Internship, should be the supervisor of the Internship.

Guidelines for Internship

- Internship can be in Data Analytics or related disciplines.
- There should be minimum 90 hours of engagement from the student in the Internship.
- Summer vacations and other holidays can be used for completing the Internship.
- In B.Sc. Data Analytics Honours program, institute/ industry visit or study tour can be part of Internship. Visit to national research institute, research laboratory and place of scientific importance should be part of the study tour. A brief report of the study tour has to be submitted with photos.
- The students should make regular and detailed entries in to a personal log book through the period of Internship. The log book will be a record of the progress of the Internship and the time spent on the work, and it will be useful in writing the final report. It may contain experimental conditions and results, ideas, mathematical expressions, rough work and calculation, computer file names etc. All entries should



be dated. The Internship supervisor should periodically examine and countersign the log book.

- The log book and the report must be submitted at the end of the Internship.
- The institution at which the Internship will be carried out should be prior-approved by the Department Council of the College where the student has enrolled for the UG Honours program.

Evaluation of Internship

- The evaluation of Internship shall be done internally through continuous assessment mode by a committee internally constituted by the Department Council of the college where the student has enrolled for the UG Honours program.
- The credits and marks for the Internship will be awarded only at the end of semester 6.

The scheme of CCA and ESE is given below:

Components of Evaluation of Internship	Weightage	Marks for Internship 2 Credit/50 Marks
Continuous Comprehensive Assessment (CCA)	30%	15
End Semester Evaluation	70%	35

The detailed distribution table with the components

EVALUATION TYPE		MARKS
ESE		35
a)	Acquisitions of skill	20
b)	Report	15
CCA		15
a)	Punctuality	5
b)	Logbook	10
TOTAL		50

PROJECT IN HONOURS PROGRAMME

- In Honours programme, the student has the option to do a 3 DSC Courses and Project of 8-credits in Major Discipline and one DSE Course or 3 DSC courses and 3 DSE Courses in Semester 8.



- The Project can be done in the same institution/ any other higher educational institution (HEI) / research centre/ training centre.
- The Project in Honours programme can be a short research work or an extended internship or a skill-based training programme.
- A faculty member of the respective institution, where the student does the Project, should be the supervisor of the Project.

PROJECT IN HONOURS WITH RESEARCH PROGRAMME

- Students who secure 75% marks and above (equivalently, CGPA 7.5 and above) cumulatively in the first six semesters are eligible to get selected to Honours with Research stream in the fourth year.
- In Honours with Research programme, the student has to do a mandatory Research Project of 12-credits in the Major Discipline and three Elective (DSE) Courses in Semester 8.
- The number of seats for the Honours with research shall be determined as per the availability of eligible faculty.
- The selection criteria for Honours with research stream shall be in accordance with the guidelines of UGC or as approved by Kannur University.
- Students who have chosen the honours with research stream shall be mentored by a faculty with a PhD.
- The mentor shall prescribe suitable advanced-level courses for a minimum of 20 credits to be taken within the institutions along with the papers on research methodology, research ethics, and research topic-specific courses for a minimum of 12 credits which may be obtained either within the institution or from other recognized institutions, including online and blended modes.
- These students who have opted for the honours with research should complete a research project under the guidance of the mentor and should submit a research report for evaluation. They need to successfully defend the research project to obtain 12 credits under a faculty member of the University/College within the University.
- The research outcomes of their project work may be published in peer-reviewed journals or presented at conferences or seminars or patented.

GUIDELINES FOR THE PROJECT IN HONOURS PROGRAMME AND HONOURS WITH RESEARCH PROGRAMME



- Project can be in Data Analytics or allied disciplines.
- Project should be done individually.
- Project work can be of experimental/ theoretical/ computational in nature.
- There should be minimum 360 hrs. of engagement from the student in the Project work in Honours programme as well as in Honours with Research programme.
- There should be minimum 13 hrs./week of engagement (the hours corresponding to the three core courses in Major in semester 8) from the teacher in the guidance of the Project(s) in Honours programme and Honours with Research programme.
- The various steps in project works are the following:
 - Review
 - Investigation on a problem in systematic way.
 - Systematic recording.
 - Reporting the results with interpretation in a standard documented form.
 - Presentation of the results before the examiners.
- The report must be submitted at the end of the Project. A copy of the report should be kept for reference at the department. A soft copy of the report too should be submitted, to be sent to the external examiner in advance.
- The project report shall have an undertaking from the student and a certificate from the research supervisor for originality of the work, stating that there is no plagiarism, and that the work has not been submitted for the award of any other degree/ diploma in the same institution or any other institution.

Evaluation of Project

- The evaluation of Project will be conducted at the end of the eighth semester by both internal and external modes.
- The internal evaluation of the Project work shall be done through continuous assessment mode by a committee internally constituted by the Department Council of the college where the student has enrolled for the UG Honours programme. 30% of the weightage shall be given through this mode.
- The remaining 70% shall be awarded by the external examiner appointed by the University.

The scheme of evaluation of the Project is given below:



Project type	Maximum Marks	CCA (30%)	ESE (70%)
Research Project of 12 Credits (UG Honours with research, mandatory)	300	90	210
Research Project of 8 Credits (UG Honours, optional)	200	60	140

The detailed distribution table with the components

CCA			
Sl. No	Components of Evaluation of Project	Marks for the Project (Honours/Honours with Research) 12 credits	Marks for the Project (Honours/Honours with Research) 8 credits
1	Skill in doing project work	30	20
2	Internal Presentation and Viva-Voce	20	15
3	Punctuality and attendance	20	15
4	Organization of Project Report	20	10
Total Marks		90	60

*Attendance certificate should be produced by the students who have done their projects in any higher educational institution (HEI)/ research centre/ training centre.

ESE			
Sl. No.	Components of Evaluation of Project	Marks for the Project (Honours/Honours with Research) 12 credits	Marks for the Project (Honours/Honours with Research) 8 credits
1	Content and relevance of the Project, Methodology, Quality of analysis, and Innovations of Research	50	40
2	Presentation of the Project	50	30
3	Project Report	40	20
4	Viva -Voce	70	50
Total Marks		210	140



EXTERNAL EVALUATION

- Examinations will be conducted at the end of each semester. The students can write the external examinations in Data Analytics in both English and Malayalam languages.
- Individual questions are evaluated in marks and the total marks are converted into grades by the University based on 10-point grading system.

Letter Grade	Grade Point(P)
O (Outstanding)	10
A+ (Excellent)	9
A (Very Good)	8
B+ (Good)	7
B (Above Average)	6
C (Average)	5
P (Pass)	4
F (Fail)	0
Ab (Absent)	0

- A minimum of grade point 4 (Grade P) is needed for the successful completion of a Course.
- A student who has failed in a Course can reappear for the End Semester Examination of the same Course along with the next batch without taking re-admission or choose another Course in the subsequent Semesters of the same programme to acquire the minimum credits needed for the completion of the Programme.
- There shall not be provision for improvement of CE and ESE.
- A student who has successfully completed the CE requirements in a subsequent semester can also appear for the ESE subject to the maximum duration permitted.

Computation of SGPA and CGPA



The following method is recommended to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

- The SGPA is the ratio of the sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e. **SGPA** (S_i) = $\Sigma(C_i \times G_i) / \Sigma C_i$, where C_i is the number of credits of the course and G_i is the grade point scored by the student in the course.

Example:

Semester	Course	Credit	Letter Grade	Grade Point	Credit Point (Credit x Grade)
I	Course 1	3	A	8	3 x 8= 24
I	Course 2	4	B+	7	4 x 7= 28
I	Course 3	3	B	6	3 x 6= 18
I	Course 4	3	O	10	3 x 10= 30
I	Course 5	3	C	5	3 x 5= 15
I	Course 6	4	B	6	4 x 6= 24
		20			139
SGPA					139/20=6.95

- The Cumulative Grade Point Average (CGPA) is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a programme, i.e. $CGPA = \Sigma (C_i \times S_i) / \Sigma C_i$ Where S_i is the SGPA of the semester and C_i is the total number of credits in that semester.
- The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts. Transcript (Format): Based on the above recommendations on Letter grades, grade points and SGPA and CCPA, the HEIs may issue the transcript for each semester and a consolidated transcript indicating the performance in all semesters

Example:

Semester I	Semester II	Semester III	Semester IV	Semester V	Semester VI
Credit: 21 SGPA: 6.9	Credit: 21 SGPA: 7.8	Credit: 22 SGPA: 5.6	Credit: 24 SGPA: 6.0	Credit: 23 SGPA: 6.3	Credit: 22 SGPA: 8.0
$CGPA = (21 \times 6.9 + 21 \times 7.8 + 22 \times 5.6 + 24 \times 6.0 + 23 \times 6.3 + 22 \times 8.0) / 133 = 6.74$					



- The SGPA is the ratio of the sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e. **SGPA** (Si) = $\Sigma (C_i \times G_i) / \Sigma C_i$. Where C_i is the number of credits of the course and G_i is the grade point scored by the student in the course.

CGPA	Overall letter Grade
9.5 and above O	O
8.5 and above but less than 9.5	A+
7.5 and above but less than 8.5	A
6.5 and above but less than 7.5	B+
5.5 and above but less than 6.5	B
4.5 and above but less than 5.5	C
4.0 and above but less than 4.5	D
Less than 4.0	F

Appearance for Continuous Evaluation (CE) and End Semester Examination (ESE) are compulsory, and no Grade shall be awarded to a candidate if the candidate is absent for CE or ESE or both.



DETAILED SYLLABUS

SEMESTER: I

DISCIPLINE SPECIFIC COURSES

KU1DSCDAS101: FUNDAMENTALS OF IT AND COMPUTERS

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
1	DSC	100-199	KU1DSCDAS101	4	60

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	-	-	30	70	100	2 Hrs

Course Description: This course covers the fundamentals of computers, data representation, software, and networks, along with an introduction to emerging technologies like AI, ML, Cloud Computing, Quantum Computing, and IoT.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
CO1	Understand the basic components of computers and data representation techniques.	R, U
CO2	Identify different types of software, programming languages, and language processors.	U, A
CO3	Explain computer networks, topologies, and common internet services.	R, U
CO4	Gain awareness of emerging IT trends such as AI, Cloud Computing, Quantum Computing, and IoT.	U

**Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)*



Mapping of Course Outcomes to PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3			2	
CO2	3	2		3	
CO3	1	2	2	3	2
CO4	2	2	2	2	3

COURSE CONTENTS

Contents for Classroom Transaction:

M O D U L E	U N I T	DESCRIPTION	HOUR S
1	MODULE TITLE: Basic Components of Computer and Data Representation		
	1	Introduction to Computers: Definition and Characteristics of Computers, Brief History and Evolution of Computers.	12
	2	Basic Components of a Computer System - Input, Output, Memory and CPU.	
	3	Memory Classification: Cache memory, Primary Memory - RAM (Random Access Memory) and ROM (Read Only Memory), Secondary Memory - Hard Drives, SSDs, USB Drives, Memory hierarchy.	
2	MODULE TITLE: Introduction to Data Representation and Softwares		
	1	Data Representation: Decimal, Binary, Hexadecimal and Octal Number Systems, Conversion Between Number Systems.	12
	2	Binary Arithmetic and Complements: Binary addition, subtraction, 2 Complements of Binary Numbers (1's Complement and 2's Complement).	
	3	Introduction to Software: Types of Software - Application software, System Software.	
	4	Programming Languages: Machine, Assembly, High-Level and 4GL. Source code and Object code.	
	5	Language Processors: Assembler, Compiler, Interpreter, Linker and Loader (Concepts Only).	
3	MODULE TITLE: Basics of Networks		



	1	Classification of Networks: LAN, WAN, MAN, Internet. Network devices.	12
	2	Network Topologies -Bus, Star, Ring and Mesh.	
	3	Internet: Definition, Features, Internet architecture, Internet Connections.	
	4	Internet Services – WWW, Email, File transfer, Chat, Video conferencing, Search engines, Web browsing and Web publishing.	
4	MODULE TITLE: Emerging Trends in IT		12
	1	Artificial Intelligence: Definition, Examples of AI, Importance of AI, Types of AI- Based on capabilities and Functionalities, Applications of AI.	
	2	Cloud Computing: Introduction to cloud computing and architecture, Types of Cloud Services (IaaS, PaaS, SaaS- Concepts only), Deployment models (Public, Private, Hybrid and Community Cloud- Concepts only).	
	3	Quantum Computing: Definition, Core Principles, and Applications.	
	4	Internet of Things (IoT): Overview of IoT, Key features, Advantages, Disadvantages, Architecture of IoT.	
5	Teacher Specific Module		12
	<i>Directions</i>		
	<i>Concerned teacher can adopt proper methodologies and evaluation metrics to understand the topics.</i>		

Essential Readings:

1. Goel, Anita, Computer Fundamentals. Pearson Education India, 2010.
2. Floyd, Thomas L, “Digital fundamentals”, 10th Edition. Pearson Education India, 2011.
3. ITL Education Solutions Ltd, “Introduction to Information Technology”, Pearson Education India, 2005.
4. Pradeep. K. Sinha, Priti Sinha, Information Technology: Theory and Practice, Kindle Edition, 2016.

Suggested Readings:

1. Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", Third Edition.



2. V.K. Pachghare, “Cloud Computing” –PHI Delhi Learning Private Limited, 2016.
4. Ethem Alpaydin, “Introduction to Machine Learning”, Third Edition, The MIT press, 2014.
5. Arshdeep Bahga and Vijay Madisetti, “Internet of Things – A Hands-On Approach”, Universities Press, 2015.
6. Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley, 2015.

ASSESSMENT RUBRICS

Evaluation Type		Marks
End Semester Evaluation		70
Continuous Evaluation		30
a)	Test Paper- 1	5
b)	Model Examination	10
c)	Assignment - 2 numbers	10
d)	Seminar	5
e)	Book/ Article Review	
f)	Viva-Voce	
g)	Case Study	
Total		100



KU1DSCDAS102 EMERGING TECHNOLOGIES IN INFORMATION TECHNOLOGY

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
1	DSC	100-199	KU1DSCDAS102	4	60

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	-	-	30	70	100	2 Hrs

Course Description: This course introduces key emerging technologies in IT, including Edge Computing, 5G, AI, ML, IoT, Blockchain, Cloud Computing, and Big Data Analytics. It focuses on core concepts, applications, benefits, and challenges, highlighting their real-world impact on IT infrastructure, industries, and society.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
CO 1	Identify the impact of emerging technologies in the field of IT and real life.	U
CO 2	Analyze the applications and impact of these technologies on IT infrastructure, industries, and society.	U, An
CO 3	Differentiate between various models, types, and architectures related to AI, ML, IoT, Blockchain, Cloud, and Big Data.	E
CO 4	Apply conceptual knowledge to identify opportunities and challenges of adopting emerging technologies in real-world scenarios.	U, A

**Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3			1	2



CO2	3			1	2
CO3	3		2	2	2
CO4	3	2	2	1	2

COURSE CONTENTS

Contents for Classroom Transaction:

M O D U L E	U N I T	DESCRIPTION	HOUR S
1	MODULE TITLE: Introduction to Emerging Technologies		
	1	Overview of Current Trends in IT, The Importance of Staying Updated with Technology.	12
	2	Edge Computing: Definition, Advantages, Examples of Edge Computing Applications.	
	3	5G Technology: The Impact of 5G Technology on IT Infrastructure, Key Features, Advantages, Applications.	
2	MODULE TITLE: Artificial Intelligence and Machine Learning		
	1	Artificial Intelligence: Basic Concept of AI, Scope of AI, Components of AI, Types of AI, Applications in Various Industries, Advantages and Disadvantages.	12
	2	Introduction to Machine Learning, Types of Machine Learning (Supervised, Unsupervised, Reinforcement-concepts only), Applications of Machine Learning.	
3	MODULE TITLE: Internet of Things and Blockchain Technology		
	1	Introduction to IoT: Definition, Characteristics, Feature and Applications of IoT, Advantages and Disadvantages.	12
	2	Physical Design of IoT: Things in IoT, IoT Protocols.	
	3	Introduction to Blockchain, Centralized Versus Decentralized System, Types of Blockchains: Public, Private, Consortium.	
	4	Layers of Blockchain, Importance of Blockchain.	
4	MODULE TITLE: Cloud Computing and Big Data Analytics		
	1	Cloud Computing: Introduction, Characteristics, Advantages, Disadvantages, Cloud Computing Architecture Types of Cloud Services (IaaS, PaaS, SaaS).	12
	2	Deployment Models: Public, Private, Hybrid, Community.	
	3	Big Data Analytics: Classification of Digital Data -	



		Structured, Semi-structured and Unstructured.	
	4	Introduction to Big Data: Characteristics of Data, Evolution of Big Data. Definition of Big Data and Big Data Analytics.	
5	Teacher Specific Module		12
	<i>Directions</i>		
	<i>Concerned teacher can adopt proper methodologies and evaluation metrics to understand the topics.</i>		

Essential Readings:

1. Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", Third Edition.
2. Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das, —Machine Learning, Pearson Education.
3. V.K. Pachghare, "Cloud Computing" –PHI Delhi Learning Private Limited, 2016.
4. Ethem Alpaydin, "Introduction to Machine Learning", Third Edition, The MIT press, 2014.
5. Arshdeep Bahga and Vijay Madisetti, "Internet of Things – A Hands-On Approach", Universities Press, 2015.
6. Seema Acharya, Subhasini Chellappan, "Big Data Analytics", Wiley, 2015.

ASSESSMENT RUBRICS

Evaluation Type		Marks
End Semester Evaluation		70
Continuous Evaluation		30
a)	Test Paper- 1	5
b)	Model Examination	10
c)	Assignment - 2 numbers	10
d)	Seminar	5
e)	Book/ Article Review	
f)	Viva-Voce	
g)	Case Study	
Total		100



KU1DSCDAS103 MULTIMEDIA AND SOFTWARE APPLICATIONS

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
1	DSC	100-199	KU1DSCDAS103	4	75

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	2	-	35	65	100	1.5 Hrs

Course Description: This course covers the basics of multimedia, including text, audio, video, graphics, and animation, with hands-on training in open-source tools for photo, video, audio editing, and simple animation creation.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
CO1	Understand the fundamentals of multimedia, its components, and applications including virtual reality.	U
CO2	Apply basic image editing techniques using photo editing software to manipulate layers, text, and color formats.	U, A
CO3	Develop simple video projects using video editing software by adding clips, transitions, effects, and exporting final output.	A, C
CO4	Edit audio tracks and create basic animations using audio and animation software tools.	A, C

**Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	2			1
CO2	2	2	2		1



CO3	2	2		3	2
CO4	2	2	2	3	2

COURSE CONTENTS

Contents for Classroom Transaction:

M O D U L E	U N I T	DESCRIPTION	HOUR S
1	MODULE TITLE: Basics of Multimedia		
	1	Definition of Multimedia, Multimedia System Characteristics, Desirable Features of a Multimedia System.	15
	2	Building Blocks of Multimedia (Text, Graphics, Audio, Video, Animation).	
	3	Multimedia System, Desirable Features of Multimedia System.	
	4	Multimedia Applications, Virtual Reality.	
	5	Definitions of System Software and Application Software Introduction to Media Software Application.	
2	MODULE TITLE: Photo Editing Software Applications		
	1	Installation and Interface Overview of Any Open-Source Tool (e.g., GIMP), Basic Image and Layer Manipulation.	15
	2	Adding Text to Image, Layers-Masking Technique.	
	3	Overview of Image Formats (JPEG, PNG, TIFF, etc.), Basic Colour Correction Using Curves.	
	4	Advanced Photo Editing -Black & White (B&W) Conversion, Luminosity Masks, Tone Mapping Techniques.	
3	MODULE TITLE: Video Editing Software Applications		
	1	Introduction to Video Editing Software (e.g., OpenShot), Features, System Requirements, and Installation.	15
	2	Basic Terms - Project, Timeline, Track, Clip and Transition.	
	3	Introduction to Software Interface Overview, Creating First Simple Project - Add Photo, Music, Timeline, Preview and Export the Video.	
	4	Clips, Transition, Effects and Animation.	



4	MODULE TITLE: Audio and Animation		15
	1	Software for Audio: Audacity, Software Interface, Stereo Audio Track Control Panel, Splitting and Joining Tracks, Changing the Track Display.	
	2	Applying Audio Effects, Effect Adjustments-Volume, Fading, Pitch, Noise Removal, Delay, Distortion.	
	3	Software for Basic Animation: An Introduction to Synfig - Importing Your Artwork, Tools, Layers.	
	4	Parameters, Converters, Configuration, Canvas, Interface, Export.	
5	Teacher Specific Module		15
	<i>Directions: The following exercises may be used as references for conducting lab experiments. This is not the final list of experiments for the practical examination. Additional experiments may be added to further enhance the practical skills of students.</i>		
	1. Create/Import an image and apply various effects on it. 2. Mixing Audio by importing music files. 3. A simple project - add photo, music, timeline, preview and export the video. 4. Create a 30 secs animation video.		

NB: In case the tools mentioned here are unavailable you may use relevant tools (Preferably Open Source.)

Essential Readings:

1. ITL Education Solutions Limited, "Introduction to Information Technology" Second Edition, Pearson Education.
2. Oilver Lecarme & Karine Delvare, "The Book of GIMP – A Complete Guide to Nearly Everything", Kindle Edition, 2013.

Suggested Readings:

1. <https://librearts.org/2022/08/audio-editors-for-linux-that-are-not-audacity/>
2. <https://www.gimp.org/tutorials/>
3. https://www.gimp.org/tutorials/The_Basics/
4. https://synfig.readthedocs.io/en/latest/quick_start.html
3. <https://www.openshot.org/user-guide/>
4. <https://support.audacityteam.org/>
5. <https://synfig.readthedocs.io/en/latest/index.html>

ASSESSMENT RUBRICS



Evaluation Type			Marks	Evaluation Type			Marks	Total	
Lecture			75	Practical			25	100	
a)	ESE		50	a)	ESE		15		
				i	Program code and execution		8		
				ii	Output		3		
				iii	Viva		2		
				iv	Modification		2		
b)	CCA		25	b)	CCA		10		
	i	Test Paper	5		i	Punctuality	3		
	ii	Model exam	10		ii	Model Exam	4		
	iii	Assignment	5						
	iv	Seminar			5	iii	Record		3
		Viva-Voce							
		Book/Article Review							
		Case Study							



MULTI DISCIPLINARY COURSE(MDC)

KU1MDCDAS101 COMPUTER FUNDAMENTALS

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
1	MDC	100-199	KU1MDCDAS101	3	45

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	-	-	25	50	75	1.5 Hrs

Course Description: This course provides an introduction to computers, covering their basics, hardware, software, networks, and internet fundamentals, along with essential concepts of computer security.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
CO1	Understand the basic concepts and history of computers.	U
CO2	Identify hardware components and their functions.	U
CO3	Differentiate between types of software and operating systems.	An
CO4	Understand basics of networking, internet, and computer security.	U

**Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2			2	
CO2	2		2	2	
CO3	1		2	3	



CO4	1	2	2	3	1
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COURSE CONTENTS

Contents for Classroom Transaction:

M O D U L E	U N I T	DESCRIPTION	HOUR S
1	MODULE TITLE: Basics of Computers		
	1	Definition, Characteristics of Computers, History of Computer.	9
	2	Functions of Computer System, Classification of Computers, Block Diagram of a Computer.	
	3	Problem Solving Using Computers- Steps to Solve a Problem.	
2	MODULE TITLE: Computer Hardware		
	1	Basic Components: Input, Output, Storage, and Processing devices.	9
	2	Central Processing Unit (CPU): Control Unit, ALU, Registers.	
	3	Memory types: Primary (RAM, ROM, Cache), Secondary (Hard Disk, SSD), Portable storage (USB, CD/DVD).	
3	MODULE TITLE: Computer Software		
	1	Definition of Software.	9
	2	Types of Software: System Software, Application Software, Utility Software.	
	3	Operating System: Functions and Examples (Windows, Linux, macOS).	
	4	Programming Languages: Machine language, Assembly, High-level languages (basic idea).	
4	MODULE TITLE: Computer Networks and Internet		
	1	Basics of Data Communication.	9
	2	Types of Networks: LAN, MAN, WAN.	
	3	Internet basics: Web browsers, Search engines, Email.	
	4	Computer Security basics: Viruses, Firewalls, Antivirus software, Safe practices.	



5	Teacher Specific Module	9
	<i>Directions</i>	
	<i>Concerned teacher can adopt proper methodologies and evaluation metrics to understand the topics.</i>	

Essential Readings:

1. P.K. Sinha & P. Sinha, “Computer Fundamentals”, Eight Edition, BPB Publications, 2020.
2. Rajaraman V. & Adabala N, “Fundamentals of Computers”, Sixth Edition, PHI Learning, 2015.
3. Alexis Leon & Mathews Leon, “Fundamentals of Information Technology”, Second Edition, Vikas Publishing House, 2009.

Suggested Readings:

1. Peter Norton, “Introduction to Computers”, 6th Edition, McGraw Hill.

ASSESSMENT RUBRICS

Evaluation Type		Marks
End Semester Evaluation		50
Continuous Evaluation		25
a)	Test Paper- 1	5
b)	Model Examination	10
c)	Assignment	5
d)	Seminar	5
e)	Book/ Article Review	
f)	Viva-Voce	
g)	Case Study	
Total		75



SEMESTER II

DISCIPLINE SPECIFIC COURSES(DSC)

KU2DSCDAS104 PYTHON PROGRAMMING

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
2	DSC	100-199	KU2DSCDAS104	4	75

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	2	-	35	65	100	1.5 Hrs

Course Description: This course provides an introduction to Python programming, covering basic syntax, control flow, functions, and exception handling. It emphasizes the use of data structures, string manipulation, and file handling, along with libraries such as NumPy and Pandas. Students will also learn to design simple GUI applications.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
CO1	Understand Python basics, syntax, and control flow.	U
CO2	Apply data structures, string handling, and exception handling for problem-solving.	A
CO3	Work with files, CSV data, and Python libraries like NumPy and Pandas for data management.	A
CO4	Create an application with the support of graphics in Python.	C

**Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3		3	
CO2	3	2	2	2	



CO3	3	2	2	2	2
CO4	2	2	3	2	

COURSE CONTENTS

Contents for Classroom Transaction:

M O D U LE	U N I T	DESCRIPTION	HOUR S
1	MODULE TITLE: Introduction to Python		
	1	History of Python Programming, Thrust Areas of Python, Installing Anaconda Python Distribution, PyCharm IDE and Jupyter Notebook, Creating and Running First Python.	15
	2	Identifiers, Keywords, Statements and expressions, Variables, Operators, Precedence and Associativity, Data Types, Indentation, Comments.	
	3	Reading Input, Print Output, Type Conversions, the type() Function and Is Operator.	
2	MODULE TITLE: Control Flow Statement and Functions		
	1	Decision control flow statement (if, if ...else, if...elif..., nested if).	15
	2	Loops (while, for, range (), enumerate () function), Nested loops, Control statements (break, continue, pass statements).	
	3	Catching Exception Using try and except Statement.	
	4	Functions- Built-In Functions Commonly Used Modules, Function Definition and Calling the Function, The return statement and void function, Scope and Life Time of Variables, Command Line Arguments.	
3	MODULE TITLE: Lists, Dictionaries, Tuple, Set and String Handling		
	1	Lists- Creating List, Basic List Operations, Indexing and Slicing in Lists, Built-In Functions Used on Lists, List	15



		Methods.	
	2	Dictionaries- Creating Dictionary, Accessing and Modifying Key: Value Pairs in Dictionaries, Built-In Functions Used on Dictionaries, Dictionary Methods, The del Statement.	
	3	Tuples: Creating Tuples, Basic Tuple Operations, Indexing and Slicing in Tuples, Built-In Functions Used on Tuples, Relation Between Tuples and Lists, Relation between Tuples and Dictionaries, Tuple Methods, Using zip () Function.	
	4	Sets, Set Methods, Frozenset.	
	5	Strings- Creating and Storing Strings, Basic String Operations, Accessing Characters in String by Index Number, String Slicing and Joining, String Methods, Formatting Strings.	
4	MODULE TITLE: Files and GUI in Python		
	1	Files- Types of Files, Creating and Reading Text Data, File Methods to Read and Write Data, Reading and Writing Binary files, Reading and Writing CSV Files, Introduction to NumPy and Pandas.	15
	2	GUIs in Python: Root Window-Fonts and colors- Working with Containers and Canvas, Frames, Widgets, Button widgets, Arranging Widgets in the Frame.	
	3	Label Widget, Message Widget, Text Widget, Scrollbar Widgets, Check Button Widget, Radio Button Widget, Entry Widget, Spin Box Widget, List Box Widget, Menu Widget.	
5	Teacher Specific Module		15
	<i>Directions: The following exercises may be used as references for conducting lab experiments. This is not the final list of experiments for the practical examination. Additional experiments may be added to further enhance the practical skills of students.</i>		
	1. Write a program to perform basic arithmetic operations		



	(addition, subtraction, multiplication, division) on two numbers. 2. Write a program that reverses a number and calculates the sum of its digits. 3. Write a Python program to get the largest number from a list. 4. Write a Python script to sort (ascending and descending) a dictionary by value. 5. Write a Python program to create a set. 6. Write a Python program to create a union of sets. 7. Write a Python program to read a given CSV file as a list. 8. Develop a function to check if a given string is a palindrome. 9. Perform operations like removing duplicates, finding the second largest element, and reversing a list without using the reverse () method. 10. Write programs to perform linear and binary search on a list of numbers. 11. Write a program to read from and write to text files. 12. Write a Python program to create a root window with a custom background color, set the window title, and display a label in a different font and color.	
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Essential Readings:

1. Gowrishankar S, Veena A, —Introduction to Python Programming, 1st Edition, CRC Press/Taylor & Francis, 2018. ISBN-13: 978-0815394372
2. Alberto Fernandez Villan, Mastering OpenCV 4 with Python, Packt Publishing Ltd, 2019, ISBN-13 978-1789344912.
3. Dr. R Nageswara Rao, Core Python Programming, 2nd edition, Dreamtech Publisher, 2019

Suggested Readings:



1. Wesley J. Chun, Core Python Programming, Second Edition, Publisher: Prentice Hall Pub, 2006.

ASSESSMENT RUBRICS

Evaluation Type			Marks	Evaluation Type			Marks	Total
Lecture			75	Practical			25	100
a)	ESE		50	a)	ESE		15	
				i	Program code and execution		8	
				ii	Output		3	
				iii	Viva		2	
				iv	Modification		2	
b)	CCA		25	b)	CCA		10	
	i	Test Paper	5		i	Punctuality	3	
	ii	Model exam	10		ii	Model Exam	4	
	iii	Assignment	5		iii	Record	3	
	iv	Seminar/	5					
		Viva-Voce						
		Book/Article Review						
		Case Study						



KU2DSCDAS105 FUNDAMENTALS OF WEB PROGRAMMING

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
2	DSC	100-199	KU2DSCDAS105	4	75

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	2	-	30	70	100	1.5 Hrs

Course Description: The course helps to design and practice real-world homepage programs and earn adequate experience with current web design techniques such as HTML5 and cascading style sheets

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
CO1	Identify different components in web technology and WWW	U, A
CO2	Apply HTML Forms and CSS Styling to design web pages.	U, A
CO3	Design webpages using HTML Forms.	U, A
CO4	Design interactive Web pages	U, A

**Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2			2	
CO2		2	3	2	
CO3		2	3	2	2
CO4		2	3	2	2

COURSE CONTENTS

Contents for Classroom Transaction:



M O D U L E	U N I T	DESCRIPTION	HOUR S
1	MODULE TITLE: Introduction to Internet and WWW		
	1	Introduction to Internet: Evolution of the Internet, World Wide Web, Web Browsers, URL, http.	15
	2	Web Basics: Static Vs Dynamic Web Pages, Client-Side Scripting Versus Server-Side Scripting.	
	3	W3C & Web Hosting: World Wide Web Consortium (W3C), Web hosting, Types of Web Hosting, Free Hosting.	
	4	Domain Name Registration: Concept, Importance, and Steps for Registering a Domain Name.	
2	MODULE TITLE: HTML		
	1	Introduction to HTML: Creating HTML Document, Tags & Attributes, Syntax of Tag, Starting and Ending Tag, Tag Without End, Building a Webpage.	15
	2	Text Formatting: Division, Paragraphs, Heading, Physical Style Tags, Text alignment, Fonts.	
	3	Hyperlink and Loading Images: Linking to Other Web Pages, Images and Tag, Line Breaks, Comments.	
	4	List: Types of Lists (Ordered, Unordered, Definition), Nested Lists.	
3	MODULE TITLE: HTML Tables and Forms		
	1	HTML Tables: Creating a Table, Table Tags and Attributes, Formatting the Table: Width, Height, Alignment, Border, Padding & Spacing, Colspan & Rowspan.	15
	2	HTML Forms: Form Elements (input, select, textarea, button, datalist), Input Types (text, password, submit, radio, checkbox, date, email, number).	
	3	Input Type Attributes (value, readonly, disabled, maxlength, autocomplete, list, min, max, placeholder).	
	4	HTML5 Form Validation (required and pattern attribute of input type).	
4	MODULE TITLE: CSS (Cascading Style Sheets)		
	1	CSS -Advantages, Types of CSS- Inline, Internal and External CSS.	15
	2	Applying Style to HTML Using CSS.	



	3	CSS Properties: CSS Colours, Fonts, Borders, Padding.	
	4	Applying Style Using Class and ID Attribute.	
5	Teacher Specific Module		15
	<i>Directions: The following exercises may be used as references for conducting lab experiments. This is not the final list of experiments for the practical examination. Additional experiments may be added to further enhance the practical skills of students.</i>		
	1. HTML program to implement basic HTML tags. 2. HTML program to implement various heading and text formatting tags. 3. HTML program to implement the tag. 4. HTML program to implement various types of HTML lists. 5. HTML program to design a table representing a student's mark list. HTML program to implement various HTML form elements and attributes.		

Essential Readings:

1. Laura Lemay, Rafe Colburn & Jennifer Kyrnin, "Mastering HTML, CSS & JavaScript Web Publishing", Paperback, BPB Publications, 2016.
2. Thomas a Powell, "HTML & CSS: The Complete Reference", Fifth Edition, Tata McGraw Hill.
3. P.J. Deitel & H.M. Deitel Pearson, "Internet and World Wide Web How to program", 2nd Edition, 2001.
4. Paul Wang & Sanda Katila, "An Introduction to WEB Design and Programming", Course Technology Inc, 2003.
5. Julie C. Meloni, "HTML and CSS in 24 Hours, Sams Teach Yourself (Updated for HTML5 and CSS3)", Ninth Edition, 2013.

ASSESSMENT RUBRICS

Evaluation Type	Marks	Evaluation Type	Marks	Total
Lecture	75	Practical	25	



a)	ESE		50	a)	ESE		15	100		
				i	Program code and execution		8			
				ii	Output		3			
				iii	Viva		2			
				iv	Modification		2			
b)	CCA		25	b)	CCA		10			
	i	Test Paper	5		i	Punctuality	3			
	ii	Model exam	10		ii	Model Exam	4			
	iii	Assignment	5							
	iv	Seminar/	5					iii	Record	3
		Viva-Voce								
		Book/Article Review								
		Case Study								



KU2DSCDAS106 CONTENT MANAGEMENT SYSTEM AND WORDPRESS

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
2	DSC	100-199	KU2DSCDAS106	4	75

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	2	-	35	65	100	1.5 Hrs

Course Description: This course introduces the fundamentals of Content Management Systems (CMS) and their applications, with hands-on practice in WordPress. Students will learn CMS concepts, architecture, and features, and gain practical skills in installing WordPress, creating and managing content, customizing themes, and designing simple websites.

Course Prerequisite: Basic knowledge of computers, internet usage, and web concepts. Familiarity with HTML and CSS is desirable but not mandatory.

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
CO1	Understand the fundamentals, types, features, and applications of Content Management Systems.	U
CO2	Explain the architecture, components, and functioning of CMS with emphasis on security and performance.	U, A
CO3	Analyze the use of CMS across domains and explore modern trends such as cloud, mobile, and headless CMS.	U
CO4	Develop, customize, and manage content using WordPress for practical web applications.	A

**Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2			2	
CO2	2		2	2	



CO3		2	2	2	2
CO4		2	2	3	

COURSE CONTENTS

Contents for Classroom Transaction:

M O D U L E	U N I T	DESCRIPTION	HOUR S
1	MODULE TITLE: Basics of Content Management Systems		
	1	Introduction to CMS: Definition, Purpose, Importance, and Benefits of Using CMS.	15
	2	Types of CMS: Open Source, Proprietary, and Custom-Built.	
	3	Features of CMS: Content Creation, Editing, Publishing, Workflows, and Version Control.	
	4	Advantages and Limitations of CMS.	
	5	Examples of Popular CMS Platforms. Comparison of Popular CMS Platforms: WordPress, Joomla, Drupal.	
2	MODULE TITLE: Components and functioning of CMS		
	1	CMS architecture: Frontend, Backend, Database.	15
	2	Core Components: Content Repository, Templates/Themes, Plugins/Extensions, Admin Interface.	
	3	User Roles and Permissions in CMS.	
	4	Content Lifecycle: Creation, Storage, Publishing, Maintenance.	
	5	Security and Performance Considerations in CMS.	
3	MODULE TITLE: Applications and Trends in CMS		
	1	Applications of CMS in Websites, E-Commerce, Education, Media, and Enterprises.	15
	2	SEO and Analytics Support in CMS.	
	3	CMS in Cloud and Mobile Environments.	
	4	Headless CMS: API-Based Content Delivery.	
4	MODULE TITLE: Introduction to WordPress		
	1	Basics of WordPress: Installation and Setup of WordPress, Exploring the WordPress Dashboard and Interface, Understanding WordPress Themes and	15



		Templates.	
	2	Content Creation and Management: Creating and Publishing Posts, Pages, and Media, Organizing Content with Categories and Tags, Using the WordPress Editor for Formatting, Incorporating Multimedia (images, videos, audio).	
	3	Customization and Design: Customizing WordPress Themes using HTML and CSS.	
5	Teacher Specific Module		15
	<i>Directions: The following exercises may be used as references for conducting lab experiments. This is not the final list of experiments for the practical examination. Additional experiments may be added to further enhance the practical skills of students.</i>		
	List of Experiments 1. Installation and Setup of WordPress - Install WordPress on XAMPP/WAMP. - Explore the WordPress dashboard and interface. 2. Working with Themes - Understand and apply WordPress themes and templates. - Switch between different themes and observe the changes. 3. Creating and Publishing Content - Create and publish posts and pages. - Upload and manage media files (images, audio, and videos). - Organize content using categories and tags. 4. Using the WordPress Block Editor - Format text using headings, paragraphs, lists, and other formatting options. - Insert and manage multimedia elements such as images, videos, and audio. 5. Customization with HTML & CSS - Customize the website layout, colors, fonts, and other design elements. Apply basic HTML and CSS to modify the appearance of web pages.		



Essential Readings:

1. Nirav Mehta, "Choosing an Open-Source CMS: Beginner's Guide", Packt Publishing Ltd, 2009.
2. Bob Boiko, "Content Management Bible", 2nd Edition, Wiley Publishing, Inc., 2005.
3. Brad Williams, David Damstra, and Hal Stern, "Professional WordPress: Design and Development", Third Edition, Wrox, 2015.
4. Lisa Sabin & Wilson, "WordPress for Dummies", 6th Edition, John Wiley & Sons, Inc., 2014.
5. Matthew MacDonald, "WordPress: The Missing Manual", 3rd Edition, O'Reilly Media, 2020.

ASSESSMENT RUBRICS

Evaluation Type			Marks	Evaluation Type		Marks	Total	
Lecture			75	Practical		25	100	
a)	ESE		50	a)	ESE	15		
				i	Program code and execution	8		
				ii	Output	3		
				iii	Viva	2		
				iv	Modification	2		
b)	CCA		25	b)	CCA	10		
	i	Test Paper	5		i	Punctuality		3
	ii	Model exam	10		ii	Model Exam		4
	iii	Assignment	5		iii	Record		3
	iv	Seminar	5					
		Viva-Voce						
		Book/Article Review						
		Case Study						



KU2DSCDAS107 INTERNET TECHNOLOGY

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
2	DSC	100-199	KU2DSCDAS107	4	60

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	-	-	30	70	100	2 Hrs

Course Description: This course covers computer networks, internet protocols, web technologies, and advanced trends, with practical skills in web design using HTML.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
CO1	Understand basic network types, topologies, and communication protocols.	U
CO2	Identify key internet technologies and evaluate search strategies, email systems, and internet services.	An
CO3	Understand recent advancements in internet and web technologies.	R, U
CO4	Apply HTML to design simple and structured web pages using various tags and media elements.	A

**Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1				2	
CO2		2		2	
CO3				2	
CO4		2	2	3	



COURSE CONTENTS

Contents for Classroom Transaction:

M O D U L E	U N I T	DESCRIPTION	HOUR S
1	MODULE TITLE: Network Technology		
	1	Introduction to Computer Networks- Advantages of Networks, Goals of Networks.	12
	2	Types of Networks- LAN, MAN, WAN, Internet, Public Networks.	
	3	LAN topologies- Bus, Star, Ring, Mesh.	
	4	Interconnecting Issues, Types, Connectivity Devices- Hubs, Switch, Bridges, Routers.	
2	MODULE TITLE: Web Pages		
	1	Introduction to WWW- WWW and HTTP, Webpage.	12
	2	Introduction to Web Browser- Bookmarks- Comparison, Directories.	
	3	Search Engines-Working and features-Search Strategies – Search Generalization-Search Specialization-Working.	
	4	Uniform Resource Locator (URL), Email-Working with Email Sending Mail-Reading Mail-Replying to Mail-Deleting Mail, Advantages and Disadvantages of Email.	
3	MODULE TITLE: Internet Protocol		
	1	Introduction to Internet -Meaning of Internet.	12
	2	WWW- History, Working of Internet, Browsing, Searching the Web.	
	3	Internet protocols- TCP/IP Protocol Suite, UDP, IP Addresses, IP Versions – IPV4, IPV6.	
	4	Services of the Internet- FTP, HTTP, Email.	
4	MODULE TITLE: Advanced Internet Technologies and Web Design using HTML		
	1	3G, 4G, 5G Networks, Internet of Behaviours.	12
	2	Web Design using HTML: HTML- Understanding HTML, Text tags, Graphics, Video and Sound Tags; Link and Anchor Tags, Table Tags; Frame Tags, Miscellaneous tags (layers, image maps etc.).	
5	Teacher Specific Module		12



	Directions	
	<i>Use appropriate methodologies and evaluation metrics related with the topics.</i>	

Essential Readings:

1. Raymond Greenlaw, Ellen Hepp, "Fundamentals of Internet and the World Wide Web,
McGraw-Hill, 1998.
2. Laura Lemay, Rafe Colburn & Jennifer Kyrnin, "Mastering HTML, CSS & JavaScript Web Publishing", Paperback, BPB Publications, 2016.
3. Thomas a Powell, "HTML & CSS: The Complete Reference", Fifth Edition, Tata McGraw Hill.
4. Dr. Surender Jangra, "Basics of Internet and Web", Vayu Education of India. New Delhi, 110002.

ASSESSMENT RUBRICS

Evaluation Type		Marks
End Semester Evaluation		70
Continuous Evaluation		30
a)	Test Paper- 1	5
b)	Model Examination	10
c)	Assignment - 2 numbers	10
d)	Seminar	5
e)	Book/ Article Review	
f)	Viva-Voce	
g)	Field Report	
Total		100



MULTI DISCIPLINARY COURSES(MDC)

KU2MDCDAS102 DATA ANALYSIS USING EXCEL

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
2	MDC	100-199	KU2MDCDAS102	3	60

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
2	2	-	25	50	75	1.5Hrs

Course Description: This course provides a comprehensive introduction to Spreadsheets, focusing on understanding formulas, functions, data organization, analysis techniques, and data visualization. Participants will gain skills in spreadsheet management, data cleansing, analysis, and visualization using Excel's various tools and features.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
CO1	Understand and apply basic Excel features, cell referencing, formulas, and commonly used functions for efficient data management.	U, A
CO2	Perform data cleansing, validation, sorting, filtering, and organization to prepare accurate and structured datasets.	A, An
CO3	Analyze data using advanced Excel tools such as Pivot Tables, What-if Analysis, Goal Seek, and Watch Window.	An, E
CO4	Create and customize charts, Pivot Charts, dashboards, and form controls to effectively visualize and interpret data.	C, E

**Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1				2	



CO2		2	2	2	
CO3	2	3	3	2	2
CO4		2	3	2	2

COURSE CONTENTS

Contents for Classroom Transaction:

M O D U L E	U N I T	DESCRIPTION	HOUR S
1	MODULE TITLE: Introduction to Excel & Understanding Formulas, Functions		
	1	Features of Spreadsheet.	12
	2	Parts of Excel Window, Tool bars, Work sheet and Work Book, Insertion and Deletion of Cells, Columns, Rows.	
	3	Formatting in Excel (Merge, Warp, Font Formatting, Number Formatting, Borders and Shading, Colouring).	
	4	Range, Autofill, Autosum, Relative, Absolute and Mixed Referencing in Excel, Linking data between worksheets.	
	5	Formulas and Functions in Excel: Use of Formula Bar, Functions: SUM, ROUND, CEIL, FLOOR, IF, AND, OR, AVERAGE, MIN, MAX, COUNT, COUNTIF, SUMIF, VLOOKUP, HLOOKUP.	
2	MODULE TITLE: Cleansing and Organising Data in Excel		
	1	Importance of Data Cleansing and Organisation.	12
	2	Data Import and Export.	
	3	Filtering and Sorting.	
	4	Data Validation and Remove Duplicates.	
	5	Group, Ungroup, Subtotal.	
	6	Conditional Formatting – Highlight Cell Rules, Top/Bottom Rules.	
3	MODULE TITLE: Advanced Techniques for Data Analysis		
	1	Features of Pivot table.	12
	2	Pivot Table Creation.	
	3	What-if Analysis.	
	4	Goal Seek.	
	5	Watch Window.	



4	MODULE TITLE: Data Visualisation Techniques		12
	1	Creating Charts, Different types of charts.	
	2	Formatting Chart Objects, Changing the Chart Type, Showing and Hiding the Legend, Showing and Hiding the Data Table.	
	3	Pivot Chart.	
	4	Dashboards.	
	5	Form Controls.	
5	Teacher Specific Module		12
	<i>Directions: Provide practical oriented sessions including following activities.</i>		
	1. Enter names and marks of 3 students and calculate the total marks using SUM function. 2. Enter sample data and apply bold formatting and borders to the column headings. 3. Enter numbers 1 and 2 and use AutoFill to continue the series up to 10. 4. Enter students’ marks and use the IF function to display “Pass” or “Fail” based on the marks obtained. 5. Enter sample data and create a bar chart to represent the data graphically.		

Essential Readings:

1. Michael Alexander and Richard Kusleika, "Excel 2019 Bible", 1st Edition, Wiley, 2018.
2. Ken Bluttman and Peter Aitken, "Excel Formulas & Functions for Dummies", John Wiley & Sons, 2005.
3. Michael R. Middleton, "Data Analysis Using Microsoft Excel", Cengage Learning, 2003.
4. Wayne Winston, "Microsoft Excel 2019 Data Analysis and Business Modeling", 6th Edition, Microsoft Press, 2019.



ASSESSMENT RUBRICS

Evaluation Type			Marks	Evaluation Type			Marks	Total
Lecture			50	Practical			25	75
a)	ESE		35	a)	ESE		15	
				i	Program code and execution		8	
				ii	Output		5	
				iii	Viva		2	
b)	CCA		15	b)	CCA		10	
	i	Test Paper	5		i	Punctuality and Lab Performance	3	
	ii	Model exam	5					
	ii	Assignment/Viva	5		ii	Model Exam	5	
					iii	Record	2	



KU2MDCDAS103 INTRODUCTION TO DIGITAL MARKETING

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
2	MDC	100-199	KU2MDCDAS103	3	45

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	-	-	25	50	75	1.5 Hrs

Course Description: This course provides a comprehensive foundation in digital marketing, covering essential topics such as SEO, social media, email marketing, content strategy, paid advertising, web analytics, and emerging marketing trends. It equips learners with practical skills to plan, execute, and analyze digital campaigns for business success in the digital era.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
CO1	Understand the fundamental concepts and importance of digital marketing.	U
CO2	Apply content and social media strategies effectively across platforms.	A
CO3	Implement SEO and paid advertising techniques to increase online visibility.	A
CO4	Use analytics tools to measure, track, and improve marketing performance.	A

**Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1					2
CO2		2	2	2	3



CO3		2	2	2	3
CO4		3	2	2	3

COURSE CONTENTS

Contents for Classroom Transaction:

M O D U L E	U N I T	DESCRIPTION	HOUR S
1	MODULE TITLE: Digital Marketing Basics		
	1	Overview of Digital Marketing.	9
	2	Importance of Digital Marketing for Businesses.	
	3	Introduction to Key Digital Marketing Channels (SEO, social media, email marketing).	
	4	Basics of Creating a Digital Marketing Strategy.	
2	MODULE TITLE: Content Marketing & Social Media		
	1	Content Marketing Fundamentals.	9
	2	Content Strategy Development.	
	3	Content Creation for Different Platforms.	
	4	Introduction to Social Media Marketing & Keyword Optimization.	
	5	Social Media Strategy & Community Management.	
3	MODULE TITLE: Search Engine Optimization (SEO) & Paid Advertising		
	1	Introduction to Search Engine Optimization.	9
	2	On-page and Off-page SEO Techniques.	
	3	Search Engine Marketing (SEM) Fundamentals.	
	4	Pay-Per-Click (PPC) Advertising with Google Ads.	
	5	Social Media Advertising Platforms.	
4	MODULE TITLE: Web Analytics & Emerging Trends		
	1	Introduction to Web Analytics & Key Metrics.	9
	2	Using Analytics Tools for Data-Driven Decision Making.	
	3	Conversion Tracking & Optimization.	
	4	Emerging Trends in Digital Marketing.	
	5	The Future of Marketing.	
5	Teacher Specific Module		9



	Directions	
	<i>Use appropriate methodologies and evaluation metrics related with the topics.</i>	

Essential Readings:

1. Ian Dodson, “The art of Digital Marketing”, Wiley; ISBN:9781119265702, 2016.
2. Puneet Singh Bhatia, “Fundamentals of Digital Marketing”, 2nd Edition, Pearson Education, 2019.

Suggested Readings:

1. Ryan, D., “Understanding Digital Marketing: Marketing Strategies for Engaging the Digital Generation”, Kogan Page Limited, 2008.
2. Satinder Kumar, Supreet Kaur, “Digital Marketing”, Taxmann Publications Private Limited, 2023.
3. Robert Hill, “Social Media Marketing 2024 - Mastering New Trends & Strategies for Online Success”, Independently Published, 2023.

ASSESSMENT RUBRICS

Evaluation Type		Marks
End Semester Evaluation		50
Continuous Evaluation		25
a)	Test Paper- 1	5
b)	Model Examination	10
c)	Assignment	5
d)	Seminar	5
e)	Book/ Article Review	
f)	Viva-Voce	
g)	Case Study	
Total		75



SEMESTER III

DISCIPLINE SPECIFIC COURSES(DSC)

KU3DSCDAS201 FUNDAMENTALS OF DATA ANALYTICS

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
3	DSC	200-299	KU3DSCDAS201	4	75

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	2	-	35	65	100	1.5 Hrs

Course Description: This course introduces the fundamentals of data analytics, including its importance, types, and real-world applications. It covers the data analytics process, data collection, preprocessing, and exploratory data analysis using statistical and visualization techniques. Students also gain practical skills in managing and analysing data using spreadsheet tools to derive meaningful insights.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
CO1	Understand the concepts, process, tools, and applications of data analytics.	U
CO2	Identify data types and apply data collection and preprocessing techniques.	A
CO3	Perform exploratory data analysis using statistics and visualization techniques.	A
CO4	Use spreadsheet tools for data analysis and management.	A
CO5	Apply analytics concepts to solve real-world problems.	A

**Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)*



Mapping of Course Outcomes to PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2			
CO2		3	2	2	
CO3	2	3	3	2	2
CO4		2	2	2	
CO5	2	3	3	3	3

COURSE CONTENTS

Contents for Classroom Transaction:

MODU LE	UNIT	DESCRIPTION	HOUR S
1	MODULE TITLE: Data Analytics		
	1	Introduction to Data Analytics: Evolution and Importance of Data Analytics; Data Driven Decision Making; Role of Data Analytics in Various Domains.	15
	2	Steps in Data Analytics Process; Types of data analytics: Descriptive, Diagnostic, Predictive, and Prescriptive; Applications of Data Analytics.	
	3	Methods of Data Analytics: Qualitative and Quantitative Approaches.	
	4	Overview of Data Analytics Tools; Role of Analytics in AI and ML (Concept Only).	
2	MODULE TITLE: Data Collection and Preprocessing		
	1	Data Concepts, Sources of Data, Types of Data (Based on Structure): Structured, Semi-structured, and Unstructured; Types of Data (Based on Nature and Source): Quantitative Data and Qualitative Data; Primary and Secondary Data; Metadata;	15
	2	Data Formats: CSV, Excel, JSON.	
	3	Data Collection Methods: Surveys, Experiments, Observation and Online Data Sources.	
	4	Data Preprocessing: Need for data preprocessing, Steps in Data Preprocessing.	
	5	Data Cleaning techniques: Handling Missing Values, Removing Duplicates, Outlier Detection	



		(Concept), Data Transformation and Data Normalization.	
3	MODULE TITLE: Exploratory Data Analysis (EDA)		
	1	Introduction to EDA- Concepts, Importance, Steps in EDA.	15
	2	Descriptive statistics: Measures of Central Tendency, Measures of Dispersion, Measures of Frequency Distribution (Conceptual Understanding Only).	
	3	Identifying Patterns, Trends, Relationships and Anomalies in data; Basic Correlation Concepts; Introduction to Probability (Concept Only).	
	4	Data Visualization: Importance and Principles of Effective Visualization;	
	5	Visualization Techniques: Bar Chart, Line Chart, Histogram, Box Plots, Scatter Plot; Common Visualization Mistakes.	
4	MODULE TITLE: Spreadsheet Based Data Analysis and Visualization		
	1	Creating and Organizing Datasets in Tabular Form; Sorting, Filtering, Data Validation, Removing Duplicates.	15
	2	Functions: Mathematical and Statistical functions, Logical Functions (IF, AND, OR), Text Functions, Date and Time Functions.	
	3	Advanced Data Analysis: Nested Functions, Pivot Tables and Pivot Charts, Data Summarization Techniques, What-if Analysis, and Goal Seek.	
	4	Visualization and Reporting: Creating Charts and Pivot Charts; Basic Dashboard Design Principles; Formatting, Interpreting and Presenting Results.	
5	Teacher Specific Module		15
	<i>Directions: The following exercises may be used as references for conducting lab experiments. This is not the final list of experiments for the practical examination. Additional experiments may be added to further enhance the practical skills of students.</i>		
	Question: A college wants to analyze the performance of students using Microsoft Excel. Create a student performance dataset and perform data preparation, processing, analysis, visualization, and reporting.		



Dataset Creation

1. Create a student dataset containing the following fields:
Roll No, Name, Department, Attendance (%), Marks in 5 Subjects, Total Marks, Average Marks, Grade and Scholarship Eligibility.
2. Create 15–20 student records and organize them in a proper tabular format. Apply suitable formatting to the table, including bold headers, alignment, appropriate column widths, and borders.

Perform the following tasks using a spreadsheet tool (Excel):

Part A: Data Preparation

1. Apply Data Validation to restrict the Department field (e.g., B.Sc. Data Analytics, BCA, B. Com).
2. Check the dataset for duplicate records and remove any duplicates found.
3. Apply appropriate formatting to the Attendance (%) and marks columns.

Part B: Data Processing

4. Calculate: Total Marks, Average Marks for each student using appropriate excel formulas.
4. Use the IF or Nested IF to assign grades according to the following criteria:
 - $\geq 90 \rightarrow A$
 - $75-89 \rightarrow B$
 - $50-74 \rightarrow C$
 - $< 50 \rightarrow \text{Fail}$
5. Determine scholarship eligibility using the following criteria:
 - Average Marks > 80 AND Attendance $> 75\%$
 - Display “Eligible” or “Not Eligible” using an appropriate logical formula.



	Part C: Data Analysis 7. Sort the dataset: Based on Average Marks in descending order. 8. Apply filters to: Display students who scored above 75, Display students from a specific department. 9. Create a Pivot Table to show: Department-wise average marks. Part D: Data Visualization 10. Create the following charts: Bar Chart for student marks comparison, Pie Chart showing department distribution 11. Apply Conditional Formatting: Highlight students scoring below 50. Part E: Reporting 12. Prepare a summary report based on the analysis include: Highest Average Marks, Lowest Average Marks, Overall Class Average, Number of Scholarship-Eligible students.	
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Essential Readings:

1. Prof. Dipanjan Keumar Dey, Fundamentals of Data Analytics, ISBN:978-93-95016-81-0, 2022, Sankalp Publications.
2. Mr. Vaishnavi Dutt Mishra, Principles and Practices of Data Analytics, First Edition, ISBN: 978-81-19832-93-4, AG Publishing House.
3. Richa Mishra, Dr. Nirvikar Katiyar, Apoorva Mishra, Basics of Data Analytics, ISBN: 9798889750369.



Suggested Readings:

1. Russell Dawson, Fundamentals of Data Analytics: Learn Essential Skills, Embrace the Future, and Catapult Your Career in the Data-Driven World-A Comprehensive Guide to Data Literacy for Beginners, ISBN: 9798895879955, Staten House, 2024.
2. <https://www.geeksforgeeks.org/maths/descriptive-statistics/>
3. Cliff T. Ragsdale, Spreadsheet Modeling & Decision Analysis: A Practical Introduction to Management Science, Thomson/South-Western, 2004.

ASSESSMENT RUBRICS

Evaluation Type			Marks	Evaluation Type		Marks	Total	
Lecture			75	Practical		25	100	
a)	ESE		50	a)	ESE	15		
				i	Program code and execution	8		
				ii	Output	3		
				iii	Viva	2		
				iv	Modification	2		
b)	CCA		25	b)	CCA	10		
	i	Test Paper	5		i	Punctuality		3
	ii	Model exam	10		ii	Model Exam		4
	iii	Assignment	5		iii	Record		3
	iv	Seminar	5					
		Viva-Voce						
		Book/Article Review						
		Case Study						



KU3DSCDAS202 DATA STRUCTURES USING PYTHON

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
3	DSC	200-299	KU3DSCDAS202	4	75

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	2	-	35	65	100	1.5 Hrs

Course Description: This course introduces fundamental data structures such as arrays, linked lists, stacks, queues, trees, and graphs. It focuses on data organization, basic operations, and algorithm efficiency for problem solving. Students will gain practical knowledge for implementing data structures in real-world applications.

Course Prerequisite: Basic knowledge of Python Programming

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
CO1	Understand data structures, arrays, and basic searching and sorting algorithms.	U, A
CO2	Understand and implement linked list operations.	U, A
CO3	Understand and apply stack and queue concepts.	U, A
CO4	Understand trees and graphs and their traversal techniques.	U, A
CO5	Develop programs using appropriate data structures and evaluate their efficiency in terms of time and space complexity.	A, An

**Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	2	
CO2	2	2	3	2	



CO3	2	3	3	2	1
CO4	2	2	3	2	1
CO5	3	3	3	3	1

COURSE CONTENTS

Contents for Classroom Transaction:

MODU LE	UNIT	DESCRIPTION	HOUR S
1	MODULE TITLE: Introduction to Data Structures and Arrays		
	1	Introduction to Data Structures: Definition, Classification of Data Structures: Linear and Non-Linear, Static and Dynamic; Data Structure Operations, and Applications of Data Structures.	15
	2	Array - Single Dimensional Arrays, Memory Representation, Operations: Traversal, Insertion and Deletion.	
	3	Searching Techniques: Linear search, Binary search; Sorting Techniques: Bubble Sort, Selection Sort, and Insertion Sort; Time and Space Complexities of Algorithms.	
	4	Multidimensional Array- Memory Representation- Row Major and Column Major Order; Sparse Matrix – Array Representation.	
2	MODULE TITLE: Linked List		
	1	Linked List: Concept, Memory Representation, Difference Between Linked List and Array.	15
	2	Singly Linked List – Memory Representation, Operations - Traversal, Searching, Insertion, and Deletion.	
	3	Doubly Linked List- Memory representation, Operations-Traversal, Searching, Insertion, and Deletion.	
	4	Circular linked list-Basic concepts; Applications of Linked Lists.	
3	MODULE TITLE: Stack & Queue		
	1	Stack: Concepts, Stack Operations, Stack Implementation Using Arrays and Linked List.	15



	2	Applications of Stack – Polish & Reverse Polish Notations; Conversion of Arithmetic Expressions- Infix to Postfix Using Stack, Evaluation of Postfix Expression Using Stack.	
	3	Queue: Concepts, Queue Operations, Queue Implementation Using Arrays and Linked list, Circular Queue (Basic Concepts), Applications of Queue.	
	4	Deque - Types- Input and Output Restricted; Priority Queues (Basic Concepts).	
4	MODULE TITLE: Trees and Graphs		
	1	Trees: Concepts and Terminologies, Binary Trees: Types-Complete Binary Tree, Full Binary Tree & Perfect Binary Tree; Expression Trees; Height, Leaf Nodes, and Internal Nodes of a Tree.	15
	2	Representation of Binary Tree, Binary Tree Traversal Techniques – Preorder, Inorder, Postorder Traversals.	
	3	Binary Search Tree (BST): Creation, Searching, Insertion and Deletion Operations; Applications of Trees.	
	4	Graphs – Basic Terminologies, Graph Representations – Adjacency Matrix and Adjacency List; Graph Traversal Techniques- DFS & BFS; Applications of Graphs.	
5	Teacher Specific Module		15
	<i>Directions: The following exercises may be used as references for conducting lab experiments. This is not the final list of experiments for the practical examination. Additional experiments may be added to further enhance the practical skills of students.</i>		
	Arrays, Searching & Sorting 1. Write a program to create an array and perform traversal, insertion and deletion operations. 2. Implement Linear Search to find an element in an array. 3. Implement Binary Search on a sorted array. 4. Write program for Bubble Sort. 5. Write program for Selection Sort. 6. Write program for Insertion Sort. 7. Write a program to implement matrix addition using multidimensional arrays.		



	Linked Lists 8. Create a Singly Linked List and perform: Traversal, Insertion (beginning, end, position), and Deletion 9. Implement searching in a linked list. 10. Create a Doubly Linked List and perform insertion and deletion. Stack and Queue 11. Implement Stack using Array (Push, Pop). 12. Implement Stack using Linked List. 13. Convert an infix expression to postfix using stack. 14. Evaluate a postfix expression. 15. Implement Queue using Array (Enqueue, Dequeue). 16. Implement Queue using Linked List. Trees and Graphs 17. Create a Binary Tree and perform: Preorder traversal, Inorder traversal and Postorder traversal. 18. Implement Binary Search Tree (BST) with: Insertion, Searching, Deletion. 19. Implement graph traversal algorithms: DFS and BFS.	
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Essential Readings:

1. Seymour Lipschutz, Data Structures, Schaum's outline Series. The McGraw Hill.
2. Ellis Horowitz and Sartaj Sajni, Fundamentals of Data Structures, Galgotia publications.
3. Debasis Samanta, Classic Data Structures, Prentice Hall of India, 2nd Edition, 2009.
4. Dinesh P Mehta & Sartaj Sahni, Handbook of Data Structures and Applications, Chapman and Hall, 2nd Edition, 2020.

Suggested Readings:

1. S.K. Srivastava, Deepali Srivastava. Data Structures Through C in Depth. BPB Publications.
2. K Sharma. Data Structures using C. Pearson, Second Edition.
3. Ashok N. Kamthane, Introduction to Data Structures in C, Pearson



ASSESSMENT RUBRICS

Evaluation Type			Marks	Evaluation Type			Marks	Total
Lecture			75	Practical			25	100
a)	ESE		50	a)	ESE		15	
				i	Program code and execution		8	
				ii	Output		3	
				iii	Viva		2	
				iv	Modification		2	
b)	CCA		25	b)	CCA		10	
	i	Test Paper	5		i	Punctuality	3	
	ii	Model exam	10		ii	Model Exam	4	
	iii	Assignment	5			iii	Record	
	iv	Seminar	5					
		Viva-Voce						
		Book/Article Review						
		Case Study						



KU3DSCDAS203 OPERATING SYSTEM

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
3	DSC	200-299	KU3DSCDAS203	4	75

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	2	-	35	65	100	1.5 Hrs

Course Description: This course covers the fundamentals of Operating Systems and Linux Shell Programming, including process management, scheduling, memory management, deadlocks, Linux commands, and shell scripting. It helps students develop practical skills in file handling, automation, and system management through hands-on exercises.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
CO1	Understand the basic concepts and functions of operating systems and process management.	U
CO2	Apply CPU scheduling, process synchronization, and deadlock handling techniques.	A
CO3	Analyze memory management methods including paging, segmentation, and virtual memory.	An
CO4	Use Linux commands and shell scripting for file handling and system operations.	U, A
CO5	Develop shell scripts to automate practical tasks in a Linux environment.	A

***Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)**



Mapping of Course Outcomes to PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	1		2	
CO2	2	3	3	2	2
CO3	3	2	3	2	2
CO4	1	2	2	3	
CO5	1	2	2	3	2

COURSE CONTENTS

Contents for Classroom Transaction:

MODU LE	UNIT	DESCRIPTION	HOURS
1	MODULE TITLE: Introduction to Operating Systems & Process Management		
	1	Operating System: History, Types, Functions, and Services of OS.	15
	2	Process Concepts: Process and Program, Process States, Process Control Block.	
	3	Process Scheduling, Types of Process Schedulers, Operations on Process.	
	4	Cooperating Processes.	
	5	Inter Process Communication.	
2	MODULE TITLE: CPU Scheduling, Process Synchronisation and Deadlocks		
	1	Basic Scheduling Concepts, Scheduling Criteria.	15
	2	Pre-emptive and Non-Pre-emptive Scheduling; CPU Scheduling Algorithms- FCFS, SJFS, Priority Scheduling, Round Robin.	
	3	Process Synchronisation: Critical Section, Semaphores (Concept Only).	
	4	Classical Problems of Synchronisation: Reader Writer, Dining Philosopher (Concept Only).	
	5	Introduction to Deadlock: Necessary Conditions,	



		Resource Allocation Graph.	
	6	Handling Deadlocks: Prevention, Avoidance (Concept Only), Detection & Recovery (Overview).	
3	MODULE TITLE: Memory Management Techniques		
	1	Basic Concepts: Physical vs Logical Address Space, Swapping, Contiguous Memory Allocation.	15
	2	Fragmentation: Internal and External Fragmentation, Techniques to Reduce Fragmentation.	
	3	Non-contiguous Memory Allocation, Paging, Segmentation, Segmentation with Paging (Overview).	
	4	Virtual Memory Concepts: Demand Paging, Page Replacement Algorithms (FIFO, LRU- Conceptual Understanding), Thrashing (Basic Idea).	
4	MODULE TITLE: Linux OS and Commands		
	1	Introduction: History, Features, Types of Linux Shells, Basic Command Structure, Introduction to Text Editors (vi/nano/vim- Basic Usage).	15
	2	File and Directory Commands: ls, cd, pwd, mkdir, rm, cp, mv, chmod, touch; Input/Output Commands: read, echo; Text Commands: grep, cat (Basic Usage Only).	
	3	Piping and Redirection Operators: , >, <, >>, <<.	
	4	Shell Programming Basics: Variables and Operators (Arithmetic, Logical, Relational); Conditional Statements (if, case), Iterative (for, while); break and continue.	
	5	Advanced Shell Features: Arrays, Functions, Command Line Arguments.	
	6	System and Utility Commands: ps, free, uptime, date; ping (Basic Usage).	
5	Teacher Specific Module		15
	<i>Directions: The following exercises may be used as references for conducting lab experiments. This is not the final list of experiments for the practical examination. Additional experiments may be added to further enhance the practical skills of students.</i>		
	1. Using mkdir and cd, create a directory named test and move into it. 2. Using touch and cat, create a file named file1.txt and display		



	its contents. - Using ls, list all files including hidden files in long format. - Using cp and mv, copy file1.txt to file2.txt and then rename it to newfile.txt. - Using rm, remove a directory named test along with its contents. - Using chmod, change the permissions of a file so that the owner has all permissions and others have read-only permission. - Using grep, search for the word "Linux" in a file named data.txt. - Using cat and piping () with wc, count the number of lines in a file data.txt.	
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Essential Readings:

- Silberschatz, Galvin and Gagne, Operating System Concepts, John Willey & Sons.
- Yashavant Kanetkar, UNIX Shell Programming, BPB.

Suggested Readings:

- William Stallings, Operating Systems, Internals and Design Principles, PHI.
- Eleen Frisch, Essential System Administration, 3rd Edition, O'Reilly Media.

ASSESSMENT RUBRICS

Evaluation Type		Marks	Evaluation Type		Marks	Total
Lecture		75	Practical		25	100
a)	ESE	50	a)	ESE	15	
			i	Program code and	8	



					execution			
				ii	Output		3	
				iii	Viva		2	
				iv	Modification		2	
b)	CCA		25	b)	CCA		10	
	i	Test Paper	5		i	Punctuality	3	
	ii	Model exam	10		ii	Model Exam	4	
	iii	Assignment	5					
	iv	Seminar	5					
		Viva-Voce						
		Book/Article Review						
		Case Study						



KU3DSCDAS204 COMPUTER NETWORKS

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
3	DSC	200-299	KU3DSCDAS204	4	60

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	-	-	30	70	100	2 Hrs

Course Description: This course introduces the fundamentals of computer networks, including network models, communication techniques, and layered architecture. It covers key concepts of data transmission, error control, addressing, routing, and common network protocols. Students also gain practical exposure to basic networking tools and real-world communication processes.

Course Prerequisite: Basic knowledge of computer fundamentals.

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
CO1	Understand the fundamental concepts of computer networks, models, and transmission techniques.	U
CO2	Explain data link layer functions, error control methods, and multiple access protocols.	U
CO3	Understand network layer concepts including addressing, routing, and internetworking.	U
CO4	Describe transport and application layer protocols and their role in network communication.	U

**Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2			
CO2		2	2		



CO3	2	3	3	2	
CO4		2	2	2	2

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1	MODULE TITLE: Introduction to Computer networks and Network Models		
	1	Introduction to Computer Networks, Types of Computer Networks: LAN, MAN, WAN, Internet, Intranet.	12
	2	Network Topologies- Star, Bus, Ring, Mesh; Advantages and Disadvantages.	
	3	Reference Models: OSI Reference Model, TCP/IP Reference Model; Comparison and Layer Functions	
	4	Physical Layer: Analog signals, Digital Signals, Analog-to-Digital Conversion, Digital-to-Analog Conversion (Concepts Only).	
	5	Transmission Media: Guided Transmission Media and Wireless Transmission.	
	6	Multiplexing: Frequency Division Multiplexing (FDM), Time Division Multiplexing (TDM) – (Basic Concepts).	
2	MODULE TITLE: Data Link Layer		
	1	Data Link Layer Services, Types of Errors: Single Bit Error, Burst Error. Error Detection: VRC, LRC, CRC, Checksum (Basic Concepts Only). Error correction: Hamming code (Concept Only).	12
	2	Error Recovery: Stop-and-Wait Protocol (Concept Only).	
	3	Multiple Access Protocols: TDMA, FDMA, CDMA, CSMA/CD, CSMA/CA (Basic Concepts Only).	
	4	MAC Address, Ethernet.	
	5	Introduction to Wireless LANs and Bluetooth.	
3	MODULE TITLE: Network layer		
	1	Network Layer Services, Networking and Internetworking Devices: Repeaters, Bridges, Routers, Gateways, Firewall.	12



	2	Logical addressing - IPV4 and IPV6 Addresses, IP Address Classes (Basic Concept), Network Address Translation (NAT), Internet Protocols, Internetworking, Datagram.	
	3	Address Mapping, Error Reporting, Multicasting, Delivery.	
	4	Basic Concepts of Routing	
4	MODULE TITLE: Transport Layer and Application layer		
	1	Transport Layer Services, Process-to-Process Delivery: UDP and TCP (Basic Comparison).	12
	2	Congestion control and Quality of Service (QoS) (Concept Only)	
	3	Application Layer, Domain Name System (DNS), Remote Login, Email.	
	4	FTP, WWW, HTTP.	
	5	Introduction to SNMP and SMTP.	
5	Teacher Specific Module		12
Directions			
Teachers are expected to select relevant topics within the chosen subject area, giving special emphasis to advanced concepts and recent developments in the field. The content should be enriched with well-chosen case studies that highlight practical applications, contemporary issues, and emerging trends, thereby enabling students to gain both theoretical knowledge and contextual understanding.			

Essential Readings:

1. Behrouz A Forozan, Introduction to Data Communications & Networking, TMH.
2. Andrew S. Tanenbaum, Computer Networks, 5th Edition, PHI.

Suggested Readings:

1. William Stallings, Data and Computer Communications, 10th Edition, Pearson Education.



ASSESSMENT RUBRICS

Evaluation Type		Marks
End Semester Evaluation		70
Continuous Evaluation		30
a)	Test Paper- 1	5
b)	Model Examination	10
c)	Assignment- 2 Numbers	10
d)	Seminar	5
e)	Book/ Article Review	
f)	Viva-Voce	
g)	Case Study	
Total		100



VALUE ADDED COURSES

KU3VACDAS201 INTRODUCTION TO DATA SCIENCE

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
3	VAC	200-299	KU3VACDAS201	3	45

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	-	-	25	50	75	1.5 Hrs

Course Description: This course introduces the fundamentals of Data Science, including data collection, preprocessing, data analysis, and model development. It covers statistical techniques, data cleaning, visualization, regression, model evaluation, and basic supervised and unsupervised learning methods to help students understand data-driven decision making.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
CO1	Understand the basic concepts, roles, and applications of Data Science.	U
CO2	Apply data collection, cleaning, and preprocessing techniques for quality data analysis.	U, A
CO3	Analyze data using descriptive statistics, visualization, and correlation methods.	An
CO4	Evaluate predictive models using regression and basic machine learning techniques.	E

**Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2			
CO2		3	2	2	
CO3	2	3	3		2



CO4		3	3	2	3
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COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1	MODULE TITLE: Introduction to Data Science		9
	1	Introduction to Data Science-Definition.	
	2	Evolution of Data Science.	
	3	Data Science Roles.	
	4	Applications of Data Science.	
2	MODULE TITLE: Data Collection and Pre-Processing		9
	1	Data Collection Strategies.	
	2	Data Pre-Processing Overview and Importance.	
	3	Data Cleaning.	
	4	Data Integration and Transformation (Concept Only).	
	5	Data Reduction and Discretization (Concept Only).	
3	MODULE TITLE: Data Analysis and Exploration		9
	1	Descriptive Statistics: Mean, Standard Deviation.	
	2	Skewness and Kurtosis (Concept Only).	
	3	Data Visualization: Box Plots, Scatter Plots.	
	4	Basic Correlation Concepts.	
4	MODULE TITLE: Data Modelling		9
	1	Introduction to Data Models; Regression Analysis: Simple and Multiple Regression.	
	2	Model Evaluation: Residual Plot and Distributional Plot.	
	3	Prediction and Decision Making (Concept Only).	
	4	Introduction to Machine Learning (Basic Idea Only): Supervised Learning, Unsupervised Learning.	
5	Teacher Specific Module		9
	Directions		
	Use appropriate methodologies and evaluation metrics related with the topics.		



Essential Readings:

1. Joel Grus, Data Science from Scratch, 2nd Edition, O'Reilly Media, Inc.
2. Cathy O'Neil and Rachel Schutt, "Doing Data Science", O'Reilly, 2015.
3. Jojo Moolayil, Smarter Decisions: The Intersection of IoT and Data Science, PACKT, 2016.
4. David Dietrich, Barry Heller, Beibei Yang, "Data Science and Big data Analytics", EMC 2013.

Suggested Readings:

1. Introduction to Data Science a Python approach to concepts, Techniques and Applications, Igual, L; Seghi', S. Springer, ISBN:978-3-319-50016-4 2.
2. Data Analysis with Python A Modern Approach, David Taieb, Packt Publishing, ISBN9781789950069

ASSESSMENT RUBRICS

Evaluation Type		Marks
End Semester Evaluation		50
Continuous Evaluation		25
a)	Test Paper- 1	5
b)	Model Examination	10
c)	Assignment	5
d)	Seminar	5
e)	Book/ Article Review	
f)	Viva-Voce	
g)	Case Study	
Total		75



KU3VACDAS202 DATA ANALYSIS AND VISUALIZATION USING EXCEL

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
3	VAC	200-299	KU3VACDAS202	3	60

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
2	2	-	25	50	75	1.5 Hrs

Course Description: This course introduces basic spreadsheet skills using Excel/Google Sheets, including data entry, formulas, functions, and data cleaning. It also covers simple data analysis, visualization, and techniques like correlation and regression to help interpret and present data effectively.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
CO1	Understand the basic concepts and features of spreadsheet tools for data organization and management.	U
CO2	Apply formulas, functions, and data cleaning techniques to process and prepare data.	A
CO3	Analyze data using statistical methods, pivot tables, and visualization techniques.	An
CO4	Interpret data using basic analytical methods such as correlation, regression, and what-if analysis to support decision-making.	E

**Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3			2	
CO2		3	2	3	



CO3	2	3	3	2	2
CO4		3	3	2	3

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1	MODULE TITLE: Introduction to Spreadsheet		
	1	Overview of Spreadsheet Software, Popular Spreadsheet Softwares: Microsoft Excel and Google Sheets; Spreadsheet Interface, Workbook, Worksheet, Cells, Rows, and Columns.	12
	2	Entering Data , Formatting Data, Data Types, Relative vs Absolute Cell Referencing.	
	3	Arithmetic Operations and Basic Formulas, Common Functions: SUM, AVERAGE, MIN, MAX, COUNT.	
	4	Sorting and Filtering Data.	
	5	Text Functions: CONCATENATE, LEFT, RIGHT, MID; Date and Time Functions.	
2	MODULE TITLE: Data Cleaning and Visualization		
	1	Logical and Conditional Functions: IF, AND, OR, COUNTIF, SUMIF.	12
	2	Lookup Functions: VLOOKUP, HLOOKUP, INDEX, MATCH.	
	3	Data Cleaning Techniques: Handling Missing Values, Removing Duplicates, Text to Columns;	
	4	Data Transformation Techniques - Splitting and Combining Text. Data Validation and Error Checking.	
	5	Introduction to Data Visualization: Bar Chart, Line Chart, Pie Chart, Scatter Plot	
3	MODULE TITLE: Pivot Tables and Data Visualization		
	1	Creating and Configuring Pivot Tables.	12
	2	Grouping and Summarizing Data Using Pivot Tables.	
	3	Creating and Customizing Pivot Charts	
	4	Basic Interactive Features: Slicers (Introductory Idea), Conditional Formatting for Data Visualization	



4	MODULE TITLE: Basic Data Analysis Techniques		
	1	Descriptive Statistics -Mean, Median, Mode, Standard Deviation.	12
	2	Correlation and Regression Analysis with Example.	
	3	What-if Analysis -Goal Seek (Basic Usage).	
	4	Interpretation of Results: Understanding Trends, Drawing Simple Conclusions from Data.	
5	Teacher Specific Module		12
	<i>Directions: The following exercises may be used as references for conducting lab experiments. This is not the final list of experiments for the practical examination. Additional experiments may be added to further enhance the practical skills of students.</i>		
	1. Sorting and Filtering Data: Create a suitable dataset containing at least 15 records and perform sorting and filtering operations. Sort the data based on a selected numerical field and apply filters based on specified conditions. 2. Basic Arithmetic Operations and Functions: Create a spreadsheet containing suitable numerical data and perform addition, subtraction, multiplication, and division using formulas. Use SUM, AVERAGE, MIN, MAX, and COUNT functions to summarize the data. 3. Text and Date Functions: Create a spreadsheet containing full names and dates of birth. Use CONCATENATE, LEFT, RIGHT, and MID to manipulate and extract text. Use appropriate Date and Time functions to calculate the current age of each person. 4. Logical, Conditional and Lookup Functions Using a suitable student or employee dataset, perform the following: (1) Use IF, AND, and OR to evaluate conditions. (2) Use COUNTIF and SUMIF to summarize data based on specified criteria. (3) Use VLOOKUP or HLOOKUP to retrieve information from		



	a reference table. (4) Use INDEX and MATCH to retrieve values based on specified lookup criteria. 5. Create a dataset containing missing values, duplicate records, and combined text entries. Perform the following: (1) Identify and handle missing values. (2) Remove duplicate records. (3) Use Text to Columns to separate data. (4) Split and combine text using appropriate techniques. (5) Apply Data Validation to restrict entries to predefined values. 6. Using a dataset of students' information, create a bar chart to visualize the data. Customize the chart with titles, axis labels, and different colors for each bar. 7. Create a sales dataset containing Product, Salesperson, Region, Date, and Sales Amount. Create a Pivot Table to calculate: (1) Total sales by region. (2) Total sales by product. (3) Salesperson-wise sales. (4) Average sales for each region. 8. Using the above sales dataset, create a Pivot Chart and add a Slicer to interactively filter the data. Apply Conditional Formatting using suitable options such as Data Bars, Color Scales, or Icon Sets to visualize important values. 9. Using a dataset containing students' study hours and examination marks, calculate: (1) Mean (2) Median (3) Mode (4) Standard Deviation (5) Correlation coefficient using the CORREL function. (6) Create a Scatter Plot and interpret the relationship between study hours and examination marks. 10. A shop records its Advertising Expenditure (₹) and Sales (₹) for 5 months and perform the following tasks: (1) Enter the data into Excel and calculate the correlation between advertising expenditure and sales. (2) Create a scatter plot and add a linear trendline. (3) Display the regression equation on the chart. (4) Use Goal Seek to find the advertising expenditure required	
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	to achieve sales of ₹1,00,000.	
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Essential Readings:

1. Michael Alexander, Richard Kusleika & John Walkenbach (2018). Excel 2019 Bible. Wiley, ISBN: 978-1-119-54937-6.
2. Wayne Winston, Microsoft Excel Data Analysis and Business Modeling (Office 2021 and Microsoft 365), 7th Edition, Pearson Education, Inc.
3. Manisha Nigam. Data Analysis with Excel, Kindle Edition, 2021, BPB Publications.

Suggested Readings:

1. Alexander Michael, & Kusleika Dick. (2018). Excel 2019 Power Programming with VBA, John Wiley & Sons.
2. McFedries P. (2019). Excel Pivot Tables and Pivot Charts: Your Visual Blueprint for Creating Dynamic Spreadsheets, ISBN: 978-0-471-78489-0.

ASSESSMENT RUBRICS

Evaluation Type			Marks	Evaluation Type			Marks	Total
Lecture			50	Practical			25	75
a)	ESE		35	a)	ESE		15	
				i	Program code and execution		8	
				ii	Output		5	
				iii	Viva		2	
b)	CCA		15	b)	CCA		10	
	i	Test Paper	5		i	Punctuality and Lab Performance	3	
	ii	Model exam	5		ii	Model Exam	5	
	ii	Assignment/Viva	5		iii	Record	2	



