GANDHI INSTITUTE OF TECHNOLOGY AND MANAGEMENT (GITAM)

(Deemed to be University)

VISAKHAPATNAM * HYDERABAD * BENGALURU

Accredited by NAAC with A^{++} Grade

GITAM School of Science

CURRICULUM AND SYLLABUS

3 Year Undergraduate Programme
UCSCI01: Bachelor of Computer Applications

w.e.f. 2024-25 admitted batch

(Updated on July 2024)

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CURRICULUM AND SYLLABUS

OF

Bachelor of Computer Applications

w.e.f. 2024-2025 batch

(Updated up to July 2024)

Website: www.gitam.edu

Academic Regulations

R21UG: Academic Regulations for the Undergraduate Programmes - B.Tech.(All branches except CSBS), B.Com. and BCA

https://www.gitam.edu/academic-regulations

VISION AND MISSION OF THE UNIVERSITY

VISION

GITAM will be an exceptional knowledge-driven institution advancing on a culture of honesty and compassion to make a difference to the world.

MISSION

- Build a dynamic application-oriented education ecosystem immersed in holistic development.
- Nurture valuable futures with global perspectives for our students by helping them find their ikigai.
- Drive impactful integrated research programmes to generate new knowledge, guided by integrity, collaboration, and entrepreneurial spirit.
- Permeate a culture of kindness within GITAM, fostering passionate contributors

QUALITY POLICY

To achieve global standards and excellence in teaching, research, and consultancy by creating an environment in which the faculty and students share a passion for creating, sharing and applying knowledge to continuously improve the quality of education.

VISION AND MISSION OF GITAM SCHOOL OF SCIENCE

VISION

Nurturing a high-quality Science Education and Research by providing a best learning ecosystem to create world class academicians and researchers

MISSION

- To teach the most renewed curriculum that lay the foundation for students to start exciting careers in academia, research, and industry.
- To foster an environment of healthy curiosity, an innovative mindset, and a strong desire to contribute to the science world.
- To advance our understandings of the natural processes of Physical, Chemical and Biological systems for a better habitable world.
- To inculcate a strong sense of empathy, integrity, and trust in the GITAM Fraternity with a strong commitment towards society and environment

VISION AND MISSION OF THE DEPARTMENT OF COMPUTER SCIENCE

Bachelor of Computer Applications

VISION

To become a leading hub for education and innovation in computer science, empowering Students with emerging technologies to achieve global tech leadership through pioneering research and active community engagement.

MISSION

- Foster a new generation of skilled computer science professionals through a well-structured curriculum that encourages continuous learning and prepares students for diverse, dynamic careers in emerging technologies.

- Conduct robust research in emerging fields of computer science and engage in strategic collaborations with industry and community partners to make significant contributions to society.

- Uphold the highest ethical standards, transparency, and accountability while fostering inclusivity and diversity in pushing the boundaries of technological advancement.

Bachelor of Computer Applications

(w.e.f. academic year 2023-24 batch)

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO 1	**Foundational Excellence** Graduates will develop a solid foundation in computer applications, including programming, web technologies, software engineering, and database management to solve real-world problems effectively.
PEO 2	**Professional Development** Graduates will exhibit professional skills including effective communication, critical thinking that prepare them for leadership roles in the IT sector.
PEO 3	**Innovation and Problem Solving** Graduates will be equipped to leverage their knowledge and skills in advanced technologies to develop and implement innovative solutions that address complex challenges in various fields, demonstrating a strong ability to improve existing systems and create new opportunities
PEO4	**Community and Environmental Responsibility** Graduates will demonstrate awareness and responsibility towards societal, environmental, and ethical issues by actively participating in community services and sustainable practices.

Mapping of the Mission of the School with the PEOs

	PEO1	PEO2	PEO3
M1	H	H	H
M2	H	H	H
M3	L	L	L
M4	M	M	M

PROGRAMME OUTCOMES (POs)
&
PROGRAMME SPECIFIC OUTCOMES (PSOs)

PO1	Critical Thinking: Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.
PO2	Effective Communication: Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.
PO3	Social Interaction: Elicit views of others, mediate disagreements and help reach conclusions in group settings.
PO4	Effective Citizenship: Demonstrate empathetic social concern and equity centred national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.
PO5	Ethics: Recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.
PO6	Environment and Sustainability: Understand the issues of environmental contexts and sustainable development.
PO7	Self-directed and Life-long Learning: Acquire the ability to engage in independent and life-long learning in the broadest context of socio-technological changes.
PSO1	Technical Competency Graduates will demonstrate the ability to apply knowledge of computing and mathematics, including mastery of various programming languages, development tools, and environments.
PSO2	Problem-Solving Skills Graduates will be able to identify, formulate and solve computing problems using modern techniques and innovative skills.
PSO3	PSO3: Communication and Teamwork Graduates will communicate effectively with a range of audiences and contribute as productive members or leaders of multidisciplinary teams.
PSO4	Professional Ethics and Social Responsibility Graduates will understand the impact of computing solutions in a global, economical, environmental, societal context, and adhere to professional ethics and responsibilities.

Allocation of credits for 3-year B.C.A. Program		
Type of Course	Credits	% of Program (in credits)
University Core	12	10
Faculty Core	12	10
Program Core	88	73.33
Program Electives	8	6.66
Total	120	100

Curriculum Structure
(Choice Based Credit System)
UNIVERSITY CORE (UC)

Course code	Level	Course title	L	T	P	S	J	C
LANG1201	100	Critical Thinking	2	0	0	0	0	2
LANG1241	100	Communicative English - I	0	0	4	0	0	2
LANG1251	100	Communicative English - II	0	0	4	0	0	2
IENT1051	100	Fundamentals Of Entrepreneurship	2	0	0	0	0	2
CLAD1041	100	Art Of Persuasive Communication	0	0	2	0	0	1
CLAD1051	100	Competence In Communication	0	0	2	0	0	1
CLAD1061	100	Life Skills	0	0	2	0	0	1
CLADXXXX	100	Soft Skills - 4	0	0	2	0	0	1
Mandatory Courses – Pass/Fail #								
PHPY1011	100	Gandhi And The Contemporary World *	1	0	0	0	0	1
ENVS1001	100	Environmental Studies *	3	0	0	0	0	3
POLS1051	100	Indian Constitution *	1	0	0	0	0	1
Mandatory Courses – Pass/Fail – OPT ANY TWO#								
FINA1081	100	Personal Financial Planning *	1	0	0	0	0	0
MFST1002	100	Health and Wellbeing *	0	0	2	0	0	0
DOSP10XX	100	Sports	0	0	0	2	0	0
DOSL10XX	100	Club Activity	0	0	0	2	0	0
DOSL10XX	100	Community Service	0	0	2	0	0	0

* Massive Open Online Course (MOOC)

These are non-graded courses and are assessed as 'Satisfactory' or 'Unsatisfactory'. No letter grade will be assigned for these courses. These courses may be either of "theory" type or "practical." The minimum pass mark for the award of satisfactory (S) grade is 40. A score less than 40 will lead to an unsatisfactory (U) grade. These courses shall not be a part of SGPA/CGPA calculations. Students are required to get an S grade for graduation.

Sports Courses								
DOSP1003	100	Badminton	0	0	0	2	0	0
DOSP1033	100	Football	0	0	0	2	0	0
DOSP1043	100	Volleyball	0	0	0	2	0	0

DOSP1053	100	Kabaddi	0	0	0	2	0	0
DOSP1073	100	Table Tennis	0	0	0	2	0	0
DOSP1083	100	Handball	0	0	0	2	0	0
DOSP1093	100	Basketball	0	0	0	2	0	0
DOSP1113	100	Throwball	0	0	0	2	0	0
DOSP1132	100	Functional Fitness	0	0	0	2	0	0
DOSP1142	100	Cricket	0	0	0	2	0	0
DOSP1171	100	Martial Arts/Self Defense	0	0	0	2	0	0
DOSP1181	100	Yogasana	0	0	0	2	0	0
Club Activity Courses								
DOSL1081	100	Student Life Activities – Participant #$	0	0	0	2	0	0
DOSL1091	100	Student Life Activities – Organizer #$	0	0	0	2	0	0
DOSL1101	100	Student Life Activities – Competitor #$	0	0	0	2	0	0
DOSL1111	100	Foundations Of Student Leadership #$	0	0	0	2	0	0
Community Service Courses								
DOSL1042	100	Community Services – Volunteer #$	0	0	2	0	0	0
DOSL1052	100	Community Services – Mobilizer #$	0	0	2	0	0	0

FACULTY CORE (FC)								
Course code	**Level**	**Course title**	**L**	**T**	**P**	**S**	**J**	**C**
MATH1131	1	Mathematics-I	4	0	0	0	0	4
MATH1141	1	Mathematics-II	4	0	0	0	0	4
MATH1291	3	Elementary Statistics	4	0	0	0	0	4

Program Core (PC)								
Course code	**Level**	**Course Title**	**L**	**T**	**P**	**J**	**S**	**C**
CSCI1351	1	Programming Lab using Python	0	0	2	0	0	1
CSCI1361	1	Fundamentals of Python Programming	4	0	0	0	0	4
CSCI1371	1	Basic principles of Information Technology	4	0	0	0	0	4
CSCI1071	1	Data Analysis Lab	0	0	2	0	0	1
CSCI1131	1	Fundamentals of Digital Logic Circuits	4	0	0	0	0	4

CSCI1081	1	Introduction to Operating Systems	4	0	0	0	0	4
CSCI1091	1	Web Technologies	4	0	0	0	0	4
CSCI1101	1	Web Technologies Lab	0	0	2	0	0	1
CSCI1111	1	Introduction to Object Oriented Programming with C++	4	0	0	0	0	4
CSCI1381	1	C++ Programming Laboratory	0	0	2	0	0	1
CSCI2001	2	Elementary Data Structures Using C++	4	0	0	0	0	4
CSCI2011	2	Data Structures using C++ Lab	0	0	2	0	0	1
CSCI2021	2	Introduction to Unix Programming	4	0	0	0	0	4
CSCI2031	2	Unix Programming Lab	0	0	2	0	0	1
CSCI2041	2	Principles of Software Engineering	4	0	0	0	0	4
CSCI2051	2	Introduction to Data Communication and Networks	4	0	0	0	0	4
CSCI2061	2	Introduction to Database Management Systems	4	0	0	0	0	4
CSCI2361	2	SQL & PL/SQL Lab	0	0	2	0	0	1
CSCI2081	2	Introduction to Java Programming	4	0	0	0	0	4
CSCI2091	2	Java Programming Lab	0	0	2	0	0	1
CSCI2121	2	Advanced Python Programming Lab	0	0	2	0	0	1
CSCI3001	3	Object Oriented Analysis and Design	4	0	0	0	0	4
CSCI3041	3	PHP Programming	4	0	0	0	0	4
CSCI3051	3	PHP Programming Lab	0	0	2	0	0	1
CSCI3061	3	Data Visualization using Tableau Lab	0	0	2	0	0	1
CSCI3021	3	R Programming Lab	0	0	2	0	0	1
CSCI3071	3	Introduction to Cloud Computing	4	0	0	0	0	4
CSCI3081	3	Introduction to Block Chain Technologies	4	0	0	0	0	4
CSCI3091	3	Project work	0	0	12	0	0	12

Programme Elective (PE)#								
Course code	**Level**	**Course Title**	**L**	**T**	**P**	**J**	**S**	**C**
CSCI2371	2	Fundamentals of Cryptography	4	0	0	0	0	4
CSCI2111	2	Fundamentals of Artificial Intelligence	4	0	0	0	0	4
CSCI3011	3	Introduction to Data Mining	4	0	0	0	0	4
CSCI3031	3	Foundations of Data Science	4	0	0	0	0	4
# Opt any one course in level 2 from Program Elective Basket # opt any one course in level 3 from Program Elective Basket								

Course PO Mapping

Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
MATH1131	Mathematics– I	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
MATH1141	Mathematics-II	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
MATH1291	Elementary Statistics	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI1041	Programming lab using python	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI1051	Fundamentals of python programming	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI1061	Basics principles of Information technology	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI1071	Data Analysis Lab	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI1131	Fundamentals of Digital Logic Circuits	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI1081	Introduction to Operating Systems	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI1091	Web Technologies	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI1101	Web Technologies Lab	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI1111	Introductionto Object Oriented Programming with C++	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI1121	C++ programming laboratory	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4

CSCI2001	Elementary Data Structures Using C++	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI2011	Data Structures using C++ Lab	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI2021	Introduction to Unix Programming	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI2031	Unix Programming Lab	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI2041	Principles of Software Engineering	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI2051	Introduction to Data Communication and Networks	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI2061	Introduction to Database Management Systems	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI2071	SQL& PL/SQL lab	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI2081	Introduction to Java Programming	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI2091	Java Programming Lab	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI2121	Advanced Python Programming Lab	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI2101	Fundamentals of Cryptography	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI2111	Fundamentals of Artificial Intelligence	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4

CSCI3001	Object Oriented Analysis and Design	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI3041	PHP Programming	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI3051	PHP Programming Lab	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI3061	Data Visualization using Tableau Lab	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI3021	R Programming Lab	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI3071	Introductionto Cloud Computing	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI3081	Introductionto Block Chain Technologies	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI3011	Introductionto Data Mining	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI3031	Foundationsof Data Science	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4
CSCI3091	Project work	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4	SDG4

Syllabus

LANG1201	CRITICAL THINKING	L	T	P	S	J	C
		2	0	0	0	0	2
Pre-requisite	None						
Co-requisite	None						
Preferable Exposure	None						

Course Description:

Critical thinking lies at the heart of scholarship in a university and is an important practice for us moderns to cultivate as members of civil society. This course begins with the historical significance of and motivations behind critical thinking in modernity. We introduce 'argumentation' as the key technique in the practice of critical thinking. First, we look at the distinction between the truth value of an opinion and the force of evidence and reasoning in arguments. We examine arguments and argumentation as instrument and practice of exercising critical thinking. Starting with simple arguments, we learn the distinction between a good and a bad argument. Next, we study the types and causes of bad or fallacious arguments. Finally, we examine longer arguments, developing practical ways of evaluating, critiquing and constructing arguments. Argumentation is central to the Socratic method, a key practice throughout the history of university education. This course prepares students to read and have a deep, original engagement with complex texts which they will encounter in various courses in the humanities and social sciences. Furthermore, this course also trains students to become public intellectuals, who can take on, address and construct complex arguments for consumption beyond academia.

Course Educational Objectives:

- Understand the historical significance and motivations behind critical thinking, fostering an appreciation for its role in modern society.
- Develop the ability to identify and evaluate arguments, distinguishing between opinions and evidence-based reasoning.
- Acquire skills in constructing and assessing well-formed arguments, both in terms of plausibility and intended purpose.
- Recognize and analyze common fallacies, enabling the identification and critique of flawed reasoning in arguments.
- Engage in advanced argumentation, demonstrating the capacity to construct effective arguments and engage with complex texts.

MODULE 1 AN INTRODUCTION TO CRITICAL THINKING **5 Hrs**

Critical thinking as a practice of freedom – reconciling duty and critique-Opinion and arguments- Identifying arguments in LSD.-How to spot an argument – structure

MODULE 2 ARGUENTATION BASICS **5 Hrs**

Interpreting arguments in LSD-The evaluation of arguments – 'good' arguments vs 'bad' arguments – Acceptability, Relevance and Sufficiency-Fundamentals of Constructing arguments - Plausibility and Purpose -

MODULE 3 'BAD' ARGUMENTS – FALLACIES **6 Hrs**

Fundamentals of Argument Construction and Evaluation in LSD. What is wrong with bad arguments? (A typology of fallacies)-The causes of fallacious reasoning.

MODULE 4 ADVANCED ARGUMENTATION **6 Hrs**

Dialectical character of arguments-Steps to construct arguments-Constructing arguments in LSD.

MODULE 5 EXTENDED ARGUMENTS **8 Hrs**

Analyzing longer arguments-Evaluation and Critique of arguments-Analyzing extended arguments in LSD-

Texbook(s):

1. Johnson, Ralph H. and J. Anthony Blair., Logical Self-Defence, International Debate Education Association,New York, 2006

Reference(s):

1. Kant, Immanuel., What is enlightenment?, ,http://www.columbia.edu/acis/ets/CCREAD/etscc/kant.html
2. Vaughn, Lewis, The Power of Critical Thinking: Effective Reasoning About Ordinary and Extraordinary Claims, Oxford,New York, 2019
3. Epstein, Richard L, Critical Thinking. Ontario, 2006

Course Outcomes:

1. Demonstrate a comprehensive understanding of the historical context and importance of critical thinking, applying it to contemporary issues.
2. Identify and analyze arguments, differentiating between opinions and well-supported claims based on evidence and reasoning.
3. Construct coherent and persuasive arguments, employing appropriate techniques and evidence to support claims effectively.
4. Identify and critique fallacious reasoning, employing critical thinking skills to evaluate the strength and validity of arguments.
5. Engage in the analysis and evaluation of complex texts, demonstrating the ability to read deeply and engage in original and thoughtful discussions.

Course Articulation Matrix:

	POs																PSOs			
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**1**	**2**	**3**	**4**
1	3	3	2	3	3	2	2	1	3	1	3	3	3	2	1	2	2	2	2	2
2	3	3	2	3	3	3	1	2	3	1	2	2	3	1	2	2	3	2	2	1
3	3	3	3	3	3	3	1	2	3	1	2	2	3	1	1	2	3	2	2	1
4	3	3	3	3	3	3	1	1	3	1	2	2	3	1	1	1	3	2	2	1
5	3	3	3	3	3	3	1	1	3	1	2	2	3	1	1	1	3	2	2	1

3 – High, 2 – Medium & 1 – Low Correlation

APPROVED IN MEETINGS HELD ON:

BOS : 28-06-2023 Academic Council Number: 27 Academic Council : 06-07-2023

SDG No(s). & Statement(s) :

4 & Quality Education : Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

SDG Justification(s):

The course involves identifying one’s personal values and working on real-life problems, thus forming the base to work on their passions even past collegiate life.

LANG1241	COMMUNICATIVE ENGLISH - I	L	T	P	S	J	C
		0	0	4	0	0	2
Pre-requisite	None						
Co-requisite	None						
Preferable Exposure	None						

Course Description:

The course is designed to enhance students' English proficiency through various interactive and practical modules. The course focuses on developing effective oral and written communication skills in diverse situations. It includes modules on self-introduction, situational conversations, formal and informal greetings, telephonic conversations, and writing tasks such as formal emails, essays, and descriptive stories. The course aims to improve listening and comprehension, enhance public speaking and presentation skills, and encourage literary analysis and creative expression. Through continuous assessment and term-end examinations, students will gain confidence and competence in using English effectively in academic and professional contexts.

Course Educational Objectives:

- Enable students to articulate their thoughts clearly and confidently in various situations, including self-introduction, situational conversations, and formal greetings.
- Improve students' ability to listen for specific information, comprehend spoken and written content, and engage in note-making and note-taking activities.
- Equip students with the skills to write formal emails, applications, and essays and create descriptive and story-writing pieces.
- Enhance the ability to deliver speeches, participate in elocution, and create video blogs, enhancing students' public speaking and presentation capabilities.
- Promote an appreciation for literature by analyzing prose, poetry, and plays while encouraging creative expression through various writing genres and video blogging.

List of Experiments

S.no	Topic	Type
1	About Oneself and Others (*A1, Module 1)	Exercise
2	Situational Conversation (*B1, Module 1-)	Exercise
3	Expressional Greeting: Formal Vs Informal Greeting (*A1, Module 2)	Exercise
4	Telephonic Conversation (*A2, Module 2)	Exercise
5	Instructions & Announcements - All (*A1, Module 5)	Exercise
6	Bus Terminals (*A2, Module 4)	Exercise
7	Notes and Messages - All (*A1, Module 6)	Exercise
8	Application Form (*A1, Module 7)	Exercise
9	Formal Email/Paragraph Writing (*B1, Module 7)	Exercise
10	Video Blogs (*C1, Module 5)	Exercise
11	Speech & Elocution (*A2, Module 5)	Exercise
12	Time Expressions (*B1, Module 6)	Exercise
13	Prose and Poems (*A1, Module 4)	Exercise

14	Plays – Macbeth (*C2, Module 4)	Exercise
15	Descriptive & Story Writing (*A1, Module 7)	Exercise
16	Story Genres - Literary Fiction (*B2, Module 3)	Exercise
17	Situational Conversations – ALL – essay writing (*A2, Module 1)	Exercise
18	Situational Conversations – Scientific Developments (*C2, Module 1)	Exercise

Textbook(s):

1. Dutt, P. K., & Rajeevan, G. , Basic Communication Skills. , Foundation Books., 2007

Reference(s):

1. Hewings, M., & McCarthy, M., Cambridge Academic English B2 Upper Intermediate Student's Book (Vol. 1)., Cambridge University Press., 2012
2. Bohlke, D., & Richards, J. C., Four corners., Cambridge University Press., 2012
3. Philpot, S., & Curnick, L., New Headway-academic skills: reading, writing, and study skills.Level 2: student's book. Oxford, UK.:, Oxford University Press., 2007
4. Latham-Koenig, C., Oxenden, C., & Lambert, J., American English File 3E Level 5 Student Book., Oxford University Press., 2020
5. McCarthy, M., & O'dell, F., Academic vocabulary in use edition with answers., Cambridge University Press., 2016
6. Zemach, D. E., & Islam, C., Writing paragraphs: from sentence to paragraph., 2006
7. Bradbury, A. J. ., Successful presentation skills (Vol. 111)., 2006

Course Outcomes:

1. Develop and apply active listening strategies to understand and analyze spoken content in diverse contexts, improving comprehension and retention.
2. Utilize different writing techniques to produce varied written forms, including persuasive essays, research papers, and creative stories, demonstrating versatility in writing.
3. Conduct detailed analyses of written texts, identifying nuanced arguments and rhetorical strategies, enhancing interpretive and evaluative reading skills.
4. Develop communication skills to articulate complex ideas clearly and persuasively in spoken interactions.
5. Apply integrated language skills in practical settings, demonstrating the ability to use listening, speaking, reading, and writing comprehensively.

Course Articulation Matrix:

	POs																PSOs			
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**1**	**2**	**3**	**4**
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3 – High, 2 – Medium & 1 – Low Correlation

APPROVED IN MEETINGS HELD ON:

BOS : 31-05-2024 Academic Council Number: 30 Academic Council : 04-07-2023

SDG No(s). & Statement(s) :

4 & Quality Education : Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

SDG Justification(s):

Quality Education: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

LANG1251	COMMUNICATIVE ENGLISH - II	L	T	P	S	J	C
		0	0	4	0	0	2
Pre-requisite	None						
Co-requisite	None						
Preferable Exposure	NO						

Course Description:

The course focuses on enhancing students' written and oral English communication proficiency. It encompasses a variety of practical skills, such as conducting effective phone conversations, engaging in situational dialogues, and excelling in public speaking. Students will participate in numerous writing exercises, including the creation of posters, brochures, journal articles, and book reviews. Additionally, the course focuses on enhancing listening and comprehension abilities in various real-world contexts. Through interactive activities like debates, presentations, and collaborative projects, students will build their capability to communicate clearly and confidently in various situations.

Course Educational Objectives:

- Enhance students' ability to handle conversations in various real-life contexts.
- Equip students with the skills to write posters, travel brochures, journal articles, and book reviews.
- Enable students' abilities in public speaking, including delivering presentations and speeches and engaging in debates.
- Strengthen students' listening and reading skills through comprehension exercises, particularly in diverse real-world contexts.
- Promote teamwork and creativity through group activities like collaborative journal writing and creating various written materials.

List of Experiments

S.no	Topic	Type
1	Customer Service - Inquiry (*C1, Module 3)	Exercise
2	Taking and Making a Call (*C2, Module 2)	Exercise
3	Telephonic Conversation – Ordering Food Online (*B2, Module 2)	Exercise
4	Situational Conversations – Marine Species (*C1, Module 1)	Exercise
5	Telephonic Expressions – Thoughtful Present (*B1, Module 2)	Exercise
6	Theatre /Movies - Life of Pi (*B1, Module 4)	Exercise
7	Poster writing/Notice Board Writing (*A1, Module 7)	Exercise
8	The Art of Writing – Travel Brochure (*C2, Module 7)	Exercise
9	Elements of Journal Article (*B2, Module 7)	Exercise
10	Presentation Skills (*C1, Module 4)	Exercise
11	Speech & Elocution (*B2, Module 6)	Exercise
12	Steps to write a book review (*C1, Module 3)	Exercise
13	Steps to write a summary (*C2, Module 5)	Exercise
14	Debate - How does debating work? (*B2, Module 4)	Exercise
15	Story Genre – Literary Fiction (*B2, Module 3)	Exercise
16	The Critic – Steps to write a book review (*C1, Module 3)	Exercise

Textbook(s):

1. Kumar, S., & Lata, P., Communication skills., Oxford University Press., 2011

Reference(s):

1. Hewings, M., Thaine, C., & McCarthy, M., Cambridge academic English C1 advanced student's book: An integrated skills course for EAP., Cambridge University Press., 2012
2. Berlin, A., 50 Conversation Classes., Createspace Independent Publishing Platform., 2022
3. McCarthy, M., English idioms in use advanced–Cambridge., 2010
4. Hollihan, T. A., & Baaske, K. T., Arguments and arguing: The products and process of human decision making., Waveland Press., 2022
5. Seo, B., Good Arguments: What can the art of debating teach us about listening better and disagreeing well? Simon and Schuster., 2022
6. Philpot, S., & Curnick, L., New Headway-academic skills: reading, writing, and study skills. Level 3: student's book. Oxford, UK.:, Oxford University Press., 2007
7. Hahn, F. E., Do-it-yourself advertising and promotion: how to produce great ads, brochures, catalogs, direct mail, websites, and more!, John Wiley & Sons., 2003

Course Outcomes:

1. Students will be able to confidently engage in conversations across a variety of real-life scenarios, demonstrating appropriate conversational strategies and cultural awareness.
2. Students can create clear, persuasive, and visually appealing posters, travel brochures, journal articles, and book reviews tailored to specific audiences and purposes.
3. Students will be able to deliver well-organized and impactful presentations and speeches and participate effectively in debates, using appropriate rhetorical techniques and presentation aids.
4. Students can accurately comprehend and critically analyze spoken and written texts from diverse real-world contexts, demonstrating improved listening and reading skills.
5. Students can work collaboratively in groups to produce creative written materials, such as collaborative journals and other projects, showcasing their ability to integrate ideas and engage in constructive teamwork.

Course Articulation Matrix:

	POs																PSOs			
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**1**	**2**	**3**	**4**
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5																				

3 – High, 2 – Medium & 1 – Low Correlation

APPROVED IN MEETINGS HELD ON:

BOS : 31-05-2024 Academic Council Number: 30 Academic Council : 04-07-2023

SDG No(s). & Statement(s) :

16 & Peace and Justice Strong Institutions : Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.

SDG Justification(s):

By relating to people with empathy, employing creative problem-solving strategies and engaging meaningfully in a diverse world will create inclusive societies for sustainable development.

IENT1051	FUNDAMENTALS OF ENTREPRENEURSHIP	L	T	P	S	J	C
		2	0	0	0	0	2
Pre-requisite	None						
Co-requisite	None						
Preferable Exposure	NO						

Course Description:

Entrepreneurship is a vital life skill that fosters curiosity, creativity, and a focus on seizing opportunities. By embracing entrepreneurship, individuals can achieve professional independence, tackle complex challenges with innovative solutions, and take calculated risks. This course, "Introduction to Entrepreneurship," is designed to provide students with essential knowledge and practical skills for their entrepreneurial journey. Contrary to popular belief, entrepreneurship can indeed be learned, and this course dispels those myths. It offers a comprehensive understanding of the entire entrepreneurial process, from generating ideas to launching a minimum viable product (MVP). Through a combination of theory and hands-on activities, students will explore various aspects of entrepreneurship, such as identifying opportunities, discovering customers, designing solutions, and employing lean startup methods. To succeed, students must demonstrate self-direction and a genuine enthusiasm for learning, whether independently or in collaboration with peers.

Course Educational Objectives:

- Understand the fundamental concepts and processes of entrepreneurship.
- Identify and evaluate business ideas and opportunities.
- Know the techniques for effective problem-solving.
- Understand the customer and the customer discovery process and how to develop market insights.
- Effectively pitch your Venture Idea

MODULE 1 ENTREPRENEURIAL PROCESS AND MINDSET **6 Hrs**

Introduction to Entrepreneurship, Pilot Your Purpose, Innovation, Risk-Taking and Value Creation, Myths around Entrepreneurship, Distinct Types of Entrepreneurship, Entrepreneurial vs. Managerial Mindset.

MODULE 2 PROBLEM IDENTIFICATION AND IDEATION **6 Hrs**

Entrepreneurship Opportunity identification, Market and Need Analysis, Problem Discovery, Problem Statement Identification and definition, Evaluating and Selecting Ideas

MODULE 3 CUSTOMER DISCOVERY & MARKET INSIGHTS **6 Hrs**

Users and Buyers, Target Group and Persona, Customer Research Methods (People Shadowing, laddering etc.), Use Cases, Market Sizing & Segmentation, Customer Value Proposition

MODULE 4 SOLUTION DESIGN **6 Hrs**

Principles of Effective Solution Design, Prototyping Methods and Tools, Building and Testing Prototypes, Gathering Feedback on Prototypes, Iterating and Refining Solutions, Building Minimum Viable solution.

MODULE 5 CRAFTING YOUR VENTURE NARRATIVE **6 Hrs**

How you can launch a successful venture. Tell your venture story

Textbook(s):

1. Eric Ries, The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses,

Reference(s):

1. Blank, S. and Dorf, B., The Startup Owner’s Manual: The Step-by-Step Guide for Building a Great Company., BookBaby, Pennsauken., 2012
2. Neck, Heidi & Greene, Patricia & Brush, Candida., Teaching entrepreneurship: A practice-based approach., 2014

Course Outcomes:

1. To discover skills and competencies needed for entrepreneurial career
2. Effectively utilize frameworks for business planning and development.
3. Implement customer research methods such as shadowing, laddering etc to gather insightful data.
4. Build and refine a minimum viable product (MVP) based on real customer feedback.
5. Present a process pitch that integrates learnings across all units to propose a viable entrepreneurial venture.

Course Articulation Matrix:

	POs																PSOs			
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**1**	**2**	**3**	**4**
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3 – High, 2 – Medium & 1 – Low Correlation

APPROVED IN MEETINGS HELD ON:

BOS : 10-06-2024 Academic Council Number: 30 Academic Council : 04-07-2023

SDG No(s). & Statement(s) :

8 & Decent Work and Economic Growth : Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.

SDG Justification(s):

To achieve sustained per capita income growth and ensure higher economic productivity,focus should be on youth by grooming them to be creative and innovative, have productive employment and quality of life through Skill development and Entrepreneurship

CLAD1041	ART OF PERSUASIVE COMMUNICATION	L	T	P	S	J	C
		0	0	2	0	0	1
Pre-requisite	None						
Co-requisite	None						
Preferable Exposure	None						

Course Description:

The first of the four graded Soft Skills courses covers foundational aspects crucial for early career development. It will enable learners to understand how to communicate effectively, master the art of expression and impactful presentations using context appropriate audio-visual aids. This course is more than just lessons; it is a guide to becoming a well-rounded and successful individual in a world where soft skills matter significantly.

Course Educational Objectives:

- .Enable learners develop a foundational understanding of effective verbal and non-verbal communication concepts and familiarize students with basic technical and business communication skills.
- .Enable learners pick basic presentation skills, context appropriate strategies for organizing content in presentations and explore using audio visual aids and advanced verbal communication strategies, including persuasive techniques and non-verbal communication skills.
- .Enhance learners' understanding of interpersonal and cross cultural communication.
- .Introduce learners to context appropriate dress code and social norms.
- Enable learners to master the essentials of business writing, encompassing letters, emails, etiquette, and the creation of impactful memos, notices, and circulars, fostering effective communication and professional writing

List of Experiments

S.no	Topic	Type
1	Foundations of Communication: Importance of communication in the professional world, overview of verbal and non-verbal communication skills, enhancing vocal delivery and articulation, utilizing body language for effective communication and relevant activities.	Exercise
2	Interpersonal Communication: Building and maintaining professional relationships, conflict resolution in the workplace, role play and relevant activities.	Exercise
3	Cross Cultural Communication: Understanding and navigating cultural differences, communication in the workplace - standards	Exercise
4	Presentation Skills: Basics of effective presentations, understanding the importance of presentation skills, overcoming stage fear and building confidence	Exercise
5	Structuring your presentation: Developing a clear introduction, body, and conclusion; organizing content for maximum impact	Exercise
6	Visual Aids and Technology in Presentations: Creating impactful slides and visual aids, Incorporating technology for engaging presentations	Exercise
7	Audience Engagement Strategies: Techniques to capture and maintain audience interest, Encouraging interaction and participation, relevant activities	Exercise
8	Adapting to Different Presentation Contexts: Tailoring presentations for various audiences (technical vs. non-technical), adjusting presentation style for different settings (academic, industry, conferences)	Exercise

9	Effective Use of Data and Statistics in Presentations: Presenting technical information with clarity, Interpreting and visualizing data effectively	Exercise
10	Dress Code Standards and Presentation: Understanding dress code standards, dressing for success, navigating dress codes in professional environments	Exercise
11	Basics of Business Writing: Letters and Emails, etiquette, drafting effective memos, notices, and circulars	Exercise

Textbook(s):

1. Gupta, S., Soft Skill - Interpersonal & Intrapersonal Skills Development, 2020
2. Chauhan, G. S., & Sharma, S., Soft Skills: An Integrated Approach to Maximise Personality, Wiley, 2016

Reference(s):

1. Rizvi, M. A., Effective Technical Communication., 2005
2. Nawal, M., Business Communication., 2012
3. Raman, M. S., Technical Communication Principles and Practice., 2020

Course Outcomes:

1. .Communicate effectively using verbal and non-verbal skills and put to use basic technical and business communication skills.
2. .Demonstrate basic presentation skills, choose context appropriate strategies for organizing content and use audio visual aids, employ advanced verbal communication strategies, including persuasive techniques and non-verbal communication skills.
3. .Exhibit understanding of interpersonal communication and cross cultural communication.
4. .Exhibit understanding of context appropriate dress code and social norms in day to day lives.
5. Proficiently craft professional business communication, including letters, emails, memos, notices, and circulars, while adhering to etiquette norms for effective and impactful correspondence.

Course Articulation Matrix:

	POs																PSOs			
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**1**	**2**	**3**	**4**
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5																				

3 – High, 2 – Medium & 1 – Low Correlation

APPROVED IN MEETINGS HELD ON:

BOS : 31-05-2024 Academic Council Number: 30 Academic Council : 04-07-2023

SDG No(s). & Statement(s) :

4 & Quality Education : Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

SDG Justification(s):

CLAD1051	COMPETENCE IN COMMUNICATION	L	T	P	S	J	C
		0	0	2	0	0	1
Pre-requisite	None						
Co-requisite	None						
Preferable Exposure	None						

Course Description:

The second of the four graded Soft Skills courses delve deeper into advanced communication and presentation skills with nuanced time management skills. Facilitating the learners in applying the principles of social etiquette and professionalism, this course emphasizes a collaborative and supportive environment that helps learners prepare for success in both personal and professional spheres. It also builds upon the foundational knowledge acquired in the previous course.

Course Educational Objectives:

- Enhance learners' professional reputation in the workplace by developing professional communication skills.
- Enable learners to explore technology tools for presentations using advanced verbal communication strategies, including strategies to overcome challenges on virtual platforms.
- Enable learners to collaborate with team members in practising and applying strategies for maintaining consistency and cohesion in team interactions.
- Enable learners to prepare technical documents and reports following advanced techniques and ethical norms.
- Equip the learner to draft the CV/Resume addressing industry demands and to face interviews confidently.

List of Experiments

S.no	Topic	Type
1	Professionalism at the Workplace: Professional communication, workplace ethics, building professional reputation.	Exercise
2	Foundations of Social Etiquette: Proper greetings and introductions, conversational skills - cultural sensitivity and inclusivity	Exercise
3	Using Communication Technologies effectively: Presenting in virtual environments, virtual collaboration, and remote communication, overcoming challenges specific to virtual presentations	Exercise
4	Effective Team Presentations: Coordinating group presentations seamlessly, strategies for maintaining consistency and cohesion in team presentations	Exercise
5	Handling Q&A Sessions: Preparing for and managing question-and-answer sessions, addressing challenging questions with confidence	Exercise
6	Technical Communication: Reports, documentation, ethical considerations in reporting and documentation.	Exercise

Textbook(s):

1. Gupta, S., Soft Skill - Interpersonal & Intrapersonal Skills Development., V&S Publishers., 2020
2. Chauhan, G. S., & Sharma, S., Soft Skills: An Integrated Approach to Maximise Personality., Wiley, 2016

Reference(s):

1. Rizvi, M. A., Effective Technical Communication., 2005
2. Nawal, M., Business Communication., 2012
3. Raman, M. S., Technical Communication Principles and Practice., 2020

Course Outcomes:

1. Deduce the skills required for developing a professional reputation in the workplace by using effective communication strategies.
2. Apply advanced technological tools and techniques in presentation and to overcome the challenges on the virtual platform.
3. Deliver presentations by collaborating with team members maintaining consistency and cohesion.
4. Compile technical documents and reports applying advanced techniques and adhering to ethical norms.
5. Draft winning CV / Resume addressing industry demands and face interviews confidently.

Course Articulation Matrix:

	POs																PSOs			
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**1**	**2**	**3**	**4**
1																				
2																				
3																				
4																				
5																				

3 – High, 2 – Medium & 1 – Low Correlation

APPROVED IN MEETINGS HELD ON:

BOS : 07-03-2024 Academic Council Number: 30 Academic Council : 04-07-2023

SDG No(s). & Statement(s) :

4 & Quality Education : Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

SDG Justification(s):

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CLAD1061	LIFE SKILLS	L	T	P	S	J	C
		0	0	2	0	0	1
Pre-requisite	None						
Co-requisite	None						
Preferable Exposure	None						

Course Description:

This course is designed to help students enhance self-awareness with a focus on managing physical and mental health, emotions and stress. As a life skill course, it helps the learners deal with adversity, develop resilience and build coping skills. In addition to helping students develop empathy, the course augments interpersonal sensitivity and enables students to improve the quality of their interpersonal relationships.

Course Educational Objectives:

- To develop an enhanced awareness of self
- To promote a focus on physical and mental health
- To facilitate an understanding of the sources of stress and reactions to stress
- To discuss the significance of emotional intelligence
- To help appreciate the role of empathy in enhancing interpersonal sensitivity

List of Experiments

S.no	Topic	Type
1	Self Awareness	Exercise
2	Staying Well: Connectedness between Physical and Mental Health	Exercise
3	Stress and Coping	Exercise
4	Emotional Intelligence	Exercise
5	Empathy	Exercise

Textbook(s):

1. Feldman, R.S., Adjustment: Applying Psychology in a Complex World., McGraw-Hill,Newyork, 1989

Reference(s):

1. Linden, W., Stress Management: From Basic Science to Better Practice., Sage,Newyork, 2004
2. Goleman, D., Working with Emotional Intelligence., Bantam,London, 2000

Course Outcomes:

1. Have an enhanced understanding of self
2. Appreciate the importance of maintaining physical and mental health
3. Identify stressors and develop coping mechanisms
4. Develop an ability to manage emotions intelligently
5. Appreciate diversity through empathy

Course Articulation Matrix:

	POs																PSOs			
CO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	1	2	3	4

1																				
2																				
3																				
4																				
5																				

3 – High, 2 – Medium & 1 – Low Correlation

APPROVED IN MEETINGS HELD ON:

BOS : 08-05-2024 Academic Council Number: 30 Academic Council : 04-07-2024

SDG No(s). & Statement(s) :

4 & Quality Education : Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

SDG Justification(s):

The course involves identifying one’s personal values and working on real-life problems, thus forming the base to work on their passions even past collegiate life.

FINA1081	PERSONAL FINANCIAL PLANNING	L	T	P	S	J	C
		1	0	0	0	0	1
Pre-requisite	None						
Co-requisite	None						
Preferable Exposure	None						

Course Description:

This course provides a comprehensive understanding of the foundations of finance, with a focus on the behavioral aspects of decision-making. Students explore topics such as risk attitudes, decision-making under uncertainty, biases, and heuristics. They learn about investment products, measuring returns, portfolio diversification, and asset allocation. The course emphasizes personal financial goal-setting and planning, including the development of financial statements and balance sheets. Additionally, students gain knowledge of tax planning and its impact on financial decisions. By the end of the course, students are equipped with the skills to make informed financial decisions and effectively plan for their personal financial goals.

Course Educational Objectives:

- To Understand the financial behaviour and Personal Financial planning process and application of time value of money
- To know applications of the financial decisions making beliefs , biases to take informed decision for better financial planning.
- Understand the investment products and measuring risk return analysis
- To know and prepare the Personal Finance Goals and analyses the factors influencing personal financial planning.
- To Understand the tax rules and to make better financial decision making and analysis the Tax Planning.

MODULE 1 INTRODUCTION TO BEHAVIORAL ECONOMICS AND FINANCE **3 Hrs**

Foundation of Finance – Equity – bond , debenture - – Behavioural aspects of finance decisions - investment decisions – financing decisions and other decisions- economics of decision making – risk attitude and decision making – decision making under risk – certainty equivalent and risk premium.

MODULE 2 BELIEFS, BIASES AND HEURISTICS FINANCIAL DECISION-MAKING **3 Hrs**

Beliefs, Biases and Heuristics Financial Decision-Making
Beliefs - Biases – information overload and decision constraints – Overconfidence and Investor Behavior - ease of processing information – familiarity Heuristics – behavioural investing – loss of aversion – and investor Behaviour – sunk cost fallacy - financial decision making – home bias – representativeness (good companies vs. good investments) – return chasers - availability of heuristics – availability and attention grabbing - anchoring – anchor to informed decision making - overconfidence bias – sample model of overconfident trader.

MODULE 3 INVESTMENT PRODUCTS AND MEASURING INVESTMENT RETURNS: **3 Hrs**

Financial Assets and valuation – present value of financial commitments (time value of money) - Investment Portfolio risk and return – return and biases and relationship – portfolio diversification - Portfolios for Individual Investors – assets allocation – return maximization and risk minimizations (L28)- Portfolio Return and Risk

MODULE 4 PERSONAL FINANCIAL GOAL - PLANNING PERSONAL FINANCES - PERSONAL FINANCIAL STATEMENTS **3 Hrs**

Personal financial goals – time based financial goals – need based financial goals – setting and basic guideline for developing financial goals -common financial goals for individuals – factors influencing financial goals - life situations and personal value – economic factors - financial planning process – personal financial settlement – cash flow personal balance sheet

MODULE 5 **TAX PLANNING - TAXES AND FINANCIAL PLANNING - TAXES AND FINANCIAL PLANNING** **3 Hrs**

Income tax basics – taxes and financial planning – implications of taxes on returns – before and after tax rate of returns – calculating taxable income and tax liability – tax planning for personal finance – purchase decisions – investment decisions – incorporating taxes into financial plan – tax saving guidelines

Texbook(s):

1. National Institute of Securities Management (NISM) Module 1 & XA,
2. Madhu Sinha, Financial Planning, 2, McGraw Hill India,
3. Vinay Bhagwat, Simplified Financial Management, The Times Group,

Reference(s):

1. S Murali and K R Subbakrishna, Personal Financial Planning (Wealth Management) ,

Course Outcomes:

1. Explain the financial planning process and how time value of money is used.
2. Financial planning with informed decision making by considering different dimensions of beliefs and biases.
3. Recognize the various investment options and do an investment return analysis.
4. Recognize and set up a personal financial for goals.
5. Explain tax rules and effects on financial planning and examine the Tax Planning strategies

Course Articulation Matrix:

	POs																PSOs			
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**1**	**2**	**3**	**4**
1	1	1			1			1	1	1		3					1	1	3	
2	2	2			1	1	1	1		1	1	3					1	1	2	
3	3	2	1		1			1		1	1	3					2	2	3	
4	3	2		1	1		1	1		1	1	2					2	3	2	
5	3	3		1	1	1	2	1		1	1	1					2	2	3	

3 – High, 2 – Medium & 1 – Low Correlation

APPROVED IN MEETINGS HELD ON:

BOS : 26-06-2023 Academic Council Number: 27 Academic Council : 06-07-2023

SDG No(s). & Statement(s) :

4 & Quality Education : Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.
12 & Responsible Consumption and Production : Ensure sustainable consumption and production patterns.

SDG Justification(s):

This course enables the students to attain their financial literacy that builds in the discipline of saving and improves their lifelong learnings.- This course ensures sustainable consumption and helps in providing them their life long financial requirements .

PHPY1011	GANDHI AND THE CONTEMPORARY WORLD	L	T	P	S	J	C
		1	0	0	0	0	1
Pre-requisite	None						
Co-requisite	None						
Preferable Exposure	None						

Course Description:

This course provides the students with basic knowledge on Gandhi's life, his philosophies and his relevance in the contemporary world.

Course Educational Objectives:

- To provide the students with the basic knowledge on Gandhi's life and his philosophies
- To understand his role in the Indian national movement
- To apply Gandhian Ethics while analysing the contemporary social/political issues
- A

MODULE 1 GANDHI'S LIFE AND HIS PHILOSOPHIES **3 Hrs**

Gandhi's Life and major contributions- Gandhi and Indian National Movement

MODULE 2 ELEVEN VOWS OF MAHATMA GANDHI **3 Hrs**

Ashram Vows/Eleven Vows of Gandhi and its implications

MODULE 3 GANDHI AND SARVODAYA **3 Hrs**

Sarvodaya as a Social Philosophy- Its Implications - Gandhian Socialism – Jayaprakash Narayan and Total Revolution- Vinoba Bhave and Bhoodan movement

MODULE 4 NEW EDUCATION/BASIC EDUCATION **3 Hrs**

Gandhi's views on Education-His experiments at Phoenix settlement and Tolstoy Farm-Educational Policies in independent India

MODULE 5 RELEVANCE OF GANDHI IN THE CONTEMPORARY TIMES **3 Hrs**

Contemporary challenges-moral-social-political and environmental challenges-Insights from Gandhi- Gandhi and Gandhism after Gandhi

Texbook(s):

1. Gandhi, M. K. , The Story of My Experiments with Truth., Navjivan Publishing House,Ahmadabad, 1948
2. Gandhi, M K, Satyagraha in South Africa, Navjivan Publishing House,Ahmadabad, 1968
3. Kripalani, J.B, Gandhi: His Life and Thought. , Publications Division,New Delhi, 1970

Reference(s):

Course Outcomes:

1. Understand the life of Gandhi
2. Appreciate the role of Gandhian non-violence and Satyagraha in India's freedom struggle.
3. Critically examine the philosophy of Gandhi on Education, Sarvodaya, and Satyagraha
4. A

Course Articulation Matrix:

	POs																PSOs			
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**1**	**2**	**3**	**4**
1	3	3	3	2	3	3	3	3	2	3	3	3	2	3	3	3				
2	1	2	3	2	3	3	2	3	2	2	3	3	3	3	2	3				
3	3	2	2	3	3	3	3	3	1	2	3	3	2	2	3	2				
4																				

3 – High, 2 – Medium & 1 – Low Correlation

APPROVED IN MEETINGS HELD ON:

BOS : 28-06-2023 Academic Council Number: 27 Academic Council : 06-07-2023

SDG No(s). & Statement(s) :

4 & Quality Education : Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

SDG Justification(s):

4

ENVS1003	ENVIRONMENTAL STUDIES	L	T	P	S	J	C
		3	0	0	0	0	3
Pre-requisite	None						
Co-requisite	None						
Preferable Exposure	NO						

Course Description:

The National Education Policy (NEP) 2020 underlines the importance of making environmental education an integral part of curricula and encouraging environmental awareness and sensitivity towards its conservation and sustainable development. Environmental studies include areas such as climate change, pollution, waste management, sanitation, conservation of biological diversity, management of biological resources and biodiversity, forest and wildlife conservation, and sustainable development.

Course Educational Objectives:

- To developed expertise relevant to the historical context of human interactions with the environment
- To make student aware about the concept of natural resources and its need for protection
- To make student aware of role of environmental legislations to protect environment
- To make student aware of a comprehensive knowledge of climate change and sustainable development goals

MODULE 1 HUMANS AND THE ENVIRONMENT, ENVIRONMENTAL ISSUES: LOCAL, REGIONAL AND GLOBAL **12 Hrs**

The man-environment interaction: Humans as hunter-gatherers; Mastery of fire; Origin of agriculture; Emergence of city-states; Great ancient civilizations and the
environment, Indic Knowelege and Culture of sustainability; Middle Ages and Renaissance; Industrial revolution and its impact on the environment; Population
growth and natural resource exploitation; Global environmental change. Environmental Ethics and emergence of environmentalism: Anthropocentric and ecocentric perspectives; The Club of Rome- Limits to Growth; UN Conference on Human Environment 1972; World Commission on Environment and Development and
the concept of sustainable development; Rio Summit and subsequent international efforts.

MODULE 2 NATURAL RESOURCES AND SUSTAINABLE DEVELOPMENT **8 Hrs**

Overview of natural resources: Definition of resource; Classification of natural resources; Major type of biotic resources- forests, grasslands, wetlands, wildlife and
aquatic; Microbes as a resource; Status and challenges.Water resources: Types - fresh water and marine resources; Environmental impact of over-exploitation,
issues and challenges. Mineral resources: Importance of mineral exploitation; Environmental problems due to extraction of minerals and use; Soil as a resource and
its degradation. Energy resources: Sources and their classification (renewable - coal, oil, natural gas, nuclear energy and non-renewable - solar, wind, tidal, hydro,
wave, ocean thermal, geothermal, biomass, hydrogen); Introduction to sustainable development: Sustainable Development Goals (SDGs)- targets and indicators,
challenges and strategies for SDGs.

MODULE 3 CONSERVATION OF BIODIVERSITY AND ECOSYSTEMS, ENVIRONMENTAL POLLUTION AND HEALTH **8 Hrs**

Biodiversity: Biodiversity as a natural resource and its distribution; Levels and types of biodiversity; Biodiversity hotspots; Threats to biodiversity and ecosystems.
Biodeiversity conservation. Ecosystems and their services: Major ecosystem types in India and their basic characteristics - forests, wetlands, grasslands, agriculture,
coastal and marine. Understanding pollution: Production processes and generation of wastes; Assimilative capacity of the environment; Causes, effects and control measures of air, water, soil and noise pollution: Principles and need of Solid and hazardous waste management. Thermal and Radioactive pollution: Sources and impact on human health and ecosystems.

MODULE 4 **CLIMATE CHANGE: IMPACTS, ADAPTATION MITIGATION, AND ENVIRONMENTAL MANAGEMENT** **8 Hrs**

Understanding climate change: Natural variations in climate; Structure of atmosphere; Anthropogenic climate change from greenhouse gas emissions– past, present and future; Impacts, vulnerability and adaptation to climate change; Mitigation of climate change: Synergies between adaptation and mitigation measures; GHG reduction vs. sink enhancement; Concept of carbon intensity; National and international policy instruments for mitigation, decarbonizing pathways and net zero targets for the future; Carbon capture and storage, National climate action plan; Climate justice.
Environmental management system: Concept of ISO 14001 and Circular Economy, Life cycle analysis; Environmental audit and impact assessment; Concept of 3R
and sustainability; Ecolabeling /Ecomark scheme

MODULE 5 **ENVIRONMENTAL TREATIES, LEGISLATION CASE STUDIES AND FIELD WORK** **9 Hrs**

An overview of instruments of international cooperation; conventions and protocols; COP Major International Environmental Agreements: CITES; Ramsar
Convention; UNCCD; Vienna Convention; Montreal Protocol ; Basel Convention; Rotterdam Convention; Stockholm Convention; UNFCCC; Kyoto Protocol; Paris
Agreement; Major Indian Environmental Legislations: The Wild Life (Protection) Act, 1972; The Water (Prevention and Control of Pollution) Act, 1974; The Forest
(Conservation) Act, 1980; The Air (Prevention and Control of Pollution) Act, 1981; The Environment (Protection) Act, 1986; The Biological Diversity Act, 2002; Waste
management rules;
Field visits to identify local/regional environmental issues; Participation in plantation drive and nature camps; Documentation of campus biodiversity; Campus
environmental management activities such as solid waste disposal, water management and sanitation and sewage treatment

Textbook(s):

1. Fisher, Michael H., An Environmental History of India- From Earliest Times to the Twenty-First Century, , Cambridge University Press., 2018
2. Perman, R., Ma, Y., McGilvray, J., and Common, M., Natural Resource and Environmental Economics. Pearson Education., Pearson Education., 2003
3. William P.Cunningham and Mary A., Cunningham Environmental Science: A Global Concern, Mc-Graw Hill, USA), 2015
4. Bawa, K.S., Oomen, M.A. and Primack, R., Conservation Biology: A Primer for South Asia. Universities Press., Universities Press.,
5. Jackson, A. R., & Jackson, J. M. , . Environmental Science: The Natural Environment and Human Impact. Pearson Education, Pearson Education, 2000
6. Ahluwalia, V. K., . Environmental Pollution, and Health. The Energy and Resources Institute (TERI), 2015
7. Tiefenbacher, J, Environmental Management - Pollution, Habitat, Ecology, and Sustainability, Intech Open, , London,
8. Theodore, M. K. and Theodore, Louis , Introduction to Environmental Management, , 2nd , CRC Press,

Reference(s):

1. Hughes, J. Donald, An Environmental History of the World- Humankind's Changing Role in the Community of Life,, 2nd , Routledge. , 2009
2. John W. Twidell and Anthony D., Renewable Energy Sources, Weir Publisher, 2015
3. Singh, J.S., Singh, S.P. & Gupta, S.R., Ecology, Environment and Resource Conservation. , Anamaya Publications ,
4. Manahan, S.E., Environmental Chemistry, 11th, CRC Press., 2022
5. Central Pollution Control Board Web page for various pollution standards.,
6. Pittock, Barrie, Climate Change: The Science, Impacts and Solutions. , 2nd , Routledge., 2009

Course Outcomes:

1. Gain insights into the international efforts to safeguard the Earth's environment and resources,ecosystems, biodiversity and conservation
2. Identify types of natural resources, their distribution and use with special reference to India.
3. Discuss the factors affecting the availability of natural resources, their conservation.
4. An overview of national and global efforts to address climate change adaptation and mitigation efforts
5. Understand different approaches of assessing environmental quality and associated risks

Course Articulation Matrix:

	POs																PSOs			
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**1**	**2**	**3**	**4**
1	2																2			
2		2												3				1		
3			1					2								1		2	1	
4					3							2								3
5						2				1									2	

3 – High, 2 – Medium & 1 – Low Correlation

APPROVED IN MEETINGS HELD ON:

BOS : 10-06-2024 Academic Council Number: 30 Academic Council : 04-07-2024

SDG No(s). & Statement(s) :

4 & Quality Education : Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.
9 & Industry, Innovation and Infrastructure : Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.
12 & Responsible Consumption and Production : Ensure sustainable consumption and production patterns.
15 & Life on Land : Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

SDG Justification(s):

SDG No:4 - The module and topics mentioned in this course are designed to ensure all-inclusive and thorough education for everyone affirming the belief that education is one of the most influential and proven for sustainable development in terms of Chemistry and toxic substances SDG NO:9- Promotes the sustainable industrialization and innovation by diversified chemical industries which are related to chemistry are sustained and are experiencing faster recovery. SDG No:12 - Achieving economic growth and sustainable development requires to reduce ecological footprint by changing the goods and resources. Encouraging industries, businesses and consumers to recycle and reduce waste is equally important, as is supporting developing countries to move towards more sustainable patterns of consumption by 2030. SDG No:15 - Urgent action must be taken to reduce the

loss of natural habitats and biodiversity which are part of our common heritage and support global food and water security, climate change mitigation and adaptation, and peace and security.

POLS1051	THE INDIAN CONSTITUTION	L	T	P	S	J	C
		1	0	0	0	0	1
Pre-requisite	None						
Co-requisite	None						
Preferable Exposure	None						

Course Description:

This course analyzes the basic structure and operative dimensions of the Indian Constitution. It explores various aspects of the Indian political and legal system from a historical perspective highlighting the various events that led to the making of the Indian Constitution. The course also deals with various challenges faced by the constitution and its coping mechanisms. Broadly, the students would understand and explain the working of different institutions and political debates ensuing from the operation of the Indian constitution in action.

Course Educational Objectives:

- To introduce constitutional history of India.
- To explain the process of making Indian constitution.
- To analyze Fundamental of Rights, Duties and other principles in constitution.
- To create familiarity with political developments which shaped the constitution.
- To inculcate constitutional morality.

MODULE 1 INTRODUCTION TO INDIAN CONSTITUTION **3 Hrs**

Introduction to constitutions, Purpose of a constitution, How should a society make a constitution? Constituent Assembly and the making of India's constitution

MODULE 2 FUNDAMENTALS OF INDIAN CONSTITUTION **3 Hrs**

Preamble: origin and significance, Fundamental rights and its significance, Directive principles of state policy and philosophical principles, Basic structure, case studies.

MODULE 3 CITIZENSHIP **3 Hrs**

Citizenship: basic concepts, citizenship in Indian constitution, changes in citizenship law, challenges and future.

MODULE 4 ORGANS OF THE STATE **3 Hrs**

The executive: The President, Prime Minister and the Council of Ministers, the legislature: Parliament, Lok Sabha and Rajya Sabha, Collective responsibility, the judiciary: the Supreme Court, changing nature of relationship between the three organs.

MODULE 5 DISTRIBUTION OF POWERS **3 Hrs**

Separation of powers at state level: executive, legislature and judiciary; changing nature of union and state relations; 73rd and 74th constitutional amendments, rural and urban local governments: challenges and future.

Texbook(s):

Reference(s):

1. Granville Austin, The Indian Constitution: Cornerstone of a Nation, 1966
2. Sujit Choudhry, Madhav Khosla, and Pratap Bhanu Mehta, The Oxford Handbook of the Indian Constitution, 2016

Course Outcomes:

1. Demonstrate an understanding of the Constitution of India and how constitutional governance is carried out in India
2. Become aware of the fundamental rights and duties of the citizens as well as the obligation of the state towards its citizens.
3. Familiarize with key political developments that have shaped the Constitution and amended it from time to time.
4. Imbibe the values enshrined in the constitution and follow the constitutional morality.
5. Equip themselves to take up other courses in law after having done a foundation course on Indian Constitution.

Course Articulation Matrix:

	POs																PSOs			
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**1**	**2**	**3**	**4**
1	1	2	2	2	2	3	3	2	2	1	2	2	2	2	2	2	1	1	3	3
2	1	2	2	2	2	3	3	1	1	1	2	2	2	2	2	2	1	1	3	3
3	1	2	2	2	2	3	3	1	1	1	2	2	2	2	2	2	1	1	3	3
4	1	2	2	2	2	3	3	1	1	1	2	2	2	2	2	2	1	1	3	3
5	1	2	2	2	2	3	3	1	1	1	2	2	2	2	2	2	1	1	3	3

3 – High, 2 – Medium & 1 – Low Correlation

APPROVED IN MEETINGS HELD ON:

BOS : 28-06-2023 Academic Council Number: 27 Academic Council : 06-07-2023

SDG No(s). & Statement(s) :

16 & Peace and Justice Strong Institutions : Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.

SDG Justification(s):

The course primarily talks about evolution of the constitutional institutions. Since the SDG-16 talks about the quality of the institutions, it is applicable here.

DOSP1181	YOGASANA	L	T	P	S	J	C
		0	0	0	2	0	1
Pre-requisite	None						
Co-requisite	None						
Preferable Exposure	NO						

Course Description:

Yoga course also helps to learn about healthy practices like regulating breathing through various techniques, performing physical exercises, and relaxation habits for long-term well- being. Students will mainly focus on the subjects like philosophy, yoga and health, and motivation.

Course Educational Objectives:

- To attain a high level of consciousness
- To enable the students to lead a healthy lifestyle
- To practice mental hygiene
- To increase concentration and self control
- To improve the immune system

List of Topics

S.no	Topic
1	Pranasanchalana (Preparatory postures) - Tadasana , Parshwa Tadasana , TiryakTadasana , Vrukshasan , Trikonasana , Utkatasana
2	Supine Postures - Uthanupadasana , Pawanamukthasana , Sethubandhasana , Sarvangasana , Matsyasana
3	Prone Asanas - Salabasana, Sarpasana , Dhanurasana
4	Sitting Asanas - Vajrasana , Shashankasana, Supthavajrasana , Ustrasana , Sarala Vakrasana
5	Surya Namaskara, Pranayama and Relaxation Exercise - Surya Namasakara , Anuloma Viloma-Brahmari , 61 Points Relaxation technique

Textbook(s):

1. Yoga Sutras of Patanjali, Swami Satchidananda,

Reference(s):

1. The Heart of Yoga: Personal Practice,
2. Sun Salutations,
3. Complete Book of Yoga: Harmony of Body and Mind,

Course Outcomes:

1. Yoga improves mental & physical strength, balance and flexibility
2. Yoga benefits heart health
3. Yoga develops core strength
4. Yoga connects you with a supportive community

5. Yoga usually involves paying attention to your breath, which can help you relax

Course Articulation Matrix:

	POs																PSOs			
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**1**	**2**	**3**	**4**
1	2	2			1				1		1					1				
2									2		2			2		3				
3									2		2					2				
4							3		3		3	2		3	3	3				
5									3		3					1				

3 – High, 2 – Medium & 1 – Low Correlation

APPROVED IN MEETINGS HELD ON:

BOS : 10-06-2024 Academic Council Number: 30 Academic Council : 04-07-2024

SDG No(s). & Statement(s) :

4 & Quality Education : Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

SDG Justification(s):

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MFST1002	HEALTH & WELLBEING	L	T	P	S	J	C
		0	0	2	0	0	1
Pre-requisite	None						
Co-requisite	None						
Preferable Exposure	none						

Course Description:

The course provides the students a better understanding of the role of a proper diet in maintenance of human health. This course emphasizes the composition of the food, and will help to understand how toexercise, the role of sports and physical fitness in development of a good health. The course also focuses on the importance of emotional well-being and mindfulness. This course helps in teaching the role of yoga in maintenance of physical balance.

Course Educational Objectives:

- To provide an understanding of the relationship between food and nutrition
- To emphasize the role of exercise, sports and physical fitness in obtaining a good health
- To explain about the mindfulness and emotional well being
- To teach the role of yoga and meditation in maintaining the body balance

List of Experiments

S.no	Topic	Type
1	Understand the relationship between Food and Nutrition and how food composition affects nutritional characteristics. Knowledge about regulatory principles in determining diets and recommended daily allowances. Understand how to create personalised diet/nutrition plans	Exercise
2	Understand how exercise, activity and sports helps in developing good health. Experiential exposure to the role of proper, specific nutritional interventions along with structured activities on developing proper physical health. Practical exercises and assignments in sports and exercise regimes.	Exercise
3	Introduction to emotional wellbeing and mindfulness. Teaching of mindfulness practices to reduce stress, increase relaxation and improve mental wellbeing.	Exercise
4	Introduction to Yoga theory and how Yoga helps in maintaining balance in the body. Practice of Yoga and meditation to improve overall emotional and physical balance. Practical yoga exercises and meditation techniques	Exercise

Texbook(s):

Reference(s):

Course Outcomes:

1. Learn the role of nutrition and diet in maintaining a good health
2. understand how the exercise, sports and physical activities will improve health
3. learn mindfulness practices for reducing stress
4. know the importance of yoga and meditation

Course Articulation Matrix:

	POs	PSOs

CO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	1	2	3	4
1	1	2	3	3	3	2	2	2	1	1	2	1	3	1	2	2	3	3	1	1
2	2	2	3	2	3	3	1	1	1	1	2	2	2	1	3	3	3	3	1	1
3	2	2	2	2	1	1	3	2	1	1	2	2	1	1	3	3	1	1	1	1
4	2	2	2	2	1	1	2	2	1	1	2	2	1	1	3	3	1	1	1	1

3 – High, 2 – Medium & 1 – Low Correlation

APPROVED IN MEETINGS HELD ON:

BOS : 28-06-2023 Academic Council Number: 27 Academic Council : 06-07-2023

SDG No(s). & Statement(s) :

3 & Good Health and Well-being : Ensure healthy lives and promote well-being for all at all ages.

SDG Justification(s):

Ensure healthy lives and promote well-being for all at all ages

DOSL1081	STUDENT LIFE ACTIVITIES - PARTICIPANT	L	T	P	S	J	C
		0	0	0	2	0	1
Pre-requisite	None						
Co-requisite	None						
Preferable Exposure	NO						

Course Description:

This course recognizes student participation in co-curricular and extra-curricular activities organised by student organisations and/or institutional departments to explore their interests. It will enable students to identify, involve, and pursue avocational interests through experiential learning opportunities.

Course Educational Objectives:

- Encourage participation across a spectrum of co-curricular and extracurricular offerings
- Foster hands-on engagement to cultivate interpersonal social competencies
- Empower learners to explore their passions and skills outside/beyond the classroom
- Inspire students to give back to society through welfare and community activities

List of Topics

S.no	Topic
1	Art & Culture (Music, Dance, Theatre, Crafts, Cinema, Cuisine, Quiz, Debate, Photography, Literature, Heritage, Creative Writing, Fashion, Social Media, Travel, Comedy, and Gaming)
2	Self-Development (Oratory, Entrepreneurship, Upskilling, Leadership, Language, Design, Student Mobility, Higher Education, and Career Guidance)
3	Wellness (Physical Health & Hygiene, Mental Health, Mindfulness, Community Building, and Socio-Cultural Inclusion)
4	Technical (Coding, Cybersecurity, Animation, Innovation, Astronomy, Robotics, Consulting, Business, Aeronautics, Automotive, and Research)
5	Social Cause (Community Service, Allyship, Women Empowerment, Sustainability and Animal Welfare)

Textbook(s):

1. Jayshree Nair-Misra., TAGORE- A LIFE OF LEARNING, Azim Premji University, 2012

Reference(s):

1. Newport, Cal., How to Win at College: Surprising Secrets for Success from the Country's Top Students., 2005
2. Light, Richard J., Making the Most of College., 2004
3. TEDx Talks., "TEDxToronto - Drew Dudley "Leading with Lollipops.", 2010
4. TED., "How to Start a Movement | Derek Sivers." ,, 2010
5. "Randy Pausch Last Lecture: Achieving Your Childhood Dreams." ,, YouTube,Carnegie Mellon University., 2007
6. "Dead Poets Society.", 1989
7. J. Cohan, Deborah., "10 Benefits of Extracurricular Activities in College." Psychology Today,, Psychology Today,, 2023

8. Christison, Claudette., “The Benefits of Participating in Extracurricular Activities.” BU Journal of Graduate Studies in Education,, BU Journal of Graduate Studies in Education,, 2013

Course Outcomes:

1. Broaden Experiential Horizons
2. Enhance Self-Discovery
3. Cultivate Diversity Awareness
4. FEffective Communication Skills:

Course Articulation Matrix:

	POs																PSOs			
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**1**	**2**	**3**	**4**
1									2											
2																				
3							2										2			
4			3																	

3 – High, 2 – Medium & 1 – Low Correlation

APPROVED IN MEETINGS HELD ON:

BOS : 10-06-2024 Academic Council Number: 30 Academic Council : 04-07-2024

SDG No(s). & Statement(s) :

4 & Quality Education : Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

SDG Justification(s):

This course recognises student participation in co-curricular and extra-curricular activities which focus on inclusive partnerships and collaborations with all stakeholders by using all sustainable means to promote lifelong learning.

DOSL1091	STUDENT LIFE ACTIVITIES - ORGANIZER	L	T	P	S	J	C
		0	0	0	2	0	1
Pre-requisite	None						
Co-requisite	None						
Preferable Exposure	NO						

Course Description:

This course promotes and acknowledges students' efforts towards organising various co-curricular and extra-curricular activities as part of various student organisations and/or institutional departments in their area of interest. It will provide students with opportunities for experiential learning through end-to-end planning and execution of versatile events as part of a team.

Course Educational Objectives:

- Enable learners to organise a wide variety of co-curricular and extracurricular activities
- Foster hands-on engagement to cultivate interpersonal social competencies
- Inculcate the ability to effectively work with a group of diverse individuals
- Enhance managerial and administrative skills essential for professional development

List of Topics

S.no	Topic
1	Art & Culture (Music, Dance, Theatre, Crafts, Cinema, Cuisine, Quiz, Debate, Photography, Literature, Heritage, Creative Writing, Fashion, Social Media, Travel, Comedy, and Gaming)
2	Self-Development (Oratory, Entrepreneurship, Upskilling, Leadership, Language, Design, Student Mobility, Higher Education, and Career Guidance)
3	Wellness (Physical Health & Hygiene, Mental Health, Mindfulness, Community Building, and Socio-Cultural Inclusion)
4	Technical (Coding, Cybersecurity, Animation, Innovation, Astronomy, Robotics, Consulting, Business, Aeronautics, Automotive, and Research)
5	Social Cause (Community Service, Allyship, Women Empowerment, Sustainability. and Animal Welfare)

Textbook(s):

1. Jayshree Nair-Misra., Nair-Misra. "Tagore - A Life of Learning." Azim Premji University,, Azim Premji University,, 2012

Reference(s):

1. Newport, Cal., How to Win at College: Surprising Secrets for Success from the Country's Top Students., 2005
2. Light, Richard J., Making the Most of College. , Harvard University Press,, 2004
3. TEDx Talks, . "TEDxToronto - Drew Dudley "Leading with Lollipops." , YouTube, 2010
4. TED. , "How to Start a Movement | Derek Sivers." , YouTube,, YouTube, 2010
5. "Randy Pausch Last Lecture: Achieving Your Childhood Dreams." , YouTube, Carnegie Mellon University, 2007
6. "Dead Poets Society." (English, 128 mins)., Buena Vista Pictures., 1989
7. Morand, Tatiana. , "The Ultimate Event Planning Guide: How to Plan an Event." , Wild Apricot Blog,, 2021

8. Thomas, Priya., Priya. “9 Ways to Help Your Students Create Awesome Events.” , Modern Campus Blog,, Modern Campus Blog, 2019

Course Outcomes:

1. Enhance Management Skills Development:
2. Effective Teamwork:
3. Cultivate Leadership Readiness:
4. Critical Thinking Proficiency:
5. Enhance Problem-Solving Skills:

Course Articulation Matrix:

	POs																PSOs			
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**1**	**2**	**3**	**4**
1			1						3											
2							3				2									
3								3					2							
4		3																		
5	3																			

3 – High, 2 – Medium & 1 – Low Correlation

APPROVED IN MEETINGS HELD ON:

BOS : 10-06-2024 Academic Council Number: 30 Academic Council : 04-07-2024

SDG No(s). & Statement(s) :

16 & Peace and Justice Strong Institutions : Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.
17 & Partnerships to achieve the Goal : Strengthen the means of implementation and revitalize the global partnership for sustainable development.

SDG Justification(s):

This course recognises student participation in community service endeavours focusing on sustainable development, and service to communities. This allows students to develop empathy, citizenship behaviour and inclusive community values.

DOSL1101	STUDENT LIFE ACTIVITIES - COMPETITOR	L	T	P	S	J	C
		0	0	0	2	0	1
Pre-requisite	None						
Co-requisite	None						
Preferable Exposure	NO						

Course Description:

This course encourages student participation in co-curricular and extra-curricular competitions organised at local, national and international levels. It will allow students to make use of various creative opportunities and benchmark themselves within their peer group on recognised platforms.

Course Educational Objectives:

- Encourage competitive participation in both co-curricular and extracurricular offerings
- Foster hands-on engagement to cultivate interpersonal social competencies
- Empower learners to explore their passions and skills outside/beyond the classroom
- Inculcate a healthy paradigm of self-awareness, commitment, and honour

List of Topics

S.no	Topic
1	Art & Culture(Music, Dance, Theatre, Crafts, Cinema, Cuisine, Quiz, Debate, Photography, Literature, Heritage, Creative Writing, Fashion, Social Media, Travel, Comedy, and Gaming)
2	Self-Development(Oratory, Entrepreneurship, Upskilling, Leadership, Language, Design, Student Mobility, Higher Education, and Career Guidance)
3	Wellness(Physical Health & Hygiene, Mental Health, Mindfulness, Community Building, and Socio-Cultural Inclusion)
4	Technical(Coding, Cybersecurity, Animation, Innovation, Astronomy, Robotics, Consulting, Business, Aeronautics, Automotive, and Research)
5	Social Cause(Community Service, Allyship, Women Empowerment, Sustainability. and Animal Welfare)

Textbook(s):

1. Jayshree Nair-Misra., . “Tagore - A Life of Learning.” , Azim Premji University, , 2012

Reference(s):

1. Newport, Cal., How to Win at College: Surprising Secrets for Success from the Country’s Top Students., 2005
2. Light, Richard J., J. Making the Most of College. , Harvard University Press,, 2004
3. TEDx Talks., “TEDxToronto - Drew Dudley “Leading with Lollipops.” , YouTube, 2010
4. TED, “How to Start a Movement | Derek Sivers.” , YouTube, 2010
5. “Randy Pausch Last Lecture: Achieving Your Childhood Dreams.” , YouTube, Carnegie Mellon University., 2007
6. “Dead Poets Society.”, Buena Vista Pictures, 1989
7. J. Cohan, Deborah., . “10 Benefits of Extracurricular Activities in College.” Psychology Today,, Psychology Today, 2023

8. Christison, Claudette., “The Benefits of Participating in Extracurricular Activities.” , BU Journal of Graduate Studies in Education, Volume 5 Issue 2,

Course Outcomes:

1. Enhanced Expertise:
2. Cultivate Social Competencies:
3. Critical Thinking Proficiency:
4. Effective Communication Skills:
5. Effective Teamwork:

Course Articulation Matrix:

	POs																PSOs			
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**1**	**2**	**3**	**4**
1			2						2											
2																2				
3		3																		
4				3																
5							3	2												

3 – High, 2 – Medium & 1 – Low Correlation

APPROVED IN MEETINGS HELD ON:

BOS : 10-06-2024 Academic Council Number: 30 Academic Council : 04-07-2024

SDG No(s). & Statement(s) :

16 & Peace and Justice Strong Institutions : Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.
17 & Partnerships to achieve the Goal : Strengthen the means of implementation and revitalize the global partnership for sustainable development.

SDG Justification(s):

This course recognises student participation in community service endeavours focusing on sustainable development, and service to communities. This allows students to develop empathy, citizenship behaviour and inclusive community values.

DOSL1111	FOUNDATIONS OF STUDENT LEADERSHIP	L	T	P	S	J	C
		0	0	0	2	0	1
Pre-requisite	None						
Co-requisite	None						
Preferable Exposure	NO						

Course Description:

This course aims to provide a foundation for student leadership through opportunities to discover their strengths and identify areas for further development. Participants will delve deeper into understanding leadership through a research-driven framework provided by Kouzes and Posner's Five Practices of Exemplary Leadership (6th ed.) which consists of five key practices: Model the Way, Inspire a Shared Vision, Challenge the Process, Enable Others to Act, and Encourage the Heart.

Course Educational Objectives:

- Unlearn preconceived notions of what makes for an effective student leader
- Identify leadership fundamentals and develop strategies to enhance them
- Inculcate the ability to effectively work with a group of diverse individuals
- Encourage the practice of consensus building and feedback for growing as a leader

List of Topics

S.no	Topic
1	Model the Way: Leaders establish principles concerning the way people (constituents, peers, colleagues, and customers alike) should be treated and the way they should pursue goals. Leaders create standards of excellence and set an example for others to follow. They put up signposts when people feel unsure of where to go or how to get there. Leaders create opportunities for victory.
2	Inspire a Shared Vision: Leaders passionately believe they can make a difference. They envision the future and create an ideal and unique image of what the organization can become. Through their magnetism and persuasion, leaders enlist others in their dreams. They breathe life into their visions and get people to see exciting possibilities for the future.
3	Challenge the Process: Leaders search for opportunities to change the status quo. They look for innovative ways to improve the organization. In doing so, they experiment and take risks. Since complex change threatens to overwhelm people and stifle action, leaders set interim goals so that people can achieve small wins as they work toward larger objectives. Effective leaders unravel bureaucracy when it impedes action. And, because leaders know that taking risks involves mistakes and failures, they accept occasional disappointments as opportunities to learn.

4	Enable Others to Act: Leaders foster collaboration and build spirited teams. They actively involve others. Leaders understand that mutual respect sustains extraordinary efforts. They strive to create an atmosphere of trust and human dignity. They strengthen others, making each person feel capable and powerful.
5	Encourage the Heart: Accomplishing extraordinary things in organizations is hard work. To keep hope and determination alive, leaders recognize the contributions that individuals make. In every winning team, the members need to share in the rewards of their efforts, so leaders celebrate accomplishments. They make people feel like heroes.

Textbook(s):

1. Kouzes, J. M., Posner, B. Z., High, B., & Morgan, G. M., The student leadership challenge: Five Practices for Becoming an Exemplary Leader ., (4th Ed), John Wiley & Sons., 2024

Reference(s):

1. Kouzes, J.M. & Posner, B.Z., The Leadership Challenge Workshop: Participant Workbook., (5th ed.), 2017
2. Kouzes, J. M., & Posner, B. Z., The Leadership Challenge: How to Make Extraordinary Things Happen In Organizations, (7th ed.), 2023
3. 42 FRESH IDEAS, 2018
4. THE LEADERSHIP CHALLENGE [VIDEO}.,

Course Outcomes:

1. Critical Self-Reflection:
2. Leadership Fundamentals:
3. Diverse Team Collaboration:
4. Consensus Building and Feedback Integration:
5. Communication skills:

Course Articulation Matrix:

	POs																PSOs			
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**1**	**2**	**3**	**4**
1									3				1							
2								3												
3							3													
4											2					1				
5				3																

3 – High, 2 – Medium & 1 – Low Correlation

APPROVED IN MEETINGS HELD ON:

BOS : 10-06-2024 Academic Council Number: 30 Academic Council : 04-07-2024

SDG No(s). & Statement(s) :

4 & Quality Education : Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

SDG Justification(s):

This course recognizes student participation in co-curricular and extra-curricular activities which focus on inclusive partnerships and collaborations with all stakeholders by using all sustainable means to promote lifelong learning.

DOSL1042	COMMUNITY SERVICES - VOLUNTEER	L	T	P	S	J	C
		0	0	2	0	0	1
Pre-requisite	None						
Co-requisite	None						
Preferable Exposure	None						

Course Description:

This course recognizes student participation in Community service activities organized by various student organizations and other Government and non-government organizations that exist for providing service to communities. These activities allow students to develop empathy, citizenship behavior and community values.

Course Educational Objectives:

- To help students develop empathy and citizenship behavior.
- Enable students to develop an altruistic attitude and community development sensibility
- Allow exploration of community service activities and reflect about these experiences
- Learn to work in small and large teams for achieving community objectives

List of Experiments

S.no	Topic	Type
1	Community Health Services	Exercise
2	Swachh Bharat Abhiyan and other Cleanliness drives management)	Exercise
3	Tree Plantation and similar environmental conservation initiatives	Exercise
4	Rain water harvesting awareness and implementation	Exercise
5	Fundraising and visits to Orphanages, Old-age homes, etc.	Exercise
6	Health and disease awareness programs	Exercise
7	Working with NGOs	Exercise
8	Disaster mitigation and management training and relief work	Exercise
9	Rural Upliftment projects	Exercise
10	Campus awareness and action projects (cleanliness, anti-ragging, blood donation, etc)	Exercise
11	Community investigations and surveys for development research	Exercise
12	Educational support for underprivileged (remedial classes, coaching, training, etc)	Exercise
13	Service camps	Exercise
14	Advocacy and information literacy initiatives	Exercise
15	Other activities serving local communities	Exercise
16	Participation in various community service activities	Project
17	Weekly reflection paper	Project
18	Portfolio (on social media using an Instagram account)	Project
19	Two learning papers (one per semester)	Project

Texbook(s):

1. Paul Rogat Loeb, Soul of a citizen: living with conviction in Challenging times,
2. Vera Lloyd, Community Services intervention ,

Reference(s):

1. Nicholas Kristof and Sheryl Wu Dunn, A path appears: Transforming lives, creating opportunities,
2. M. K. Gandhi, The story of My Experiments with Truth,

Course Outcomes:

1. Experience of volunteering in a variety of Community service activities
2. Gaining empathy for lesser privileged sections of society by experience
3. Understanding the process of generating community awareness
4. Understanding Disaster management and relief through training and experience
5. Developing environmental and sustainability awareness

Course Articulation Matrix:

	POs																PSOs			
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**1**	**2**	**3**	**4**
1								3	3	3		3								
2									3	2		3								
3								3	3	2										
4										2	3	3								
5								2				3								

3 – High, 2 – Medium & 1 – Low Correlation

APPROVED IN MEETINGS HELD ON:

BOS : 06-07-2023 Academic Council Number: 27 Academic Council : 06-07-2023

SDG No(s). & Statement(s) :

16 & Peace and Justice Strong Institutions : Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.
17 & Partnerships to achieve the Goal : Strengthen the means of implementation and revitalize the global partnership for sustainable development.

SDG Justification(s):

This course recognizes student participation in community service endeavours focussing on sustainable development, service to communities. This allows students to develop empathy, citizenship behaviour and inclusive community values.

DOSL1052	COMMUNITY SERVICES - MOBILIZER	L	T	P	S	J	C
		0	0	2	0	0	1
Pre-requisite	None						
Co-requisite	None						
Preferable Exposure	None						

Course Description:

This course recognizes student participation in Community service activities organized by various student organizations and other Government and non-government organizations that exist for providing service to communities. These activities allow students to develop empathy, citizenship behavior and community values.

Course Educational Objectives:

- To help students understand leadership in a community environment.
- Enable students to develop an altruistic attitude and community development sensibility
- Allow deep understanding of community service through practical experience
- Learn to lead small and large teams for achieving community objectives

List of Experiments

S.no	Topic	Type
1	Community Health Services	Exercise
2	"Swachh Bharat Abhiyan and other Cleanliness drives management)"	Exercise
3	Tree Plantation and similar environmental conservation initiatives	Exercise
4	Rain water harvesting awareness and implementation	Exercise
5	Fundraising and visits to Orphanages, Old-age homes, etc.	Exercise
6	Health and disease awareness programs	Exercise
7	Working with NGOs	Exercise
8	Disaster mitigation and management training and relief work	Exercise
9	Rural Upliftment projects	Exercise
10	"Campus awareness and action projects (cleanliness, anti-ragging, blood donation, etc)"	Exercise
11	Community investigations and surveys for development research	Exercise
12	Educational support for underprivileged (remedial classes, coaching, training, etc)	Exercise
13	Service camps	Exercise
14	Advocacy and information literacy initiatives	Exercise
15	Other activities serving local communities	Exercise
16	Organizing and leading teams in various community service activities	Project
17	Fortnightly reflection paper	Project
18	Portfolio (on social media using an instagram account)	Project
19	Two learning papers (one per semester)	Project

Texbook(s):

1. Paul Rogat Loeb, Soul of a citizen: living with conviction in Challenging times,
2. Vera Lloyd, Community Services intervention,

Reference(s):

1. Nicholas Kristof and Sheryl Wu Dunn, A path appears: Transforming lives, creating opportunities,
2. M. K. Gandhi, The story of My Experiments with Truth,
3. List of student run and other Government and non- government community service organizations,

Course Outcomes:

1. Experience of mobilizing and executing Community service activities
2. Providing opportunities for community service volunteering for other fellow students
3. Understanding the process of mobilizing cash, kind and volunteer support
4. Building leadership and management skills
5. Building empathy and citizenship behavior

Course Articulation Matrix:

	POs																PSOs			
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**1**	**2**	**3**	**4**
1								3	3	3		3								
2									3	2		3								
3								3	3	2										
4										2	3	3								
5								2				3								

3 – High, 2 – Medium & 1 – Low Correlation

APPROVED IN MEETINGS HELD ON:

BOS : 06-07-2023 Academic Council Number: 27 Academic Council : 06-07-2023

SDG No(s). & Statement(s) :

16 & Peace and Justice Strong Institutions : Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.
17 & Partnerships to achieve the Goal : Strengthen the means of implementation and revitalize the global partnership for sustainable development.

SDG Justification(s):

This course recognizes student "SDG 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels SDG17 : Strengthen the means of implementation and revitalize the global partnership for sustainable development"

DOSP1003	BADMINTON	L	T	P	S	J	C
		0	0	0	2	0	1
Pre-requisite	None						
Co-requisite	None						
Preferable Exposure	NO						

Course Description:

This course provides instruction and the opportunity for participation in sports and physical fitness activities. Skills, strategies, rules, and personal wellness goals are included as appropriate. This course will provide students with an understanding of the fundamental concepts of the physiological functions and training principles associated with the chosen sport.

Course Educational Objectives:

- Understand training principles used in the sport
- Demonstrate knowledge of the game in a recreational /competitive play setting
- Organize an event around the sport
- Demonstrate concepts of warm up, game conditioning.

List of Topics

S.no	Topic
1	Watch a sport documentary / training video / game history
2	. On field coaching and demonstration session
3	Guided practice and play
4	Event management & game officiating
5	Friendly competitions and structured matches

Textbook(s):

1. Handbook of the Badminton World Federation (BWF) ,

Reference(s):

Course Outcomes:

1. Learn to play Badminton
2. Understanding of the fundamental concepts such as rules of play, game variations
3. Understanding of the governing structure and administration of the sport
4. Understand the event management of the sport
5. Apply sport concepts into an active physical lifestyle

Course Articulation Matrix:

	POs																PSOs			
CO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	1	2	3	4
1									3	2		3								
2												2								

3												2								
4							2		3	3	2									
5						2	2		3			3								

3 – High, 2 – Medium & 1 – Low Correlation

APPROVED IN MEETINGS HELD ON:

BOS : 10-06-2024 Academic Council Number: 30 Academic Council : 04-07-2024

SDG No(s). & Statement(s) :

4 & Quality Education : Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

SDG Justification(s):

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DOSP1033	FOOTBALL	L	T	P	S	J	C
		0	0	0	2	0	1
Pre-requisite	None						
Co-requisite	None						
Preferable Exposure	NO						

Course Description:

This course provides instruction and the opportunity for participation in sports and physical fitness activities. Skills, strategies, rules, and personal wellness goals are included as appropriate. This course will provide students with an understanding of the fundamental concepts of the physiological functions and training principles associated with the chosen sport.

Course Educational Objectives:

- Understand training principles used in the sport
- Demonstrate knowledge of the game in a recreational /competitive play setting
- Organize an event around the sport
- Demonstrate concepts of warm up, game conditioning, training plans

List of Topics

S.no	Topic
1	Watch a sport documentary / training video / game history
2	On field coaching and demonstration session
3	Guided practice and play
4	Event management & game officiating
5	Friendly competitions and structured matches

Textbook(s):

Reference(s):

1. FIFA Laws of the Game,

Course Outcomes:

1. Learn to play Football
2. Understanding of the fundamental concepts such as rules of play, game variations
3. Understanding of the governing structure and administration of the sport
4. Understand the event management of the sport
5. Apply sport concepts into an active physical lifestyle

Course Articulation Matrix:

	POs																PSOs			
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**1**	**2**	**3**	**4**
1									3	2		3								
2												2								

3												2								
4							2		3	3	2									
5						2	2		3			3								

3 – High, 2 – Medium & 1 – Low Correlation

APPROVED IN MEETINGS HELD ON:

BOS : 10-06-2024 Academic Council Number: 30 Academic Council : 04-07-2024

SDG No(s). & Statement(s) :

4 & Quality Education : Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

SDG Justification(s):

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DOSP1043	VOLLEYBALL	L	T	P	S	J	C
		0	0	0	2	0	1
Pre-requisite	None						
Co-requisite	None						
Preferable Exposure	NO						

Course Description:

This course provides instruction and the opportunity for participation in sports and physical fitness activities. Skills, strategies, rules, and personal wellness goals are included as appropriate. This course will provide students with an understanding of the fundamental concepts of the physiological functions and training principles associated with the chosen sport.

Course Educational Objectives:

- Understand training principles used in the sport
- Demonstrate knowledge of the game in a recreational /competitive play setting
- Organize an event around the sport
- Demonstrate concepts of warm up, game conditioning, training plans

List of Topics

S.no	Topic
1	Watch a sport documentary / training video / game history
2	On field coaching and demonstration session
3	Guided practice and play
4	Event management & game officiating
5	Friendly competitions and structured matches

Textbook(s):

Reference(s):

1. FIVB - Official Volleyball Rules ,

Course Outcomes:

1. Learn to play Volleyball
2. Understanding of the fundamental concepts such as rules of play, game variations
3. Understanding of the governing structure and administration of the sport
4. Understand the event management of the sport
5. Apply sport concepts into an active physical lifestyle

Course Articulation Matrix:

	POs																PSOs			
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**1**	**2**	**3**	**4**
1									3	2		3								
2												2								

3												2								
4							2		3	3	2	3								
5						2	2		3											

3 – High, 2 – Medium & 1 – Low Correlation

APPROVED IN MEETINGS HELD ON:

BOS : 10-06-2024 Academic Council Number: 30 Academic Council : 04-07-2024

SDG No(s). & Statement(s) :

4 & Quality Education : Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

SDG Justification(s):

.

DOSP1053	KABADDI	L	T	P	S	J	C
		0	0	0	2	0	1
Pre-requisite	None						
Co-requisite	None						
Preferable Exposure	NO						

Course Description:

This course provides instruction and the opportunity for participation in sports and physical fitness activities. Skills, strategies, rules, and personal wellness goals are included as appropriate. This course will provide students with an understanding of the fundamental concepts of the physiological functions and training principles associated with the chosen sport

Course Educational Objectives:

- Understand training principles used in the sport
- Demonstrate knowledge of the game in a recreational /competitive play setting
- Organize an event around the sport
- Demonstrate concepts of warm up, game conditioning, training plans

List of Topics

S.no	Topic
1	Watch a sport documentary / training video / game history
2	On field coaching and demonstration session
3	Guided practice and play
4	Event management & game officiating
5	Friendly competitions and structured matches

Textbook(s):

Reference(s):

1. Amateur Kabaddi Federation of India (AKFI) - Official Rules ,

Course Outcomes:

1. Learn to play Kabaddi
2. Understanding of the fundamental concepts such as rules of play, game variations
3. Understanding of the governing structure and administration of the sport
4. Understand the event management of the sport
5. Apply sport concepts into an active physical lifestyle

Course Articulation Matrix:

	POs																PSOs			
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**1**	**2**	**3**	**4**
1									3	2		3								
2												2								

3												2								
4							2		3	3	2									
5						2	2		3			3								

3 – High, 2 – Medium & 1 – Low Correlation

APPROVED IN MEETINGS HELD ON:

BOS : 10-06-2024 Academic Council Number: 30 Academic Council : 04-07-2024

SDG No(s). & Statement(s) :

4 & Quality Education : Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

SDG Justification(s):

.

DOSP1073	TABLE TENNIS	L	T	P	S	J	C
		0	0	0	2	0	1
Pre-requisite	None						
Co-requisite	None						
Preferable Exposure	NO						

Course Description:

This course provides instruction and the opportunity for participation in sports and physical fitness activities. Skills, strategies, rules, and personal wellness goals are included as appropriate. This course will provide students with an understanding of the fundamental concepts of the physiological functions and training principles associated with the chosen sport.

Course Educational Objectives:

- Understand training principles used in the sport
- Demonstrate knowledge of the game in a recreational /competitive play setting
- Organize an event around the sport
- Demonstrate concepts of warm up, game conditioning, training plans

List of Topics

S.no	Topic
1	Watch a sport documentary / training video / game history
2	On field coaching and demonstration session
3	Guided practice and play
4	Event management & game officiating
5	Friendly competitions and structured matches

Textbook(s):

Reference(s):

1. Handbook of the International Table Tennis Federation (ITTF) ,

Course Outcomes:

1. Learn to play Table Tennis
2. Understanding of the fundamental concepts such as rules of play, game variations
3. Understanding of the governing structure and administration of the sport
4. Understand the event management of the sport
5. Apply sport concepts into an active physical lifestyle

Course Articulation Matrix:

	POs																PSOs			
CO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	1	2	3	4
1									3	2		3								
2												2								

3												2								
4							2		3	3	2									
5						2	2		3			3								

3 – High, 2 – Medium & 1 – Low Correlation

APPROVED IN MEETINGS HELD ON:

BOS : 10-06-2024 Academic Council Number: 30 Academic Council : 04-07-2024

SDG No(s). & Statement(s) :

4 & Quality Education : Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

SDG Justification(s):

.

DOSP1083	HANDBALL	L	T	P	S	J	C
		0	0	0	2	0	1
Pre-requisite	None						
Co-requisite	None						
Preferable Exposure	NO						

Course Description:

This course provides instruction and the opportunity for participation in sports and physical fitness activities. Skills, strategies, rules, and personal wellness goals are included as appropriate. This course will provide students with an understanding of the fundamental concepts of the physiological functions and training principles associated with the chosen sport.

Course Educational Objectives:

- Understand training principles used in the sport
- Demonstrate knowledge of the game in a recreational /competitive play setting
- Organize an event around the sport
- Demonstrate concepts of warm up, game conditioning, training plans

List of Topics

S.no	Topic
1	Watch a sport documentary / training video / game history
2	On field coaching and demonstration session
3	Guided practice and play
4	Event management & game officiating
5	Friendly competitions and structured matches

Textbook(s):

Reference(s):

1. International Handball Federation - Rules of the Game & Regulations,

Course Outcomes:

1. Learn to play Handball
2. Understanding of the fundamental concepts such as rules of play, game variations
3. Understanding of the governing structure and administration of the sport
4. Understand the event management of the sport
5. Apply sport concepts into an active physical lifestyle

Course Articulation Matrix:

	POs																PSOs			
CO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	1	2	3	4
1									3	2		3								
2												2								

3												2								
4							2		3	3	2									
5						2	2		3			3								

3 – High, 2 – Medium & 1 – Low Correlation

APPROVED IN MEETINGS HELD ON:

BOS : 10-06-2024 Academic Council Number: 30 Academic Council : 04-07-2024

SDG No(s). & Statement(s) :

4 & Quality Education : Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

SDG Justification(s):

.

DOSP1093	BASKETBALL	L	T	P	S	J	C
		0	0	0	2	0	1
Pre-requisite	None						
Co-requisite	None						
Preferable Exposure	NO						

Course Description:

This course provides instruction and the opportunity for participation in sports and physical fitness activities. Skills, strategies, rules, and personal wellness goals are included as appropriate. This course will provide students with an understanding of the fundamental concepts of the physiological functions and training principles associated with the chosen sport.

Course Educational Objectives:

- Understand training principles used in the sport
- Demonstrate knowledge of the game in a recreational /competitive play setting
- Organize an event around the sport
- Demonstrate concepts of warm up, game conditioning, training plans

List of Topics

S.no	Topic
1	Watch a sport documentary / training video / game history
2	On field coaching and demonstration session
3	Guided practice and play
4	Event management & game officiating
5	Friendly competitions and structured matches

Textbook(s):

Reference(s):

1. FIBA Basketball Official Rules,

Course Outcomes:

1. Learn to play Basketball
2. Understanding of the fundamental concepts such as rules of play, game variations
3. Understanding of the governing structure and administration of the sport
4. Understand the event management of the sport
5. Apply sport concepts into an active physical lifestyle

Course Articulation Matrix:

	POs																PSOs			
CO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	1	2	3	4
1									3	2		3								
2												2								

3												2								
4							2		3	3	2									
5						2	2		3			3								

3 – High, 2 – Medium & 1 – Low Correlation

APPROVED IN MEETINGS HELD ON:

BOS : 10-06-2024 Academic Council Number: 30 Academic Council : 04-07-2024

SDG No(s). & Statement(s) :

4 & Quality Education : Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

SDG Justification(s):

.

DOSP1113	THROWBALL	L	T	P	S	J	C
		0	0	0	2	0	1
Pre-requisite	None						
Co-requisite	None						
Preferable Exposure	NO						

Course Description:

This course provides instruction and the opportunity for participation in sports and physical fitness activities. Skills, strategies, rules, and personal wellness goals are included as appropriate. This course will provide students with an understanding of the fundamental concepts of the physiological functions and training principles associated with the chosen sport.

Course Educational Objectives:

- Understand training principles used in the sport
- Demonstrate knowledge of the game in a recreational /competitive play setting
- Organize an event around the sport
- Demonstrate concepts of warm up, game conditioning, training plans

List of Topics

S.no	Topic
1	Watch a sport documentary / training video / game history
2	On field coaching and demonstration session
3	Guided practice and play
4	Event management & game officiating
5	Friendly competitions and structured matches

Textbook(s):

Reference(s):

1. World Throw ball Federation - Rules of the Game ,

Course Outcomes:

1. Learn to play Throw ball
2. Understanding of the fundamental concepts such as rules of play, game variations
3. Understanding of the governing structure and administration of the sport
4. Understand the event management of the sport
5. Apply sport concepts into an active physical lifestyle

Course Articulation Matrix:

	POs																PSOs			
CO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	1	2	3	4
1									3	2		3								
2												2								

3												2								
4							2		3	3	2									
5						2	2		3			3								

3 – High, 2 – Medium & 1 – Low Correlation

APPROVED IN MEETINGS HELD ON:

BOS : 10-06-2024 Academic Council Number: 30 Academic Council : 04-07-2024

SDG No(s). & Statement(s) :

4 & Quality Education : Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

SDG Justification(s):

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DOSP1142	CRICKET	L	T	P	S	J	C
		0	0	0	2	0	1
Pre-requisite	None						
Co-requisite	None						
Preferable Exposure	NO						

Course Description:

This course provides instruction and the opportunity for participation in sports and physical fitness activities. Skills, strategies, rules, and personal wellness goals are included as appropriate. This course will provide students with an understanding of the fundamental concepts of the physiological functions and training principles associated with the chosen sport.

Course Educational Objectives:

- Understand training principles used in the sport
- Demonstrate knowledge of the game in a recreational /competitive play setting
- Organize an event around the spor
- Demonstrate concepts of warm up, game conditioning, training plans

List of Topics

S.no	Topic
1	Watch a sport documentary / training video / game history
2	On field coaching and demonstration session
3	Guided practice and play
4	Event management & game officiatin
5	Friendly competitions and structured matches

Textbook(s):

Reference(s):

1. Law of Cricket -MCC ,

Course Outcomes:

1. Learn to play Cricket
2. Understanding of the fundamental concepts such as rules of play, game variations
3. Understanding of the governing structure and administration of the sport
4. Understand the event management of the sport
5. Apply sport concepts into an active physical lifestyle

Course Articulation Matrix:

	POs																PSOs			
CO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	1	2	3	4
1									3	2		3								
2												2								

3												2								
4							2		3	3	2									
5						2	2		3			3								

3 – High, 2 – Medium & 1 – Low Correlation

APPROVED IN MEETINGS HELD ON:

BOS : 10-06-2024 Academic Council Number: 30 Academic Council : 04-07-2024

SDG No(s). & Statement(s) :

4 & Quality Education : Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

SDG Justification(s):

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DOSP1132	FUNCTIONAL FITNESS	L	T	P	S	J	C
		0	0	0	2	0	1
Pre-requisite	None						
Co-requisite	None						
Preferable Exposure	NO						

Course Description:

This course provides instruction and the opportunity for participation in physical fitness activities. Injury Prevention, Weight Management, Food and Nutrition, Resistance Training strategies, and personal wellness goals are included as appropriate. This course will provide students with an understanding of the fundamental concepts of the physical and physiological functions of the human body.

Course Educational Objectives:

- Understand training principles used in the sport
- Demonstrate knowledge of the game in a recreational /competitive play setting
- Organize an event around the sport
- Demonstrate concepts of warm up, game conditioning, training plans

List of Topics

S.no	Topic
1	Watch a sport documentary / training video / game history
2	On field coaching and demonstration session
3	Guided practice and play
4	Event management & game officiating
5	Friendly competitions and structured matches

Textbook(s):

Reference(s):

1. National Institute of Health,
2. World Health Organization,
3. JC Santana, author of Functional Training ,

Course Outcomes:

1. Learn to how to do Physical fitness Activities
2. Understanding of the fundamental concepts such as Physical Activates, variations type of training
3. Understanding of the governing structure and administration training
4. .
5. .

Course Articulation Matrix:

	POs																PSOs			
CO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	1	2	3	4

1																				
2																				
3																				
4																				
5																				

3 – High, 2 – Medium & 1 – Low Correlation

APPROVED IN MEETINGS HELD ON:

BOS : 10-06-2024 Academic Council Number: 30 Academic Council : 04-07-2024

SDG No(s). & Statement(s) :

4 & Quality Education : Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

SDG Justification(s):

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DOSP1171	MARTIAL ARTS/SELF DEFENCE	L	T	P	S	J	C
		0	0	0	2	0	1
Pre-requisite	None						
Co-requisite	None						
Preferable Exposure	NO						

Course Description:

The fundamental objective of self defence training is to prepare and empower the students with techniques to handle an attack. Self defence course not only enables students to defend themselves against physical attack, it also has diverse benefit for the students in their everyday lives.

Course Educational Objectives:

- To enhance the ability to defend and protect
- To enhance confidence building
- To enhance the value of self-discipline
- To inculcate the knowledge of life skills.
- To enhance the employment opportunities.
- To facilities the students in improving physical and mental health.

List of Topics

S.no	Topic
1	Watch a sport documentary / training video / game history
2	On field coaching and demonstration session
3	Guided practice and play
4	Event management & game officiating
5	Friendly competitions and structured matches

Textbook(s):

Reference(s):

1. Self Defence Make Simple ,
2. Phil Pierce 2. Self Defence : Janathan Kellerman,
3. Right of Private and Self Defence : Ramachandra,

Course Outcomes:

1. Learn to how to do Martial Arts and Self defence
2. Understanding of the fundamental concepts such as Physical Activates, variations type of training
3. Understanding of the governing structure and administration training
4. .
5. .

Course Articulation Matrix:

	POs	PSOs

CO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	1	2	3	4
1																				
2																				
3																				
4																				
5																				

3 – High, 2 – Medium & 1 – Low Correlation

APPROVED IN MEETINGS HELD ON:

BOS : 10-06-2024 Academic Council Number: 30 Academic Council : 04-07-2024

SDG No(s). & Statement(s) :

4 & Quality Education : Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

SDG Justification(s):

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FACULTY CORE

MATH1131	**Mathematics-I**	**L**	**T**	**P**	**S**	**J**	**C**
SDG No.4		4	0	0	0	0	4

Course Description:

This course is introduced to learn fundamental topics in mathematics in undergraduate level such as Matrices, Solutions of Linear system of Equations, Eigen values and Eigen vectors, interpolation, solution of algebraic and transcendental equations, numerical differentiation and numerical integration

Course Educational Objectives:

- To understand the matrices and their uses in real life problems
- To learn the basic concept and applications of matrices
- To identify and estimate the function or function value using various interpolation formulae for the given equal interval and unequal interval data
- Ability to implement numerical methods for differentiation as well as for integration.
- Ability to solve numerically algebraic and transcendental equations

UNIT 1 **10 hours**

Determinants, properties of determinants, matrices, matrices operations, transpose of a matrix, adjoint of a square matrix, inverse of a matrix, rank of a matrix

UNIT 2 **10 hours**

Solution of linear system of equations: Cramer's rule, matrix inversion method, Consistency of linear system of equations, Eigen values and Eigen vectors, Cayley-Hamilton theorem (without proof).

UNIT 3 **10 hours**

Interpolation: Operators, Forward and Backward Difference Operations and Their Interrelation. Interpolation Formulae: Newton's Forward, Backward and Divided Difference Formulae, LaGrange's Formula

UNIT 4 **10 hours**

Numerical differentiation &Integration: Numerical Differentiation: Formulae for derivatives, **Numerical Integration**: Trapezoidal rule, Simpson's1/3rule,Simpson's3/8rule,Weddle'srule.

UNIT 5 **10 hours**

Solution of Algebraic and Transcendental Equations: Bisection Method, False Position Method, Gauss elimination method, Jacobi's iteration method, Gauss siedaliterationmethod.

Textbooks:

1. Higher Engineering Mathematics by B.S.Grewal, Khanna Publishers, 43rd edition,2015

References:

1. Introductory methods of numerical analysis by S.S.Sastry, PHI, 5th edition,2012.

2. Engineering Mathematics by B.V. Ramana, Tata Mc.Graw Hill, 1stedition,2006.

Course Outcomes:

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

- Able to evaluate various matrices, operations on matrices, linear system of equations using Cramer's rule and Matrix inversion method.
- Evaluate Eigen values and Eigen vectors of a matrix.
- Able to apply forward and backward difference operators to interpolate the function value using Newton's forward and backward formulae, divided difference formula and Lagrange's formula.
- Explain the need of numerical differentiation and numerical integration.
- Able to evaluate numerically the algebraic and transcendental equations

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	3	2		1		3	3	3	3	3
CO2	3	3	2		1		2	3	3	3	3
CO3	3	3	2		1		3	3	3	3	3
CO4	3	3	2		1		2	3	3	3	3
CO5	3	3	2		1		2	3	3	3	3

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

APPROVED IN:	
BOS :9.9.2021	**ACADEMIC COUNCIL: 17.09.2021**
SDG No. & Statement:	
4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.	
SDG Justification:	
The topics included in this course are designed to get acquainted with one of the skills that handle necessary mathematical orientation, programming techniques and concept based learning.	

MATH1141	Mathematics-II	L	T	P	S	J	C
SDG No.4		4	0	0	0	0	4

Course Description:

This course is introduced to impart knowledge of basic computer concepts such as Mathematical Logic, Set Theory, Relations, Lattices and Boolean Algebra, and Graph Theory.

Course Educational Objectives:

- To understand the basic concepts of set theory and relations
- To learn the basic concept and applications of functions and counting
- To evaluate inference theory problems in proposition calculus
- Ability to learn about lattices and Boolean algebra.
- To understand the concept of graphs, directed graphs and trees.

UNIT -I

Set Theory and Relations: Sets, Set Operations, Algebra of Sets, Classes of Sets, Power Sets, Partitions, Relations, Representations of Relations, Composition of Relations, Types of Relations, Partial Ordering Relations, n-aryRelations. **10 hours**

UNIT-II

Functions and Counting: Functions, One-to-One, onto and Invertible Functions, Mathematical, Exponential and Logarithmic Functions, Basic Counting Principles, Permutations, Combinations, The Pigeonhole Principle, The Inclusion –Exclusion Principle **10 hours**

UNIT-III

Logic and Propositional Calculus: Propositions and Truth Tables, Tautologies, Logical Equivalence, Algebra of Propositions, Arguments, Logical Implication, Propositional Functions, Quantifiers. **10 hours**

UNIT-IV

Lattices and Boolean algebra: Ordered, Sets, Hasse Diagrams, Lattices, Distributed Lattices & Complimented Lattices, Boolean algebra, Sum of Products form for Boolean algebra. **10 hours**

UNIT-V

Graph Theory: Graphs, Multi graphs, directed graphs, Isomorphic Graphs, Paths, Connectivity Complete, Regular and Bipartite Graphs, Planar Graphs, Tree Graphs, Spanning Trees, Kruskal Algorithm, Warshall Algorithm for Path Matrix and Shortest –Path Matrix **10 hours**

Textbooks:

1. Discrete Mathematics (Schaum's Outline Series) by Seymour Lipschutz, Marc Lipson, Tata Mc- Graw Hill, 2nd edition.
2. Discrete Mathematics and its applications by Kenneth H. Rosen, Tata Mc-GrawHill.

References:

1. Discrete Mathematical Structures with applications to Computer Science by Tremblay and R.Manohar, Tata McGrawhill education.

Course Outcomes:

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

- Describe the basic concepts of sets and operations on sets and different types of relations and representations of relations.
- Differentiate various functions and explain the concepts of permutations and combinations and Pigeonhole principle.
- Evaluate logical equivalence formulas using with and without truth tables, and uses logical implication and equivalence formulas in proposition calculus, and outlines the different types of propositional functions & types of quantifiers.
- Explains the procedure and need of Hasse diagrams in posests, and summarizes different types of lattices and defines the Boolean algebra using lattices.
- Classify various types of graphs and explains tree graphs with examples and calculates minimum spanning tree of a given connected graph using Kruskal's algorithm and shortest path matrix using Warshall's algorithm.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	1	1	1	1	1	2	2	3	3	2
CO2	3	1	1	1	1	1	2	2	3	3	2
CO3	3	1	1	1	1	1	2	2	3	3	2
CO4	3	1	1	1	1	1	2	2	3	3	2
CO5	3	1	1	1	1	1	2	2	3	3	2

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

APPROVED IN:	
BOS :9.9.2021	**ACADEMIC COUNCIL: 17.09.2021**
SDG No. & Statement:	
4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.	
SDG Justification:	
The topics included in this course are designed to get acquainted with one of the skills that handle necessary mathematical orientation, programming techniques and concept based learning.	

MATH1291	Elementary Statistics	L	T	P	S	J	C
SDG No.		4	0	0	0	0	4

Course Description:

Elementary statistics deals with the collection, analysis, interpretation, and presentation of data. Probability and Statistics for Computer Science treats the most common discrete and continuous distributions, showing how they find use in decision and estimation problems, and constructs computer algorithms for generating observations from the various distributions.

Course Educational Objectives:

To understand the difference between primary and secondary data

- To learn the basic concepts in applications of statistics and graphical presentation of data
- To understand the concept of measures of central tendency
- Ability to implement features of measures of dispersion.
- To understand the concept of correlation and regression.
- To understand the difference between discrete and continuous random variables and probability
- To evaluate problems on discrete and continuous probability distributions

UNIT - I

Introduction: Statistical Data and Methods, Applications of Statistics, Primary and Secondary data, Methods of collecting primary data, Tabulation of data, Diagrammatic and Graphic presentation of data**.** **10 Hours**

UNIT – II

Measures of Central Value& Dispersion: Arithmetic mean, Median, Mode, Range, Quartile deviation, Mean deviation, Standard deviation. **10 Hours**

UNIT – III

Correlation and Regression : Types of correlation, Methods of studying Correlation, Karl pearson's coefficient of Correlation, Properties of the coefficient of correlation, Rank correlation coefficient, Uses of regression analysis, Difference between correlation and regression analysis, Regression lines, Regression equations**.** **10 Hours**

UNIT – IV

Probability : Definition of probability, Addition theorem on probability, Multiplication theorem on probability, Baye's theorem, Mathematical expectation**.** **10 Hours**

UNIT – V

Probability Distributions : Random variable and probability distribution, Binomial distribution, fitting a Binomial distribution, Poisson distribution, Fitting a Poisson distribution, Normal distribution, Area under the normal curve. **10 Hours**

Text Book :

1. Statistical Methods by S.P. Gupta, Sultan Chand &sons publication, 44th edition, 2017.

Reference Book :

1. Probability and Statistics for Engineers by G.S.S. BhishmaRao, Sci-tech publishers,4th edition, 2010.

Course Outcomes:

Upon completion of the course, the student is able to

- Able to differentiate between primary and secondary data.
- Present the data in pictorial format.
- Learn different measures of central tendency.
- Able to apply of measures of dispersion, correlation and regression.
- Able to differentiate between discrete and continuous random variables.

	Programme Objectives							**Programme Specific Objectives**			
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**
CO1	3	2	3	1	2	3	3	1	3	2	3
CO2	3	3	2	1	2	2	3	2	3	3	2
CO3	3	2	2	1	2	2	2	2	3	2	1
CO4	3	2	1	2	2	2	3	2	3	1	2
CO5	3	1	2	1	2	2	2	1	3	2	1

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

APPROVED IN:	
BOS :9.9.2021	**ACADEMIC COUNCIL: 17.09.2021**
SDG No. & Statement:	
4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.	
SDG Justification:	
The topics included in this course are designed to get acquainted with one of the skills that handle necessary mathematical orientation, programming techniques and concept based learning.	

PROGRAMME CORE

CSCI1351	**Programming Lab Using Python**	**L**	**T**	**P**	**S**	**J**	**C**
SDG No.4		0	0	2	0	0	1

Course Description:

To write, test, and debug simple Python programs. To implement Python programs with conditionals and loops. Use functions for structuring Python programs. Installing Python, executing Python, Python Standard Library, and Find where the python executable and standard library modules are installed on your system.

Course Educational Objectives:

- To learn writing, testing and debugging python programs using interpreter
- To practice use of programming constructs of python
- To practice python data structures and their applications
- To get familiar with Built-in and user defined functions.
- To understand the concept of Files.

1. Start the Python interpreter in interactive mode.
2. Demonstrate to write, test, and debug simple Python programs.
3. Demonstrate Python syntax – identifiers, variables, keywords, Lines & Indentation, Quotation, and Comments.
4. Demonstrate the use operators- Arithmetic, Comparison, Assignment, Logical, Bitwise, Membership, Identity, and Operator Precedence.
5. Demonstrate assigning values to variable, Multiple Assignments, Standard Data Types- Numbers, Strings, Lists, Tuples, Dictionary, Data Type Conversion.
6. Demonstrate Decision Making &Loops-
    a. Check if a given number is divisible by5
    b. Sum of N different numbers
    c. Sum and average of N different numbers
    d. Sum of numbers between 1 and 50 which are divisible by 3 and not by5
    e. First N even numbers
    f. First N numbers divisible by4
7. Demonstrate Built-in functions.
8. Demonstrate the use of Lists.
    a. Create a list and perform the following operations on the list:
    b. Display content of list
    c. Display length of list
    d. Display element in given position in the list
    e. Add elements to the list
    f. Remove elements from the list:
    g. Slice
    h. Sort
    i. Reverse

j. Replace elements
k. Join two lists
l. Membership test
m. Nested lists

9. Demonstrate the use of Dictionaries.
    a. Creating a Dictionary and perform the following operations:
    b. Get the values in a Dictionary
    c. Looping over dictionary
    d. Add elements to a dictionary
    e. combine two dictionariesDelete elements of a dictionary
    f. Test the presence of a key
10. Demonstrate the use of Tuples
    a. Creating a Tuple
    b. Accessing values in Tuple
    c. Updating Tuples
    d. Delete Tuple elements
    e. Basic Tuple Operations
    f. Indexing, Slicing, Matrixes
11. Demonstrate the use of Functions
    a. Smallest number from a set of numbers
    b. Largest number from a set of numbers
    c. Sum of even and odd numbers from a set of numbers
    d. Sort the elements of a matrix
    e. Read an N x N matrix. Check if the last element of each row is the sum of the all other elements in that row
12. Demonstrate Files
    a. Read a file and display all words containing all 5 vowels at least once.
    b. Write a program to read student details (Name, roll number and CGPA) and write to file. Also display the file content.

References:

1. Head First Python by Barry, Paul, O Rielly Publications, 2nd Edition,2010.
2. Core Python Programming by Wesley J. Chun, Prentice Hall, First Edition,2000.
3. Learning Python by Lutz, Mark, O Rielly Publications, 4th Edition,2009.

Course Outcomes:

Upon completion of the course, the student is able to

- Analyze what is HLL programming and the purpose of Python.(L4)
- Build to Install python and Start the Python interpreter in interactive mode.(L3)
- Utilize correct syntax and write simple programs.(L3)
- Utilize operators, Built-in functions, user-defined functions, Lists , Dictionary, Tuples.(L3)
- Construct with conditional statements, decision making loops.(L6)
- Define fundamental knowledge on file concepts.(L1)

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	1	1	1	1	1	2	3	1	2	2
CO2	2	1	2	1	1	1	2	2	1	2	1
CO3	2	2	1	1	1	1	2	1	1	2	1
CO4	2	2	2	1	1	1	3	1	2	2	2
CO5	2	1	1	1	1	1	2	3	1	2	2

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

APPROVED IN:	
BOS :9.9.2021	**ACADEMIC COUNCIL: 17.09.2021**
SDG No. & Statement:	
4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.	
SDG Justification:	
The topics included in this course are designed to get acquainted with one of the skills that handle necessary mathematical orientation, programming techniques and concept based learning.	

CSCI1361	Fundamentals of Python Programming	L	T	P	S	J	C
SDG No.4		4	0	0	0	0	4

Course Description:

Python is an Internet and systems programming language that is soaring in popularity in today's fast-paced software development environment, and its simple (yet robust), object-oriented (yet can be used as a procedural language), extensible, scalable and features an easy to learn syntax that is clear and concise. Python combines the power of a compiled object language like Java and C++ with the ease of use and rapid development time of a scripting language. Its syntax is so easy to understand that students are likely to pick it up faster than any of the other popular scripting languages in use today! Python is a fully object-oriented programming language, but students do not have to understand object- oriented concepts to start programming in Python.

Course Educational Objectives:

- To explain the elementary programming constructs and input and output statements and use it in Python programming.
- To identify and practice different conditionals and loop control statements.
- To provide knowledge on different built in data structures like strings, lists, tuples, dictionaries and use these in python programming.
- To explain the concept functions, recursive functions, file and exception handling mechanisms in Python.

UNIT -I **8 hours**

Introduction to Computers and Programming: Introduction, Hardware and Software, How Computers Store Data, How a Program Works, Using Python.

Core Python: What is Python, History, features, Installing, Running, Getting Started, Syntax and Style, Python Objects, Numbers, Keywords, Operators, Syntax, Compilers and Interpreters, The Python Interpreter.

UNIT-II **8 hours**

Input, Processing, and Output: Designing a Program, Input, Processing, and Output, Displaying Output with the print Statement, Comments, Variables, Reading Input from the Keyboard, Performing Calculations, More about Data Output.

Decision Structures and Boolean Logic: The if Statement, The if -else Statement, Comparing Strings, Nested Decision Structures and the if -elseif -else Statement, Logical Operators, Boolean Variables.

UNIT -III **8 hours**

Repetition Structures: Introduction to Repetition Structures, The while Loop: a Condition-Controlled Loop, The for Loop: a Count-Controlled Loop, Calculating a Running Total, Sentinels, Input Validation Loops, Nested Loops.

UNIT-IV **8 hours**

Data Structures: Lists, Quick Introduction to Objects and Classes, Tuple, Dictionary, Sequence, Set, Working with Strings.

UNIT-V **8 hours**

Functions: Introduction to Functions, Defining and Calling a Function, Designing a Program to Use Functions, Local Variables, Passing Arguments to Functions, Global Variables and Global Constants.

Files and Exceptions: Introduction to File Input and Output, Using Loops to Process Files, Processing Records, Exceptions.

Textbooks:

1. Starting Out with Python, Tony Gaddis, Haywood Community College, Pearson,2018.
2. Core Python Programming, Wesley J. Chun, Prentice Hall PTR, First Edition,2000.

References:

1. How to Think Like a Computer Scientist: Learning with Python by Jeffrey Elkner, Allen B. Downey and Chris Meyers, Samurai Media Limited,2016.

Course Outcomes:

Upon completion of the course, the student is able to

- Build knowledge about basic Python language syntax and semantics.(L5)
- Analyze programming skills in core python.(L4)
- What python programs and use concepts such as variables, conditional and iterative execution methods.(L1)
- Build the knowledge on usage of Data structures in Python (L5)
- Usage of modules and Built-in functions

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	2	1	1	1	1	1	2	3	1	2	2
CO2	3	1	2	1	1	1	3	3	1	3	3
CO3	2	1	1	1	1	1	2	2	1	2	2
CO4	2	2	2	1	1	1	2	2	1	3	3
CO5	2	2	2	1	1	1	2	2	1	3	3

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

APPROVED IN:	
BOS :9.9.2021	**ACADEMIC COUNCIL: 17.09.2021**
SDG No. & Statement:	
4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.	
SDG Justification:	
The topics included in this course are designed to get acquainted with one of the skills that handle necessary mathematical orientation, programming techniques and concept based learning.	

CSCI1371	Basic Principles of Information Technology	L	T	P	S	J	C
SDG No.4		4	0	0	0	0	4

Course Description:

The course is designed for an introductory core course in Information Technology to the UG students as IT is a rapidly advancing technology.

Course Educational Objectives:

- To emphasize reasonably stable fundamental concepts on which Information technology is built.
- To make the student familiarize in IT and their applications to business processes.

UNIT -I

Data and Information: Introduction, Types of data, Simple model of a computer, Data processing using a computer, Desktop computer.
Acquisition of Numbers and Textual Data: Introduction, input units, internal representation of numeric data, Representation of characters in computers, Error Detecting codes.
Processing and Displaying Textual Data: Word processor, Desktop Publishing, Page Description language, Mark-up Languages. **8 hours**

UNIT -II

Data storage: Introduction, Storage cell, Physical devices used as storage cells, Random access memory, Read only memory, Secondary storage, Compact disk read only memory (CDROM), Archival store.
Central Processing Unit: Introduction, Structure of a central processing unit, Specifications of a CPU, Interconnection of CPU with memory and I/O units, Embedded processors.
Output Devices: Video Display Devices, Touch Screen, Printers, Audio Output. **8 hours**

UNIT -III

Computer Networks: Introduction, Local Area Network (LAN), Applications of LAN, Wide Area Network (WAN), Internet, Naming computers connected to Internet, Future of Internet Technology.
Computer Software: Introduction, Operating system, Programming languages, Classification of programming languages, Classification of Programming Languages based on applications.
Processing Multimedia Data: Graphics Processing, Audio Signal Processing.Acquiring Audio Data - Basics of Audio Signals, Acquiring and storing Audio Signals, Compression of Audio Signals.
Acquisition of Video: Computing a moving Scene with a video camera, Compression of Video Data, MPEG Compression standard. **8 hours**

UNIT -IV

Data organization: Introduction, Organizing a database, Structure of a database, Database Management System, Example of database design, Non-text databases, Archiving databases. Processing Numerical Data: Introduction, Use of spreadsheets, Numerical computation examples.Business Information Systems: Introduction, Types of Information Needed by Organization**.** **8 hours**

UNIT-V

Some Internet Applications: Introduction, Email, World Wide Web, Information Retrieval from the WWW - Browsers.

E-Commerce: Introduction, Business to customer E-commerce, Business to business E-commerce, Customer to customer E-commerce, Advantages and disadvantages of E-commerce, E-commerce system architecture, Digital signature, Payment schemes in E-commerce, Electronic clearing service in E-commerce, Cash transactions in E-commerce, Payment in C2C E-commerce, Electronic data interchange, Intellectual property rights and E-commerce, Information technology act.

Social Impacts of Information Technology: Introduction, Social uses of www, Privacy, Security and integrity of information, Disaster recovery, Intellectual property rights, Careers in Information technology. **8 hours**

Textbooks:

1. Introduction to Information Technology by V. Rajaraman, PHI Learning Pvt.Ltd. 2013.

References:

2. Computing Fundamentals by Peter Norton, Tata Mc. Graw Hill, 6th edition,2006.
3. Fundamentals of Computers by E.Balagurusamy, Tata McGraw Hill,2009.

Course Outcomes:

Upon completion of the course, the student is able to

- Understand what a data is and what the information is.(L3)
- Analyze how data is processed by a computer.(L4)
- Discuss Hardware and Software.(L6)
- Demonstrate the basic parts of the Computer.(L3)
- List different types of Data and Analyze them.(L4)

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	3	2	3	3	2	3	2	3	2	3
CO2	3	2	2	2	2	1	2	2	3	2	1
CO3	3	2	3	2	2	3	3	2	3	3	2
CO4	3	3	2	2	2	2	3	2	2	2	3
CO5	3	3	3	3	2	2	3	2	2	3	3

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

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BOS :9.9.2021	**ACADEMIC COUNCIL: 17.09.2021**
SDG No. & Statement:	
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SDG Justification:	
The topics included in this course are designed to get acquainted with one of the skills that handle necessary mathematical orientation, programming techniques and concept based learning.	

CSCI1071	Data Analysis Lab	L	T	P	S	J	C
SDG No.4		0	0	2	0	0	1

Course Description:

To familiarize the student to explore powerful data analysis tool. To train the student to use the Adobe motion graphics creation tool to Animate, create animation and interactivity to produce visuals such as banner ads, slideshows, animations, and other forms of rich media

Course Educational Objectives:

- the Excel user interface, the basic terminology of Excel
- Gets the skill of working with formulas and functions
- Uses font formatting, borders, alignment, number formatting, and Excel styles and themes
- Optimizes a spreadsheet for printing by managing margins, orientation, headers and footers, and more
- Creates and edits charts in Excel.

Data Analysis using Excel

1. **About Excel & Microsoft** - Uses of Excel, Excel software, Spreadsheet window pane, Title Bar, Menu Bar, Standard Toolbar, Formatting Toolbar, the Ribbon, File Tab and Backstage View, Formula Bar, Workbook Window, Status Bar, Task Pane, Workbook &sheets
2. **Work with Columns & Rows -** Selecting Columns &Rows , Changing Column Width & Row Height, Auto fitting Columns & Rows, Hiding/ Unhiding Columns & Rows, Inserting & Deleting Columns & Rows, Cell, Address of a cell, Components of a cell – Format, value, formula, Use of paste and past especial.
3. **Demonstrate Functionality Using Ranges** - Using Ranges, Selecting Ranges, Entering Information Into a Range, Using AutoFill Creating Formulas. (4 hours) Using Formulas, Formula Functions – Sum, Average, if, Count, max, min, Proper, Upper, Lower, Using AutoSum.
4. **Use Advance Formulas -** Concatenate, Vlookup, Hlookup, Match, Countif, Text,Trim
5. **Demonstrate Spreadsheet Charts** - Creating Charts, Different types of chart, Formatting Chart Objects, Changing the Chart Type, Showing and Hiding the Legend, Showing and Hiding the Data Table.
6. **Perform Data Analysis project**

References:

1. Data Analysis With Microsoft Excel , Kenneth N. Berk , Patrick Carey, Cengage Learning.

Course Outcomes:

Upon completion of the course, the student is able to

- Uses font formatting, borders, alignment, number formatting, and Excel styles and themes
- Understanding to manage margins, orientation, headers and footers
- Understand how to use the Excel spreadsheet for data analytics.
- Implement and use the functions and formulas in the Excel.
- Understand the usage of various graphs.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	2	1	1	3	1	3	1	1	1	1
CO2	2	1	1	1	1	1	1	1	1	1	1
CO3	2	1	1	1	1	1	1	1	1	1	1
CO4	3	1	1	1	1	1	1	1	1	1	1
CO5	2	1	1	1	1	1	1	1	1	1	1

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

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BOS :9.9.2021	**ACADEMIC COUNCIL: 17.09.2021**
SDG No. & Statement:	
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SDG Justification:	
The topics included in this course are designed to get acquainted with one of the skills that handle necessary mathematical orientation, programming techniques and concept based learning.	

CSCI1131	Fundamentals of Digital Logic Circuits	L	T	P	S	J	C
SDG No.4		4	0	0	0	0	4

Course Description:

This Course provides the knowledge and fundamentals of logic gates, Encoders & decoders implementation and Number Conversion system. It also underpins other areas of the digital circuits such as Registers.

Course Educational Objectives:

- To know about Binary systems and Number conversions
- To know about the Boolean algebra, logic gates and its operations.
- To understand about Digital logic fundamentals, Design steps of flip flops, Shift registers, Counters etc.

UNIT-I

Binary Systems: Digital Systems, Binary numbers, Number base conversion, Octal &Hexa-Decimal Numbers, Complements, Signed Binary numbers, Binary codes, Binary storage and registers, Binary Logic. **8 hours**

UNIT-II

Boolean Algebra and Logic Gates: Basic Definition, Axiomatic definition of Boolean Algebra, Theorems and properties, Canonical form & Standard Form, Other Logic Operations, Digital Logic Gates, ICs. **8 hours**

UNIT -III

Gate Level Minimization: Introduction, Map Method, Four and Five variable maps, POS Simplification, Don't care conditions, NAND and NOR Implementation, Other two Level Implementation, Ex-OR function. **8 hours**

UNIT -IV

Combinational Circuits: Introduction, Combinational Circuits, Analysis Procedure, Design Procedure, Binary Adder - Subtraction, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoder, Encoder, Multiplexer. **8 hours**

UNIT -V

Synchronous Sequential Circuits: Sequential Circuits, Latches, Flip-Flops, Analysis of Clocked Sequential Circuits, State reduction and Assignment, Design procedure.
Registers and Counters: Registers, Shift registers, Ripple Counters. **8 hours**

Textbooks:

1. Digital Design by M. Morris Mano, Michael D.Ciletti, Pearson edition, 4th edition. 2012.

References:

2. Fundamentals of Digital Logic Design by Stephen Brown and ZvonkoVranesic, McGraw Hill Education, 3rd edition, 2009.

Course Outcomes:

Upon completion of the course, the student is able to

- To examine Binary systems and Number conversions.(L4)
- To discuss about the Boolean algebra, logic gates and its operations (L6)
- To understand the functionality of the combinational circuits (L2)
- To construct the various combinational circuits as per the required logic (L6)
- To understand the functionality of sequential circuits (L2)

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	1	2	1	1	1	1	2	3	2	2	2
CO2	1	2	1	2	1	1	2	3	2	2	2
CO3	1	2	1	2	1	1	2	3	2	2	2
CO4	1	2	1	1	1	2	2	3	2	1	2
CO5	1	2	1	1	1	2	2	3	2	1	2

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

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SDG Justification:	
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CSCI1081	Introduction to Operating Systems	L	T	P	S	J	C
SDG No.4		4	0	0	0	0	4

Course Description:

Operating system illustrates abstractions, mechanisms and their implementations. It contains threads, synchronization, inter process communication, Scheduling algorithms, deadlock, memory management, virtual memory, and file system.

Course Educational Objectives:

- To learn the fundamentals of operating systems.
- To understand of mechanisms of OS to handle processes and threads and their communication.
- To ability to learn the mechanisms involved in memory management.
- To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocol.
- To know the components and management aspects of concurrency management.
- To lean File system concepts.

UNIT-I

Introduction: What operating system does? Computer – System Architecture, Operating System structure, Operating System Operations, Distributed Systems, Special-purpose Systems, Computing Environments.

System Structures: Operating System Services, User Operating System Interface, System Calls, Types of System Calls, System Programs, OS Design and Implementation. **8 hours**

UNIT -II

Process Management: Process Concept, Process Scheduling, Operations On Processes, Inter Process Communication.

Process Scheduling: Basic concepts, Scheduling criteria, Scheduling algorithms. **8 hours**

UNIT-III

Process Synchronization: Background, Critical Section Problem, Peterson's Solution, Classic Problems of Synchronization.

Deadlock: System Model, Deadlock Characterization, Methods for Handling Deadlock, Deadlock Prevention, Avoidance and Detection, Recovery from Deadlock. **8 hours**

UNIT-IV

Memory Management: Memory Management Strategies, Background, Swapping, Contiguous, Memory allocation, Paging, Structure of the page table, Segmentation.

Virtual memory: Background, Demand paging, Page replacement, Allocation of frames, Thrashing, other considerations. **8 hours**

UNIT -V

File System: File concept, Access Methods, Directory and Disk Structure, File-System Mounting, File Sharing. **8 hours**

Textbooks:

1. Operating System Concepts by Abraham Silberschatz, Peter B. Galvin and Greg Gagne, Wiley India Publication, 8th edition, Reprint 2012.

References:

1. Operating Systems: Internals and Design Principles by Stalling William, Prentice Hall,7th edition, 2011.
2. Operating System by Dietel, Pearson Education, 3rd edition,2004.
3. Modern Operating Systems by A.S. Tanenbaum, Prentice Hall, 3rd edition,2007.

Course Outcomes:

Upon completion of the course, the student is able to

- Explain the concepts, structure and design of operating Systems.(L2)
- Design of operating system and its impact on application system design and performance. (L6)
- Demonstrate competence in recognizing and using operating system featues.(L2)
- Explain analyses theory and implementation of: processes, resource control(concurrency etc.), physical and virtual memory, scheduling, I/O and files.(L2)
- Discuss paging performance, demand paging and page replacement.(L6)

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	2	2	2	1	1	1	2	2	1	2	2
CO2	3	1	2	1	2	1	2	3	2	3	2
CO3	1	2	2	1	1	1	2	1	1	2	2
CO4	3	2	2	1	1	1	2	1	1	2	3
CO5	2	2	2	1	1	1	2	2	1	2	3

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

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SDG Justification:	
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CSCI1091	Web Technologies	L	T	P	S	J	C
SDG No.4		4	0	0	0	0	4

Course Description:

Web Technologies helps to learn about the HTTP communication protocol. The markup language like HTML, which helps in formatting and transforming web content, interactive graphics, and multimedia content on the web. It helps to know client-side Programming by using JavaScript.

Course Educational Objectives:

- To understand the various elements of HTML and Linking of Documents(L1)
- To design web applications using style sheets(L6)
- To design static webpage using Markup languages(L6)
- To develop web applications by making use of JavaScript. (L3)
- To know about JSS(DOM) and adding dynamic content to web applications(L6)

UNIT -I

Internet Basics: Basic Concepts, Communicating on the Internet, Internet Domains, Internet Server Identities, Establishing Connectivity on the Internet, Client IP address, Transmission Control Protocols.

Introduction to HTML: Information files creation, Web Server, Web Client/Browser, Hyper Text Markup Language, Commonly used HTML Commands. **8 hours**

LISTS: Types of lists.

UNIT -II

Adding Graphics to HTML Documents: Using the Attributes- Border, Width, and Height, Align and Alt Attributes.

Tables: Introduction, The Caption Tag, Using the width and boarder, Cell padding, Cell spacing, Using Background-Color property, Using the Colspan and Rowspan Attributes.

Linking Documents: Links, Images as Hyperlinks. FRAMES: Introduction to Frames. **8 hours**

UNIT -III

CSS2 - Introduction, Syntax, Selectors, Color Background Cursor, Text Fonts, Lists Tables, Box Model, Display Positioning, Floats.

Dynamic HTML: Cascading Style Sheets, Class, Using the TAG, External Style Sheets, Using the TAG. **8 hours**

UNIT -IV

Introduction To JavaScript: JavaScript in web pages, The Advantages of JavaScript, Writing JavaScript into HTML, Basic Programming Techniques, Operators and Expressions in JavaScript, JavaScript Programming Constructs, Conditional Checking, Super controlled-endless loops, Functions in JavaScript, User defined functions, Placing text in a Browser, Dialog Boxes. **8 hours**

UNIT-V

The JavaScript Document Object Model: Introduction, the JavaScript assisted style sheets DOM (JSSS DOM).

Understanding Objects in HTML: Browser Objects, Handling (Web page) Events Using JavaScript. Forms used by A Web Site: The form Object, Other Built -In objects in JavaScript, User Defined Objects. **8 hours**

Textbooks:

1. Web Enable Commercial Application Development Using HTML, JavaScript, DHTML and PHP by Ivan Bayross, BPB Publications, 4th revised edition, 2010 .

References:

2. Complete Reference HTML by T. A. Powell, 3rd edition, TMH,2003.
3. The Complete Reference - PHP by Steven Holzner, Tata McGraw Hill,2008.
4. Web Technology and Design by Xavier, C, New Age International,2013.

CourseOutcomes:

Upon completion of the course, the student is able to

- Analyze a web page and identify its elements and attributes. (L4)
- To apply graphics to web pages, to know about tables and list and frames. (L3)
- Create web pages using Cascading Style Sheets. (L6)
- Understand the concept of Java Scripts. (L2)
- Build dynamic web pages using JavaScript (Client-side programming). (L6)

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	2	2	1	1	1	2	3	2	3	2
CO2	3	2	2	1	1	1	2	3	2	3	2
CO3	3	2	2	1	1	1	2	3	2	3	2
CO4	3	2	2	1	1	1	2	3	2	3	2
CO5	3	2	2	1	1	1	2	3	2	3	2

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

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SDG Justification:	
The topics included in this course are designed to get acquainted with one of the skills that handle necessary mathematical orientation, programming techniques and concept based learning.	

CSCI1101	Web Technologies Lab	L	T	P	S	J	C
SDG No.4		0	0	2	0	0	1

Course Description:

Web Technologies helps to learn about the HTTP communication protocol. The markup language like HTML, which helps in formatting and transforming web content, interactive graphics, and multimedia content on the web. It helps to know client-side Programming by using JavaScript.

Course Educational Objectives:

- To understand the various elements of HTML and Linking of Documents(L1)
- To design web applications using style sheets(L6)
- To design static webpage using Markup languages(L6)
- To develop web applications by making use of JavaScript. (L3)
- To know about JSS(DOM) and adding dynamic content to web applications(L6)

List of Experiments

1. Write a HTML document to demonstrate Formatting tags.
2. HTML document to demonstrate Ordered lists, unordered Lists, definition Lists.
3. Write an HTML document to create table header rows, data rows, caption and attributes of the table tag.
4. Write an HTML document to cell padding and cell spacing, Bgcolor, Colspan and Rowspan attribute.
5. Write an HTML document using frameset and the targeting named frames.
6. Create Style Sheet and implement the following:
    - CSS Styling (Background, Text Format, Controlling Fonts),Working with block elements and objects, Working with Lists and Tables , CSS Id and , Box Model(Introduction, Border properties, Padding Properties, Margin properties)
    - CSS Advanced (Grouping, Dimension, Display, Positioning, Floating, Align, Pseudo class, Navigation Bar, Image Sprites, Attribute sector)
    - CSS Color, Creating page Layout and Site Designs.
7. Write a JavaScript to demonstrate different data types.
8. Write a JavaScript to demonstrate different operators.
9. Write a JavaScript to demonstrate for loop and while loop.
10. Write a JavaScript to demonstrate arrays.
11. Write a JavaScript to demonstrate dialog boxes.
12. Write a JavaScript to demonstrate user defined functions.

13. Write a JavaScript to demonstrate built-in functions.
14. Write a JavaScript to create login application using form elements.

References:

1. Complete Reference HTML by T. A. Powell, 3rd edition, TMH,2003.
2. HTML, XHTML, and CSS Bible by Steven M. Schafer, Wiley India, 5thEdition.
3. Beginning CSS: Cascading Style Sheets for Web Design by Ian Pouncey, Richard York, Wiley India.
4. Web Technology and Design by Xavier, C, New Age International,2013.

Course Outcomes:

Upon completion of the course, the student is able to

- Develop a webpage by the use of HTML tags. (L6)
- Develop a dynamic webpage by the use of DHTML and javascript. (L6)
- Develop a web page using various CSS styles. (L6)
- Construct to write various features of Java Script.(L6)
- Design client- side java applications. (L6)

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	3	2	2	2	1	2	3	3	2	2
CO2	3	3	2	2	2	1	2	3	3	2	2
CO3	3	3	2	2	2	1	2	3	3	2	2
CO4	3	3	2	2	2	1	2	3	3	2	2
CO5	3	3	2	2	2	1	2	3	3	2	2

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

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SDG Justification:	
The topics included in this course are designed to get acquainted with one of the skills that handle necessary mathematical orientation, programming techniques and concept based learning.	

CSCI1111	Introduction to Object Oriented Programming with C++	L	T	P	S	J	C
SDG No.4		4	0	0	0	0	4

Course Description:

C++ is one of the most popular programming language. It contains object-orientation, a new programming concept used to create an object, in code, that has certain properties and methods or Units. The implementation of the Units helps to see the whole world in the form of objects. This course also helps in developing high quality software like system application software, drivers, client-server applications and embedded firmware.

Course Educational Objectives:

- To understand the difference between procedure-oriented programming and object oriented programming.
- To learn the basic concepts and applications of OOPS and practice object oriented analysis and design in the construction of robust, maintainable programs whichsatisfy the requirements of users.
- To identify and practice the object-oriented programming concepts and techniques, practice the use of C++ classes and class libraries, modify existing C++ classes, develop C++ classes for simple applications and implement features of object oriented programming in solving real world problems using Inheritance, Data abstraction, Encapsulation and Polymorphism.
- To understand the concept of file and handling function to perform file operations like accessing the data from file and store the data into file.

UNIT-I

Principles of Object-Oriented Programming: Software Evolution, Procedure oriented Vs Object Oriented Programming Paradigm, Basic Concepts of OOPs, Benefits of OOP, Features and Applications of OOP, Structure of C++ program. Tokens, Expressions and control structures: Introduction, Tokens, Keywords, Identifiers and Constants, Basic Data types, User-Defined Data types, Derived Data Types and Sizes, Dynamic Initialization of variables, Reference Variables, Scope Resolution Operator, Type Cast Operator, Expressions and their types. **8 hours**

UNIT-II

Functions in C++: Function Prototype, call by reference, Inline functions, Default Arguments, Const arguments Function Overloading, Library Functions. Classes and Objects: Introduction, Specifying a class, making an outside function inline, Arrays within a class, Defining Member functions, Memory Allocation for Objects, array of Objects, Static Data Members, Static Member Functions, Friend Functions. **8 hours**

UNIT-III

Constructor: Constructor Parameterized Constructor, Multiple Constructors in a Class, Copy Constructor, Dynamic Constructors, Destructors. Operator Overloading: Definition, Overloading Unary, Binary operators, Overloading Binary Operators using Friends,

Manipulation of Strings using operators. **8 hours**

UNIT -IV

Inheritance: Introduction, Defining Derived Classes, Single Inheritance, Multiple Inheritance, Multi-Level Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Virtual Base Classes. Constructors in Derived Classes **8 hours**

UNIT-V

Exception Handling: Introduction, Basics of Exception Handling, Exception Handling Mechanism, Throwing Mechanism, Catching Mechanism, Re-throwing exception, Specifying Exceptions. **8 hours**

Textbooks:

1. Object Oriented Programming in C++ by E. Balagurusamy, 7th Edition, Tata McGraw Hill Publication, 2017.

References:

2. Object Oriented Programming with C++ by M.T. Somashekara, D.S. Guru, H.S.Nagendraswamy,
3. K.S. Manjunatha, PHI Learning, 1st edition, 2012.
4. Mastering C++ by K.R Venugopal, T. Ravishankar, RajKumar, Tata McGraw Hill Publishing Company Limited, 2nd edition,2006.

Course Outcomes:

Upon completion of the course, the student is able to

- Demonstrate of classes and objects.
- Discuss the concepts of inheritance and polymorphism.
- Develop constructors and destructors, friend function.
- Discuss overloading of operators in C++.
- Distinguish function overloading and function overriding.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	1	1	1	1	1	1	1	1	1	1
CO2	2	1	1	1	1	1	1	1	1	1	1
CO3	3	1	1	1	1	1	1	1	1	1	1
CO4	3	1	1	1	1	1	1	1	1	1	1
CO5	3	1	1	1	1	1	1	1	1	1	1

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

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SDG Justification:	
The topics included in this course are designed to get acquainted with one of the skills that handle necessary mathematical orientation, programming techniques and concept based learning.	

CSCI1381	C++ Programming Laboratory	L	T	P	S	J	C
SDG No.4		0	0	2	0	0	1

Course Description:

To make the students to understand the features of object oriented principles and familiarize them with virtual functions, templates and exception handling. Be able to write a C++program to solve a well specified problem

Course Educational Objectives:

- It provide the necessary knowledge to design and develop programs using Object Oriented Programming Concepts .
- Students will learn how to write programs using matrixes ,Constructors .
- Students will learn how to write programs using inheritance, Polymorphism.
- Students will learn how to write programs using inheritance, Polymorphism.
- Students also learn how to write programs using Exception Handling .

List of Experiments

1. Write a program that contains a function to exchange (swap) values of two arguments by using pointers and References parameters.
2. Write a program to check the given string is palindrome or not using a private member function.
3. Write a program to Demonstrate Inline Function.
4. Write a program to add corresponding elements of two 2-D matrices using friend function. Create two classes each capable of storing one 2-D matrix. Declare the matrices under private access specifier and access them outside the class.
5. Write a program for finding area of different geometric shapes (Circle, Rectangle and Cube) using function overloading.
6. Write a Program to generate Fibonacci Series by using Constructor to initialize the Data Members.
7. Write a program to demonstrate a copy constructor.
8. Write a Program to demonstrate Constructors in derived class using friend function.
9. Write a program to demonstrate single inheritance distinguishing public and private derivation.
10. Write a program to illustrate the implementation of both Multilevel and Multiple (Hybrid) inheritance.
11. Write a program to reverse of a string using operators.
12. Write a program to find transpose of a given matrix of mxn size using unary operator overloading.
13. Write a program to add two matrices of mxn size using binary operator overloading.

14. Write a program to demonstrate the usage of virtual functions.
15. Write a program to find average marks of the subjects of a student. Throw multiple exceptions and define multiple catch statements to handle division by zero as well as array index out of bounds exceptions.

References:

1. Object Oriented Programming in C++ by E. Balaguruswamy, 4rd Edition, Tata McGraw Hill Publication.
2. Let Us C++ by YashavantP.Kanetkar,2ndEdition, BPB Publications,

Course Outcomes:

Upon completion of the course, the student is able to

- Demonstrate of classes and objects.
- Develop the concepts of inheritance and polymorphism.
- Develop constructors and destructors, friend function.
- Implement Operator overloading, Virtual functions,
- Implement concepts of Exception Handling.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	1	1	1	1	1	1	1	1	1	1
CO2	2	1	1	1	1	1	1	1	1	1	1
CO3	3	1	1	1	1	1	1	1	1	1	1
CO4	3	1	1	1	1	1	1	1	1	1	1
CO5	3	1	1	1	1	1	1	1	1	1	1

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

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SDG Justification:	
The topics included in this course are designed to get acquainted with one of the skills that handle necessary mathematical orientation, programming techniques and concept based learning.	

CSCI2001	Elementary Data Structures	L	T	P	S	J	C
SDG No.4	Using C++	4	0	0	0	0	4

Course Objectives:

- To understand the linear and non linear data structures available in solving problems.
- To know about the sorting and searching techniques and its efficiencies.
- Usage of the data structures and algorithms in real time applications and ability to designtheir own data structure according to the application need.
- To understand about stacks, queues, linked lists, trees and graphs.

UNIT-I

Fundamental Concepts: Introduction to Data Structures, Types of Data Structures, and Implementation of data structures, Analysis of Algorithms.
Complexity of algorithms: Space complexity, Time complexity.
Linear Data Structure Using Arrays: Sequential Organization, Linear Data Structure.
Sequential Organization: Arrays, Array as an Abstract Data Type, Memory Representation and Address Calculation, The Class Array, Inserting an element into an array, Deleting an element, Pros and Cons of Arrays, Applications of arrays, Sparse Matrix**.** **7 hours**

UNIT -II

Stacks: Primitive operations, Stack Abstract Data Type, Representation of Stacks Using Sequential Organization (Arrays), Applications of Stack, Expression Evaluation and Conversion Polish notation and expression.
Queues: Concept of Queues, Queue as Abstract Data Type, Realization of Queues Using Arrays, Circular Queue, Advantages of using circular queues, Array implementation of priority queue.
12 hours

UNIT -III

Linked Lists: Introduction, Linked List, Comparison of sequential and linked organizations, Linked list terminology, Primitive operations, Realization of Linked Lists using arrays, Linked list using dynamic memory management.
Linked List Abstract Data Type: Data structure of node, Insertion of a node, Linked list traversal, Deletion of a node, Types of linked list, Linear and Circular linked lists, Linked Stack, Linked Queues**.** **8 hours**

UNIT -IV

Trees: Introduction, Basic terminology, Types of Trees, Binary Tree, Properties of a binary tree, Binary Tree Abstract Data Type, Array implementation of binary trees, Linked implementation of binary trees, Binary Tree Traversal, Conversion of General Tree to Binary Tree.
Binary Search Tree: Basic Concepts, Traversals, Creation, Insertion, Deletion of binary search trees**.** **8 hours**

UNIT- V

Graphs: Introduction, ADT of Graph, Representation of Graph, Graph Traversal, Spanning Trees.

Searching: Search Techniques, Sequential Search, Binary search.

Sorting: Types of sorting, general sort concepts, Bubble sort, Insertion sort, Selection sort Quick sort**.** **8 hours**

Text Book:

1. Data Structures using C++ by Varsha H.Patil, Oxford University Press, New edition, 2012.

Reference Books:

1. Fundamentals of Data Structures in C++ by Ellis Horowitz, Sartaj Sahni Anderson, Freed, 2nd edition 2008.
2. Data Structures using C++ by D.S.Malik, Cengage Learning, 2nd edition, 2009.

Course Outcomes:

Upon completion of the course, the student is able to

- Develop knowledge of basic data structures for storage and retrieval of ordered or unordereddata. Data structures include: arrays, linked lists, binary trees, heaps, and hash tables. (L6)
- Develop knowledge of applications of data structures including the ability to implement algorithms for the creation, insertion, deletion, searching, and sorting of each data structure.(L6)
- Analyze and compare algorithms for efficiency using C++.(L4)
- Developing Knowledge of applications involving tree and graphs
- How to implement projects requiring the implementation of the above data structures using C++.(L1)

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	1	2	1	1	1	1	1	1	1	1
CO2	2	1	1	1	1	2	1	1	1	1	1
CO3	3	1	1	1	1	1	1	2	1	2	1
CO4	3	1	1	1	1	1	1	1	1	1	1
CO5	3	1	1	1	1	1	1	1	1	1	1

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

APPROVED IN:	
BOS :9.9.2021	**ACADEMIC COUNCIL: 17.09.2021**
SDG No. & Statement:	
4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.	
SDG Justification:	
The topics included in this course are designed to get acquainted with one of the skills that handle necessary mathematical orientation, programming techniques and concept based learning.	

BCA – III SEMESTER

CSCI2011: **DATA STRUCTURES USING C++ LAB**

Hours per week: 4 Examination: 100 Marks

Credits: 2

Objective: To develop skills to design and analyze simple linear and non linear data structures and identify the appropriate data structure for the given problem and to write and execute programs in C++.

1. Implementation of Array Operations.
2. Implementation of Sparse Matrix Addition, Multiplications.
3. Array implementation of stack.
4. Array implementation of Queue.
5. Implementation of circular queue ADT using an array.
6. Implementation of conversion of expressions.
7. Implementation of Postfix Expression Evaluation.
8. Implementation of Singly Linked List operations, insertion, deletion, display, reverse.
9. Implementation of Linked Stack Operations.
10. Implementation of Linked Queue Operations.
11. Implementation of Binary Search Tree Creation, Traversals.
12. Implementation of Graph Traversals.
13. Implementation of Linear Search, Binary Search.
14. Implementing the following sorting methods.

a. Bubble sort

b.Insertion sort

c.Selection Sort

d.Quick Sort

References Books:

1. Data Structures with C++ by John R. Hubbard, TMH, 1st edition, 2004.
2. Data Structures using C& C++ by Rajesh K Shukla,Wiley Publications, 2009.
3. Data Structures using C++ by Varsha H Patil, Oxford University Press, New edition, 2012.

Course Outcomes:

Upon completion of the course, the student is able to

- Able to develop and implementation of Array operations.(L3)
- Examine the working of Spares Matrix Addition, Multiplications ,conversion expression(L4).
- Able to develop and implement Stack, queue, circular queue,(L3)
- Understand various linked list operations.(L2)
- List the concepts of Binary Search Tree Traversals, Graph Traversals, Linear Search, BinarySearch able develop applications. (L4)
- Understand sorting methods Bubble sort , Insertion sort, Selection sort, Quick sort. (L2)

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	1	2	1	1	1	1	1	1	1	1
CO2	2	1	1	1	1	2	1	1	1	1	1
CO3	3	1	1	1	1	1	1	2	1	2	1
CO4	3	1	1	1	1	1	1	1	1	1	1
CO5	3	1	1	1	1	1	1	1	1	1	1

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

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Prepared By: Mr.B.Srinivasa Rao

Verified By: Dr.M.Srivenkatesh

CSCI2021	Introduction to Unix Programming	L	T	P	S	J	C
SDG No.4		4	0	0	0	0	4

Course Description:

Unix is popular multiuser operating system in the world. We learn unix tools and concepts. We can write shell programming in Unix programming languages. It is aimed to give securityof files and directories of Unix operating system.

Course Educational Objectives:

- To make the student to learn ownership and permissions of the files and directories.
- To train the student to acquaint about Vi- a standard Unix text editor.
- To make the student to write shell script programs.
- To enable the student on how to give the security of Unix files and directories through login and password.

UNIT -I

Getting started: The operating system-The Unix operating system-knowing your machine-knowing your machine-briefing session.

The Unix architecture and command usage: Unix architecture-features of Unix-Locating commands-Internal and external commands-command structure. **8 hours**

UNIT -II

General-purpose utilities- cal, date, echo, printf, bc, passwd, who, tty.

The file system: Filename, The parent-child relationship, The Home Directory, pwd, cd, mkdir, rmdir, ls-Absolute Pathnames-Relative Pathnames, ls-The UNIX file System. **8 hours**

UNIT -III

Handling ordinary files: cat, cp, rm, mv, more, lp, file, wc, od, cmp, comm., diff,zip and unzip. Basic file attributes: ls –l, chmod, Directory Permissions, Changing file ownership. **8 hours**

UNIT -IV

The vi Editor: vi Basics-Input Mode-Entering and Replacing Text-Saving Test and quitting-Editing Text. The Shell: The shell's Interpretive Cycle-Shell Offerings-Pattern Matching-The wild-cardsEscaping and Quoting-Redirection-Pipes-tee-Command substitution-Shell Variables. The Shell: The shell's Interpretive Cycle-Shell Offerigs, Pattern Matching-The Wild-cardsEscaping and Quoting-Redirection-Pipes-tee-Command Substitution-Shell variables. More file attributes: file systems and Inodes-Hrd links-Symbolic Links and ln-The Directory-find. 33 Simple Filters: head, tail, cut, paste, sort, uniq ,tr. Filter using regular expressions: grep-sed. **8 hours**

UNIT-V

Essential Shell Programming: Shell Scripts, read-The if Conditional-The case Conditional-the case Conditional-expr-while looping-for looping. **8 hours**

Textbooks:

1. Unix Concepts and Applications by Sumitabha Das, McGrawHill , 4th Edition, 2014.

References:

2. UNIX Concepts and Programming by MuruganSethuraman, Denet and Company,2006.

Course Outcomes:

Upon completion of the course, the student is able to

- Learn the concepts, design, structure, features of the UNIX operating system.
- Learn the basic UNIX Utilities.
- Learn the shell script commands.
- Learn vi Editor and its commands
- Learn and write UNIX shell script programming.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	1	2	3	1	2	3	1	2	3	1	3
CO2	1	2	3	2	3	1	3	1	2	3	1
CO3	1	2	3	1	3	1	3	2	3	1	2
CO4	1	2	3	1	3	1	3	2	3	1	2
CO5	1	2	3	2	3	1	3	2	2	1	2

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

APPROVED IN:	
BOS :9.9.2021	**ACADEMIC COUNCIL: 17.09.2021**
SDG No. & Statement:	
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SDG Justification:	
The topics included in this course are designed to get acquainted with one of the skills that handle necessary mathematical orientation, programming techniques and concept based learning.	

CSCI2031	Unix Programming Lab	L	T	P	S	J	C
SDG No.4		0	0	2	0	0	1

Course Description:

To give an overview of the UNIX Operating System, its Architecture, Directory Structure and Command Usage.

Course Educational Objectives:

1. This course introduces basic understanding of UNIX OS, UNIX commands and File system and to familiarize students with the Linux environment.

2. To make student learn fundamentals of shell scripting and shell programming. Emphases are on making student familiar with UNIX environment and issues related to it.

3. Student learn technical communication and effective use of concepts and terminology.

4. Student Ability to practice and understand specifications, scripts and programs.

5.Individual capability in problem solving using the tools presented within the lab.

List of Experiments

1. Practice the commands encountered in the syllabus.
2. Write a shell script to compare two strings.
3. Write a shell script to find the length of the strings.
4. The marks obtained by a student in 5 different subjects are input through the keyboard. The student gets a rank as per the following rules: Percentage above or equal to 60, First Rank Percentage above 50 and 59, Second Rank, Percentage above 40 and 49, Third Rank, Percentage less than 40, Fail. P
5. Write a shell script to display file permissions along with their names.
6. Write a shell script to prints date, no of users and personal status.
7. Write a shell script which accepts a number and displays the list of even numbers from given numbers.
8. Write a shell script that prints out date information in this order: TIME, DAY OF WEEK, DAY NUMBER, MONTH, YEAR Like 20:10:42 Mon 29 Jun2015.
9. Write a shell script to display the following details in a pays lip.
10. Pay slip Details: 1. House Rent Allowance, 2. Dearness Allowance, 3. Provident Fund
11. Write a shell script to reverse the digit.
12. Write a program to check whether a given number is even or odd.
13. Program to generate Fibonacci series up to N.

References:

1. Unix Concepts and Programming by MuruganSethuraman, Denet and Company,2006.
2. Unix Concepts by Sumitaba Das, TMH Publications, 4th edition,2006.

Course Outcomes:

Upon completion of the course, the student is able to

- Able to develop and understand Unix commands.
- Understand various Unix commands.
- Able to develop and implement shell script programs.
- Construct applications using control structure.
- Construct applications using control structureand shell commands.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	1	2	3	1	2	3	1	2	3	1	3
CO2	1	2	3	2	3	1	3	1	2	3	1
CO3	1	2	3	1	3	1	3	2	3	1	2
CO4	1	2	3	1	3	1	3	2	3	1	2
CO5	1	2	3	1	3	1	3	2	3	1	2

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

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BOS :9.9.2021	**ACADEMIC COUNCIL: 17.09.2021**
SDG No. & Statement:	
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SDG Justification:	
The topics included in this course are designed to get acquainted with one of the skills that handle necessary mathematical orientation, programming techniques and concept based learning.	

CSCI2041	Principles of Software Engineering	L	T	P	S	J	C
SDG No.4		4	0	0	0	0	4

Course Description:

Software engineering is the process of analyzing user needs followed by designing, constructing, and testing end user applications. It is done through the use of software programming languages. It is an application of engineering principles to software development.

Course Educational Objectives:

- To enable the student to understand the Software Engineering process models.
- To know about Agile development and Requirements of engineering.
- To Understand about Architectural design, Implementation and testing strategies.

UNIT-I

Introduction to software Engineering and Software Process: Introduction to software Engineering: Professional software development, Software Engineering Ethics, Case studies. **Software processes:** Software process models, Process activities, coping with change, The rational unified process. **8 hours**

UNIT -II

Agile software development & Requirements Engineering:

Agile software development: Agile methods, Plan-driven and agile development, Contents, Extreme programming, Agile project management, scaling agile methods.

Requirements Engineering: Functional and non-functional requirements, The software Requirements Document, Requirements specification, Requirements engineering processes, Requirements elicitation & analysis, Requirements validation, Requirements management.

8 hours

UNIT -III

System modeling: Context models, Interaction models, Structural models, Behavioral models, Model-driven engineering. **8 hours**

UNIT -IV

Architectural design: Architectural design decisions, Architectural views, Architectural patterns, Application architectures. **8 hours**

UNIT -V

Design and Implementation: Object-oriented design using the UML, Design patterns, Implementation issues, Open source development.
Software Testing: Software testing, Development testing, Test driven development, Reuse testing, User testing. **8 hours**

Textbooks:

1. Ian Sommerville,'Software Engineering',ninth,Pearson,india,2011,978-93-325-1885-8,All unites

References:

1. Roger S Pressman, 'Software Engineering: A Practitioner's Approach ',6th,Tata McGraw Hill, New York,2005, 978–0–07–337597–7,ALL

Course Outcomes:

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

- Able to implement agile software and development methods software process models.(L3)
- Able to manage and analyze requirement process.(L3)
- Able to design the system model using UML modeling.(L3)
- Able to analyze the system architecture and organizing system architecture for reusability.(L3)
- Able to implement the system using object-oriented design for the UML, design patterns and evaluate the

system.(L3)

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	2	1	1	1		1	3	1	3	1
CO2	3	2	1	1	1		1	3	1	3	1
CO3	3	2	1	1	1		1	3	1	3	1
CO4	3	2	1	1	1		1	3	1	3	1
CO5	3	2	1	1	1		1	3	1	3	1

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

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BOS :9.9.2021	**ACADEMIC COUNCIL: 17.09.2021**
SDG No. & Statement:	
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SDG Justification:	
The topics included in this course are designed to get acquainted with one of the skills that handle necessary mathematical orientation, programming techniques and concept based learning.	

CSCI2051	Introduction to Data Communications and Networks	L	T	P	S	J	C
SDG No.4		4	0	0	0	0	4

Course Description:

Data communications and networking may be the fastest growing technologies in our culture today. This course is to provide students with an overview of the basic concepts of Data Communication and fundamentals of computer networks. The course gives knowledge on data communication concepts and techniques in layered network architecture, communications switching and routing, types of communication, network congestion, network topologies, network configuration and management, network model components, layered network models (OSI reference model, TCP/IP networking architecture) and their protocols.

Course Educational Objectives:

- Build an understanding of the fundamental concepts of computer networking.
- Familiarize the student with the basic taxonomy and terminology of the computer networking area.
- Allow the student to gain expertise in some specific areas of networking

UNIT-I

Data Communications, Networks, Network Models- OSI Model, TCP/IP Protocol Suite.
Digital Transmission - Transmission Modes, Multiplexing, Transmission Media**.** **8 hours**

UNIT-II

Switching-Datagram Networks: Routing Table, Efficiency, Delay, Datagram Networks in the Internet.

Wired LANs: Ethernet, IEEE standards. **8 hours**

UNIT-III

Error Detection and Correction: types of errors, redundancy, detection versus correction, forward error correction versus re-transmission, CRC, Cheksum.
Flow and Error control, Noisy Channels –stop-and-wait repeat request, go-back-n automatic repeat request, selective repeat automatic repeat request, piggybacking. **8 hours**

UNIT-IV

Network Layer:IPv4 address-address space, notations, classful addressing, network address translation(NAT),IPv6 address-structure, address space Address Mapping-mapping logical to physical address -ARP, mapping physical to logical address- RARP,BOOTP and DHCP.
8 hours

UNIT-V

Transport layer: connectionless versus connection-oriented services, reliable versus unreliable, three protocols, User Datagram Protocol(UDP)-well-known ports for UDP, user datagram, checksum, UDP operation, use of UDP,TCP-TCP services, TCP features, segment.
Application Layer: Domain Name System. Name Space, Distribution of Name Space, DNS in the Internet, Resolution. **8 hours**

Textbooks:

1. Data Communication and Networking by Behrouz A Forouzan, Tata McGraw Hill, 4th edition, 5th reprint, 2007.

References:

2. Data and Computer Communications by William Stallings, Pearson Publications, 9th edition, 2011.
3. Data Communication and Computer Networks by Ajit Pal, PHI Learning 1st edition,2013.

Course Outcomes:

Upon completion of the course, the student is able to

- Able to differentiate among and discuss the four levels of addresses (physical, logical port, and specific used by the Internet TCP/Protocols.(L3)
- Identity types of bit errors and explain the concept of bit redundancy.(L3)
- List internetworking principles and how Internet protocols IP, IPv4 and IPv6 operate.(L1)
- List the concept of reliable and unreliable transfer protocol of data and how TCP and UDP.(L1)
- List Application Layer Services.(L1)

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	1	2	3	2	2	2	3	2	3	2	2
CO2	1	2	2	3	2	2	3	3	2	2	2
CO3	2	2	2	3	2	2	3	2	2	2	2
CO4	1	2	2	2	2	3	1	3	2	2	2
CO5	1	1	2	2	2	3	3	2	2	2	2

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

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BOS :9.9.2021	**ACADEMIC COUNCIL: 17.09.2021**
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SDG Justification:	
The topics included in this course are designed to get acquainted with one of the skills that handle necessary mathematical orientation, programming techniques and concept based learning.	

CSCI2061	Introduction to Database Management Systems	L	T	P	S	J	C
SDG No.4		4	0	0	0	0	4

Course Description:

A database management system (DBMS) is system software for creating and managing databases. It provides users and programmers with a systematic way to create, retrieve, update and manage data.

Course Educational Objectives:

- To study in detail about the Fundamentals of Database Management Systems, Various applications of DBMS.
- To understand the Entity-Relationship modeling, SQL, Data Normalization and Database design.
- To know about the Database Architecture and design models.

UNIT -I

Introduction: Database-Systems Applications, Purpose of Database Systems, View of Data, Database Languages, Relational Databases, Database Design, Object based and Semi structured Databases, Data Storage and Querying, Transaction Management, Data Mining and Analysis, Database Architecture, Database Users and Administrators, History of Database Systems. **8 hours**

UNIT-II

Relational Model: Structure of Relational Databases, Fundamental Relational Algebra Operations, Additional Relational Algebra operations, Extended Relational Algebra operations, Null Values, Modification of the Database. **8 hours**

UNIT -III

SQL: Data Definition, Basic Structure of SQL Queries, Set Operations, Aggregate Functions, Null Values, Nested Sub queries, Complex Queries, Views, Modification of the Database, Joined Relations. **8 hours**

UNIT-IV

Database Design and E-R Model: Entity-Relationship Model, Constraints, Entity Relationship Diagrams, Entity-Relationship Design Issues, Weak Entity Sets, Extended E-R Features, Database Design for Banking Enterprise, Reduction to Relational Schem as, UML. **8 hours**

UNIT-V

Relational Database Design: Features of Good Relational Design, Atomic Domains and normalization, 1NF, 2NF, 3NF, BCNF, Decomposition using Functional Dependencies, Functional

Dependency Theory, Decomposition Using Functional Dependencies, Decomposition Using Multi- Valued Dependencies, more Normal Form and Database Design Process & Modeling Temporal Data. **8 hours**

Textbooks:

1. Database System Concepts by Henry F.Korth and S.Sundarshan, MC Graw Hill Higher Education, 5th edition, 2006.

References:

1. Database Management Systems by Raghurama Krishnan and James Gerhke, MC Graw Hill Higher Education, 3rd edition.
2. Fundamentals of Database Systems by ElmasriNavathe, Sixth edition, Addison-Wesley,2011.

Course Outcomes:

Upon completion of the course, the student is able to

- Explain the Fundamentals of Database Management System ,Various applications of DBMS.
- Convert the ER Model to relational tables ,populate and formulate the relational algebra queries
- Discuss and design the complex queries based on relational database models
- Discuss the Entity –Relationship modeling ,SQL.
- Explain the Data Normalization and Database design

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	2	2	3	3	2	1	2	2	1	1	1
CO2	3	3	2	2	2	1	3	2	2	2	2
CO3	3	3	2	2	1	1	2	2	2	3	2
CO4	2	2	1	1	2	1	1	1	1	1	1
CO5	2	1	1	1	1	1	2	1	1	1	1

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

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BOS :9.9.2021	**ACADEMIC COUNCIL: 17.09.2021**
SDG No. & Statement:	
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SDG Justification:	
The topics included in this course are designed to get acquainted with one of the skills that handle necessary mathematical orientation, programming techniques and concept based learning.	

CSCI2361	SQL& PL/SQL Lab	L	T	P	S	J	C
SDG No.4		0	0	2	0	0	1

Course Description:

To give a formal foundation on the relational model of data and to give an introduction to systematic database design approaches covering conceptual design, logical design and an overview of physical design

Course Educational Objectives:

The aim of this lab is to make the students to learn the concepts of SQL

- Demonstrates various DDL,DML,TCL and DCL Statements
- Demonstrate various PL/SQL Programs
- Demonstrate various triggers and cursors

1. To implement Data Definition language commands using Create, Alter, Drop, Truncate
2. To implement DML, TCL and DRL commands
   a. Insert (b)Select (c)Update (d)Delete
   (e)Commit (f)Rollback (g) Save point
   Like'%' 3.To implement Constraints.
3. (a)Primary key (b)Foreign Key (c)Check (d)Unique (e) Null
   (f)Not Null (g) Drop Constraints
4. To implement Nested Queries & Join Queries
5. PL/SQL programs to implement
   a. Addition of Two Numbers (b) IF Condition
   (c) Greatest of three numbers using IF ANDELSEIF
   (d) Summation of odd numbers using for LOOP (e) GCD Numbers
6. Implementation of Implicit and Explicit Cursors
7. Demonstration of triggers

References:

1. Introduction to Relational Databases and SQL Programming by Christopher Allen, Simon Chatwin, Catherine A. Vreary, TataMcGraw-Hill.
2. Databse Management System a Practical Approach by Rajiv Chopra, S.Chand, Fourth revised edition, 2010.

Course Outcomes:

Upon completion of the course, the student is able to

1. To implement Create, insert, select commands on the database.
2. Demonstrate the working of different concepts of DBMS
3. Implement, analyze and evaluate the project developed for an application.
4. Design and implement database scheme for a given problem–domain.
5. Normalize a database

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	2	3	2	1	2	1	2	2	2	2	3
CO2	3	2	2	2	2	1	2	2	3	2	1
CO3	3	3	3	2	2	2	3	2	2	3	2
CO4	3	3	2	2	2	2	3	2	2	2	3
CO5	3	3	3	3	2	2	3	2	2	3	3

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

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SDG Justification:	
The topics included in this course are designed to get acquainted with one of the skills that handle necessary mathematical orientation, programming techniques and concept based learning.	

CSCI2081	Introduction to Java Programming	L	T	P	S	J	C
SDG No.4		4	0	0	0	0	4

Course Description:

Java is a popular general-purpose programming language and computing platform which fast, reliable, and secure. This course helps in developing classes, objects and also different packages in Java. It also helpful in creating a programmer's API for Java semantic web applications.

Course Educational Objectives:

- To cover preliminaries and learn how to program in basic concepts.
- To understand packages, Interfaces
- To understand the implementation of multi-threading concept.
- To understand exception Handling, String Handling.
- To understand and to implement the concepts of swings and Event handling.

UNIT -I

The Primaries and Control Statements: Introduction to Java, Features of Java, Object Oriented Concepts, Lexical Issues, Data Types, Variables, Arrays, Operators, Control Statements.

8 hours

UNIT-II

Classes and Objects: Classes, Objects, Constructors, Overloading methods, Overloading Constructors, Using Objects as Parameters, Understanding static, Introducing Inner Classes, Inheritance, Overriding methods, Dynamic Method Dispatch, Abstract class. **8 hours**

UNIT -III

Packages, Interfaces and Exception Handling: Packages, Access Protection, Importing Packages, Interfaces, Exception Handling, Throw and Throws finally. **8 hours**

UNIT-IV

Multithreaded Programming: The Java Thread Model , Main Thread, Creating Thread, Extending Thread, Creating Multiple Threads , Using is Alive() and join(),Thread Priorities

8 hours

UNIT -V

Event-Driven Programming : Event- Handling Process, Event- Handling Mechanism, Delegation Model of Event Handling, Event Classes, Event Sources, Event Listeners, Adapter Classes in Event Handling

Introducing Swings: AWT vs Swings, Components and Containers, Swing Packages, A Simple Swing Application, Painting in Swing, Designing Swing GUI Application using Buttons, Labels, Checkboxes, Radio Buttons, ScrollPane, List, ComboBox, , Tables, Scroll pane and Menus

8 hours

Textbooks:

1. The Complete Reference Java2 by Herbert Schildt, TMH, 5th edition, 2009.

References:

2. The Java Programming Language by K. Arnold and J. Gosling, Pearson Education, 3rd edition, 2005.

3. Java in a Nutshell: A Desktop Quick Reference for Java Programming by DavidFlanagan, Rammers, O'Reilly and Associates Inc. 1999.

4. Thinking in Java by Bruce Eckel, Prentice Hall, 2nd edition,2002.

Course Outcomes:

Upon completion of the course, the student is able to

- To demonstrate data types and control statements
- To develop class and objects and constructors
- To explain packages and exception handling concepts
- To develop programs using Multi-threading concepts
- To create user forms using Swings and perform event handling

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	2	1	1	1	1	1	1	1	1	1	1
CO2	3	1	1	1	1	1	1	1	1	1	1
CO3	3	1	1	1	1	1	1	1	1	1	1
CO4	3	1	1	1	1	1	1	1	1	1	1
CO5	3	1	1	1	1	1	1	1	1	1	1

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

APPROVED IN:	
BOS :9.9.2021	**ACADEMIC COUNCIL: 17.09.2021**
SDG No. & Statement:	
4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.	
SDG Justification:	
The topics included in this course are designed to get acquainted with one of the skills that handle necessary mathematical orientation, programming techniques and concept based learning.	

CSCI2091	Java Programming Lab	L	T	P	S	J	C
SDG No.4		0	0	2	0	0	1

Course Description:

To make the student to understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc. and to enable the student to define classes, invoke methods and using class libraries, etc.

Course Educational Objectives:

- To write programs using abstract classes.
- To write programs for solving real world problems using object oriented concepts.
- To write multithreaded programs.
- To design user forms using Swing components and perform Event handling

List of Experiments:

1. Implement a Java Program that reads a line of integers, and then displays each integer, and the sum of all the integers (Use String Tokenizer class of java.util)
2. Write a Java program to illustrate the concept of class with method overloading.
3. Demonstrate a Java program and apply the concept of Single level and Multi level Inheritance.
4. Write a Java program to illustrate the concept of Dynamic Polymorphism.
5. Demonstrate a Java program to execute Interfaces &Abstract Classes.
6. Write a Java program to implement the concept of exception handling.
7. Illustrate the concept of threading using Thread Class and runnable Interface.
8. Demonstrate the concept of multi-threading that creates three threads. First thread displays “Good Morning” every one second, the second thread displays “Hello” every two seconds and the third thread displays “Welcome” every three seconds.
9. Implement the serialization concept
10. Write a Java program to illustrate the concept of Thread synchronization.
11. Write a program to create login form using swing components and perform event handling for the button controls.
12. Write a program to design a basic student registration form using Swing components

References:

1. The Complete Reference Java2 by Herbert Schildt, TMH 5th edition,2009.
2. Java How to program by Paul Deitel, Harvey Deitel, Pearson, 10th edition,2016.

Course Outcomes:

Upon completion of the course, the student is able to

- An ability to analyze a problem and identify and define the computing requirements appropriate for its solution under given constraints.(L2)
- Understand the importance of OOP and describe the Multithreading concepts.(L2)
- An ability to perform experiments to analyze and interpret data for different applications of exception handling.(L2)
- Create Java programs using inheritance and polymorphism and Implement error-handling techniques using exception handling and multithreading.(L3)
- Create user forms and perform Event handling for Swing components.(L3)

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	2	1	1	1	1	1	1	1	1	1	1
CO2	3	1	1	1	1	1	1	1	1	1	1
CO3	3	1	1	1	1	1	1	1	1	1	1
CO4	2	1	1	1	1	1	1	1	1	1	1
CO5	3	1	1	1	1	1	1	1	1	1	1

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

APPROVED IN:	
BOS :9.9.2021	**ACADEMIC COUNCIL: 17.09.2021**
SDG No. & Statement:	
4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.	
SDG Justification:	
The topics included in this course are designed to get acquainted with one of the skills that handle necessary mathematical orientation, programming techniques and concept based learning.	

CSCI2121	Advanced Python Programming Lab	L	T	P	S	J	C
SDG No.4		0	0	2	0	0	1

Course Description:

To write, test, and debug advanced Python programs. To implement Python programs based on searching and sorting algorithms. Use functions for structuring Python programs. Write programs using concepts such as lambda, OOPs concepts, data frames.

Course Educational Objectives:

- The students will be able to improve Problem solving and programming capability
- The students will learn data analytics through python programming

List of Experiments

1. Write a program add.py that takes 2 numbers as command line arguments and prints its sum
2. Write function to computegcd,lcm of two numbers.
3. To write a python program Binary search
4. Write a program to implement Selection sort
5. Write a program to implement Insertion Sort
6. Write a function cumulative_sum to compute cumulative sum o a list of numbers.
7. Write a program to perform addition of two square matrices
8. Write a program to double a given number and add two numbers using lambda()
9. Write a python program which accepts the radiu so far circle
10. From user and computes the area(use math module).
11. Write a program to find sum of two numbers using class and methods
12. Using a numpy module create an array and check the following:
13. a)Type of array b)Dimensions of array c)Shape of array d)Type of elements in array
14. Writeapythonprogramtoconcatenatethedataframeswithtwodifferentobjects
15. WriteapythonprogramtodefineamoduleandimportaSpecificfunctioninthatmodule toanotherprogram.
16. Write a python program to illustrate the concept of polymorphism in python
17. Write a python code to set background color and pic and draw
18. A square and fill the color using turtle module

Textbooks:

1. Starting Out with Python, Tony Gaddis, Haywood Community College, Pearson,2018.

References:

1. Core Python Programming, Wesley J. Chun, Prentice Hall PTR, First Edition,2000.
2. How to Think Like a Computer Scientist: Learning with Python by Jeffrey Elkner, Allen B. Downey and Chris Meyers, Samurai Media Limited,2016.

Course Outcomes:

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

1. To build the basic concepts of python programming like functions, modules(L3)
2. To build searching, sorting and merging algorithms(L3)
3. To build the concepts data frames(L3)
4. To build concepts of packages(L3)
5. To build concepts of OOPS(L3)

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	2	1	3	2	1	2	1	2	1	3
CO2	2	1	3	1	1	2	3	2	3	2	1
CO3	3	2	3	3	2	1	1	2	2	3	1
CO4	1	2	1	1	2	3	2	3	1	2	1
CO5	1	3	2	1	2	1	1	2	1	1	2

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

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SDG No. & Statement:	
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SDG Justification:	
The topics included in this course are designed to get acquainted with one of the skills that handle necessary mathematical orientation, programming techniques and concept based learning.	

CSCI3001	Object Oriented Analysis and Design	L	T	P	S	J	C
SDG No.4		4	0	0	0	0	4

Course Description:

Object oriented analysis and design is one is a popular technical approach for analyzing and designing an application, system, or business by applying object-oriented programming, as well as using visual modeling throughout the development life cycles to foster better stakeholder communication and product quality. This course also helps in developing is to improve the quality and productivity of system analysis and design by making it more usable. In analysis phase, OO models are used to fill the gap between problem and solution.

Course Educational Objectives:

- To create a requirements model using UML class notations and symbols,
- To create use-cases based on statements of user requirements, and to analyze requirements models given to them for correctness and quality.
- To construct the Object Oriented Analysis and design of a system from the requirements model in terms of a high-level architecture description, and low-level models of structural organization and dynamic behavior using UML class, object, and sequence diagrams.
- To build the nature of design patterns by understanding a small number of examples from different pattern categories, and to be able to apply these patterns in creating an OOdesign.
- To analyze OO design heuristics, patterns or published guidance, evaluate a design for applicability, reasonableness, and relation to other design criteria

UNIT-I

System Development (Introduction):

An Overview of Object-Oriented Systems Development: Orthogonal View of the software, Object-Oriented Systems Development Methodology, Why an Object Orientation.

Object Basics: Objects Are Grouped in Classes, Attributes, Object Behavior and methods, Objects Respond to Messages, Encapsulation, Class Hierarchy, Polymorphism, Object Relationships and Associations, Aggregations and Object Containment, Advanced Topics.

System Development Life Cycle: Software Development Process, High-Quality Systems, Object-Oriented Systems Development, Reusability. **8 hours**

UNIT-II

Object-Oriented Methodologies: Introduction, Rumbaugh et al.'s Object Modeling Technique, The Booch Methodology, The Jacobson et al. Methodologies, Patterns, Frameworks, Unified Approach.

Unified Modeling Language: Static and Dynamic Models, Introduction to the Unified Modeling Language, UML diagram, UML Class Diagram, Use-Case Diagram, UML Dynamic Modeling, Model Management, UML Extensibility, UML Meta-Model **12 hours**

UNIT-III

Object-Oriented Analysis Process: Identifying use cases – Introduction, Why Analysis is a difficult Activity, Business Object Analysis, Use-Case Driven Object Analysis, Business Process Modeling, Use-Case Model, Developing Effective Documentation, Case Study.

Object Analysis – Classification: Classifications Theory, Approaches of Identifying Classes, Noun Phrase Approach, Common Class Patterns Approach, Classes, Responsibilities and collaborators, naming classes. **8 hours**

UNIT -IV

Identifying Object Relationships, Attributes, and Methods: Associations, Super-Sub Class Relationships, Aggregation, Class Responsibility, Object Responsibility.

Design Processes and Design Axioms: Object-Oriented Design Process, Object-Oriented Design Axioms, Corollaries, Design Patterns

Class Design: The Process, Class Visibility, Refining Attributes, Designing Methods and Protocols, Packages and Managing Classes, Case Studies. **8 hours**

UNIT-IV

Object Storage and Object Interoperability: Database Management Systems, Logical and Physical Database Organization and Access Control, Distributed Databases and Client-Server Computing, Next Generation of Client-Server Computing, The pure world, The Practical World, Multi-database Systems, Designing Access Layer Classes, Case Study.

View layer : User Interface Design as a creative Process, Designing View Layer Classes, Macro-Level Process, Micro-Level Process, The Purpose, Prototyping the User Interface, Case Study. **8 hours**

Textbooks:

1. Object Oriented Systems Development by Ali Bahrami, McGraw Hill International Edition , 2017.

References:

2. Object Oriented Analysis and design by Grady Booch, Addison Wesley publications,3rd Edition, 2007.

Course Outcomes:

Upon completion of the course, the student is able to

- To adapt different process models using UML.(L6)
- Able to identify and understand the requirements and develop the analysis models using UML concepts.(L6)
- Develop object design using UML models.(L6)
- Develop user interface design using UML models.(L6)
- Examine the various testing strategies ,debugging principles and case studies.(L4)

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	3	1	1	1	1	1	2	1	2	1
CO2	3	3	1	1	1	1	1	1	1	1	1
CO3	3	3	1	1	1	1	1	1	1	2	1
CO4	2	2	1	1	1	1	1	1	1	2	1
CO5	2	2	1	1	1	1	1	1	1	2	1

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

APPROVED IN:	
BOS :9.9.2021	**ACADEMIC COUNCIL: 17.09.2021**
SDG No. & Statement:	
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SDG Justification:	
The topics included in this course are designed to get acquainted with one of the skills that handle necessary mathematical orientation, programming techniques and concept based learning.	

CSCI3041	PHP Programming	L	T	P	S	J	C
SDG No.4		4	0	0	0	0	4

Course Description:

This course provides basic concepts about PHP, Database connectivity and advanced PHP programming skills. Use PHP and MySQL to develop dynamic web sites for users on the Internet. This course will help to develop web sites ranging from simple online information forms to complex e-commerce sites. After successful completion of this course students are able to develop web applications.

Course Educational Objectives:

- It provide the necessary knowledge to design and develop dynamic, database-driven web applications using PHP version 5.
- Students will learn how to connect to any ODBC-compliant database, and perform hands-on practice with a MySQL database to create database-driven HTML forms and reports etc.
- Students also learn how to configure PHP and Apache Web Server. Comprehensive lab exercises provide facilitated hands-on practice crucial to develop competence web sites.

UNIT -I

Introduction :What is PHP? – History of PHP – Installing PHP – Language Basics: Lexical Structure – Data types – What's a Variable?– PHP variable and value types – Using PHP Variables – Expression and Operators – #Flow Control statements# **8 hours**

UNIT-II

Functions : Calling a function – Defining a function – Introduction to Strings – Comparing Strings – Manipulating and Searching strings – #Arrays: Types of Arrays# – Array functions – Storing data in Arrays **8 hours**

UNIT -III

Form Handling: Form Validation – $_GET variable – $_ POST variable – $_REQUEST variable – Creating the Form –#Creating the Upload script# – Using your File system: File paths and permissions – Displaying directory contents – Working with fopen( ) and fclose( ) **8 hours**

UNIT-IV

Using Cookies : What are Cookies? – Setting Cookies – Using Cookie variables – Session Basics: What's a session? – Understanding Session variables – Managing User preferences with Sessions – Graphics: Drawing functions – #Creating and Drawing images#. **8 hours**

UNIT-V

Installing and Configuring MySQL :Establishing a connection and poking around – Creating a database table – Inserting data into the table – #Selecting and displaying data. **8hours**

Textbooks:

1. Julie Meloni and Matt Telles,'PHP 6 Fast and Easy Web Development',1st,DelmarCengage Learning; ,USA,2008,1598634712,topic mapping

References:

2. Kevin Tatroe, Peter MacIntyre and RasmusLerdorf,'Programming PHP',3rd, O'REILLY media,India,2013,9781449392772,topic mapping

Course Outcomes:

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

Course Outcomes:

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

- To build PHP Basic syntax for variable types and calculations(L3)
- To Build Creating conditional structures(L3)
- To Build Storing data in arrays Using PHP built-in functions and creating custom functions(L3)
- To build and understanding POST and GET in form submission(L3)
- To connect MySQL database and displaying data(L3)

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	1	1	1	1	1	2	2	1	2	2
CO2	3	1	1	1	1	1	2	3	1	2	2
CO3	3	1	1	1	1	1	2	3	1	2	2
CO4	3	2	1	1	1	1	2	3	1	2	1
CO5	2	2	1	1	1	2	1	2	1	2	2

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

APPROVED IN:	
BOS :9.9.2021	**ACADEMIC COUNCIL: 17.09.2021**
SDG No. & Statement:	
4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.	
SDG Justification:	
The topics included in this course are designed to get acquainted with one of the skills that handle necessary mathematical orientation, programming techniques and concept based learning.	

CSCI3051	PHP Programming Lab	L	T	P	S	J	C
SDG No.4		0	0	2	0	0	1

Course Description:

Introduction to the open-source Web scripting language PHP. Build dynamic Web applications. Semantics and syntax of the PHP language, including discussion on the practical problems that PHP solves. Write server-side cross-platform HTML-embedded scripts to implement dynamic Web pages that interact with databases and files.

Course Educational Objectives:

- To learn writing and testing basic PHP programs
- To practice use of Indexed and Associative Arrays
- To write PHP code to display parameters like last visited date and time in webpage
- To get familiar with downloading files from the server.
- To design webpages for authentication, simple applications.

List of Experiments:

1. Write a PHP program to find whether given number is prime or not
2. Write a PHP program using Conditional Statements
3. Write a PHP program to find the maximum value in a given 2 Dimensional Aarray
4. Create a PHP page using functions for comparing three integers and print the largest number
5. Write a PHP program to find the factorial of a given number using user-defined functions
6. Design a simple web page to generate multiplication table for a given number using PHP.
7. Write a PHP program to print Fibonacci series using recursion.
8. Write a PHP program to illustrate Indexed Arrays
9. Write a PHP program to illustrate Associative Arrays
10. Write a PHP program to illustrate two Dimensional array
11. Write a PHP program to down load a file from the server.
12. Write a PHP program to store the current date and time in a COOKIE and display the‘ Last Visited’ date and time on the webpage.
13. Write a PHP program to store page views count in SESSION, to increment the count on each refresh and to show the count on web page.
14. Write a PHP program to design a simple calculator
15. Design an authentication web page in PHP with MySQL to check username and password.

Textbooks:

1. Julie Meloni and Matt Telles,'PHP 6 Fast and Easy Web Development',1st,Delmar

Cengage Learning,USA,2008,1598634712

Course Outcomes:

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

- To build PHP Basic syntax for variable types and calculations(L3)
- To Build Creating conditional structures(L3)
- To Build Storing data in arrays Using PHP built-in functions and creating custom functions(L3)
- To build and understanding POST and GET in form submission(L3)
- To connect MySQL database and displaying data(L3)

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	1	1	1	1	1	2	2	1	2	2
CO2	3	1	1	1	1	1	2	3	1	2	2
CO3	3	1	1	1	1	1	2	3	1	2	2
CO4	3	2	1	1	1	1	2	3	1	2	1
CO5	2	2	1	1	1	2	1	2	1	2	2

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

APPROVED IN:	
BOS :9.9.2021	**ACADEMIC COUNCIL: 17.09.2021**
SDG No. & Statement:	
4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.	
SDG Justification:	
The topics included in this course are designed to get acquainted with one of the skills that handle necessary mathematical orientation, programming techniques and concept based learning.	

CSCI3061	Data Visualization Using Tableau Lab	L	T	P	S	J	C
SDG No.4		0	0	2	0	0	1

Course Description:

To make students aware of the basics of the fast-growing data visualization tool this is currently being used in the BI Industry.

Course Educational Objectives:

1. Introduce students to the fundamentals of using Tableau Desktop in the context of business and data analytics

2. The course is focused on project-based learning and covers all of the skills identified in the Tableau Desktop.

3. More specifically, students will explore the role and application of data visualization in the data analysis process using Tableau.

4. They will create and design both static and dynamic tables, data visualizations, dashboards, and stories while incorporating visual design best practices to better communicate insights to the intended audience, such as business stakeholders.

5. Students will also connect multiple external data sources (e.g., Text Files, Excel, SQL databases) to Tableau and optimize large data to efficiently wrangle and analyze real-industry data.

List of Experiments

1. Program to Demonstrate the Data Sources, Custom Data View, Extracting Data.
2. Program to Demonstrate the Fields Operations, Editing Metadata.
3. Program to Demonstrate the Data Joining, Data Blending.
4. Program to Demonstrate the Worksheets.
5. Program to Demonstrate the Add Worksheets, Rename Worksheet, Save &Delete Worksheet, Reorder Worksheet, Paged Workbook.
6. Program to Demonstrate the Calculations.
7. Program to Demonstrate the Operators.
8. Program to Demonstrate the Functions.
9. Program to Demonstrate the Numeric Calculations, String Calculations.
10. Program to Demonstrate the Date Calculations, Table Calculations, LOD Expressions.
11. Program to Demonstrate the Sort & Filters, Basic Sorting, Basic Filters.
12. Program to Demonstrate the Quick Filters, Context Filters, Condition Filters, Top Filters
13. Program to Demonstrate the Charts, Bar Chart, Line Chart, Pie Chart, Crosstab,

Scatter Plot.

14. Program to Demonstrate the Bubble Chart, Bullet Graph, Box Plot, Tree Map, Bump Char, Gantt Chart.
15. Program to Demonstrate the Histogram, Motion Charts, Waterfall Charts.

Textbooks:

1. Tableau your data: Fast and Easy Visual Analysis with Tableau Software by Murray, Daniel G.: Wiley India, 2014.

References:

1. Learning Tableau by Milligan, N., PACKT / Shroff Publishers,2015.
2. Communicating Data with Tableau by Jones, B, PACKT Shroff Publishers,2014.
3. Power Pivot and Power BI Collie by Rob., Singh, Avichal, Holy Macro Books,2016.

Course Outcomes:

Upon completion of the course, the student is able to

1. To demonstrate various programs which includes data ,field operations, date operations.
2. To discuss worksheets and various operations on worksheets.
3. To demonstrate calculations, operations, Designing applications using time serious data and its related concepts.
4. To demonstrate various filters.
5. To demonstrate various charts.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	2	1	3	2	2	1	1	1	3	1	2
CO2	1	1	2	2	3	1	2	3	2	3	3
CO3	3	1	2	3	1	2	1	2	3	3	3
CO4	1	2	1	1	1	2	1	1	1	2	2
CO5	2	2	1	3	2	3	2	2	1	2	2

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

APPROVED IN:	
BOS :9.9.2021	**ACADEMIC COUNCIL: 17.09.2021**
SDG No. & Statement:	
4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.	
SDG Justification:	
The topics included in this course are designed to get acquainted with one of the skills that handle necessary mathematical orientation, programming techniques and concept based learning.	

CSCI3021	R Programming Lab	L	T	P	S	J	C
SDG No.4		0	0	2	0	0	1

Course Description:

To make the students to learn how to program in *R* and how to use *R* for effective data analysis.

Course Educational Objectives:

1. To know how to use R Data types, Strings, Vectors, and Lists while creating applications.
2. To become familiar with loading a workspace that contains a R Data frame, editing the dataset, and saving the workspace, data analysis.
3. To be familiar with the steps involved in creating data visualisations by plotting data using the ggplot package and other methods.
4. To learn how to employ loop functions and data structures.
5. To enable the own spectacular data visualisations by delving deeper into R's graphical capabilities.

1. What is R? and Data Types
    a. Download, Install, Configure
    b. Learn to use help()function
    c. Understand data types in R (logical, numeric,etc)
    d. Convert data types
2. Getting Data In and Out ofR
    a. Create, find, and remove data(vector, matrix, data frame) inR
    b. Read external data into R(.txt,.csv)
    c. Write R data into external files(.txt,.csv)
3. Manipulating on Strings
    a. Understand and manipulate strings(e.g. substr(),scan())
    b. Understand indexing of data in vectors, matrices, and data frames
    c. Graphing techniques to visualize data selection
4. Operators, Vectors ,Matrices, Array, Lists, Data Frames and math functions
    a. Learn about operators(mathematics, logical, miscellaneous)
    b. Learn about basic math functions(e.g.sum())
    c. Use operators and math functions onvariables
5. Plotting Data
    a. Dot Plots
    b. Histograms
    c. Box Plots
6. Using Control Structures
    a. Understand if else statement
    b. Use if else statement for data manipulation
    c. Compare if else statement with ifelse()function
    d. Learn about ifelse() function
    e. Use ifelse() function on vectors and matrices

f. Use graphs to show the results

7. Working with Loops
    a. Understand how loops work in R
    b. Create your own loop for vectors
    c. Create a series of graphs with loop functions
    d. Learn to use break and next statements in loops
    e. Use loops to create and change data in vectors, matrices, and arrays
    f. Use loops to create data as a list
    g. Learn about double loops
    h. Create your own double loops for matrix
    i. Use operators and functions in single and double loops
8. Using control structure, math function in loops
    a. Use ifelse() function in loops
    b. Combine loops and if else statement
    c. Represent your results with graphs
    d. Use math functions in loops
    e. Use math functions in if else statement
    f. Show your results with graphs
9. Understand advanced functions such as apply() andby()
10. Use apply() and by() to calculate descriptive statistics
11. Create graphs for the calculated descriptive statistics

References:

1. R Cook Book by Paul Teetor, Orielly Publications,2011.
2. Efficient R Programming : A Practical Guide to Smarter Programming by Colin Gillespie & Robin Lovealce, O'Reilly,2017

Course Outcomes:

Upon completion of the course, the student is able to

1. To discuss data in and out of R ,Strings, operators, vectors list motivation for learning a programming language
2. To transform your datasets into a form convenient for analysis
3. To demonstrate plotting of data with various techniques
4. To examine control structures and working with loops
5. To learn advanced functions and create graphs for statistics

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	2	3	3	2	2	1	2	2	3	2
CO2	3	3	2	2	1	2	2	3	2	3	2
CO3	2	1	2	1	2	1	2	1	3	3	2
CO4	1	1	3	2	2	1	1	3	1	3	1
CO5	3	1	3	3	2	2	2	1	3	2	1

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

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4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.	
SDG Justification:	
The topics included in this course are designed to get acquainted with one of the skills that handle necessary mathematical orientation, programming techniques and concept based learning.	

CSCI3071	Introduction to Cloud Computing	L	T	P	S	J	C
SDG No.4		4	0	0	0	0	4

Course Description:

This course will help the students to get familiar with Cloud Computing Fundamental concepts, technologies, architecture and state-of-the-art in Cloud Computing fundamental issues, technologies, applications and implementations.

Course Educational Objectives:

- To understand basic concepts related to cloud computing technologies and concepts of cloud delivery models IaaS, PaaS and Saas
- To evaluate the underlying principle of Data Center, cloud virtualization, cloud multitenant and service technologies.
- To implement different infrastructure and specialized mechanisms related to cloud storage and usage monitor.
- Fundamentals of cloud computing architectures based on current standards, protocols, and best practices.

UNIT -I

Define: What is a cloud? Hype cycle, Implantation gap, Common Definition Metaphorical Interpretation, Attributes.
Cloud Architecture: Stack Management Layers, Standards and Interoperability, Private Cloud, Community Cloud, Hybrid Cloud, Cloud Maturity. **8 hours**

UNIT-II

Infrastructure as a Service: Infrastructure Stack, Servers, Storage, Network, Integration, Management, Payment and Billing, Iaas Landscape.
Platforms a Service: Web Application Frameworks, Web Hosting Services, Google App Engine, Microsoft Windows Azure, Force.com, Additional Platforms.
Software as a service: Customer Relationship Management, Human Resources, Financial, Collaboration, Backup and Recovery, Industry Solutions. **8 hours**

UNIT-III

Benefits and Challenges: Benefits, Challenges, Recommendations.
Strategic Impact: What is Strategy? Strategic Analysis, External Analysis, Internal Analysis, Strategic Realignment.
Risk Impact: Notion of Risk, Risk Management, Cloud Impact, Enterprise Wide Risk Management.
Financial Impact: Resource Costs, Return on Investment, Cash Flow, Financial Visibility, Return on Assets. **8 hours**

UNIT -IV

Requirements Analysis: Strategic Alignment, Architecture Development Cycle.
Draft Architecture: Business Process Modeling, Architecture Modeling, Preliminary Design.

Application Inventory: Options, Stakeholders, Business criteria, technical criteria, Cloud Opportunities, Analysis, Net Benefit and Risk, New Opportunities.
Service Components: Service Delivery Model, Potential Providers, Evaluation Criteria and Weight.

UNIT V **8 hours**

User Profiles: Options, Segmentation Criteria, Profile Classification, Application Map, Identity Management, Compliance.
End-to-end Design: Technical Design, Devices, Connectivity, Physical Infrastructure, Management, Metering and Billing, Hybrid Cloud Design.
Connectivity: Network Connectivity, Content Delivery Networks, Application Connectivity, Information Connectivity**.** **8 hours**

Textbooks:

1. Cloud Computing Explained by John Rhoton, Recursive Press, 2013.

References:

1. Cloud Computing, Principles, Systems and Applications by Nick Antonopoulos and Lee Gilliam Springer International Edition, 2015.
2. Cloud Computing Principles and Paradigms by Raj Kumar Buyya, James Broberg and AnderzejGoscinscinki, Wiley Publications,2011

Course Outcomes:

Upon completion of the course, the student is able to

- Define the basic concepts, terminology and the fundamental models.
- Demonstrate the set of primary technology components and characteristics
- associated with cloud computing.
- Discuss various benefits and challenges and various types of impact on cloud.
- Elaborate requirements analysis ,draft architecture ,application inventory and service components of cloud.
- Define user profile, end to end design and connectivity issues of cloud.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	2	1	2	2	3	1	1	3	1	3	3
CO2	2	2	1	2	3	1	1	2	1	2	1
CO3	1	2	1	3	2	1	1	1	1	2	1
CO4	3	1	1	1	1	1	1	3	2	2	1
CO5	1	2	2	2	1	1	1	2	1	1	2

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

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SDG No. & Statement:	
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SDG Justification:	
The topics included in this course are designed to get acquainted with one of the skills that handle necessary mathematical orientation, programming techniques and concept based learning.	

CSCI3081	Introduction to Block Chain Technologies	L	T	P	S	J	C
SDG No.4		4	0	0	0	0	4

Course Description:

This is new technology of digital currency. Block chains are to achieve decentralization. The system needs to validate transactions without anyone being able to veto transactions or control the network.

Course Educational Objectives:

- To understand distributed systems, the concepts of Block chain technology
- To know types of blockchain and consensus.
- To get a technical overview of decentralization using blockchain and digital currencies like Bitcoin, as well as their broader economic, legal and financial context
- Learn the basic concept of Cryptographic Hash Functions, Hash Pointers and Elliptic Curve Digital Signature Algorithm.
- To get an insight into the working of the Bitcoin network, Wallet, Bitcoin mining and distributed consensus for reliability.

UNIT-I

The Growth of Block chain Technology Distributed System: The History of Blockchain and Bitcoin, Types of Block chain, consensus. **8 hours**

UNIT-II

Decentralization: Decentralization using block chain, methods of decentralization, routes to decentralization, platform for decentralization. **8 hours**

UNIT-III

Public Key Cryptography: Asymmetric cryptography, public and private keys, RSA, Hash Functions, Elliptical Curve Digital Signature Algorithm (ECDSA). **8 hours**

UNIT-IV

Introduction to Bitcoin: Bitcoin, Digital keys and address, transactions, block chain, mining **8 hours**

UNIT-V

Ethereum: Introduction, The Ethereum network, components of Ethereum ecosystem **8 hours**

Textbooks:

1. Imran Bashir, "Mastering Blockchain: Distributed Ledger Technology,Decentralization and Smart Contracts Explained", Second Edition, Packt Publishing, 2018.

References:

1. Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction by Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, Princeton Press, 2016.

Course Outcomes:

Upon completion of this course student will be able to

- Learn concepts of distributed systems and block chain technology.
- Will get an overview on the types of block chain and consensus
- Understand the concepts of decentralization and crypto currencies.
- Analyze the cryptographic hash functions and digital signature algorithms used in Block chain technology.
- Explain the working of the Bitcoin network, Wallet, Bitcoin mining and distributed consensus for reliability

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	2	1	1	1	1	2	3	1	3	1
CO2	3	2	1	1	1	1	2	3	1	3	1
CO3	3	2	1	1	1	1	2	2	3	3	2
CO4	3	2	1	1	1	1	2	3	2	2	1
CO5	3	2	1	1	1	1	2	3	2	2	1

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

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BOS :9.9.2021	**ACADEMIC COUNCIL: 17.09.2021**
SDG No. & Statement:	
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SDG Justification:	
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CSCI3091	Project Work	L	T	P	S	J	C
SDG No.4		0	0	12	0	0	12

Course Description:

The project work is designed with the objective to prepare the students to take up positions in it industries as programmer, systems designers, software engineers, etc. The projects are to be designed to provide students comprehensive knowledge covering the skills and core areas of computer science in theory and practical's. Six months major project is part of curricula in last semester of BCA.

Course Educational Objectives:

- To help the student develop the ability to apply theoretical and practical tools / techniques to solve real life problems related to industry, academic institutions and research laboratories.
- To get software skills of students in various platforms, of students are supposed to develop quality software solutions by applying theoretical and practical knowledge of various courses learnt.
- To develop Requirement Analysis for the problem that will be considered.
- To develop Design Document from the Requirement Analysis.
- To develop coding and testing for the problem that will be considered.

Course Outcomes:

Upon completion of the course, the student is able to

- Skill to apply Software Development Cycle to develop a software module.
- Ability to use the techniques, skills and modern engineering tools necessary for software development.
- Design a Requirement Analysis Document for various real world problems which are to be automated.
- Demonstrate Design Document for real world problems which are to be automated.
- Develop a software product along with its complete documentation.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	1	1	1	1	1	3	3	2	3	3
CO2	3	1	1	1	1	1	3	3	2	3	3
CO3	3	1	1	1	1	1	3	3	2	3	3
CO4	3	1	1	1	1	1	3	3	2	3	3
CO5	3	1	1	1	1	1	3	3	2	3	3

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

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SDG No. & Statement:	
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SDG Justification:	
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Program Elective

CSCI2371	**Fundamentals of Cryptography**	**L**	**T**	**P**	**S**	**J**	**C**
SDG No.4		4	0	0	0	0	4

Course Description:

Due to rapid growth of digital communication and electronic data exchange information security has become a crucial issue in industry, business and administration. Modern cryptograph provides essential techniques for securing information and protecting data.

Course Educational Objectives:

- To enable the students to understand the importance of information security.
- To make them to understand attacks, cryptography, steganography.
- To know about the ciphers.
- To describe data encryption standards.

UNIT-I

Introduction: Security goals, Confidentiality, Integrity, Availability, Attacks, Attacks threatening Confidentiality, Attacks Threatening Integrity, Attacks Threatening Availability, Passive versus Active Attacks, Services and Mechanism, Security Services, Security Mechanisms, Relation Between Services and Mechanisms, Techniques, Cryptography, Steganography. **8 hours**

UNIT-II

Traditional Symmetric Key Ciphers: Introduction, Kerckhoff's Principle, Cryptanalysis, Categories of Traditional ciphers, Substitution Ciphers, Mono alphabetic ciphers, Poly alphabetic Ciphers, Transposition Ciphers, Keyless Transposition Ciphers, Keyed Transposition Ciphers, Combining two approaches. **8 hours**

UNIT-III

Stream and Block Ciphers: Stream ciphers, Block Ciphers, Combination, Introduction to Modern Symmetric Key cipher, Modern Block Ciphers-Substitution or Transposition, Block Ciphers as Permutation Groups, Components of Modern Block Cipher, S-Boxes. **8 hours**

UNIT-IV

Product Ciphers: Introduction, two Classes of Product Ciphers, Feistel Ciphers, Non-Feistel Ciphers, Attacks on Blocks Ciphers, Modern Stream Ciphers. **8 hours**

UNIT-V

Data Encryption Standard (DES): Introduction, DES Structure, Multiple DES. Asymmetric-Key Cryptography: Introduction, RSA Cryptosystem. **8 hours**

Textbooks:

1. Cryptography and Network Security by Behrouz A. Forouzan, Tata McGraw-Hill Special Indian edition, 2007.

References:

- Cryptography and Network Security by William Stallings, Pearson Education,2011.
- Cryptography and Network Security by AtulKahate, Tata McGraw-Hill Publishing Company Limited,2003.

Course Outcomes:

Upon completion of the course the student will be able to

- Understand the importance of computer security.
- Identify the differences between different types of ciphers.
- List the concepts of block ciphers and stream ciphers.
- Able to outline structure of DES
- List the concepts of asymmetric key cryptography.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	1	1	1	1	1	1	2	2	3	2
CO2	3	1	1	1	1	1	1	3	2	2	2
CO3	3	1	1	1	1	1	1	2	2	3	2
CO4	3	1	1	1	1	1	1	2	2	3	2
CO5	3	1	1	1	1	1	1	2	2	3	2

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

APPROVED IN:	
BOS :9.9.2021	**ACADEMIC COUNCIL: 17.09.2021**
SDG No. & Statement:	
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SDG Justification:	
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CSCI2111	Fundamentals of Artificial Intelligence	L	T	P	S	J	C
SDG No.4		4	0	0	0	0	4

Course Description:

Intelligent machines has replaced human capabilities in many areas. Artificial intelligence is the intelligence exhibited by machines or software. It is the branch of computer science that emphasizes on creating intelligent machines that work and react like humans. Artificial Intelligence spans a wide variety of topics in computer science research, including machine learning, deep learning, reinforcement learning, natural language processing, reasoning, perception etc.

Course Educational Objectives:

- The fundamental concepts of Artificial Intelligence and the participants will get to learn in the future about Machine learning, Deep Learning, explore the Platforms for AI, implement methods to solve problems using Artificial Intelligence and Natural Language Processing, etc.
- To make the students to understand about the building blocks of AI such as Search, Knowledge representation, inference, logic, and learning and the concepts of Natural Language Processing.

UNIT-I

Introduction: Introduction to Artificial Intelligence, Historical Backdrop, What is Intelligence, The bottom line.
State Space Search: Generate the test, Simple search, Depth First Search (DFS), Breadth First Search (BFS), Comparison of BFS and DFS, Quality of solution, Depth Bounded DFS (DBDFS), Depth First Iterative Deepening(DFID). **8 hours**

UNIT -II

Heuristic Search: Heuristic Functions, Best First Search, Hill Climbing, Local Maxima, Solution Space Search, Variable Neighborhood Descent, Beam Search, Tabu Search, Peak to Peak Methods. **8 hours**

UNIT-III

Finding Optimal Paths: Brute Force, Branch and Bound, Refinement Search, Dijkstra's Algorithm, Algorithm A*, Admissibility of A*, Iterative Depending A* (IDA*), Recursive Best First Search (RBFS), Pruning the CLOSED list, Pruning the OPEN list, Divide and Conquer Beam Stack Search. **8 hours**

UNIT-IV

Knowledge Representation : Representations and mapping ,Knowledge representations approaches ,types of Knowledge's, issues in knowledge representation ,Procedural and Declarative knowledge

Advanced Knowledge Representation: semantic Nets, Frames, Scripts and Conceptual dependency . **8 hours**

UNIT -V

Logical Reasoning: Propositional Logic, first order predicate logic(FOPL).
Natural Language Processing :Classic problems in NLP and schools of thought ,B Techniques, Applications ,Natural Language processing **8 hours**

Textbooks:

1. A first course in Artificial Intelligence by Deepak Khemani, TMH, 2013.

References:

1. Understanding the basic concepts by Binto George, Gail Carmichael, CST,2016. Artificial Intelligence by Elaine Rich, Kevin Knight, Shivashankar B Nair TMH, 3rdedition.
2. Artificial Intelligence simplified thebasic concepts byBinto George, Gail Carmichael, CST,2016.

1.

Course Outcomes:

Upon completion of the course, the student is able to

- Discuss the basic fundamental concepts of Artificial Intelligence.
- What is the future of AI.
- Explain different AI techniques used.
- Develop Applications of AI.
- Discuss Natural Language Processing Concepts

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	2	3	1	1	2	2	2	3	1	3	1
CO2	3	3	1	1	1	1	1	2	2	1	2
CO3	1	1	1	1	1	1	1	1	1	1	1
CO4	2	1	2	1	1	1	1	3	3	3	3
CO5	2	2	2	2	2	2	2	2	2	2	2

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SDG Justification:	
The topics included in this course are designed to get acquainted with one of the skills that handle necessary mathematical orientation, programming techniques and concept based learning.	

	Introduction to Data Mining	L	T	P	S	J	C
CSCI3011							
SDG No.4		4	0	0	0	0	4

Course Description:

Data warehousing and data mining is one of the most advanced fields of computer science which involves use of Mathematics, Statistics, Information Technology and information Sciences in discovering new information and knowledge from large databases It is a new emerging interdisciplinary area of research and development which has created interest among scientists of various disciplines like computer science, mathematics, statistics, information technology.

Course Educational Objectives:

- To learn the basic concepts and techniques of data mining,
- To study about Frequent Item sets and Related Algorithms and Classification,
- To learn about Clustering Concepts.

UNIT-I

Introduction: What motivated data mining? why is it important? What is data mining? data mining-on what kind of data? data mining functionalities, what kinds of patterns can be mined? Are all of the patterns interesting? Classification of data mining systems, Data mining task primitives, Integration of a data mining system with a database or data warehouse system

8 hours

UNIT-II

Data pre-processing: Types of data sets and attribute values, basic statistical descriptions of data, data visualization, measuring data similarity, data quality, major tasks in data preprocessing, data reduction, Data transformation and data discretization, data cleaning and data integration. **8 hours**

UNIT-III

Mining frequent patterns, associations and correlations: Basic concepts, applications of frequent pattern and associations, frequent pattern and association mining, mining various kinds of association rules, a priori algorithm, FP growth algorithm. **8 hours**

UNIT-IV

Classification Analysis: Classification: Basic concepts, decision tree induction, Bayes classification methods, rule-based classification, model evaluation and selection, classification by neural networks, techniques to improve classification accuracy. **8 hours**

UNIT-V

Cluster Analysis: Basic concepts and methods, clustering structures, major clustering approaches, partitioning methods, hierarchical methods, density based methods, model-based clustering: the expectation-maximization method. **8 hours**

Textbooks:

1. Data Mining: Concepts and Techniques by Jiawei Han, MichelineKamber, JianPei ,Morgan Kaufmann publishers, 3rd edition,2011.

References:

2. Introduction to Data Mining by Michael Steinbach, Vipin Kumar, Pang-Ning Tan,
3. Addison Wesley, 1/e ,2006.
4. Data Mining: Introductory and Advanced Topics by Margaret H. Dunham, Data,1/e Pearson Publishers,2006.

Course Outcomes:

Upon completion of the course, the student is able to

- Discuss and define data warehousing and data mining.
- Interpret data and apply preprocessing techniques.
- Explain association rule mining algorithms and evaluate patterns.
- Explain various classification techniques and find accuracy.
- Elaborate various clustering methods and evaluate them

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	2	3	1	1	2	2	2	3	1	3	1
CO2	3	3	1	1	1	1	1	2	2	1	2
CO3	1	1	1	1	1	1	1	1	1	1	1
CO4	2	1	2	1	1	1	1	3	3	3	3
CO5											

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

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SDG No. & Statement:	
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SDG Justification:	
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CSCI3031	Foundation of Data Science	L	T	P	S	J	C
SDG No.4		4	0	0	0	0	4

Course Description:

This course covers foundational techniques and tools required for data science. The course focuses on concepts, principles, and techniques applicable to any technology environment and industry and establishes a baseline that can be enhanced by further formal training and additional real-world experience.

Course Educational Objectives:

- To discuss basics of python programming and its related concepts.
- To demonstrate data in various visual representation and learn about mathematical concepts of linear algebra and statistics.
- To learn machine learning concepts and its various algorithms.
- To discuss various regression and decision tree concepts.
- To learn neural networks, clustering, natural language processing.

UNIT-I

A crash course in Python : The basics, Getting Python, The Zen of Python, Whitespace Formatting, Modules, Arithmetic, Functions, Strings, Exceptions, Lists, Tuples, Dictionaries, Sets, Control flow, Sorting, Generators and Iterators, Randomness, Regular Expressions, Object-Oriented Programming, Functional Tools, enumerate. **8 hours**

UNIT-II

Visualizing Data: Matplotlib, Bar charts, Line Charts, Scatter plots.
Linear Algebra: Vectors, Matrices.
Statistics: Describing a single set of data, Central Tendencies, Dispersion, Correlation, Simpson's Paradox, Correlation and Causation. **8 hours**

UNIT -III

Machine Learning: Modeling, What Is Machine Learning, Over fitting and Under fitting , Correctness , The Bias-Variance Trade-off , Feature Extraction and Selection
K-Nearest Neighbors: The Model, The Curse of Dimensionality
Naive Bayes: A Really Dumb Spam Filter, A More Sophisticated Spam Filter, Implementation, Testing Our Model
Simple Linear Regression: The Model , Using Gradient Descent , Maximum Likelihood Estimation. **8 hours**

UNIT-IV

Multiple Regressions: The Model, Further Assumptions of the Least Squares Model, Fitting the Model, Interpreting the Model, Goodness of Fit
Logistic Regression: The Problem, The Logistic Function, Applying the Model, Goodness of Fit, Support Vector Machines
Decision Trees: What Is a Decision Tree? , Entropy, The Entropy of a Partition, Creating a Decision Tree, Putting It All Together, Random Forests. **8 hours**

UNIT-V

Neural Networks: Perceptions , Feed-Forward Neural Networks, Back propagation

Clustering: The Model ,Example: Meetups , Choosing k , Example: Clustering Colors, Bottom-up Hierarchical Clustering.

Natural Language Processing: Word Clouds, n-gram Models, Grammars **8 hours**

Textbooks:

1. Data Science from Scratch First Principles with python by Joel Grus, O'Reilly Media, 2015.

References:

2. Data Analytics Made Access by Anil Maheshwari,2019.
3. Python for Data Analysis step-by-step tutorial for Beginners by Samuel Burns, Global Tech and Amazon KDP,2019.

Course Outcomes:

Upon completion of the course, the student is able to

- List motivation for learning a programming language.(L1)
- To transform data in visualized fashion.(L3)
- To learn linear algebra, various statistical Techniques. (L5)
- To examine Multiple Regressions, Logistic Regression, Decision Trees.(L4)
- To learn Neural Networks, Clustering, Natural Language Processing(L5)

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	2	-	1	-	1	1	2	1	-	2	1
CO2	2	1	1	-	-	1	2	-	2	2	1
CO3	2	-	-	-	-	1	2	1	2	2	1
CO4	3	-	1	1	1	1	3	1	2	2	1
CO5	3	-	1	1	1	1	3	1	2	2	1

Note: 1 - Low Correlation 2 - Medium Correlation 3 - High Correlation

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GITAM School of Science

GITAM (Deemed to be University)

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