IGDTUW Welcomes
Undergraduate first year students

B.Tech, DMAM, B.Arch, BBA Orientation Booklet

Academic Session 2022-2023

Indira Gandhi Delhi Technical University for Women

(Established by Govt. of Delhi vide Act 9 of 2012)
ISO 9001:2015 Certified University

Kashmere Gate, Delhi 110006

https://igdtuw.ac.in/index.php

ABOUT THE UNIVERSITY

Indira Gandhi Delhi Technical University for Women (IGDTUW) was established by the Govt. NCT of Delhi in May, 2013 vide Delhi Act 09 of 2012, as a non-affiliating University to facilitate and promote studies, research, technology, innovation, incubation and extension work in emerging areas of professional education among women, with focus on engineering, technology, applied sciences, architecture and its allied areas with the objective to achieve excellence in these and related fields.

Erstwhile Indira Gandhi Institute of Technology (IGIT) was established in 1998 by Directorate of Training and Technical Education, Govt. of NCT of Delhi as the first engineering college for women only. Over the years erstwhile IGIT has significantly contributed to the growth of quality technical education in the country and has become not only one of the premier institutions of Delhi but as the most prestigious college of north India.

The University is not only providing high-quality teaching in an environment of competitive research but is also committed towards the creation of new knowledge through research, development and innovation. At present the various departments of the University are running sponsored research projects from the leading Industry/organizations. With the support of the Govt. of NCT of Delhi, the University has started its incubation centre – Anveshan that is offering ample opportunities to the young women engineers to realize their dreams by becoming the entrepreneur. The university incessant effort is to produce work-ready graduates and this is achieved through continuously updating the syllabus with the involvement of the experts from Industry and leading academia. As an outcome, the students of the University are placed 100% with multiple job offers in the leading industry.

VISION

- To make India a Knowledge Society and Knowledge Economy by empowering the women of our country through education in Engineering, Science, Management and Technology.
- To become one of the top technical Universities in the country known for its value based, quality technical education supported with industry relevant research, with focus on environmental and social issues.

MISSION

- To foster an environment for excellence in professional education and ensure active participation of women in the field of Engineering, Science, Management and Technology, while striking out a work-life balance.
- To start new professional courses for women in sun-rise disciplines and forge alliances with industry to impart industry relevant education.
- To emancipate women through pursuit of knowledge enabling them to gain equal status in society through realization of their rights and responsibilities
- To develop sustainable systems and state-of-the-art infrastructure to enable the Indian women to become the future leaders, managers, researchers and productive team players in the field of science, technology and management.

Programmes offered by the University:

Name of Programme	Specialization	Duration	Department
UNDERGRADUATE PROGRAMMES			
B.Tech.	Computer Science Engineering	4 yrs	CSE
B.Tech.	Computer Science Engineering (Artificial Intelligence)	4 yrs	AI & DS
B.Tech.	Information Technology	4 yrs	IT
B.Tech.	AI & ML	4 yrs	IT
B.Tech.	Electronics and Communications Engineering	4 yrs	ECE
B.Tech.	Mechanical and Automation Engineering	4 yrs	MAE
B.Tech.	Mechanical and Automation Engineering	4 yrs	MAE
B.Arch.	Architecture	5 yrs	A&P
B.B.A.	Management	3 yrs	MGMT
POSTGRADUATE PROGRAMMES			
M.Tech.	IT (Cyber Security)	2 yrs	IT
M.Tech.	CSE (Artificial Intelligence)	2 yrs	CSE
M.Tech.	(Artificial Intelligence & Data Science)	2 yrs	AI & DS
M.Tech.	ECE (VLSI Design)	2 yrs	ECE
M.Tech.	Robotics and Artificial Intelligence	2 yrs	MAE
M.C.A.	Computer Applications	2 yrs	IT
M.Plan.	Urban Planning	2 yrs	A&P
M.B.A.	Business Administration	2 yrs	MGMT
DOCTORAL PROGRAMMES			
Ph.D.	Ph.D in Computer Science Engineering Ph.D in Information Technology Ph.D in Computer Applications Ph.D in Mechanical and Automation Ph.D in Electrical Engineering Ph.D in Electronics and Communication Ph.D in Architecture and Planning Ph.D in Physics Ph.D in Chemistry Ph.D in English Ph.D in Mathematics		

Dear Student,
Congratulations!! to you and your family for securing Admission in the prestigious Indira Gandhi Delhi Technical University for Women, the only women Technical University of Delhi. The entire family of IGDTUW welcomes you to the world of technology and innovation. It is this fact that makes IGDTUW unique!
You are a part of the great IGDTUW legacy, which has achieved a number of milestones, to name a few recent ones are:

- **WORLD TIMES HIGHER EDUCATION IMPACT RANKINGS 2021(INTERNATIONAL RANKING):**
    - IGDTUWmade India Proud by Ranked in the band of 101-200 by prestigious '***Times Higher Education World Impact Rankings 2021***' for **Sustainable Development Goal (SDG-4) i.e. Quality Education**
    - IGDTUW made India Proud by Ranked in the band of 101-200 by esteemed '**Times Higher Education World Impact Rankings 2021'** for **Sustainable Development Goal (SDG-5) i.e. Gender Equality**

- **BEST UNIVERSITY IN NORTH INDIA FOR TEACHING EXCELLENCE AWARD 2022**
    - IGDTUW is awarded with "**Best University in North India for Teaching Excellence 2022"** for dedicated and exemplary contribution towards Education, Skill and Research.

- **INDIA TODAY RANKING 2022**
    - All India Rank **"4th** in **Government Colleges with Best value for money"**.
    - All India Rank **"6th**in **Emerging Government Colleges".**
    - All India Rank **7th**in **"Government Colleges with Best Placement Record"**.
    - All India Rank **10th** in "**Government Colleges with Lowest Fees".**

- **THE AWARDS ASIA 2022**
    - IGDTUW makes India proud by being shortlisted in the "**The Awards Asia 2022**" under the category of "**Outstanding Support for Students**".

- **UNIVERSITY EXCELLENCE AWARD**
    - IGDTUW has been conferred upon "**UNIVERSITY EXCELLENCE AWARD"** at VIGYAN BHAVAN on 26th December 2021 at "Indian Engineering Congress Centenary Celebrations"

- **UNIVERSITY OF THE YEAR AWARD BY FICCI**
    - IGDTUW has been conferred with the prestigious "**FICCI University of the Year Award** 2021" (1 to 10 Years Category) for its **continuous commitment towards Quality Education**.

- **NEW CODE OF EDUCATION 2022 AWARD**
  - Hon'ble Vice Chancellor, IGDTUW Dr. (Mrs.) Amita Dev was conferred with "**NEW CODE OF EDUCATION 2022 AWARD**" given by distinguished Prof. Anil D. Sahasrabudhe, Chairperson AICTE on 25th March 2022.

- **WORLD'S UNIVERSITIES WITH REAL IMPACT (WURI) RANKING**
  - It is matter of immense pride that IGDTUW secured **54th position in the overall "*World's Universities with Real Impact (WURI) Ranking*", as the Innovative Universities for 2022".**
  - The University also bagged **13th position in the special category "Entrepreneurial Spirit of WURI ranking, 2022".**

INDIRA GANDHI DELHI TECHNICAL UNIVERSITY FOR WOMEN
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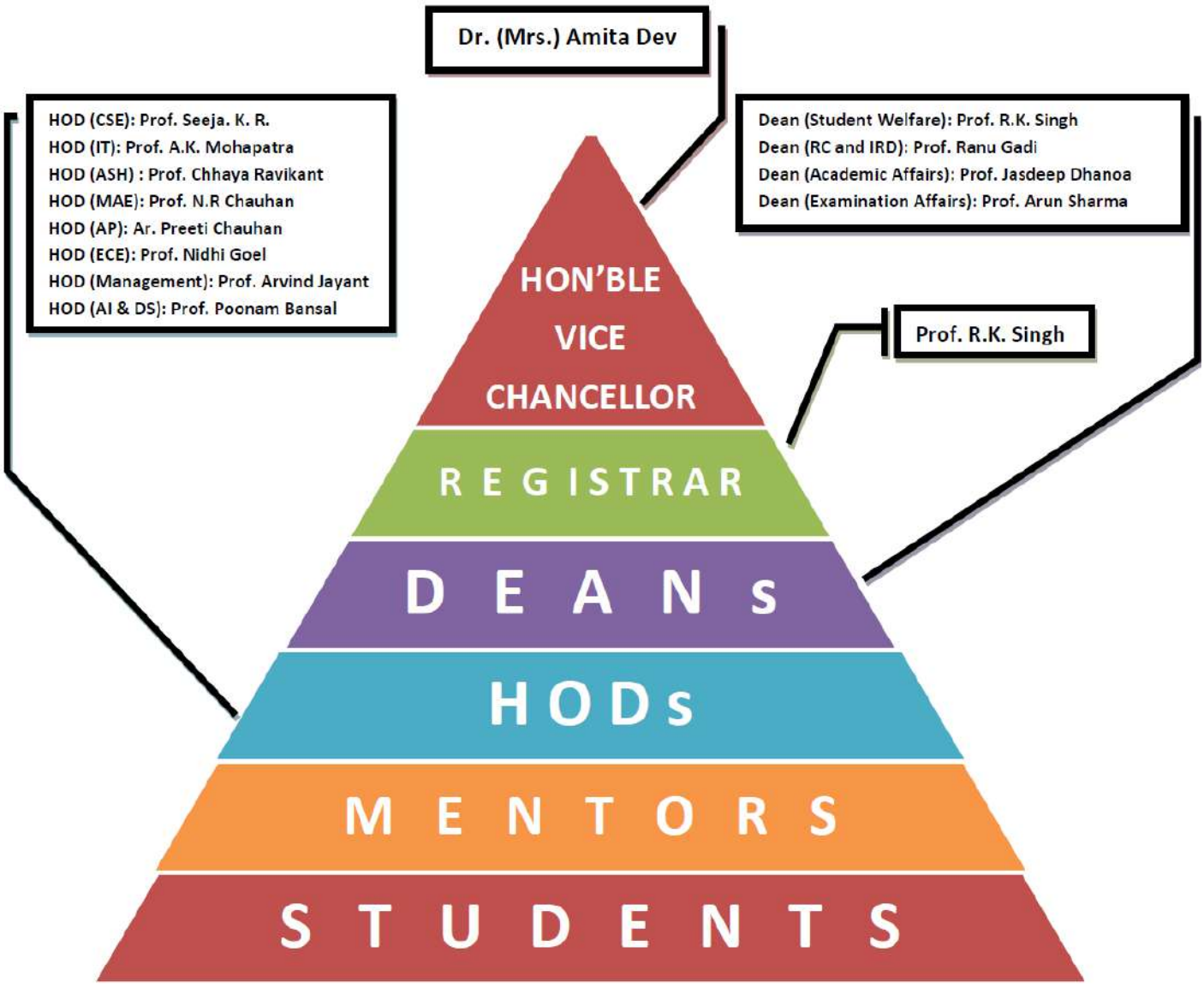
KASHMERE GATE, DELHI-110006
website: www.igdtuw.ac.in

Escalation Matrix for Students Batch-2022

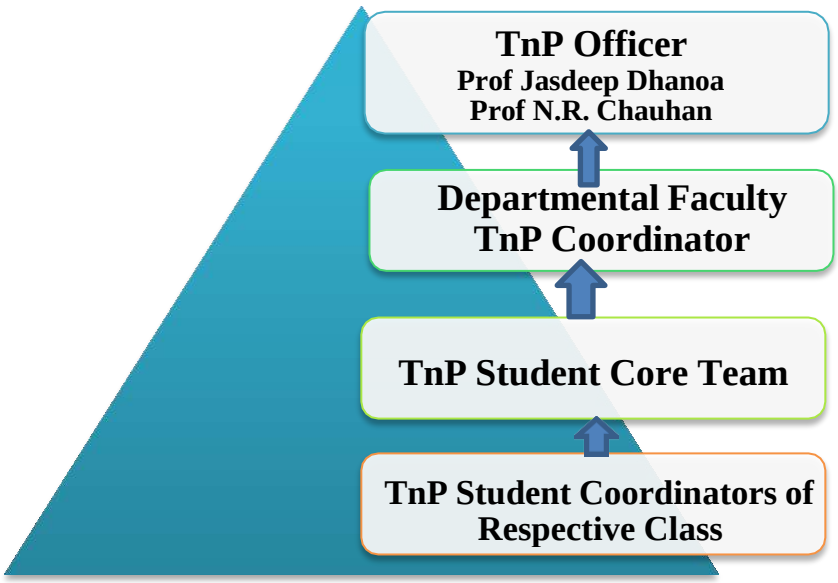
(1) Domain: Query/Suggestions/Student issues/Concerns

(ACADEMIC/EXAMS/RESEARCH & CONSULTANCY/INTERNATIONAL COLLABORATIONS)



(2) Domain: Discipline

(3) Domain: Training and Placement (TnP) Public



Note: ***It is advised that the students will follow decorum and will use public domain responsibly in the best interest of the University, its reputation and placement related activities.***

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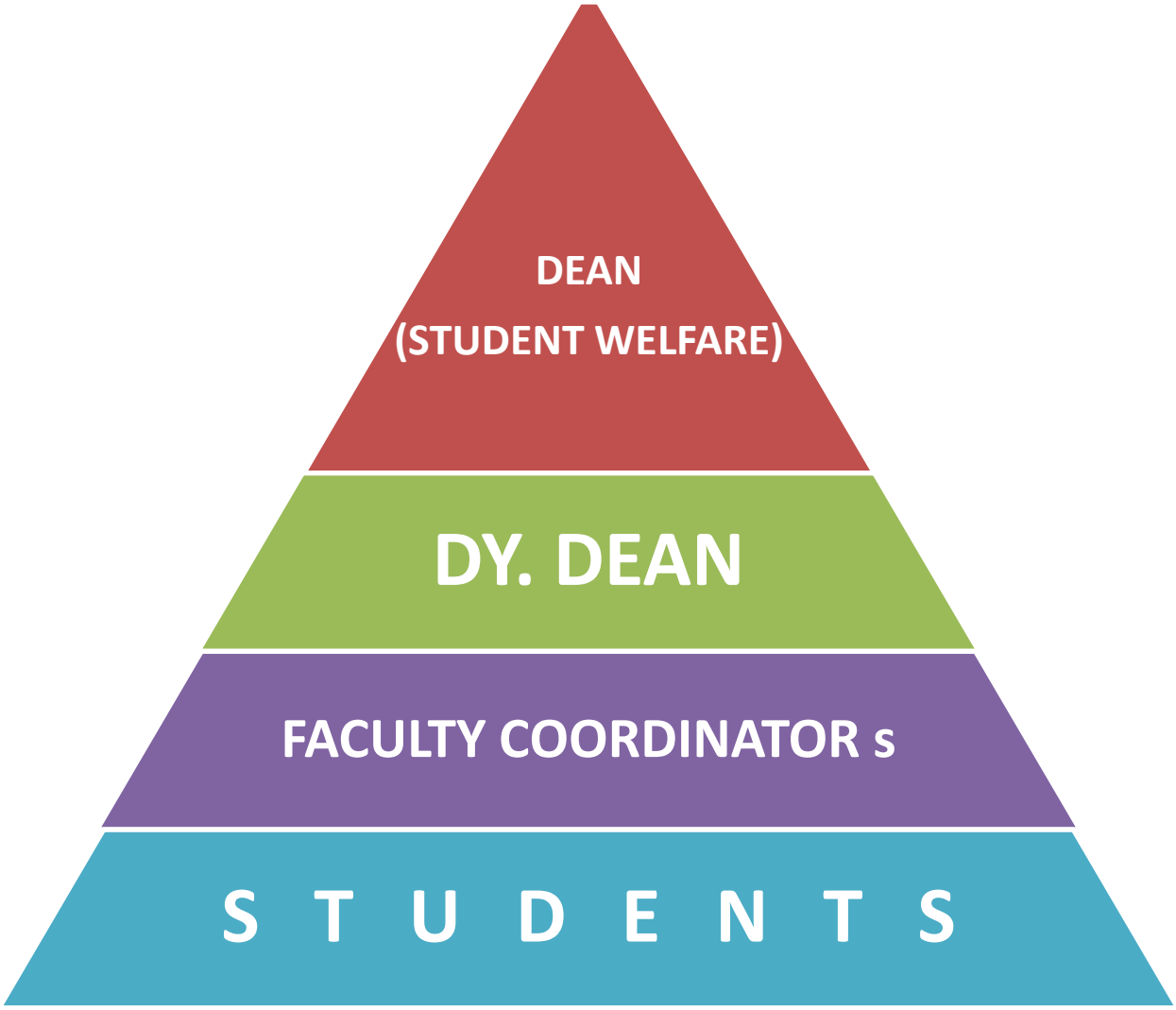
Escalation Matrix for Students Batch-2022

(2) Domain: Query/Suggestions/Student issues/Concerns

(STUDENT TECHNICAL / CULTURAL SOCIETIES/ CLUBS)



DEAN (S/W)	DY. DEAN	FACULTY COORDINATOR
• Prof. R.K. Singh	• Prof. Rashmi Ashtt	•Dr. Rishabh Kaushal •Prof. Jasdeep Kaur Dhanoa •Mr. Vivek Chawala •Dr.Nidhi Goel •Prof. N.R.Chauhan •Ms. Karuna Kadian •Ar. Preeti Chauhan •Dr. Bhavya •Dr. Bhavani Prasad •Ar. Sneha Maji •Dr Kanchan Sharma •Dr.Dinesh Ganotra •Ar. Venus Kashyap •Ar.Kshitij Kumar Sinha •Dr.Manoj Soni

CLUBS AND SOCIETIES-IGDTUW

Technical Societies	ACM STUDENT CHAPTER
	CSI Student Branch
	IEEE Student Chapter
	American Society of Mechanical Engineers (ASME) Chapter
	ENACTUS
	ROBOLUTION
	LEAN IN
Societies Founded / Promoted	Antargat- Creative Society
	TechnoLiterati
	The Economics society
	Taarangana - The Cultural Society
	Greensphere
	SPIC MACAY Chapter
	ZENA - Fashion Society
	Rotaract Club-IGDTUW
	Prekshaya -Photography Society
	Tarannum
	Synergy
	RAHNUMA-Dramatics Society
	HYPNOTICS –Dance Society
	INSTINCT: The Peer Educator's and Life Skills society
	B.H.A.V (Behold an Architects View)- The Role Play Society of IGDTUW
	SOCH (Station of Creativity and Hue) - The Art and Writing Society of IGDTUW
	Unnat Bharat Abhiyan - IGDTUW
CLUBS	SAE Collegiate Club
	Greensphere : The Eco club
	Sports Club
	Leaders for Tomorrow
FESTIVALS	ESPECTRO
	IMPULSE
	TREMORS
	XEBEC
SPORTS	Synergy Sports Club

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आज़ादी का अमृत महोत्सव

No.F./DAA/AC/IGDTUW/2022/

Dated: 10.10.2022

Academic Calendar for Under Graduate Programs for Academic Year -2022-23
B.Tech, DMAM, B.Arch., BBA (Admitted in 2022)

Start of session: - 07th November, 2022			
Orientation Program for All Under Graduate Programs : 07th November, 2022			
		From	**To**
	Semester Registration for Students (1st Semester)	10/11/2022 (Thursday)	18/11/2022 (Friday)
1	**Imparting of instructions and laboratory work**	07/11/2022 (Monday)	24/02/2023 (Friday)
2	Mid-Term Examinations	02/01/2023 (Monday)	07/01/2023 (Saturday)
3	Tarangana 2023 (Cultural Fest)	January/February (Any two days)	
4	Sports Meet "Ignite-2023"	February/March (Any one day)	
5	All Academic Internal/Continuous Assessment to be completed and uploaded by 23/02/2023.		
6	Conduct of End Term Theory Examination	27/02/2023 (Monday) To 13/03/2023 (Monday)	
7	Student Semester Break* *Industry Interaction Week*	14/03/2023 (Tuesday) To 21/03/2023 (Tuesday) *14/03/2023 (Tuesday) To 17/03/2023 (Friday)*	

Even Semester for All Under Graduate Programs (Admitted in 2022)			
Start of session: - 22nd March, 2023 (Wednesday)			
		From	**To**
	Semester Registration for Students (2nd Semester)	22/03/2023 (Wednesday)	31/03/2023 (Friday)
1	Imparting of instruction and laboratory work	22/03/2023 (Wednesday)	30/06/2023 (Friday)
2	Mid-term Examinations	15/05/2023 (Monday)	20/05/2023 (Saturday)
3	All Academic Internal/Continuous Assessment to be completed and uploaded by 29/06/2023.		
4	Conduct of End Term Theory Examination	03/07/2023 (Monday)	17/07/2023 (Monday)
5	Student Semester Break**	18/7/2023 (Tuesday)	31/7/2023 (Monday)

New Academic Session-Second year starts from 1st August, 2023.

* Faculty (*engaged*) Break (*in lieu of winter vacation*) from 27th February, 2023 to 17th March, 2023 (3 weeks), subject to approval from concerned Head of the Department, on completion of evaluation/assessment (Internal/External).
** Faculty *(engaged)* Summer Break from 01 July to 31 July, 2023 (4 weeks), subject to approval from concerned Head of the Department, on completion of evaluation/assessment (Internal/External).

1. Office of the Dean (EA) to ensure the declaration of 1st year result by 31st July, 2023 for other academic related processes like upgradation and admission for Diploma students.
2. Anveshan Foundation to plan out the Activity Calendar for short term and long term programs separately for 1st year B.Tech, DMAM, B. Arch and BBA alongwith holding some Business Plan, Entrepreneurship Development Competitions /Events, during the Academic year.
3. Office of the Dean (SW) to ensure conducting events for specific days like "International Yoga Day", "Women's Day", "Independence Day," "Swachh Bharat Abhiyan", "Environment Day" etc. as and when it falls. Events related to "United Nations Sustainable Development Goals (SDGs)" to be encouraged for all student societies/clubs throughout the year.

Academic Branch, IGDTUW

31/10/22

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आज़ादी का अमृत महोत्सव

No.F./DAA/AC/IGDTUW/2022/

Dated: 10.10.2022

Academic Calendar-2022-23 (Even Semester)
January 2023 to May 2023

Even Semester for M.Tech/MCA/M.Plan/MBA/Ph.D. (admitted up to 2022) and B.Tech/DMAM/B.Arch./BBA (admitted up to 2021)			
		From	**To**
	Semester Registration for Students (Even Semester)	20/12/2022 (Tuesday)	04/01/2023 (Wednesday)
1	**Imparting of instructions and laboratory work**	02/01/2023 (Monday)	21/04/2023 (Friday)
2	Tarangana 2023 (Cultural Fest)	January/February (Any two days)	
3	Sports Meet "Ignite-2023"	February/march (Any one day)	
4	Mid-Term Examinations	20/02/2023 (Monday)	27/02/2023 (Monday)
5	Industry Interaction Week	13/03/2023 (Monday)	17/03/2023 (Friday)
6	*All Academic Internal/Continuous Assessment to be completed and uploaded by 27/04/2023.		
7	Conduct of End Term Theory Examinations	28/04/2023 (Friday) to 15/05/2023 (Monday)	
8	**Student Summer Break **Internships/Skill Development/Summer Workshops**	17/05/2023 (Wednesday)	31/07/2023 (Monday)

New Academic Session Starts from 1st August, 2023 for M.Tech/MCA/M.Plan/Ph.D./MBA and B.Tech/DMAM/ B.Arch./BBA (2nd year onwards)

*Continuous Assessment/Evaluation of Lab Sessions to be completed and uploaded by 27th April, 2023.
**Faculty Summer vacation (6 weeks), from 05/06/2023 to 14/07/2023, subject to approval from Head of Department, on completion and submission of evaluation/assessment (Internal/External).

1. Office of the Dean (EA) to ensure the declaration of End Term results by 3rd July, 2023.
2. Regular conduct of Guest lectures, visits of Eminent Speakers and dignitaries to be planned and information uploaded on the website, by each department.
3. All HoDs (CSE, IT, ECE, MAE, DAP, AI&DS, AS&H, Mgmt) to upload information about Departmental Inovation/Project/Thesis Gallery- "Department of____ OPEN DAY. Invite school students, parents, and peer students for Display of B.Tech/ M.Tech/ MCA/ B.Arch. / M.Plan Projects.
4. Anveshan Foundation to plan out the Activity Calendar for short term and long term programs separately and hold some Business Plan, entrepreneurship Development Competitions/ Events, year around.
5. Office of the Dean (SW) to ensure conducting of events for specific days like "International Yoga Day", "Women's Day", "Independence Day," "Swachh Bharat Abhiyan", "Environment Day" etc. as and when it falls. Events related to "United Nations Sustainable Development Goals (SDGs)" are to be encouraged for all student societies/clubs throughout the year.
6. Release of E-magazine/Newsletter and video (3/4 minutes) of the academic year 2022-23, by every department, containing details of academic activities, prizes, awards, publications etc. by students and faculty on 25.07.2023.

Academic Branch, IGDTUW

31/10/22

Indira Gandhi Delhi Technical University for Women

Time-Table

F-AD-03

Department of Artificial Intelligence and Data Sciences

(2022-2023)

CSE-AI – (I)

Faculty Mentors: Ms. Ritika Kumari (Mb. 9711250496) and Ms. Kiran Mallik (Mb. 9911115455)

w.e.f. 07.11.22

Time / Day	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5
MON	PHYSICS LAB CSE AI (A1)		CS	MATHS	PHYSICS	**LUNCH**	COA	COA
TUES	PWP LAB CSE-AI (A2)		MATHS	CS	PHYSICS	**LUNCH**	COA LAB CSE-AI (A2)	
WED			CS	MATHS	PHYSICS	**LUNCH**	PWP	COA
THUR			MATHS	CS	**LUNCH**	PWP	IS	IS
FRI	PWP LAB CSE-AI (A1)		PHYSICS LAB CSE-AI (A2) / COA LAB CSE-AI(A1)		**LUNCH**	IS	PWP	

BAS-101	**Applied Mathematics – I (MATHS)**	**Dr. Swati Sharma (VF)**	**Room No. 213 IT Block First Floor**
BAS-107	**Applied Physics**	**Dr. Poonam (VF)**	**Room No. 213 IT Block First Floor**
BAI-101	**Programming with Python(PWP)**	**Ms. Kiran Mallik (RF)**	**Room No. 213 IT Block First Floor**
BAI-103	**Introduction to Intelligent Systems(IIS)**	**Ms. Ritika Kumari (RF)**	**Room No. 213 IT Block First Floor**
BAI-105	**Computer Organization and Architecture(CoA)**	**Dr. Ankush Jain/Dr. Himanshu Mittal (RF)**	**Room No. 213 IT Block First Floor**
HMC-110	**Communication Skills (CS)**	**Dr. Bhavya (RF)**	**Room No. 213 IT Block First Floor**
BAS-107	**Applied Physics Lab**	**Dr. Poonam (VF) & Rita (CAI3) (JRF) & Dr. Sachin (CAI4) (VF)**	**E-201 ECE Block I Floor**
BAI-101	**Programming with Python Lab (PWP Lab)**	**Ms. Kiran Mallik**	**IT Block -313**
BAI-105	**Computer Organization and Architecture (COA Lab)**	**Dr. Ankush Jain/Dr. Himanshu Mittal**	**Microprocessor Lab First Floor Electrical block**

Prof. Poonam Bansal
(HoD, AI & DS)

Dr. Ankush Jain
(Time-Table In-charge, AI & DS Dept.)

Indira Gandhi Delhi Technical University for Women

Time-Table

F-AD-03

Department of Artificial Intelligence and Data Sciences

(2022-2023)

CSE-AI – (II)

Faculty Mentors: Dr. Ankush Jain (Mb. 8949224010) and Dr. Himanshu Mittal (Mb. 9958687894)

w.e.f. 07.11.22

Time / Day	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5
MON	MATHS	CS			**LUNCH**	COA	PWP LAB CSE-AI (A3)	
TUES	MATHS	CS	CS		**LUNCH**	COA	IS	PWP
WED	PHYSICS	CS	PHYSICS LAB CSE-AI (A3) / COA LAB CSE-AI (A4)		**LUNCH**	PWP		
THUR	PHYSICS	PHYSICS	PHYSICS LAB CSE-AI (A4) / COA LAB CSE-AI (A3)		MATHS	**LUNCH**	PWP LAB CSE-AI (A4)	
FRI	MATHS	COA	PWP	IS	IS			

BAS-101	**Applied Mathematics – I (MATHS)**	**Dr. Swati Sharma (VF)**	**Room No. 213 IT Block First Floor**
BAS-107	**Applied Physics**	**Dr. Poonam (VF)**	**Room No. 213 IT Block First Floor**
BAI-101	**Programming with Python (PWP)**	**Ms. Kiran Mallik**	**Room No. 213 IT Block First Floor**
BAI-103	**Introduction to Intelligent Systems (IIS)**	**Ms. Ritika Kumari**	**Room No. 213 IT Block First Floor**
BAI-105	**Computer Organization and Architecture**	**Dr. Ankush Jain/Dr. Himanshu Mittal**	**Room No. 213 IT Block First Floor**
HMC-110	**Communication Skills (CS)**	**Dr. Bhavya (RF)**	**Room No. 213 IT Block First Floor**
BAS-107	**Applied Physics Lab**	**Dr. Poonam (VF) & Rita (CAI3) (JRF) & Dr. Sachin (CAI4) (VF)**	**E-201 ECE Block I Floor**
BAI-101	**Programming with Python Lab (PWP Lab)**	**Ms. Kiran Mallik**	**IT Block -313**
BAI-105	**Computer Organization and Architecture (COA Lab)**	**Dr. Ankush Jain/Dr. Himanshu Mittal**	**Microprocessor Lab First Floor Electrical block**

Prof. Poonam Bansal
(HoD, AI & DS)

Dr. Ankush Jain
(Time-Table In-charge, AI & DS Dept.)

Indira Gandhi Delhi Technical University for Women

Time-Table

F-AD-03

Information Technology
B.Tech AI-ML First Semester (2022-2023)
Faculty Mentor: Dr.Alongbar Wary (8119973666), Ms. Himani (JRF) (9971276172) **w.e.f. : 07.11.2022**

Faculty Coordinator: Dr.Alongbar Wary

Time / Day	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5
MON	PP	PP LAB (1)		LUNCH	CS	MATHS		
TUES		PP LAB (2)/COA LAB (1)		LUNCH	CS	MATHS		
WED	IS		PP	LUNCH	CS	COA		PP
THUR				COA	CS	PHYSICS	PHYSICS LAB AIML 1	
FRI	COA LAB (2)		IS	LUNCH	PHYSICS		PHYSICS LAB AIML 2	

BAI-101	Intelligent Systems (IS)	Mr. Santanoo (VF)	E-310 ECE Block II Floor
BAI-103	Computer Organization and Architecture (COA)	Dr. Himanshu Mittal	E-310 ECE Block II Floor
BAI-110	Programming with Python (PP)	Mr. Debendra Kumar Dhir (VF)	E-310 ECE Block II Floor
BAS-107	Applied Physics (Physics)	Dr. Sachin (VF)	E-310 ECE Block II Floor
BAS-109	Applied Mathematics (Maths)	Dr. Bindu (VF)	E-310 ECE Block II Floor
HMC-110	Communication Skills (CS)	Ms. Himani (JRF)	E-310 ECE Block II Floor
BAS113	Applied Physics Lab-I (ECE block, 201)	Dr. Sachin (VF) & Ms Ritu (JRF) (AIML 1 Group) Ms.Megha (JRF) (AIML 2 Group)	E-201 ECE Block I Floor
BAI-103	Computer Organization and Architecture (COA) Lab	Dr. Himanshu Mittal	Microprocessor Lab I Floor ECE Department
BAI-110	Programming with Python (PP) Lab	Mr. Debendra Kumar Dhir (VF)	Room No. IT-313 II Floor Lab

Prof. Amar Kumar Mohapatra
(HoD, IT)

Dr.Alongbar Wary and Dr. Bhawna Narwal
(Time-Table In-charge, IT Dept.)

Indira Gandhi Delhi Technical University for Women

Time-Table

F-AD-03

B.Tech CSE(I) First Semester (2022-2023) **w.e.f. : 07.11.2022**

FACULTY MENTOR : Dr. Vijay Kumar (8707863069), Dr. Priyanka Lochab (9871765212)

Time / Day	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5
MON	PROG. IN C	PHYSICS	PHYSICS LAB C1		LUNCH		BEE LAB C1	
			CHEMISTRY LAB C2					
TUES	PROG. IN C LAB C2			MATHS	LUNCH	PHYSICS	PROG. IN C	BEE
	EG LAB C1							
WED	CHEMISTRY	PHYSICS	MATHS	LUNCH	PROG. IN C LAB C1			
THUR	PHYSICS LAB C2		MATHS	CHEMISTRY	LUNCH		BEE LAB C1	
	CHEMISTRY LAB C1					EG LAB C2		
FRI	BEE		PROG. IN C	MATHS	LUNCH	CHEMISTRY		

BAS101	**Applied Mathematics – I (MATHS)**	**Prof. Shalini Arora (RF)**	**E-308 ECE Block II Floor**
BAS103	**Applied Physics – I (PHYSICS)**	**Dr. Priyanka Lochab (RF)**	**E-308 ECE Block II Floor**
BAS105	**Applied Chemistry (CHEM)**	**Dr. Bhawani Prasad (RF)**	**E-308 ECE Block II Floor**
BCS110	**Programming in C Language**	**Dr. Vijay Kumar (VF)**	**E-308 ECE Block II Floor**
BEC 110	**Basic Electrical Engineering**	**Ms. Astha Sharma (JRF)**	**E-308 ECE Block II Floor**
BAS103	**Applied Physics Lab-I (ECE block, 201)**	**Dr. Priyanka Lochab (RF) & Dr Sachin (VF)**	**E-308 ECE Block I Floor**
BAS105	**Applied Chemistry Lab-I (IT Block Ground floor)**	**Dr. Bhawani Prasad & Aishwarya (C1, C2) (JRF)**	**C-113, IT Block Ground Floor**
BCS110	**Programming in C Language Lab**	**Dr. Vijay Kumar(VF)**	**E-109, VLSI/DSP ECE Block Ground Floor**
BMA130	**Engineering Graphics lab**	**Mr. Urfi Khan (C1, C2) (RF)**	**M-110, MAE Ground Floor**
BEC 110	**Basic Electrical Engineering lab**	**Ms. Astha Sharma (C1,C2) (JRF)**	**E-212 ECE Block I Floor**

Prof. Chhaya Ravi Kant
(HoD, ASH)

Dr. Shivani
(Time-Table In-charge, ASH Dept.)

Indira Gandhi Delhi Technical University for Women

Time-Table

F-AD-03

B.Tech CSE(II) First Semester (2022-2023) **w.e.f. : 07.11.2022**

FACULTY MENTOR : Ms. Deepika (JRF)(8368469238), Saumya (JRF) (6397326001)

Time / Day	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5
MON	BEE LAB C4		PROG. IN C	PROG. IN C	CHEMISTRY		PHYSICS LAB C3	
							CHEMISTRY LAB C4	
TUES	BEE	CHEMISTRY	BEE LAB C3		MATHS		PHYSICS LAB C4	
							CHEMISTRY LAB C3	
WED	PROG. IN C LAB C3				MATHS	PHYSICS	BEE	
	EG LAB C4							
THUR		BEE			MATHS	PHYSICS		
FRI	EG LAB C3				MATHS		PROG. IN C	
	PROG. IN C LAB C4							

BAS101	**Applied Mathematics – I (MATHS)**	**Prof. Shalini Arora (RF)**	**E-308 ECE Block II Floor**
BAS103	**Applied Physics – I (PHYSICS)**	**Dr. Priyanka Lochab (RF)**	**E-308 ECE Block II Floor**
BAS105	**Applied Chemistry (CHEM)**	**Dr. Bhawani Prasad (RF)**	**E-308 ECE Block II Floor**
BCS110	**Programming in C Language**	**Ms. Deepika (JRF)**	**E-308 ECE Block II Floor**
BEC 110	**Basic Electrical Engineering**	**Ms. Astha Sharma (JRF)**	**E-308 ECE Block II Floor**
BAS103	**Applied Physics Lab-I (ECE block, 201)**	**Dr. Priyanka Lochab (RF) &Dr. Vicky Kapoor (C3, C4) (JRF)**	**E-308 ECE Block I Floor**
BAS105	**Applied Chemistry Lab-I (IT Block Ground floor)**	**Dr. Bhawani Prasad (RF) &Saumya (C3, C4) (JRF)**	**C-113, IT Block Ground Floor**
BCS110	**Programming in C Language Lab**	**Ms. Deepika (JRF)**	**E-109, VLSI/DSP ECE Block Ground Floor**
BMA130	**Engineering Graphics lab**	**Ms. Akansha (C3) (Ph.D. Scholar) & Ms. Kanika Gupta (C4) (Ph.D. Scholar)**	**M-110, MAE Ground Floor**
BEC 110	**Basic Electrical Engineering lab**	**Ms. Astha Sharma (JRF) (C3,C4)**	**E-212 ECE Block I Floor**

Prof. Chhaya Ravi Kant
(HoD, ASH)

Dr. Shivani
(Time-Table In-charge, ASH Dept.)

Indira Gandhi Delhi Technical University for Women

Time-Table

F-AD-03

B.Tech CSE(III) First Semester (2022-2023) **w.e.f. : 07.11.2022**

FACULTY MENTOR : Ms. Prerna (JRF),(9458865471), Dr. Chanchal Gupta (V.F)(9953831580)

Time / Day	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5
MON	PROG. IN C	MATHS	PROG. IN C LAB C5			BEE	PROG. IN C	
			EG LAB C6					
TUES	MATHS	CHEMISTRY	PHYSICS LAB C5		BEE			
			CHEMISTRY LAB C6					
WED	PHYSICS LAB C6		MATHS	PHYSICS	CHEMISTRY		BEE LAB C5	
	CHEMISTRY LAB C5							
THUR	CHEMISTRY	MATHS	PHYSICS	PROG. IN C	BEE			
FRI	BEE LAB C6		PROG. IN C	PHYSICS			PROG. IN C LAB C6	
						EG LAB C5		

BAS101	**Applied Mathematics – I (MATHS)**	**Ms. Sakshi (JRF)**	**C-104 IT Block Ground Floor**
BAS103	**Applied Physics – I (PHYSICS)**	**Prof ChhayaRavikant (RF)**	**C-104 IT Block Ground Floor**
BAS105	**Applied Chemistry (CHEM)**	**Dr. Chanchal Gupta (RF)**	**C-104 IT Block Ground Floor**
BCS110	**Programming in C Language**	**Ms. Prerna (JRF)**	**C-104 IT Block Ground Floor**
BEC 110	**Basic Electrical Engineering**	**Ms RituKhandari (JRF)**	**C-104 IT Block Ground Floor**
BAS103	**Applied Physics Lab-I (ECE block, 201)**	**Prof ChhayaRavikant (RF) & Ms. Ritu Chaudhary (C5, C6) (JRF)**	**C-104 IT Block Ground Floor**
BAS105	**Applied Chemistry Lab-I (IT Block Ground floor)**	**Dr. Chanchal Gupta (VF) &Dr.Shuchi Maheshwari (C5,C6) (VF)**	**C-113, IT Block Ground Floor**
BCS110	**Programming in C Language Lab**	**Ms. Prerna (JRF)**	**E-109, VLSI/DSP ECE Block Ground Floor**
BMA130	**Engineering Graphics lab**	**Ms. Ranjana Mishra (C5) & Ms. Santwana Mishra (C6) (Ph.D. Scholar)**	**M-110, MAE Ground Floor**
BEC 110	**Ms RituKhandari (JRF)**	**Ms RituKhandari (JRF) (C5,C6)**	**E-212 ECE Block I Floor**

Prof. Chhaya Ravi Kant
(HoD, ASH)

Dr. Shivani
(Time-Table In-charge, ASH Dept.)

Indira Gandhi Delhi Technical University for Women

Time-Table

F-AD-03

B.Tech ECE First Semester (2022-2023) **w.e.f. : 07.11.2022**

FACULTY MENTOR : Dr. Geeta Sachdev (9990454802), Dr. Dinesh Ganotra (9818129793)

Time / Day	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5
MON	PROG. IN C	MATHS	BEE	PHYSICS		BEE LAB E1		
TUES	CHEMISTRY LAB E2		PHYSICS	MATHS		EG LAB E1		
	PHYSICS LAB E1					PROG. IN C LAB E2		
WED	CHEMISTRY	BEE	MATHS	PROG. IN C		EG LAB E2		
THUR	CHEMISTRY		PHYSICS	MATHS		PROG. IN C LAB E1		
FRI	CHEMISTRY LAB E1		BEE	PROG. IN C		BEE LAB 2		
	PHYSICS LAB E2							

BAS101	**Applied Mathematics – I**	**Dr. Geeta (RF)**	**E-309 ECE Block II Floor**
BAS103	**Applied Physics – I**	**Dr. Dinesh Ganotra (RF)**	**E-309 ECE Block II Floor**
BAS105	**Applied Chemistry**	**Dr. Sarika Gupta (VF)**	**E-309 ECE Block II Floor**
BCS110	**Programming in C Language**	**Ms. Ishmita (JRF)**	**E-309 ECE Block II Floor**
BEC 110	**Basic Electrical Engineering**	**Ms RituKhandari (JRF)**	**E-309 ECE Block II Floor**
BAS103	**Applied Physics Lab-I (ECE block, 201)**	**Dr. Dinesh Ganotra (RF) &Dr. Vicky Kapoor (VF)**	**E-201 ECE Block I Floor**
BAS105	**Applied Chemistry Lab-I (IT Block Ground floor)**	**Dr. Sarika Gupta (VF) &Dr.ShuchiMaheshwari (VF) (E1,E2)**	**C-113, IT Ground Floor**
BCS110	**Programming in C Language Lab**	**Ms. Ishmita (JRF)**	**E-109, VLSI/DSP ECE Block Ground Floor**
BMA130	**Engineering Graphics Lab (MAE Block)**	**Dr. Pooja Bhati (E1) (RF) & Ms. Ekta Yadav (E2) (Ph.D. Scholar)**	**M-110, MAE Ground Floor**
BEC 110	**Basic Electrical Engineering lab**	**Ms RituKhandari (JRF) (E1,E2)**	**E-212 ECE Block I Floor**

Prof. Chhaya Ravi Kant
(HoD, ASH)

Dr. Shivani
(Time-Table In-charge, ASH Dept.)

Indira Gandhi Delhi Technical University for Women

Time-Table

F-AD-03

B.Tech MAE (I) First Semester (2022-2023)

FACULTY MENTOR : Dr. Tina Chaudhary (9999228533), Mr. Urfi Khan(9811744571) **w.e.f. :**

07.11.2022

Time / Day	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5
MON	CS	PHYSICS	CHEMISTRY		PHYSICS LAB M1		EM	
					CHEMISTRY LAB M2			
TUES	CS	PHYSICS	CHEMISTRY		PHYSICS LAB M1		EM	
					CHEMISTRY LAB M2			
WED	CS	MATHS		**CHEMISTRY**				
THUR	EM LAB M2			EM		MATHS	PHYSICS	
	WORKSHOP PRAC. M1							
FRI		EM LAB M1			MATHS		CS	
	WORKSHOP PRAC. M2							

BAS101	**Applied Mathematics – I (MATHS)**	**Dr. Geeta (RF)**	**M-201 MAE Block I Floor**
BAS103	**Applied Physics – I (PHYSICS)**	**Dr. Vicky Kapoor (VF)**	**M-201 MAE Block I Floor**
BAS105	**Applied Chemistry (CHEM)**	**Prof. Ranu Gadi (RF)**	**M-201 MAE Block I Floor**
BMA110	**Engineering Mechanics (EM)**	**Dr. Tina Chaudhary (RF)**	**M-201 MAE Block I Floor**
HMC-110	**Communication Skills (CS)**	**Ms. Swati Basu (VF)**	**M-201 MAE Block I Floor**
BAS103	**Applied Physics Lab-I (ECE block, 201)**	**Dr. Vicky Kapoor (VF) &Dr. Aman (VF)**	**E-201 ECE block I Floor**
BAS105	**Applied Chemistry Lab-I (IT Block Ground floor)**	**Prof. Ranu Gadi (RF) & Ms. Shobhna Shankar (M1, M2) (JRF)**	**C-113 IT Ground Floor**
BMA120	**Workshop Practice (MAE Block)**	**Prof Manoj Soni (M1) &Mr. Urfi Khan (M2) (RF)**	**M-113 MAE Block Ground Floor**
BMA110	**Engineering Mechanics Lab (MAE Block)**	**Dr. Tina Chaudhary (RF)**	**M-111 MAE Block Ground Floor**

Prof. Chhaya Ravi Kant
(HoD, ASH)

Dr. Shivani
(Time-Table In-charge, ASH Dept.)

Indira Gandhi Delhi Technical University for Women

Time-Table

F-AD-03

B.Tech MAE (II)+DMAM First Semester (2022-2023)

w.e.f. : 07.11.2022

FACULTY MENTOR: Dr. Shivani, (9599628157), Dr. Pooja Bhati (9810724622)

Time / Day	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5
MON		EM LAB M3			MATHS			
	WORKSHOP PRAC. M4							
TUES		EM LAB M4			MATHS			
	WORKSHOP PRAC. M3							
WED			CHEMISTRY		PHYSICS LAB M3		PHYSICS	CS
					CHEMISTRY LAB M4			
THUR	EM	CHEMISTRY			PHYSICS LAB M4		PHYSICS	CS
					CHEMISTRY LAB M3			
FRI		EM		PHYSICS		CS		

BAS101	**Applied Mathematics – I (MATHS)**	**Dr. Geeta (RF)**	**M-201 MAE Block I Floor**
BAS103	**Applied Physics – I (PHYSICS)**	**Dr. Aman (VF)**	**M-201 MAE Block I Floor**
BAS105	**Applied Chemistry (CHEM)**	**Dr. Shivani (RF)**	**M-201 MAE Block I Floor**
BMA110	**Engineering Mechanics (EM)**	**Mr Rajeev Mahajan (VF)**	**M-201 MAE Block I Floor**
HMC-110	**Communication Skills (CS)**	**Ms. Swati Basu (VF)**	**M-201 MAE Block I Floor**
BAS113	**Applied Physics Lab-I (ECE block, 201)**	**Dr. Aman (VF) & Ms Ritu Goel (JRF)**	**E-201 ECE block I Floor**
BAS115	**Applied Chemistry Lab-I (IT Block Ground floor)**	**Dr. Shivani (RF) & Ms. Shobhna Shankar (JRF) (M3)&Dr.Shuchi Maheshwari (VF) (M4)**	**C-113 IT Ground Floor**
BMA120	**Workshop Practice (MAE Block)**	**Prof. N R Chauhan (M3,M4)**	**M-113 MAE Block Ground Floor**
BMA110	**Engineering Mechanics Lab (MAE Block)**	**Dr. Pooja Bhatti (M3,M4)**	**M-111 MAE Block Ground Floor**

Prof. Chhaya Ravi Kant
(HoD, ASH)

Dr. Shivani
(Time-Table In-charge, ASH Dept.)

Indira Gandhi Delhi Technical University for Women

Time-Table

B.Tech IT First Semester (2022-2023) **w.e.f. : 07.11.2022**

FACULTY MENTOR Ms. Nidhi Arora (9868991835), Dr. Bhavya (9810182953)

Time / Day	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5
MON		MATHS		CS		EM LAB IT1 (B1)		EM
					WORKSHOP PRACTICE IT (A1)			
TUES	EM	CHEMISTRY		PHYSICS				MATHS
WED			EM LAB IT (A1)				PHYSICS LAB IT (A1)	
			WORKSHOP PRACTICE IT (B1)				CHEMISTRY LAB IT (B1)	
THUR	MATHS	CS						
FRI	EM	CS		CHEMISTRY	PHYSICS LAB IT (B1)		PHYSICS	
					CHEMISTRY LAB IT (A1)			

BAS101	**Applied Mathematics – I (MATHS)**	**Ms. Sarita (JRF)**	**E-310 ECE Block II Floor**
BAS103	**Applied Physics – I (PHYSICS)**	**Mr. Amit Kumar (VF)**	**E-310 ECE Block II Floor**
BAS105	**Applied Chemistry (CHEM)**	**Dr. Shivani (RF)**	**E-310 ECE Block II Floor**
BMA110	**Engineering Mechanics (**EM**)**	**Dr. Tina Chaudhary (RF)**	**E-310 ECE Block II Floor**
HMC-110	**Communication Skills (CS)**	**Dr. Bhavya (RF)**	**E-310 ECE Block II Floor**
BAS113	**Applied Physics Lab-I (ECE block, 201)**	**Mr. Amit Kumar (VF) & Ms Megha(JRF)**	**E-201 ECE Block I Floor**
BAS115	**Applied Chemistry Lab-I (IT Block Ground floor)**	**Dr. Shivani (RF) & Aishwarya (I1) (JRF) & Ms. Saumya (I2) (JRF)**	**C-113 IT Ground Floor**
BMA120	**Workshop Practice (MAE Block)**	**Dr.Viveak Chawla (A1) &Dr. Tina Chaudhary (B1) (RF)**	**M-113 MAE Block Ground Floor**
BMA 110	**Engineering Mechanic Lab**	**Dr. Tina Chaudhary (RF)**	**M-111 MAE Block Ground Floor**

Prof. Chhaya Ravi Kant
(HoD, ASH)

IT 1st Year 2022 batch

Dr. Shivani
(Time-Table In-charge, ASH Dept.)

INDIRA GANDHI DELHI TECHNICAL UNIVERSITY FOR WOMEN

Department of Electronics and Communication Engineering

Kashmere Gate, Delhi-110006

Odd Sem August 2022

Faculty Mentor:-Mr. Ejaz Lodhi (Mob: 9818936431) & Ms. Ritu Kandari (Mob: 9999156708) **w.e.f.: 07/11/2022**

BTECH 1st SEMESTER ECE-AI-1

	1	2	3	4	5	6	7	8	9
Days	**8-9 am**	**9-10 am**	**10-11 am**	**11-12 pm**	**12-1 pm**	**1-2 pm**	**2-3 pm**	**3-4 pm**	**4-5 pm**
Monday		IS	IS	CS	LUNCH	C LAB (GP-1) AE LAB (GP-2)		C LAB (GP-2) AE LAB (GP-1)	
Tuesday	BEE	BEE	CS	AE	LUNCH	BEE LAB (GP-1)			
Wednesday	IS	IS	AE	AM	LUNCH	BEE LAB (GP-2)			
Thursday		C	BEE	CS	LUNCH	AM	AM		
Friday	C	C	CS	AE	LUNCH	AM			

BEC-101	Analog Electronics (AE) (Theory + Lab-AE Lab)	Md. Ejaz Lodhi
BEC-110	Basic Electrical Engineering (BEE) (Theory + Lab-Electrical Engineering Lab)	Ms. Surbhi Bharti
BCS-110	Programming in C Language (C) (Theory + Lab-DSP Lab)	Dr Alongbar Wari
BAI-101	Intelligent Systems (IS) (Theory)	Mr. Vikas Badgujar
BAS-109	Applied Mathematics (AM) (Theory + Tutorial-E314A)	Dr Mohdpravesh
HMC-110	Communication Skills (CS) (Theory + Tutorial-E314A)	Ms. Himani

HOD, ECE

(Dr. Kanchan Sharma)
Time Table Incharge

INDIRA GANDHI DELHI TECHNICAL UNIVERSITY FOR WOMEN

Department of Electronics and Communication Engineering

Kashmere Gate, Delhi-110006

Faculty Mentor:-Ms. Megha Dua (Mob: 8826945775) & Ms. Ramsha Suhail (Mob: 9560330903) **w.e.f.: 07/11/2022**

BTECH 1st SEMESTER ECE-AI-2

	1	2	3	4	5	6	7	8	9
Days	**9-10 am**	**10-11 am**	**11-12 pm**	**12-1 pm**	**1-2 pm**	**2-3 pm**	**3-4 pm**	**4-5 pm**	**5-6 pm**
Monday	C LAB (GP-1) AE LAB (GP-2)		C LAB (GP-2) AE LAB (GP-1)		LUNCH	BEE	BEE	AM	AM
Tuesday		BEE LAB (GP-1)		CS	LUNCH	IS	AE	C	C
Wednesday		BEE LAB (GP-2)		CS	LUNCH	IS	AM	AE	
Thursday				CS	LUNCH		C	BEE	
Friday				AM	LUNCH	AE	AE	IS	CS

BEC-101	Analog Electronics (AE) (Theory + Lab- AE Lab)	Ms. Shambhavi Tiwari (Theory only)+ Md. Ejaz Lodhi (Lab only)
BEC-110	Basic Electrical Engineering (BEE) (Theory + Lab-Electrical Engineering Lab)	Ms. Surbhi Bharti (Theory only)+ Ms. Neeraj (Lab only)
BCS-110	Programming in C Language (Theory + Lab-DSP Lab)	Dr.Alongbar Wari
BAI-101	Intelligent Systems (IS) (Theory)	Mr. Vikas Badgujar
BAS-109	Applied Mathematics (AM) (Theory + Tutorial-E314A)	Dr Mohdpravesh
HMC-110	Communication Skills (CS) (Theory + Tutorial-E314A)	Ms Himani

HOD, ECE

(Dr. Kanchan Sharma)
Time Table Incharge

Indira Gandhi Delhi Technical University for Women
B.Arch Ist Yr.: FIRST SEMESTER(2022-2023)

w.e.f.28October,2022 **STUDIO 1: RM.NO.123** FACULTYMENTOR/COORDINATOR:**AR.MONALIWANKAR**
Mob: 9729391008, email: monaliwankar@igdtuw.ac.in

TIME / DAY	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5
MON	BAP103					BAP103	BAP117	
TUES	BAP113		BAP101			BAP101		LIBRARY
WED	BAP105					BAP109		LIBRARY
THURS	BAP107					BAP111		LIBRARY
FRI	BAP115		BAP101			BAP101		LIBRARY

SUBJECTS:T-THEORY,S-STUDIO,P-PRACTICAL

BAP101	IntroductiontoArchitecturalDesign–I(S-8)	Ar. MonaliVWankar, Ar.AmitaKhodankar,Ar.JaiPrakash
BAP103	BuildingMaterials&ConstructionTechnology–I(S-5)	Ar.RupeshKumar,Ar.CharuMathur,Ar.GauravKr.
BAP105	ArchitecturalDrawing–I(S-4)	Ar.CharuMathur, Ar. Shivani Goel
BAP107	ArchitecturalGraphics–I(P-4)	Ar.JaiPrakash, Ar.CharuMathur
BAP109	HistoryofArchitecture-I(T-2)	Dr. Rashmi Ashtt
BAP111	Structures–I(T-2)	Er.MousumiBiswas
BAP113	ClimatologyandEnvironmentalStudiesI(T-2)	Ar.RupeshKumar
BAP115	ArchitecturalWorkshop–I(P-2)	Ar.PreetiChauhan, Ar. Mani Gupta
BAP117	MathematicsinArchitecture(T-2)	Dr.LuckshayBatra

4/11/22
Ar. Jai Prakash
(Assistant Professor)
DAP, IGDTUW.

Scan QR Code to Join
2022 Batch
WhatsApp Group

Rashmi Ashtt
Dr. ~~Rashmi~~ Ashtt
(Professor) DAP,
IGDTUW

BBA First Semester (2022-2023) w.e.f 07 November, 2022

Mentor for BBA first year Students – Dr.Hansika Singhal (8954073604) [Management Block Above Library Room No – 1]

Time / Day	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5
MON			Principles of Management (BMS-101)	Business Mathematics (AMC-101)	Business Mathematics (AMC-101)	Computer Application in Managemen(AMC -105)		
TUES		Business Communication -I AMC103	Business Communication -I AMC103	Computer Application in Management (AMC-105)	Computer Application in Management (AMC-105)	Principles of Management (BMS-101)	Principles of Management (BMS-101)	
WED	Computer Application in Management Lab(AMC-105)	Computer Application in Management Lab(AMC-105)	Micro Economics(BMS-105)	Micro Economics (BMS-105)	Financial Accounting (BMS-103)			
THUR			Financial Accounting (BMS-103)	Financial Accounting (BMS-103)		Environmental Management (AMC-107)	Environmental Management (AMC-107)	
FRI		Micro Economics (BMS-105)	Financial Accounting (BMS-103)	Business Mathematics (AMC-101)	Business Mathematics (AMC-101)			

BMS101	Principles of Management	Dr. Dhanjay Yadav
BMS103	Financial Accounting	Ms. Rabia Khan
BMS105	Micro Economics	Dr. Shikha Gupta
AMC101	Business Mathematics	Dr. LuckshayBatra
AMC103	Business Communication -I	Ms. Himani Sharma
AMC105	Computer Application in Management (CAM)	Ms. SaumyaSatija
AMC107	Environmental Management (EM)	Ms. Shuchi

Dept.of Mngt. Batch-2022

Prof. Arvind Kr. Jayant
(HOD, Dept. of Management)

Dr.Dhanjay Yadav
(Table In-charge,BBA)

Indira Gandhi Delhi Technical University For Women
(Established by Govt. of Delhi vide Act 09 of 2012)
Kashmere Gate, Delhi-110006

Course Structure for B. Tech First Year
(Common courses for all B. Tech Programs)

First Semester					
S. No.	**Code**	**Subject**	**L-T-P**	**Credits**	**Category**
1.	BAS-101	Applied Mathematics-I	3-1-0	4	**BAS**
2.	BAS-103	Applied Physics-I	2-1-2	4	**BAS**
3.	BAS-105	Applied Chemistry	2-1-2	4	**BAS**
4.	BMA-110/ BEC-110	Engineering Mechanics/ Basic Electrical Engineering	3-0-2	4	**OEC**
5.	BMA-120/ BMA-130	Workshop Practice/ Engineering Graphics Lab	0-1-2	2	**OEC**
6.	HMC-110/ BCS-110	Humanities and Social Science/ Programming in C Language	3-1-0/ 3-0-2	4	**HMC/ OEC**
		Total		**22**	
Second Semester					
S. No.	**Code**	**Subject**	**L-T-P**	**Credits**	**Category**
1.	BAS-102	Applied Mathematics-II	3-1-0	4	**BAS**
2.	BAS-104	Applied Physics-II	2-1-2	4	**BAS**
3.	BAS-106	Environmental Science	2-1-2	4	**BAS**
4.	BEC-110/ BMA-110	Engineering Mechanics/ Basic Electrical Engineering	3-0-2	4	**OEC**
5.	BMA-130/ BMA-120	Workshop Practice/ Engineering Graphics Lab	0-1-2	2	**OEC**
6.	BCS-110/ HMC-110	Programming in C Language / Humanities and Social Science	3-0-2/ 3-1-0	4	**HMC/ OEC**
		Total		**22**	

APPLIED MATHEMATICS – I	
Course Code: BAS-101 Contact Hours: L-3 T-1 P-0 Course Category: BAS	Credits: 4 Semester: 1

Introduction: Mathematics is used in almost every field of engineering be it computer science and information technology wherein it may be used in modeling, machine learning, image processing etc., or by electrical engineers for signal processing, control engineering or by mechanical engineers for design, modeling, manufacturing etc. But the problem faced by engineers is to how to apply the basic mathematical concepts in engineering problem which they would be dealing in coming years. The course covers the various topics of engineering mathematics such as matrices, sequences and series, calculus of functions of more than one variable.

Course Objective:

- The students will be made familiar with the concepts of matrices, sequences and series.
- To provide students with skills and knowledge of calculus of functions of several variables which would enable them to devise solutions for given situations they may encounter in day to day engineering problems.

Prerequisite: Fundamentals of matrices, calculus of functions of single variable.

Course Outcomes (CO)

Having successfully completed this course, the student will be able to

C0 1. Recall the concepts of matrices. Evaluate rank, inverse, eigen values and eigen vectors of a matrix and apply them in engineering problems.

C0 2. Determine the convergence/divergence of an infinite series.

C0 3. Apply the knowledge of calculus to trace simple Cartesian and polar curves for evaluating multiple integrals.

C0 4. Find the partial derivatives and evaluate maxima/minima for functions of two or more variables and apply them in real world problems.

C0 5. Evaluate multiple integrals and discuss their applications in determining surface area and volumes.

PO **CO**	**PO1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO 1	**3**	**3**	**2**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO 2	**3**	**3**	**1**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO 3	**3**	**3**	**2**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO 4	**3**	**3**	**2**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO 5	**3**	**3**	**2**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Pedagogy: Apart from class room teaching, main focus is to enhance problem solving ability supported by weekly assignments and discussing individual's doubts.

Contents

UNIT-I	08 Hours
Matrix Algebra: Rank of a matrix, Inverse of a matrix using elementary transformations, consistency of system of linear equations, eigenvalues and eigenvectors of a matrix, some special matrices and their properties, Cayley Hamilton theorem,Diagonalization of a matrix.	
UNIT-II	12 Hours
Sequences and series: Introduction to sequences and infinite series, various tests for convergence/divergence of infinite series-limit comparison test, ratio test, root test, Raabe's test, log test, integral test. Alternating series, absoluteand conditional convergence. **Differential Calculus:**Successive differentiation, Leibnitz theorem,Taylor's and Maclaurin's Series (in one variable).	
UNIT-III	12 Hours
Differential Calculus (continued) : Tracing of some standard curves (cartesian, polar, parametric coordinates),Introductions to functions of several variables,Partial differentiation, Euler's theorem for homogenous equations, Jacobian, Taylor's and Maclaurin's Series (in two variables), maxima and minima, Lagrange's method of undetermined multiplier.	
UNIT-IV	10 Hours
Integral Calculus :Evaluation of double integral (in cartesian and polar co-ordinates), change of order of integration, change of variables, triple integral (in cartesian),applications of definite integrals in determination ofarea, arc length, surface area and volumes.	
1.	D. G. Zill and W. S. Wright, "Advanced Engineering Mathematics", 6th Edition, The Jones and Bartlett Learning Publishers, 2016.
2.	Jain R. K. and Iyengar S. R. K., "Advanced Engineering Mathematics", 5th Edition, Narosa Publishing House Pvt. Ltd.2016.
3.	Grewal, B. S. , "Higher Engineering Mathematics", 44th Edition, Khanna Publishers, 2017
Reference Books	
1.	George B. Thomas Jr., Ross L. Finney, "Calculus and Analytic Geometry", 9th Edition, Pearson Education India, 2010
2.	Greenberg M., "Advanced Engineering Mathematics", 2nd Edition, Pearson Education, 1998.
3.	KreyszigE. , "Advanced Engineering Mathematics", 10th Edition, John Wiley & Sons, 2010.

APPLIED PHYSICS - I	
Course Code: BAS-103 Contact Hours: L-2 T-1 P-2 Course Category: BAS	Credits: 4 Semester: 1

Introduction: Applied physics introduces the basic concepts of physics to undergraduate students, with the application of scientific principles in various technological applications, devices, and systems. The course spans wide-ranging topics of physics which cover the underlying principles of classical mechanics, quantum mechanics, optics and its applications like lasers and fiber optics communication. The syllabus is a perfect blend of classical laws with allied modern devices and will serve to enhance the ability of students to apply fundamental principles to various modern-age applications.

Course Objectives:

- To introduce the students with the wide-ranging topics of physics which cover the underlying principles of classical mechanics, quantum mechanics, optics, and its applications.
- To impart an in-depth knowledge of everyday systems and phenomena surrounding them and explain the underlying physics.
- To enhance the ability of students to apply physics fundamentals to various modern applications for societal benefits.
- To develop a quantitative aptitude for solving engineering problems.
- To perform and interpret experiments using modern tools, techniques and write effective lab reports to various engineering problems, with an understanding of the limitations.

Pre-requisites: None

Course Outcomes:

Having successfully completed this course, the student will be able to

1. Gain knowledge of different concepts in Optics and optical devices.
2. Understand the principles of Classical Mechanics and study the motion of harmonic oscillators and body under a Central force.
3. Explain the basic principles and laws of Quantum Mechanics and examine the quantum mechanicalbehavior of a particle in a 1-D box.
4. Describe the principles of LASER and optical fibers and study their modern-day applications.

Pedagogy: Classroom teaching which focuses upon relating the textbook concepts with real world phenomena, supplemented with periodic tutorial classes to enhance the problem-solving ability. The students would perform experiments to develop a deeper insight into the underlying principles of Physics.

CO-PO Mapping:

S.No.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	2	2	---	---	1	1	1	---	---
CO2	3	2	---	2	2	---	---	1	1	2	---	---
CO3	3	2	---	2	---	---	---	---	---	---	---	---
CO4	3	2	2	2	2	2	1	1	1	1	---	---
Average	3	2	0.75	2	1.5	0.5	0.25	0.75	0.75	1	---	---

BAS 103 THEORY CONTENTS

UNIT-1 **Hours**	**8**
OPTICS Coherent Sources, Temporal and Spatial Coherence, Interference due to Division of wave-front and Division of Amplitude, Interference in Parallel Thin Films, Fresnel Diffraction at Straight Edge, Fraunhofer Diffraction due to Single Slit, N Slits, Diffraction Grating (absent spectra, maxima, resolving and dispersive power of grating (Formula only without derivation) Polarization, Malus Law, Brewster Law, Double Refraction, Nicol Prism, Production of Plane, Elliptically and Circularly Polarized Light.	
UNIT-2 **Hours**	**6**
CLASSICAL MECHANICS Simple Harmonic Oscillator, Damped Harmonic Oscillator, Forced Harmonic Oscillator, Small Oscillations, Central and Non-Central Forces (conservative, planar, bound trajectories)	
UNIT-3 **Hours**	**8**
QUANTUM MECHANICS Origin of Quantum Mechanics, De Broglie Hypothesis, Heisenberg Uncertainty Principle, Postulates of Quantum Mechanics, Wave Function and Properties, Group and Phase velocity, Time Independent Schrodinger Wave Equation, Particle in 1-D Box.	
UNIT-4 **Hours**	**6**
LASER AND OPTICAL FIBER COMMUNICATION Stimulated and Spontaneous Emission, Principle of LASER, Einstein's A and B Coefficients, Components of LASER, He-Ne LASER. Optical Fibers, Step Index and Graded Index Fibers, Numerical Aperture, Acceptance angle, Pulse Dispersion in Optical Fibers, Schematic of optical fiber communication	

Textbooks

1	H. K. Malik and A. K. Singh, "Engineering Physics", 2nd Edition, Mc Graw Hill Ed, 2017.
2	M. C. Jain, "Textbook of Engineering Physics", 1st Edition, Vol. I and II, Phi Learning Pvt Limited, 2009.
3	G. Aruldhas, "Engineering Physics", Phi Learning Pvt Limited,2010.
4	Abhijit Nayak, "Engineering Physics", S K Kataria and sons, 2011
5	M N Avadhanulu, P G Kshirsagar and TVS Arun Murthy, "A Textbook of Engineering Physics", S Chand Publishing, 11th Edition, 2018.

Reference Books

1	Daniel Kleppner and Robert Kolenkow, "An Introduction to Mechanics", 2nd Edition, Cambridge University Press, 2021.
2	C. Kittle, "Mechanics", Berkeley Physics Course, Vol-I, 2nd Edition, McGraw Hill Education 2017.
3	Wilson and J.F.B Hawkes, "Optoelectronics", 3rd Edition, Prentice Hall Europe, 1998.
4	F. K. Richtmyer, E. H. Kennard, and J. N. Cooper, "Introduction to Modern Physics" 6th Edition,

	Tata Mc Graw Hill, 1997.
5	Arthur Beiser, Shobhit Mahajan and S. Rai Choudhury, "Concepts of Modern Physics", 7th Edition, Mc Graw Hill,2015
6	Eugene Hecht and A.R. Ganesan, "Optics",5th Edition, Pearson Education, 2019.
7	David J Griffiths and Darrell F. Schroeter, "Introduction to Quantum Mechanics", 3rd Edition, Cambridge University Press India Pvt Ltd, 2019.
8	Ajoy K. Ghatak, "Optics", 7th Edition, McGraw Hill Education India Private Limited, 2020

List of Experiments

1. To determine the refractive index of a prism using spectrometer.
2. To determine the wavelength of sodium vapour lamp by Newton's Ring.
3. To determine the wavelength of sodium light using diffraction grating.
4. To determine the specific rotation of cane sugar solution with the help of polarimeter.
5. To find the wavelength of He-Ne Laser using transmission diffraction grating.
6. To determine the numerical aperture of an optical fiber.
7. To measure the transmission wavelength of various optical filters using Handheld spectrometer.
8. To measure the emission spectra of various light source.
9. To measure the logarithmic decrement of a damped harmonic oscillator.
10. To determine the acceleration due to gravity using bar pendulum.
11. To determine the acceleration due to gravity using Kater's pendulum.
12. To determine the moment of inertia of a flywheel about its axis of rotation.
13. To determine the Young's modulus of the material of a given bar by bending.
14. To study different modes of oscillations using coupled pendulum.
15. To determine the frequency of A.C. mains using sonometer and an electromagnet.
16. To measure the frequency of a sine-wave voltage obtained from signal generator and to obtain Lissajous pattern on the CRO screen by feeding two sine wave voltages from two signal generator.
17. To determine the value of e/m by J J Thompson method.
18. To determine Planck's constant.
19. To study the IV characteristics of a PN junction diode, Zener Diode and LED.
20. To study the charging and discharging of a capacitor to find the time constant.
21. To find the thermal conductivity of a poor conductor by Lee's disk method.
22. To study Hall effect and to measure carrier concentration and Hall coefficient for unknown semiconductor.
23. Measurement of high resistance by ballistic galvanometer.
24. To trace the B-H curve for a ferromagnetic material using CRO and to find the magnetic parameters from the B-H hysteresis loop.
25. Study of semiconductor devices (PN junction, Metal-insulator semiconductor diode etc.) by current-voltage (I-V) and capacitance-voltage (C-V) measurements using semiconductor parameter analyzer.
26. To determine the resistivity of Semiconductors by Four Probe Method at different temperatures and to calculate Band-gap from it.
27. To study and calibrate temperature transducers.
28. To study the gas sensing response characteristics (I-V characteristics) of Gas Sensors.
29. To study response and IV characteristics of infrared (IR) Sensor.

Reference Books	
1	Geeta Sanon, "B. Sc. Practical Physics", 1st Edition, R Chand, and Co. New Delhi, 2019.
2	Indu Prakash, Ramkrishna and A.K. Jha, "A textbook of Practical Physics", 3rd Edition, Kitab Mahal, 2011.
3	Harnam Singh and P.S. Hemne, "B.Sc. Practical Physics", S Chand and Company, 2000.
4	C L Arora, "Practical Physics", S. Chand & Company Ltd., 2010

5	Manjeet Singh, Surender Duhan and Anita Devi, "Applied Physics Theory and Experiments", 1st Edition, Vayu Education of India Publications, 2011.

APPLIED CHEMISTRY	
Course Code: BAS-105 Contact Hours: L-2 T-1 P-2 Course Category: BAS	Credits: 4 Semester: 1

Introduction: Applied Chemistry essentially deals with a wide variety of topics related to Water Technology, Catalysis, Phase Rule, Nano-chemistry, Composite materials and Instrumental Techniques; from the development and characterization of new materials to the development of the technology to effectively apply knowledge in their field.

Course Objectives:

- The course aims at elucidating principles of applied chemistry in industrial systems, water treatment, engineering materials and analytical techniques.
- It aims to impart theoretical and technical knowledge applicable to various industries e.g. Textile, Petrochemicals, Heavy Chemical Industries, Food, Metallurgy etc.

Pre-requisite: None

Course Outcomes: Having successfully completed this course,

CO1: Students will apply the principles underlying various techniques of water and waste treatment, to develop the solutions to industrial problems.

CO2: Students will implement the concept of catalysis and phase rule for their applications in various fields of Engineering and Technology. This will enable them to develop the skills to find solutions towards scientific and engineering problems.

CO3: The students shall understand the recent research carried out on different types of composite materials; Synthesis, characterization and evaluation of Nanomaterials and composite materials and their applications. As an outcome, student will synthesize the nanomaterial followed by its characterization.
CO4: Young graduates will be able to analyze the physical and chemical properties of the aqueous solutions using experimental techniques of conductometry, potentiometry spectroscopy and thermal analysis.

Pedagogy: Classroom teaching which focuses upon relating the textbook concepts with real world phenomena, along with regular tutorial classes to enhance the problem-solving ability.

CO-PO Mapping

Course Outcomes (CO) to Programme Outcomes (PO) Mapping (Scale 1: low, 2: Medium, 3: High)												
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	2	1	1	1	-	2	2	-	2

CO2	2	2	2	2	1	1	2	-	1	1	-	2
CO3	2	2	2	2	2	2	2	-	2	2	-	2
CO4	2	2	1	2	2	1	-	-	2	2	-	2

Contents

UNIT-I	8 Hours
Water Technology: Introduction and specification of water, Total Hardness and its determination (EDTA method)-(Numericals), Alkalinity-(Numericals), Boiler feed water, boiler problems – scale, sludge, priming & foaming, caustic embrittlement & corrosion : causes & prevention, Water Softening by Internal Treatment: carbonate & phosphate conditioning, colloidal conditioning &calgon treatment Water Softening by External Treatment: Lime-Soda Process, (Numericals), Zeolite & Ion-Exchange Process(Numericals). Water for Domestic use: Disinfection by Breakpoint chlorination.	
UNIT-II	6 Hours
Catalysis and Phase Rule: Catalyst and its characteristics, Types of catalysts, Concept of promoters, inhibitors and poisons, autocatalysis, physisorption, chemisorption, surface area. Theories of catalysis: Intermediate compound formation theory, adsorption or contact theory. Homogenous catalysis: Acid-Base catalysis-Types, Enzyme catalysis, Lock and key mechanism and turn over number. Phase rule-Definition of various terms, Gibb's Phase rule, Application of phase rule to one component system- The water system and sulphur system Application of phase rule to two component system- The Lead-Silver system (Pattinson's process), $FeCl_3$water system.	
UNIT-III	6 HOUR
Nanochemistry and Composite Materials: Nanoscience & nanotechnology; Top-down and bottom up approaches for nanomaterial synthesis, properties of nanomaterials, Properties and applications of nanoscale materials: Carbon nanotubes, fullerenes, nano-metals, and biological nanomaterials Practical applications of nanomaterials in different areas Introduction, advantages of composite materials. Roles of matrix in composites, classification of matrix material and reinforcements. Fiber-reinforced composites and structural composites**.**	
UNIT IV	8 HOUR
Instrumental Methods of Analysis: Spectral Analysis: Electromagnetic radiations, Regions of electromagnetic spectrum and types of spectra, Lambert-Beer's Law (Numericals), Instrumentation and applications of UV-Vis and Infrared Spectroscopy. Thermal Analysis: Basic principle, instrumentation and applications of Thermo gravimetric analysis (TGA), Differential thermal analysis (DTA). Conductance and Electrochemistry**:** Conductivity of electrolytes: specific, equivalent and molar conductivity. Kohlrausch law of independent migration of ions. Conductometric titrations (Acid-base only).Electrochemical cell, electromotive force(emf) and its measurements, Nernst equation, Qualitative discussions of potentiometric titrations (Acid-Base, redox).	
Text Books	
1	S. Rattan, "Text book on Engineering Chemistry", 7th Ed., S. K. Kataria& Sons, 2013.
2	P.C. Jain & M. Jain, "Engineering Chemistry", 16th Ed., Dhanpat Rai Publishing Co., 2013.
Reference Books	

1	P.W. Atkins, "The Elements of Physical Chemistry", 6th Ed., Oxford University Press, 2012.
2	B.S. Bahl, G.D. Tuli, A. Bahl, "Essentials of Physical Chemistry", 24th Ed., S. Chand & Co., 2000.
3	D. A. Skoog, F. J. Holler and A. N. Timothy, "Principle of Instrumental Analysis", 6th Ed., Saunders College Publishing, Philadelphia, 2016.
4	O. G. Palanna, Engineering Chemistry, McGraw Hill Education (India) Pvt Ltd., 2017.
5	K. SeshaMaheswaramma, MridulaChugh, Engineering Chemistry, 1st Ed., Pearson India Education Services Pvt. Ltd, 2016.

PRACTICAL COMPONENT

Introduction: Applied Chemistry Lab acquaints the students with fundamental laboratory equipments and their usage. The students gain hands on experience of conducting various experiments.

Course Objectives:

- The aim of this course is to make the students learn Iodometric titrations, Argentometric titration, complexometric titration, acid/base reactions, redox reactions etc.
- Also experiments on basic instruments like pH meter, Conductivity meter, Ostwald viscometer, Stalagmometer, UV visible spectrophotometer etc. would be carried out

Course Outcomes: Having successfully completed this course, the student will be able to Learn to work on a variety of instruments to be used later on.

- Young graduates gains knowledge of interdisciplinary branches of the chemistry namely Engineering, Inorganic, Physical, Analytical, nanotechnology, Industrial and Instrumentation Techniques

Pedagogy: Hands on experience on laboratory equipment with self-explanatory lab manuals.

Evaluation Scheme:

Continuous Assessment Practical (CAP)	10marks
End Term Internal Practical (ETIP)	15marks

List of Experiments (Minimum Eight experiments to be performed)

1. Determine the percentage composition of sodium hydroxide in the given mixture of sodium hydroxide and sodium chloride.
2. Determine the amount of Oxalic acid and Sulphuric acid in one litre of solution, given standard sodium hydroxide and Potassium Permanganate.
3. Determine the amount of copper in the copper ore solution, provided hypo solution.
4. Determine the amount of chloride ions present in water using silver nitrate (Mohr's precipitation method)
5. Determination of Alkalinity in the water sample.
6. Determination of Hardness in the water sample.
7. Determine the strength of $KMnO_4$ solution using sodium oxalate.
8. Determine the surface tension of a liquid using drop weight method.
9. Determine viscosity of a given liquid (density to be determined).

10. Determine the cell constant of a conductivity cell and titration of strong acid/strong base conductometrically.
11. To determine of the solution of (a) λ_{max} of the solution of $KMno_4$ (b) verify beers law and find out the concentration of unknown solution using spectrophotometer
12. Determination concentration of iron in the given sample using Spectrophotometer
13. Determination of eutectic point and congruent melting point for a two component system by method of cooling curve.
14. Determine the concentration and dissociation constants of polyprotic acid potentiometrically.
15. Synthesis of Ag/ZnO/CuO nanoparticles and record UV-Visible spectra.

REFERENCE BOOKS:

1. G.H. Jeffery, J. Bassett, J. Mendham and R.C. Denney, Vogel's Textbook of Quantitative Chemical Analysis, 6th edition, Pearson Education, 2009.
2. S.K. Bhasin and Sudha Rani, Laboratory Manual on Engg. Chemistry, Dhanpat Rai Publishing Company, 2006.
3. Sunita Rattan, Experiments in Applied Chemistry, S.K. Kataria& Sons, Delhi, 2011.
4. Janet Macfall,Catherine Deininger,Atricia Thomas-Laemont, Environmental Science Lab Manual, 2nd Edition, Kendall Hunt Publishing, 2017.

ENGINEERING MECHANICS	
Course Code: BMA-110 Contact Hours: L-3 T-0 P-2 Course Category: OEC	Credits: 4 Semester: 1

Introduction: Engineering mechanics deals with the various types of forces, their analysis and applications. The students need to design applications and this subject gives basic knowledge for designing and algorithm development for software applications.

Course Objective:

- To make the student comfortable with the concepts of forces and their applications. This course is also a prerequisite for further courses of Mechanical Stream like Machine Design, Theory of Machines, Strength of Materials, Fluid Mechanics.

- The students are to be provided hands on practical exposure on topics covered inthe course.

Pre-Requisites: NIL

Course Outcomes:

Having successfully completed this course the student will be able to:

- Get familiarized with the different types of forces acting on the elements.
- Distinguish between the desirable and non-desirable forces.
- Analyze the basic mechanical elements under various types of loads.
- Approach solving a mechanics problem in a systematic manner.

Pedagogy: The classroom sessions will be aimed at creating a strong theoretical basis with strong emphasis on the application part and tutorial sessions will give concentrated attention to individual student.

Theory Contents:

UNIT I	11 Hours
Force Systems: Introduction, Laws of Mechanics, Force Systems - Force, moment & couple, Varignon's theorem, Resultant of concurrent and non-concurrent forces, Free Body Diagram, Equilibrium conditions, Application to various problems. **Friction:** Introduction, Laws of Dry Friction, Coefficients of Friction, Angle of Friction, Cone of friction, Applications of Friction in Wedges, Ladder, Inclined Plane.	
UNIT II	11 Hours
Centroid and Centre of gravity: Introduction, Centre of gravity, Centroids of lines, Areas & Volumes, Centroid of Composite bodies, Pappus theorems.	

Moment of Inertia: Introduction, Moment of Inertia of Area, Polar Moment of Inertia, Radius of gyration, Parallel axis and Perpendicular axis theorem, Moment of inertia of composite areas, MOI about an arbitrary axis, Radius of gyration, Moment of Inertia of masses, Moment of Inertia of Solids of Revolutions **Trusses:** Introduction, Various types of trusses, Perfect and imperfect truss, Assumption in the truss analysis, Analysis of perfect plane trusses by the method of joints andmethod of section.	
UNIT III	10 Hours
Kinematics of Particles: Equation of motion, Rectilinear motion and planecurvilinear motion, Rectangular coordinates, Normal and tangential components. **Kinetics of Particles:** Work energy equation, Conservation of energy, Principle of Impulse and momentum, Linear and angular momentum, D'Alembert's principle, Conservationof momentum, Impact of bodies, Co-efficient of restitution, Loss of energy during impact.	
UNIT IV	10 Hours
Kinematics of Rigid Bodies: Concept of rigid body, Rotation, translation and general plane motion of rigid bodies, Analysis by relative velocity and instantaneous center of rotation methods. Application to various problems. **Kinetics of Rigid Bodies:** Rotary motion and torque, Moment of momentum, Laws of Rotary motion, Torque and angular momentum, Kinetic energy due to rotation, Work energy principle and principle of conservation of energy applied to rigid bodies, Equation of motion.	
Text Books	
1.	D. S. Kumar, Engineering Mechanics, S.K. Kataria & Sons, Delhi, 2006.
2.	I. B. Prasad: A Text Book of Applied Mechanics, Khanna Pub. Delhi.
3.	A.K. Tayal: Engineering Mechanics (Statics and Dynamics) Umesh Pub. Delhi.
Reference Books	
1.	I. H. Shames, Engineering Mechanics—Statics and Dynamics, 4th Edition, Prentice Hall ofIndia, 1996.
2.	F.P. Beer and E.R. Johnston, Vector Mechanics for Engineers – Statics, McGraw Hill BookCompany, 2000.

BASIC ELECTRICAL ENGINEERING	
Course Code :BEC-110 **Contact Hours**: L-3 T-0 P-2 **Course Category**: OEC	**Credits**: 4 **Semeste**r : 1, 2

Introduction: To impart basic knowledge of electrical engineering with an understanding of fundamental knowledge.

Course Objective: The aim of this course is to:

- Prepare the students to develop the ability of solving real world problems, going a step ahead of what they have studied in school. The curriculum is so designed that the students get an
- Provide students with in-depth knowledge of everyday systems and phenomena surrounding them.
- Make student understand the classical laws with modern devices which will enhance the ability of students to apply fundamentals to various applications.

Course Outcome: Having successfully completed this course, the student will be able to:

- Gain knowledge and comprehend various fundamentals of electrical engineering.
- Build a sound foundation of applications of electrical engineering.
- Identify and analyze relationship between different principles of electrical engineering and integrate them for various field of engineering.
- Evaluate and apply the quantitative and qualitative aspects of electrical engineeringto innovate devices in the constantly competitive Technologies

Pedagogy: Classroom teaching which focuses upon relating the textbook concepts withreal world phenomena, along with periodic tutorial classes to enhance the problem-solving ability.

Contents

UNIT-I	11 Hours
Circuit Analysis: Ohm‘s Law, KCL, KVL Mesh and Nodal Analysis, Circuit parameters, energy storage aspects, Superposition, Thevenin‘s, Norton‘s, Reciprocity, Maximum Power Transfer Theorem, Millman‘s Theorem, Star Delta Transformation, Applicationof theorems for the Analysis of dc circuits.	
UNIT-II	10 Hours
A. C. Circuit: Basics of AC, effective, average and maximum values, form factor and k-factor, different types of AC power, R-L, R-C, R-L-C circuits (series and parallel), Time Constant, Phasor- representations, Response of R-L, RC and R-L-C circuit to sinusoidal input, Resonance-series and parallel Circuits, Q-factor, Bandwidth.	

UNIT-III	10 Hours
Measuring Instruments: Principles, construction and application of moving coil, moving iron, dynamometer type, induction type instruments, extension of range of ammeter, voltmeter (shunt and multiplier), Two-wattmeter method, for the measurement of power	
UNIT-IV	11 Hours
Transformer and Electrical Machines: Construction and working principles, phasor diagrams of single-phase Transformer, Emf equation, equivalent circuit, regulation and efficiency, auto transformer. Rotating Machines DC Machines: Construction and working principles of dc motor and generator and its characteristics, applications of DC machines.	
Text Books	
1	Vincent DEL TORO, "Electrical Engineering Fundamental's", Prentice Hall India, Ed 2011.
2	J. Edminister, M. Nahvi, K. Rao, "Electric Circuits," Schaum's Outline Series, 2017.
Reference Books	
1	Hayt, W. H., Kemmerly, J. E., & Durbin, S. M. (1986), "Engineering Circuit Analysis", (p. 74), New York: McGraw-Hill
2	Fitzgerald, Arthur Eugene, David E. Higginbotham, and Arvin Grabel, "Basic Electrical Engineering," McGraw-Hill Series in Electrical Engineering, Auckland: McGraw-Hill, 1981, 5^{th} ed. (1981).

WORKSHOP PRACTICES	
Course Code: BMA-120 Contact Hours: L-0 T-1 P-2 Course Category: OEC	Credits: 2 Semester: 1

Introduction: Students of all branches need to know basics of workshop practice, so that they can give shape to their projects and also understand Mechanical / hardware aspects in Industry. Workshop Practice acquaints the students with fundamental mechanical workshop equipment, their usage and hardware development. The students gain hands on experience of making various jobs in the shops.

Course Objectives:

The aim of this course is to equip students with skills that are essential for their academic projects as well as through-out their entire engineering career. The students make jobs using workshop tools in various shops like Fitting, Sheet Metal, Foundry, Welding etc.

Pre-Requisites: NIL

Course Outcomes:

Having successfully completed this course the student will be able to:

- Aware herself of the safety precautions while working in workshop;
- Understand working and usage of workshop tools and equipment.
- Use different manufacturing processes (fitting, welding, foundry, sheet-metalworking, etc) required to manufacture a product from the raw materials.
- Develop practical engineering aptitude in manufacturing applications.
- Use the tools for projects in college and industry.

Pedagogy: Hands on experience on workshop tools and equipment with self-explanatory lab manuals.

Contents:

UNIT I	11 Hours
Safety Precautions and Knowledge of Hand Tools: Introduction to Workshop Practice and various tools used indifferent shops; general safety precautions on different shop floors. Study about first aid. **Foundry Shop:** Introduction of foundry shop and its tools, to make a sand mould with single piece pattern or two piece patterns. **Exercises** 1. Preparation of sand 2. Sand moulding process	
UNIT II	11 Hours

Fitting Section: Introduction of fitting operations, Study of hand tools and measuring instruments, Hacksaw cutting practice, Filing practice, Male female joints, Jobs made out of MS Flats. **Exercises** 1. Flat Joint or L Joint 2. Drilling and tapping	
UNIT III	10 Hours
Welding: Identify welding materials and processes, Gas and Electric arc welding and its equipment, Use of welding equipment and tools and accessories, Electric arc welding, Edge preparations, Exercises making of various joints. Bead formation in horizontal, vertical and overhead positions. **Exercises** 1. Welding Practice: Butt joint or Lap joint or T joint	
UNIT IV	10 Hours
Sheet Metal Work: Introduction to sheet metal, Study and demonstration of sheet metaltools, joints and operations procedure, making jobs out of GI sheet metal. **Exercises** 1. Simple Development of the job, to make lap and seam joints. 2. Rectangular or Cylindrical container or Hexagon shape.	
Text Books	
1.	Shop Theory, J. Anderson and E.E. Tatro, McGraw Hill, 2017.
2.	Juneja B.L., Workshop/Manufacturing Practices, Cengage, 2019
Reference Books	
1.	Hazra Choudhary , Elements Of Workshop Technology I & II, Media Promoters, 2008.

Engineering Graphics Lab	
Course Code: BMA-130 Contact Hours: L-0 T-1 P-2 Course Category: OEC	Credits: 2 Semester: 1

Introduction: Engineering Graphics develops basic concepts for advance courses like Machine Drawing/Design, Computer Graphics, and Computer Aided Design. Manufacturing drawings are an integral part of any production company. They provide most efficient and clear information about the parts to be produced and act as a language for engineers to communicate. The subject not only provides basic knowledge required as above but also develops visualization capability in students so that they can become creative and organized.

Course Objectives: The aim of this course is to provide a base for visualizing and drawing objects in different views which is an essential tool for a design engineer as well as graphicsdesigner.

Pre-Requisites: NIL

Course Outcomes:

Having successfully completed this course the student will be able to:

- Recognize different standards that are used in engineering drawings.
- Visualize and plot various projections of objects and are able to develop surfaces tosolid model.
- Communicate engineering aspects of a part with other engineers and technicians.

Pedagogy: The lab sessions are aimed at providing the students an exposure to traditional methods of engineering drawing on drawing sheets by using drawing tools. This gives the students an exposure to using these tools and helps them better understand intricacies andappreciate this art.

Content:

UNIT I	12 Hours
General: Importance, Significance and scope of engineering drawing, Lettering, Dimensioning, Orthographic Projection, B.I.S. Specifications, Engineering curves. **Projections of Point and Lines:** Introduction of planes of projection, Reference andauxiliary planes, projections of points and Lines in different quadrants, traces, inclinations, and true lengths of the lines, projections on Auxiliary planes, shortest distance, intersecting andnon-intersecting lines.	
UNIT II	12 Hours
Projections of Plane Figures: Different cases of plane figures (of different shapes) making	

different angles with one or both reference planes and lines lying in the plane figuresmaking different given angles (with one of both reference planes). Obtaining true shape of the plane figure by projection.
Projection of Solids: Simple cases when a solid is placed in different positions, Axis facesand lines lying in the faces of the solid making given angles.

UNIT III	9 Hours

Section of Solids: Introduction, conventions, sections of various solids**.**
Development of Surfaces: Method of development, Development of surfaces of obliquesolids.

UNIT IV	9 Hours

Projections: Perspective, orthographic, isometric and oblique projections, isometric scale, isometric drawing.
Computer Aided Drafting: Basic concepts and use.

Text Books

1.	Bhatt N.D., Elementary Engineering Drawing, Charotar Publishing House, 2014.

Reference Books

1.	Gill P.S., A text book of Engineering Drawing, S.K.Kataria & sons, 2013
2.	K.Venugopal and V.Prabhu Raja, "Engineering Graphics", New Age International Private Limited, 2011.
3.	Sharma S.C., Kumar Navin, Engineering Drawing, Galgotia Publications, 2003.
4.	Narayana, K.L. and Kannaiah, P., A Textbook on Engineering Drawing , Tata McGraw Hill, 2012

COMMUNICATION SKILLS	
Course Code: HMC-110 Contact Hours: L-3 T-1 P-0	Credits: 4 Semester: Odd

Introduction: This course facilitates communication skills development by exposing the students to various nuances of effective communication. The course provides an in-depth understanding of several key concepts of Communication like importance and functions of communication, barriers to communication, active listening, group discussions, presentation skills etc. The course also provides valid inputs on the *ethical* dimension of communication to enable the students to be ethical communicators.

The highlight of the course is special emphasis on Employment Communication i.e. job application and resume writing along with preparing and appearing for Interviews and Group Discussions. The students will also be acquainted with various forms of business correspondence used in organizations on a regular basis like agenda and minutes of meetings, business letters, reports etc.

Course Objectives:

- To enable students to evaluate their personal communications styles and improve upon it.
- To help the students understand the contemporary trends in communication.
- To facilitate the students in becoming aware of different communication theories and their application.
- To encourage students to develop/cteate their own unique style of communication.

Pre-requisites: None

Course Outcomes – After completion of the course, the students should be able to:

CO1- Understand the various communication theories and communicate effectively in different settings and contexts. (10, 12)
CO2- Improve their competence in professional writing and presentation skills. (10, 12)
CO3- Demonstrate appropriate professional and ethical behavior. (8, 10, 12)
CO4- Create awareness about related skills which facilitate effective communication. (9, 10,12)

CO mapping with Course Program Outcomes

PO **CO**	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO 1	-	-	-	-	-	-	-	-	-	**3**	-	**3**
CO 2	-	-	-	-	-	-	-	-	-	**3**	-	**3**
CO 3	-	-	-	-	-	-	-	**2**	-	**3**	-	**2**
CO 4	-	-	-	-	-	-	-	-	**2**	**3**	-	**2**

Syllabus:

UNIT-I	10 Hours
Introducing Communication: Importance and function of Communication, Communication Cycle, Characteristics and Types of Communication, Channels and Medium of Communication, 7 C's of Communication, Barriers to Communication. Ethics of Communication (plagiarism, language sensitivity towards gender, caste, race, disability etc.	
UNIT-II	11 Hours
Everyday Communication: Non-Verbal Language (Symbols, Appearance, Paralanguage and Body Language, Proxemics, Chronemics), Listening Skills (Importance, Barriers, Essentials of Good Listening), Communication Skills (greetings, introducing, making requests, asking and giving permission, offering help and giving instructions and directions etc.), Understanding Telephone Skills (handling calls, leaving a message, asking and giving information and instructions etc.), Net Etiquettes.	
UNIT-III	11 Hours
Presentations & Employment Communication: Classroom Presentations (purpose, types, preparing and presenting – use of visual aids/ power point presentations), Group Discussion (purpose, strategies, guidelines etc.), Job Application (Resume and Cover Letter), Interview Skills (purpose, types of interviews, guidelines and preparing for facing the interviews). Presentation, Group discussion and Mock interview practice should be undertaken in class.	
UNIT-IV	10 Hours
Writing on the Job: Formal and Informal Writing, Basics of Paragraph Writing**,** Email Writing, Letters at the workplace, Meeting documentations (Agenda and Minutes of meeting etc.), Report Writing (characteristics, types, structure of formal report).	
Text Books	
1.	M. Raman and S. Sharma. Technical Communication: Principles and Practice, 3rd Edition, Oxford University Press, 2011.
2.	M. Ashraf Rizvi, Effective Technical Communication, Tata McGraw Hill Publications, 2005.
Reference Books	
1.	Lewis and Hedwig, Body Language: A Guide for Professionals, New Delhi, Response Books, 2000
2.	Sides and H. Charles, How to Write & Present Technical Information, Cambridge, CUP, 1999.
3.	S. Kumar and P. Lata. Language and Communication Skills for Engineers, Oxford University Press, 2018.
4.	Hasson, Gill. Brilliant Communication Skills. Pearson Education, 2012.

Teaching Pedagogy: The classes will be held using WebEx or a similar online platform. Apart from interactive teaching, various activities will be done in the class and assignments will be given from time to time to facilitate learning in students. For better facilitation, students would be divided into groups of 5, 6 each after the Book Recommendation activity and they will work in teams on class activities and assignments.

Book Recommendation as an individual activity, Group discussions and presentations as a team activity will be used for evaluation purposes. All these would be conducted in class to enable students to practically apply the theories learnt during the course and in the end proper feedback would be provided to all of them so that students get a fair understanding of their areas of improvement and can work on the same.

Lesson Plan:

Lecture No.	**Topic**	**Activity/Assignment**	**Outcome**
1.	Introduction Class	Students will be given brief topics on the spot and they will present their views for 30 seconds.	Ice breaking activity, it will make students comfortable and familiar with their class mates
2.	Importance and function of Communication and it's Cycle	Interactive Lecture Case for home study	Students will understand how important effective communication skills are
3.	Communication: Characteristics and Types, Channel and Medium	Interactive Lecture	Students will understand how important all types of communication proficiency is
4.	7 C's of Communication, Barriers to Communication	Interactive Lecture Written activity Assignment 1	Students will understand about how using the seven Cs makes written communication substantial and more meaningful.
5.	Barriers contd.	Case Discussion	Students will be able to identify and reduce barriers in their communication style
6.	*Book Recommendation activity	Evaluative activity for 3 marks	Confidence enhancement speaking activity for all students
7.	*Book Recommendation activity	Evaluative activity for 3 marks	Confidence enhancement speaking activity for all students
8.	*Book Recommendation activity	Evaluative activity for 3 marks	Confidence enhancement speaking activity for all students
9.	*Book Recommendation activity	Evaluative activity for 3 marks	Confidence enhancement speaking activity for all students
10.	Ethics of Communication (plagiarism, language sensitivity	Interactive lecture/ Caselet discussion	Students will understand the importance and usage of Ethics in Communication processes

11.	Non-Verbal Communication Aspects	Interactive Lecture	Students will learn about various nuances of Kinesics, Proxemics, Chronemics and Paralanguage
12.	Non-Verbal Communication Aspects	Case Discussion	Enabling practical application of NV Cues
13.	Listening Skills (Importance, Barriers)	Interactive Lecture Caselet discussion	Students will understand how Listening is one of the most important requisite for becoming an effective communicator
14.	Listening Skills (Essentials of Good Listening)	Listening activity	Practical tips to improve listening skills
15.	Formal & Informal writing	Interactive Lecture Writing activity Assignment 2	Students will be able to avoid common errors made in formal written communication
16.	Paragraph writing	Interactive Lecture Writing activity Assignment 3	Students will be able to write effective paragraphs
17.	Understanding Telephone Skills	Interactive Lecture	Students will understand the do and don'ts of telephonic conversations
18.	Netiquette	Interactive Lecture Caselet discussion	Students will understand the do and don'ts of being in internet space
19.	Introduction to Group Discussions	Interactive Lecture Caselet discussion	Students will learn about effective participation in GDs
20.	Mock GD	Non Evaluative activity for training purposes	Practical application demonstration for training purposes
21.	Art of making effective Presentations	Interactive Discussion	Enabling students to learn the knowhow of making effective presentations

22	Presentation Bloopers	Caselet discussion	”
23.	Job Applications & Resume Writing	Interactive lecture Writing activity Assignment 4	Help students to learn the nuances of effective Resume writing
24.	Preparing for Interviews	Interactive lecture	Students will understand how to prepare for facing interviews
25.	Interviews contd.	Avoiding common mistakes during interviews	”
26.	Writing effective emails	Interactive lecture	Students will be exposed to the nitty-gritty’s of effective email writing
27.	Email writing contd.	Writing activity	Enabling students for practical application of email writing etiquette
28.	Agenda and Minutes of Meetings	Interactive lecture	Students will learn how to make agenda and minutes of meeting
29.	Report writing	Interactive lecture	Students will understand the nuances of effective report writing
30.	Report writing Contd.	Writing activity	Sample report writing in the class
31.	Letter Writing	Format discussion Writing activity Assignment 5	Students will learn the basics of formal business letters writing
32.	Class Room GDs	Evaluative activity for 3 marks	Would enable students to be able to participate in GDs more confidently
33.	Class Room GDs	Evaluative activity for 3 marks	”
34.	Class Room GDs	Evaluative activity for 3 marks	”
35.	Class Room GDs	Evaluative activity for 3 marks	”
36.	Class Room GDs	Evaluative activity for 3 marks	”
37.	Team Presentations	Evaluative activity for 4 marks	Would enable students to prepare effective presentations for different purposes

38.	Team Presentations	Evaluative activity for 4 marks	”
39.	Team Presentations	Evaluative activity for 4 marks	”
40.	Team Presentation	Evaluative activity for 4 marks	”
41.	Team Presentation	Evaluative activity for 4 marks	”
42.	Feedback discussion		To help students understand the areas of improvement in their communication style

Evaluation:

Assessment Category	Mode	% in 100 marks	Type of questions
Mid Term	Online Subjective Examination	30	Application based questions on communication concepts
End Term	Online Subjective Examination	60	Application based questions on communication concepts
*TA	Class Evaluation through 3 activities: a) Book Recommendation for 3 marks b) Group discussion for 3 marks c) Team presentation for 4 marks	10	Oral Activities evaluation

APPLIED MATHEMATICS – II	
Course Code: BAS-102 Contact Hours: L-3 T-1 P-0 Course Category: BAS	Credits: 4 Semester: 2

Introduction: Mathematics is used in almost every field of engineering be it computer science and information technology wherein it may be used in modelling, machine learning, image processing etc., or by electrical engineers for signal processing, control engineering or by mechanical engineers for design, modelling, manufacturing etc. But the problem faced by engineers is to how to apply the basic mathematical concepts in engineering problem which they would be dealing in coming years. The course covers vector calculus, linear ordinary differential equations of higher order, introduction of Laplace and Fourier transforms, functions of complex variables.

Course Objectives:

- To introduce the calculus of vector functions and their applications.
- To introduce the theory and concepts of differential equations and their applications, Laplace and Fourier transformations which will equip them with adequate knowledge of mathematics to formulate and solve problems analytically.

- Students will be equipped with the understanding of the fundamental concepts of functions of complex variable and their calculus.

Prerequisite: Vectors, Ordinary differential equations of first order, calculus of functions of more than one variable, complex numbers.

Course Outcomes: Having successfully completed this course, the student will be able to

C0 1. Compute gradient, divergence and curl of scalar and vector point functions. Evaluate line, surface and volume integrals using Green's, Gauss's divergence and Stoke's theorem.

C0 2. Determine the solution of ordinary linear differential equations of higher order and apply them in engineering problems.

C0 3. Evaluate Laplace, inverse Laplace transforms and apply them to solve initial and boundary value problem.

C0 4. Determine the analyticity of complex valued functions and solve integrals of real and complex variable functions.

PO / **CO**	**PO1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO 1	**3**	**3**	**2**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO 2	**3**	**3**	**2**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO 3	**3**	**3**	**2**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO 4	**3**	**3**	**2**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Pedagogy: Apart from class room teaching, main focus is to enhance problem solving ability supported by weekly assignments and discussing individual's doubts.

Content

UNIT-I	10 Hours
Vector Calculus: Scalar and vector point functions, gradient, directional derivative, divergence, curl and their applications, Green's, Stoke's and Gauss divergence theorems (without proof).	
UNIT-II	10 Hours
Differential Equations : Linear differential equations of higher order with constant coefficients, simultaneous linear differential equations, method of undetermined coefficients and Variation of parameters, solution of homogeneous nonlinear differential equations (Cauchy's and Legendre's form).	
UNIT-III	12 Hours
Laplace Transforms: Basic properties of Laplace and inverse Laplace transform, convolution theorem. Laplace transform of unit step function,applications of Laplace transform to initial and boundary value problems. **Fourier series and Transforms** : Fourier series, Fourier series expansion of even and odd functions, Fourier half range series,Fourier transforms, transforms of derivatives and integrals.	

UNIT-IV	10 Hours
Complex Analysis: Functions of a complex variable, analytic functions, Cauchy-Riemann equations, complex line integrals, Cauchy's integral theorem and integral formula, Taylor's and Laurent's series,zeroesand singularities, calculation of residues and residue theorem.	
Text Books	
1.	D. G. Zill and W. S. Wright, "Advanced Engineering Mathematics", 6th Edition, The Jones and Bartlett Learning Publishers, 2016.
2.	Jain R. K. and Iyengar S. R. K., "Advanced Engineering Mathematics", 5th Edition, Narosa Publishing House Pvt. Ltd.2016.
3.	Grewal, B. S. , "Higher Engineering Mathematics", 44th Edition, Khanna Publishers, 2017
Reference Books	
4.	George B. Thomas Jr., Ross L. Finney, "Calculus and Analytic Geometry", 9th Edition, Pearson Education India, 2010
5.	Greenberg M., "Advanced Engineering Mathematics", 2nd Edition, Pearson Education, 1998
6.	Kreyszig. E. , "Advanced Engineering Mathematics", 10thEdition, John Wiley & Sons, 2010.

APPLIED PHYSICS – II	
Course Code: BAS-104 Contact Hours: L-2 T-1 P-2 Course Category: BAS	Credits: 4 Semester:2

Introduction: Applied physics introduces the basic concepts of physics to undergraduate students, with the application of scientific principles in various technological applications, devices, and systems. The course covers wide-ranging topics of physics which cover the underlying principles of electromagnetic theory, solid state physics, special theory of relativity, X-rays and sensors. The syllabus is a perfect blend of classical laws with modern devices which will enhance the ability of students to apply fundamentals to various applications.

Course Objectives:

- To introduce students with the wide-ranging topics of physics which form the underlying physical principles of electromagnetic theory, solid state physics, special theory of relativity, X-rays and sensors.

- To impart an in-depth knowledge of everyday systems and phenomena surrounding them and explain the underlying physics.
- To enhance the ability of students to apply physics fundamentals to various modern applications for societal benefits.
- To develop a quantitative aptitude for solving engineering problems.
- To perform and interpret experiments using modern tools, techniques and write effective lab reports to various engineering problems, with an understanding of the limitations

Pre-requisites: None

Course Outcomes:

Having successfully completed this course, the student will be able to

1. Understand the laws of Electromagnetic (EM) theory and solve engineering problems, based on propagation of EM waves in different media.
2. Enhance the knowledge of solid-state physics concepts and understand the band structure of solids with modern device applications.
3. Describe the basic postulates of special theory of relativity and learn the space time transformations to formulate different relativistic phenomena
4. Describe the principle, design and applications of X-rays and various types of sensors with their characteristics.

Pedagogy: Classroom teaching which focuses upon relating the textbook concepts with real world phenomena, supplemented with periodic tutorial classes to enhance the problem-solving ability. The students would perform experiments to develop a deeper insight into the underlying principles of Physics.

CO-PO Mapping:

S.No.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	---	2	---	1	---	1	---	---	---	---
CO2	3	2	2	2	2	2	---	1	1	2	---	---
CO3	3	3	---	2	---	---	---	---	---	---	---	---
CO4	3	1	2	2	2	2	2	2	1	1	---	---
Average	3	2	1	2	1	1.25	0.5	1	0.5	0.75	---	---

BAS 104 THEORY CONTENTS

UNIT-1 **8 Hours**

ELECTRO MAGNETIC THEORY

Introduction to gradient divergence, curl, Gauss divergence theorem and Stoke's theorem (without proof). Electromagnetic Waves, Electromagnetic spectrum, Equation of Continuity, Maxwell's Equations, Poynting Theorem (No Derivation), Propagation of Electromagnetic Waves in Free Space, Dielectric and Conducting Medium (Qualitative), Skin Depth.

UNIT-2 **8 Hours**

SOLID STATE PHYSICS

Space lattice, Unit cell and Translation Vector, Wigner-Seitz cell, reciprocal lattice, Miller Indices, Bose-Einstein, and Fermi -Dirac Distribution functions (formula only). Fermi level, Density of states. Bloch Theorem and Kronig-Penney model (Qualitative), E-K diagram, Band structure in Metals,

Semiconductors, and Insulators, Intrinsic and Extrinsic Semiconductors, Fermi Energy Level for Undoped and Doped Semiconductors, pn-junction, Zener Diode (voltage regulation).

UNIT-3 **6 Hours**

SPECIAL THEORY OF RELATIVITY (STR)

Introduction to frames of reference (inertial and non-inertial), Galilean and Lorentz transformation, Postulates of Special Theory of Relativity, Time dilation, Length contraction, Relativistic addition of Velocities.

UNIT-4 **6 Hours**

RADIATION AND SENSORS

Production of X-rays, Moseley's law, Bragg's law, X-ray diffraction and its applications

Sensor, Signals and Response, Sensor Characteristics (Transfer Function, Sensitivity, Non-linearity, Saturation, Dead Band, Resolution and Selectivity), LDR, Temperature sensor - Thermocouple.

Textbooks

1	H. K. Malik and A. K. Singh, "Engineering Physics", 2nd Edition, Mc Graw Hill Ed, 2017.
3	M. C. Jain, "Textbook of Engineering Physics", 1st Edition, Vol. I and II, Phi Learning Pvt Limited, 2009.
4	G. Aruldhas, "Engineering Physics", Phi Learning Pvt Limited 2010.
5	Abhijit Nayak, "Engineering Physics", S K Kataria and sons, 2011
6	M N Avadhanulu, P G Kshirsagar and TVS Arun Murthy, "A Textbook of Engineering Physics", S Chand Publishing, 11th Edition, 2018.

Reference Books

1	Charles Kittel, "Introduction to Solid State Physics", Wiley India Edition, 2019.
2	N. David and Neil W. Ashcroft, "Solid State Physics", 1st Edition, Cengage Publication, 2003.
3	Wilson and J.F.B Hawkes, "Optoelectronics", 3rd Edition, Prentice Hall Europe, 1998.
4	F. K. Richtmyer, E. H. Kennard, and J. N. Cooper, "Introduction to Modern Physics" 6th Edition, Tata Mc Graw Hill, 1997.
5	D.J. Griffith, "Introduction to Electrodynamics ",4thEdition, Pearson Education India Learning Private Limited, 2015.
6	Arthur Beiser, Shobhit Mahajan and S. Rai Choudhury, "Concepts of Modern Physics", 7th Edition, Mc Graw Hill,2015
7	William H. Hayt and J. A Buck, 6th Edition, "Engineering Electromagnetism", 2001.
8	David J Griffiths and Darrell F. Schroeter, "Introduction to Quantum Mechanics", 3rd Edition, Cambridge University Press India Pvt Ltd, 2019.
9	Handbook of Modern Sensors: Physics, Designs, and Applications, Jacob Fraden,4thEdition, Springer, 2010.
10	R.K. Puri and V.K. Babbar, "Solid State Physics", S Chand Publication, 2010

List of Experiments

1. To determine the refractive index of a prism using spectrometer.
2. To determine the wavelength of sodium vapour lamp by Newton's Ring.

3. To determine the wavelength of sodium light using diffraction grating.
4. To determine the specific rotation of cane sugar solution with the help of polarimeter.
5. To find the wavelength of He-Ne Laser using transmission diffraction grating.
6. To determine the numerical aperture of an optical fiber.
7. To measure the transmission wavelength of various optical filters using Handheld spectrometer.
8. To measure the emission spectra of various light source.
9. To measure the logarithmic decrement of a damped harmonic oscillator.
10. To determine the acceleration due to gravity using bar pendulum.
11. To determine the acceleration due to gravity using Kater's pendulum.
12. To determine the moment of inertia of a flywheel about its axis of rotation.
13. To determine the Young's modulus of the material of a given bar by bending.
14. To study different modes of oscillations using coupled pendulum.
15. To determine the frequency of A.C. mains using sonometer and an electromagnet.
16. To measure the frequency of a sine-wave voltage obtained from signal generator and to obtain Lissajous pattern on the CRO screen by feeding two sine wave voltages from two signal generator.
17. To determine the value of e/m by J J Thompson method.
18. To determine Planck's constant.
19. To study the IV characteristics of a PN junction diode, Zener Diode and LED.
20. To study the charging and discharging of a capacitor to find the time constant.
21. To find the thermal conductivity of a poor conductor by Lee's disk method.
22. To study Hall effect and to measure carrier concentration and Hall coefficient for unknown semiconductor.
23. Measurement of high resistance by ballistic galvanometer.
24. To trace the B-H curve for a ferromagnetic material using CRO and to find the magnetic parameters from the B-H hysteresis loop.
25. Study of semiconductor devices (PN junction, Metal-insulator semiconductor diode etc.) by current-voltage (I-V) and capacitance-voltage (C-V) measurements using semiconductor parameter analyzer.
26. To determine the resistivity of Semiconductors by Four Probe Method at different temperatures and to calculate Band-gap from it.
27. To study and calibrate temperature transducers.
28. To study the gas sensing response characteristics (I-V characteristics) of Gas Sensors.
29. To study response and IV characteristics of infrared (IR) Sensor.

Reference Books	
1	Geeta Sanon, "B. Sc. Practical Physics", 1st Edition, R Chand, and Co. New Delhi, 2019.
2	Indu Prakash, Ramkrishna and A.K. Jha, "A textbook of Practical Physics", 3rd Edition, Kitab Mahal, 2011.
3	Harnam Singh and P.S. Hemne, "B.Sc. Practical Physics", S Chand and Company, 2000.
4	C L Arora, "Practical Physics", S. Chand & Company Ltd., 2010
5	Manjeet Singh, Surender Duhan and Anita Devi, "Applied Physics Theory and Experiments", 1st Edition, Vayu Education of India Publications, 2011.

ENVIRONMENTAL SCIENCES	
Course Code: BAS-106 Contact Hours: L-2 T-1 P-2 Course Category: BAS	Credits: 4 Semester: 2

Introduction: A scientific study of the natural world and how it is influenced by people. It Surveys environmental studies, examining ecological, socioeconomic, and technological factors that influence the quality of life on Earth.

Course Objectives:

- Environmental science prepares students for career success in environmental monitoring and remediation, natural resources and conservation, public health, industrial environmental management.
- The curriculum is so designed that the students get an in-depth knowledge of the environment and various issues arising due to mismanagement of resources.

Pre-requisites: None

Course Outcomes: Having successfully completed this course,

CO1: Students will be able understand about the availability and sustainable use of natural resources and concept of ecosystems and biodiversity.
CO2: Students will understand and evaluate the transnational character of environmental problems, their sources, sinks and control strategies along with their short-term and long term impacts to humans. Students will also learn to apply green methodologies to find solutions to address various environmental issues.
CO3: Students will understand the concept of fuel technology and implement their interpretative skills to evaluate the usage and application of alternate energy sources for sustainability.
CO4: Young graduates would understand the interconnected and interdisciplinary branches like Toxicology, synthesis and applications of Eco friendly polymers and demonstrate an integrative approach to environmental issues with a focus on sustainability.

Pedagogy: Classroom teaching which focuses upon relating the textbook concepts with real world phenomena, along with periodic tutorial classes to enhance the problem-solving ability.

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	2	1	-	1	2	1	-	1	1	2
CO2	1	1	2	2	-	2	2	-	2	1	1	2
CO3	2	1	2	2	-	1	2	-	2	1	1	2
CO4	1	1	2	2	-	2	2	-	2	1	1	2

Theory Contents

UNIT-I	6 Hours
Natural Resources, Conservation and Management: Forest resources: Use and over-exploitation, deforestation, Timber extraction, mining, dams and their effects on forest and tribal people. Water resources: Use and overutilization of surface and ground water, floods, drought, conflicts over water. Mineral resources: Environmental effects of extracting and using mineral resources. Food resources: World food problems, changes caused by agriculture and over-grazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity. Energy resources: Growing energy needs renewable and non-renewable energy sources. Resource Management-Concept of Sustainable development, Environmental Management Systems, Environmental Impact Assessment, Biodiversity- conservation and threats.	
UNIT-II	8 Hours
Environmental Pollution and Control: Air Pollution: Types of air pollutants; Source, effects, sink & control of common air pollutants (CO, oxides of nitrogen & sulphur, hydrocarbons and particulates), Photochemical smog, acid rain, greenhouse effect, global warming, Carbon dioxide sequestration and the concept of Carbon Credits Water Pollution: Classification of pollutants and their sources, Waste water treatment (Primary, secondary and tertiary treatment), Impact of water pollution on hydrological ecosystems. Solid and Hazardous Waste Pollution: Classification, waste treatment and disposal methods: Sanitary landfill, thermal processes, chemical and biological processes, disposal methods for nuclear waste, nuclear disaster (case study), disposal methods for e-waste. Green Technology And Green Chemistry: Introduction to concept of Green Technology and Zero Waste Technology, Green Chemistry & its basic principles, Atom Economy, evaluation of feedstock, reaction types, methods, reagents and solvents.	
UNIT-III	8 HOUR
Fuels and Alternate Energy Sources: Classification, Calorific value of fuels (gross and net), Dulong's formula, Determination of calorific value of fuels using bomb's calorimeter, Determination of calorific value of fuels using Boy's Gas Calorimeter (Numericals). Liquid fuels-petroleum chemical composition, fractional distillation, Cracking – Thermal & catalytic cracking, Octane &Cetane numbers with their significance. Analysis of flue gases (Orsat's Apparatus)-(Numericals), Combustion of fuels. Use of alternate energy sources including solar energy harnessing (photovoltaics), wind energy, hydroenergy, geothermal energy, ocean energy, biodiesel, power alcohol, biomass energy.	
UNIT IV	6 HOUR
Chemical Toxicology and Eco-Friendly Polymers Toxicology: terminology & toxic effects, chemical interactions, impact of toxic chemicals on enzymes, Biochemical effects of arsenic, mercury, lead, chromium, & cadmium. PolymersIntroduction: Functionality of monomer, polymerization, degree of polymerization, Number average and weight average molecular weight of polymers. Environmental degradation of polymers: Biodegradable, Photo-biodegradable polymers, Hydrolysis &	
Hydro-biodegradable polymers Biopolymers & Bioplastics.	
Text Books	
1	RanuGadi, Sunita Rattan, SushmitaMohapatra. A Text book of Environmental Studies (with experiments), 4th Ed., S.K. Kataria& Sons, 2014.

2	S. Rattan, "Applied Chemistry", S.K.Kataria& Sons, 2013.
3	S.S.Dara, D.D.Mishra. A Textbook of Environmental Chemistry and Pollution Control (With Energy, Ecology, Ethics and Society) S. Chand and Company Pvt. Ltd. (India), 2011.
Reference Books	
1	Richard T. Wright, Environmental Science, 9thEdition, Pearson Education, 2007.
2	Gerard Kiely, Environmental Engineering, special Indian edition The McGraw-Hill Companies, 2007.
3	E. Barucha, Textbook of Environmental Studies for Undergraduate Courses, Universities Press (India) Pvt. Ltd., 2005.
4	C.N. Sawyer, P.L. McCarty, and G.F. Parkin, "Chemistry for Environmental Engg. and Science", 5th Ed., The McGraw-Hill Companies, 2003.
5	R. Rajagopalan, Environmental studies from crisis to cure, 3rd edition, Oxford University Press., 2016.

PRACTICAL COMPONENT

Introduction: Environmental Studies Lab acquaints the students with fundamental laboratory equipments and their usage. The students gain hands on experience of conducting various experiments.

Course Objectives:

- The aim of this course is to make the students learn the usage of basic instruments in Sciences like BOD Incubator, Bomb Calorimeter, pH meter, conductivity meter etc.
- Students will demonstrate interpretative skills including the ability to analyze data statistically, assess reliability, interpret results and draw reasonable conclusions.

Course Outcomes:

Having successfully completed this course, the student will be able to

- Learn to work on a variety of instruments to be used later on.
- Understand the transnational character of environmental problems and ways of addressing them, including interactions across local to global scales

Pedagogy: Hands on experience on laboratory equipments with self-explanatory lab manuals.

Evaluation Scheme:

Continuous Assessment Practical (CAP)	10marks
End Term Internal Practical (ETIP)	15marks

List of Experiments (Minimum eight experiments to be performed)

1. Determination of Dissolved Oxygen (DO) in the water sample.
2. Determination of Biological oxygen demand (BOD) in the water sample.
3. Determination of Chemical oxygen demand (COD) in the water sample.
4. Determination of pH, conductivity and TDS in different drinking water samples and preparation of report.

5. Determination of Residual Chlorine in the water sample.
6. Determination of Ammonia in the water sample.
7. Determination of Calorific Value of fuels using Bomb calorimeter.
8. Determination of Free Carbon Dioxide in the water sample.
9. Estimation of sulphur in given coal sample gravimetrically
10. Determination of molecular weight of polystyrene sample using viscometric method
11. Acetylation of primary amines using green methodology
12. Preparation of urea formaldehyde resin and functional group analysis using IR spectroscopy.
13. Preparation of aloevera/avocado soap by green method of saponification.
14. Preparation of biodiesel from waste cooking oil using KOH as the catalyst.

REFERENCE BOOKS:

1. Standard Methods for the Examination of Water and Wastewater, American Public Health Association (APHA), American Water Works Association (AWWA) & Water Environment Federation (WEF), 2005.
2. Experiments in Applied Chemistry, Sunita Rattan, Publ.: S.K. Kataria& Sons, Delhi, Edition 2011.
3. Laboratory Manual on Engg. Chemistry, S.K. Bhasin and Sudha Rani, DhanpatRai Publ. Comp., New Delhi, Edition 2009.

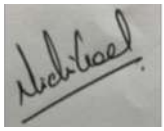
Indira Gandhi Delhi Technical University For Women
(Established by Govt. of Delhi vide Act 09 of 2012)
Department of Electronics and Communication Engineering

Course Structure for B. Tech ECE-AI
(Electronics & Communication Engineering- Artificial Intelligence)

First Year

First Semester					
S. No.	**Code**	**Subject**	**L-T-P**	**Credits**	**Category**
1.	BEC-101	Analog Electronics	3-0-2	4	**DCC**
2.	BEC-110	Basic Electrical Engineering	3-0-2	4	**DCC**
3.	BCS-110	Programming in C Language	3-0-2	4	**DCC**
4.	BAI-101	Intelligent Systems	3-0-0	3	**DCC**
5.	BAS-109	Applied Mathematics	3-1-0	4	**ASH**
6.	HMC-110	Communication Skills	3-1-0	4	**HMC**
		Total		**23**	

Second Semester					
S. No.	**Code**	**Subject**	**L-T-P**	**Credits**	**Category**
1.	BEC-104	Digital Electronics	3-0-2	4	**DCC**
2.	BEC-106	Signals and Systems	3-0-2	4	**DCC**
3.	BAI-110	Programming with Python	3-0-2	4	**DCC**
4.	BAS-106	Environmental Sciences	2-1-2	4	**ASH**
5.	BAS-108	Probability and Statistics	3-1-0	4	**ASH**
6.	BAI-108	IT Workshop	1-0-2	2	**DCC**
		Total		**22**	



ANALOG ELECTRONICS	
Course Code: BEC-101 Contact Hours:L-3 T-0 P-2 Course Category: DCC	Credits: 4 Semester: 1

Introduction: It a branch of electronics which deals with analog electronic circuits and electronic components. The course will introduce solid state electronic devices such as p-n junction diode, BJT and FET which form the basic building block of any electronic system.

Course Objective:

- To give an insight into fundamental concepts of semiconductor devices and design of Analog integrated circuits
- To give the broad spectrum of Analog principles and design equations

Pre-requisite: Theory of semiconductor physics

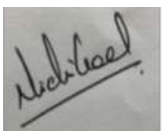
Course Outcome: After completion of the course, student will be able to:

- Understand the basic electronics components such as diodes and transistors
- Develop the capability to analyse and design transistor based circuits
- Understand various models for designing and analysing circuits

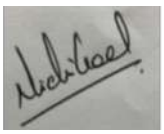
Pedagogy: The teaching-learning of the course would be organized through lectures, assignments, projects/ presentations and quizzes. Faculty members strive to make the classes interactive so that students can correlate the theories with practical examples for better understanding. Use of ICT, web-based sources as well as flipped class room teaching will be adopted.

Contents

UNIT-I	12 Hours
Review of semiconductor physics, p-n junction diode, p-n diode characteristics and its operation, p-njunction capacitances (depletion and diffusion), breakdown in p-n diodes Diode applications: Clipping and clamping circuits, rectifier circuits, Zener diode, Zener diode as regulators, voltage multipliers, switching behavior of p-n diode Bipolar junction transistor: Introduction and types of transistors, construction, BJT characteristics inCB, CE & CC mode, operating point, ac/dc load line, leakage current, saturation and cut off mode ofoperations, Ebers-moll model Bias stabilization: Need for stabilization, various biasing schemes, bias stability with respect to variations in Ico, V_{BE} & β, Stabilization factors, thermal stability.	
UNIT-II	10 Hours



Models: Low frequency models for transistor (h-parameter, Hybrid – Π, r_{Π}) BJT amplifiers: Analysis at low frequency (CB, CE, CC & CE with R_E), comparison of varioustypes of configurations, cascaded Amplifiers, Darlington pair, cascode amplifiers High frequency response of amplifier: Hybrid-Π Model at high frequency, CE short circuit currentgain, current gain with resistive load	
UNIT-III	12 Hours
Multistage Amplifiers: Methods of coupling, RC coupled amplifier, frequency response analysis(Low, Mid & High), calculation of gain bandwidth Feedback Amplifiers: Feedback concept, Classification of Feedback amplifiers, properties of negative feedback amplifiers, overall gain using feedback, impedance considerations in different configurations, examples of analysis of feedback amplifiers Special semiconductor devices: SCR (Operation, Characteristics & applications), Thyristors, TRIAC, DIAC, Unijunction Transistor (UJT), UJT Relaxation Oscillator	
UNIT-IV	8 Hours
Field Effect Transistor: Classification, JFET characteristics, operating point, various biasing techniques, enhancement & depletion type MOSFETs, JFET Model, JFET amplifier analysis (CD, CS & CG), CMOS, MISFET, MESFET, VFET	
Text Books	
1	Millman and Halkias, "Electronic devices and circuits" TMH, 4th Edition, 2015.
2	Salivahanan, Suresh Kumar, Vallavaraj, "Electronic devices and circuits" TMH, 4th Edition. 2016
3	Boylestad & Nashelsky, "Electronic Devices & Circuit Theory" PHI, 5th Edition, 2014.
Reference Books	
1	Balbir Kumar and S. B. Jain, "Electronic Devices and Circuits" PHI, 2012.
2	Sedra& Smith, "Micro Electronic Circuits" Oxford University Press, 6th Edition, 2012.
3	J. Millman and Halkias, "Integrated Electronics, Analog & Digital Circuits & Systems" TMH, 2017.



BASIC ELECTRICAL ENGINEERING	
Course Code : BEC-110 Contact Hours: L-3 T-0 P-2 Course Category: DCC	Credits: 4 Semester : 1

Introduction: To impart basic knowledge of electrical engineering with an understanding of fundamental knowledge.

Course Objective: The aim of this course is to:

- Prepare the students to develop the ability of solving real world problems, going a step ahead of what they have studied in school. The curriculum is so designed that the students get an
- Provide students with in-depth knowledge of everyday systems and phenomena surrounding them.
- Make student understand the classical laws with modern devices which will enhance the ability of students to apply fundamentals to various applications.

Course Outcome:

Having successfully completed this course, the student will be able to:

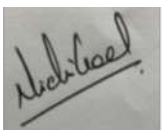
- Gain knowledge and comprehend various fundamentals of electrical engineering.
- Build a sound foundation of applications of electrical engineering.
- Identify and analyze relationship between different principles of electrical engineering and integrate them for various field of engineering.
- Evaluate and apply the quantitative and qualitative aspects of electrical engineering to innovate devices in the constantly competitive Technologies

Pedagogy:

The teaching-learning of the course would be organized through lectures, assignments, projects/ presentations and quizzes. Faculty members strive to make the classes interactive so that students can correlate the theories with practical examples for better understanding. Use of ICT, web-based sources as well as flipped class room teaching will be adopted.

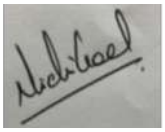
Contents

UNIT-I	11 Hours
Circuit Analysis: Ohm‘s Law, KCL, KVL Mesh and Nodal Analysis, Circuit parameters, energy storage aspects, Superposition, Thevenin‘s, Norton‘s, Reciprocity, Maximum Power Transfer Theorem, Millman‘s Theorem, Star Delta Transformation, Applicationof theorems for the Analysis of dc circuits.	
UNIT-II	10 Hours
A. C. Circuit: Basics of AC, effective, average and maximum values, form factor and k-factor, different types of AC power, R-L, R-C, R-L-C circuits (series and parallel), Time Constant, Phasor- representations, Response of R-L, RC and R-L-C circuit to sinusoidalinput, Resonance-series and parallel Circuits, Q-factor, and Bandwidth.	



UNIT-III	10 Hours
Measuring Instruments: Principles, construction and application of moving coil, moving iron, dynamometer type, induction type instruments, extension of range of ammeter, voltmeter (shunt and multiplier), Two-wattmeter method, for the measurement of power	
UNIT-IV	11 Hours
Transformer and Electrical Machines: Construction and working principles, phasor diagrams of single-phase Transformer, Emf equation, equivalent circuit, regulation and efficiency, auto transformer. Rotating Machines DC Machines: Construction and working principles of dc motor andgenerator and its characteristics, applications of DC machines.	

Text Books	
1	Vincent DEL TORO, "Electrical Engineering Fundamental's", Prentice Hall India, Ed 2011 or latest.
2	J. Edminister, M. Nahvi, K. Rao, "Electric Circuits," Schaum's Outline Series, 2017.
Reference Books	
1	Hayt, W. H., Kemmerly, J. E., & Durbin, S. M. (1986), "Engineering CircuitAnalysis", (p. 74), New York: McGraw-Hill or latest.
2	Fitzgerald, Arthur Eugene, David E. Higginbotham, and Arvin Grabel, "Basic Electrical Engineering," McGraw-Hill Series in Electrical Engineering, Auckland: McGraw-Hill, 1981, 5th ed. (1981) or latest.



PROGRAMMING IN C LANGUAGE	
Course Code: BCS- 110 Contact Hours: L-3 T-0 P- 2 Course Category: DCC	Credits: 4 Semester: 1

Introduction: This course briefs about basic introduction to computers and its corresponding concepts in benefit of students coming from non-computer background. Apart from this, programming concepts are also discussed in this courseusing C programming language.

Course Objective:

- To provide an understanding of basic computer architecture includingNumber System. Discussion of computer history and overview of operating systems.
- To impart adequate knowledge on the need and concept of algorithms andprogramming.
- Develop, execute and document computerized solution for variousproblems using the features of C language.
- To enable effective usage of arrays, structures, functions, pointers andto implement the concepts of file organization.

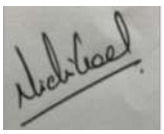
Pre-requisite: None

Course Outcome: After studying this course students will be able to:

- Explain the fundamentals of computers and programming.
- Apply problem solving skills in programming.
- Learn logic development
- Develop and run computer programs in C language

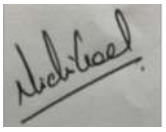
Pedagogy:

The teaching-learning of the course would be organized through lectures, assignments, projects/ presentations and quizzes. Faculty members strive to make the classes interactive so that students can correlate the theories with practical examples for better understanding. Use of ICT, web-based sources as well as flipped class room teaching will be adopted.



Contents

UNIT-I	12 Hours
Introduction to computer systems, ALU, registers, memory. Concepts of the finite storage, bits bytes, kilo, mega and gigabytes. Idea of program execution at micro level. Introductionto system software: operating systems, compilers, assemblers, interpreter and multi-user environments. Concept of flow chart and algorithms, algorithms to programs. Logic development for solving problems, development of flow chart and algorithms	
UNIT-II	12 Hours
Concept of variables, program statements and function calls from the library (Printf for example), C data types: int, char, float etc., C expressions, arithmetic operation, relational and logic operations, C assignment statements, extension of assignment of the operations. Cprimitive input output using getchar and putchar, exposure to scanf and printf functions, C Statements, conditional executing using if, else, switch case, go-to and break statements.	
UNIT-III	09 Hours
Concept of loops in C using for, while and do-while. Arrays: single and two--dimensional arrays, initializers, array parameters, example of iterative programs using arrays and use in matrix computations. Functions, parameters and return values, standard library functions.	
UNIT-IV	09 Hours
Pointers, relationship between arrays and pointers, Call by reference. Array of pointers, passing arrays as arguments. Character strings: processing strings using loops, and string library functions Structure and Unions: structure concepts, structures as Parameters, arrays of structures.	
Text Books	
1	Mastering C, 2nd Edition, K R Venugopal,Sudeep R Prasad, McGraw Hill Education, 2017
2	Let Us C, 13th Edition, Yashavant Kanetkar, BPB Publications, ISBN: 978-8183331630, 2013.
3	Fundamentals of Computers, 6th Edition, V Rajaraman, PHI Learning, 2014.
Reference Books	
1	Programming in ANSI C, 6th Edition, McGraw Hill Education (India) PrivateLimited E Balagurusamy, ISBN:978-1259004612, 2012.
2	The C Programming Language, B W Kernighan, Dennis Ritchie, 2nd Edition, 2015.
3	The Complete Reference C, Herbert Schildt, Tata McGraw Hill, 4th Edition, 2017.



INTELLIGENT SYSTEMS	
Course Code: BAI-101 Contact Hours: L-3 P-0 C-0 Course Category: DCC	Credits: 3 Semester: 1

Introduction

The field of computer science has continuously evolved to build intelligent systems. The design and development of intelligent systems grounded in the field of artificial intelligence is becoming quite popular in Computer Science. The fundamental question 'Can intelligent systems mimic humans and surpass them in all kinds of work?' has kept computer scientists occupied for many decades in the past, and will continue to occupy them in future. This course is a gentle introduction to the field of intelligent systems.

Course Objectives

- Understand the basic building blocks of Intelligent Systems.
- Appreciate some of the approaches to build Intelligent Systems.
- Understand the importance of application of Intelligent Systems in different domains.

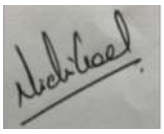
Pre-requisites: None

Course Outcome Upon successful completion of this course, students will be able to:

- Understand the different approaches to the design of intelligent systems.
- Appreciate the importance of intelligent systems in different domains.
- Development of an intelligent system is not expected. But 'thinking' in that direction should start.

Pedagogy

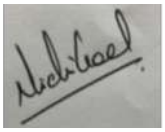
The teaching-learning of the course would be organized through lectures, assignments, case studies/presentations and quizzes. Faculty members strive to make the classes interactive so that students can correlate the theories with practical examples for better understanding. Use of ICT, web-based sources as well as flipped class room teaching will be adopted.



Contents

UNIT- I	7 Hrs
Intelligence, Intelligent Systems, Characteristics of Intelligent Systems, Knowledge vs Intelligence, Knowledge Representation, Reasoning, Deductive vs. Inductive vs. Abductive Reasoning, Propositional Logic, Inference Foundations of AI, Intelligent Agents, Structure of Intelligent Agent. Environment of Intelligent Agent. Case Studies.	
UNIT - II	7 Hrs
Importance of Data, Dataset, Introduction to Data driven approaches, Introduction to Machine Learning, Training and Testing, Various approaches to intelligent system, Pattern recognition and classification,	
UNIT - III	7 Hrs
Domains of Intelligent Systems – Computer Vision, Natural Language Processing, Speech Processing, Mobile Robotics, Internet of Things (IoT), Intelligent IoT Applications, Drones, Intelligent Web Applications	
UNIT - IV	7 Hrs
Intelligent Applications – Agriculture, Healthcare, Education, Smart Cities, Autonomous Vehicle.	

Text Books	
1	Stuart J. Russel and Peter Norvig. Artificial Intelligence – A Modern Approach. 4th/Latest Edition, Pearson Education, 2020.
2	Deepak Khemani, A First course on Artificial Intelligence –McGraw Hill India, 2013
3	Peter Flach, The Art and Science of Machine Learning, Cambridge University Press, 2012.
Reference Books	
1	Josh Patterson, Adam Gibson. Deep Learning: A Practitioner's Approach. O'Reilly Media, 2017.
2	Gregory Dudek and Michael Jenkin. Computational Principles of Mobile Robotics. Cambridge University Press, 2012.



APPLIED MATHEMATICS	
Course Code: BAS-109 Contact Hours: L-3 T-1 P-0 Course Category: ASH	Credits: 4 Semester: 1

Introduction: Mathematics is used in almost every field of engineering be it computer science and information technology wherein it may be used in modeling, machine learning, image processing etc., or by electrical engineers for signal processing, control engineering or by mechanical engineers for design, modeling, manufacturing etc. But the problem faced by engineers is to how to apply the basic mathematical concepts in engineering problem which they would be dealing in coming years. The course covers the various topics of engineering mathematics such as matrices, sequences and series, calculus of functions of more than one variable and vector calculus.

Course Objective:

- The students will be made familiar with the concepts of matrices, sequences and series.
- To provide students with skills and knowledge of calculus of functions of several variables and vector calculus which would enable them to devise solutions for given situations they may encounter in day-to-day engineering problems.

Prerequisite: Fundamentals of matrices, calculus of functions of single variable, vectors.

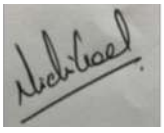
Course Outcomes:

Having successfully completed this course, the student will be able to

- Build a sound foundation and have comprehensive knowledge of matrices, Infinite series, Fourier series, calculus of functions of more than one variable and vector calculus.
- Evaluate rank, inverse, Eigen values and Eigen vectors of a matrix.
- Determine the convergence/divergence of an infinite series, approximation of functions and error estimation using Taylor's series expansion.
- Analyze some mathematical problems encountered in engineering applications.
- Learn various concepts and applications of maxima and minima, multiple integrals, gradient, divergence, curl, Green's theorem, Gauss divergence theorem and Stoke's theorem.

Pedagogy:

The teaching-learning of the course would be organized through lectures, assignments, projects/ presentations and quizzes. Faculty members strive to make the classes interactive so that students can correlate the theories with practical examples for better understanding. Use of ICT, web-based sources as well as flipped class room teaching will be adopted.



Contents

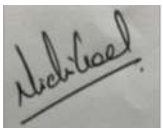
UNIT-I	10 Hours
Matrix Algebra: Elementary operations and their use in getting the rank, Inverse of a matrix and solution of linear simultaneous equations, orthogonal, symmetric, skew-symmetric, hermitian, skew-hermitian, normal & unitary matrices and their elementary properties, linear transformations, Eigen values and eigenvectors of a matrix, Cayley Hamilton theorem, diagonalization of a matrix.	
UNIT-II	12 Hours
Sequences and series: Introduction to sequences and Infinite series, tests for convergence/divergence, Limit comparison test, ratio test, root test, Raabe's test, log test, Gauss's test, Cauchy integral test, alternating series, absolute convergence and conditionalconvergence. Fourier series and its convergence, Fourier half range series.	
UNIT-III	10 Hours
Differential Calculus: Functions of several variables: Limits, continuity and Differentiability, Successive differentiation, Leibnitz theorem, Partial differentiation, Euler's Theorem for homogenous equations. Composite functions, Change of variables, Taylor's and Maclaurin's Series, maxima and minima, Lagrange's method of undetermined multiplier.	
UNIT-IV	10 Hours
Vector Calculus: Vector point functions, Gradient, Divergence and Curl and their physical interpretation, Line integrals, Multiple Integrals, Change of order of integration, Surface and Volume integrals, Green's, Gauss Divergence and Stoke's theorems (without proof).	

Text Books

1	D. G. Zill and W. S. Wright, "Advanced Engineering Mathematics", 6th Edition, The Jones and Bartlett Learning Publishers, 2016 or latest.
2	Jain R. K. and Iyengar S. R. K., "Advanced Engineering Mathematics", 4th Edition, Narosa Publishing House Pvt. Ltd.2012 or latest.
3	Grewal, B. S., "Higher Engineering Mathematics", 44th Edition, Khanna Publishers, 2017 or latest.

Reference Books

1	George B. Thomas Jr., Ross L. Finney, "Calculus and Analytic Geometry", 9th Edition, Pearson Education India, 2010 or latest.
2	Greenberg M., "Advanced Engineering Mathematics", 2nd Edition, Pearson Education, 1998 or latest.
3	Kreyszig E. "Advanced Engineering Mathematics", 10th Edition, John Wiley &Sons, 2010 or latest.



COMMUNICATION SKILLS	
Course Code: HMC-110 Contact Hours: L-3 T-1 P-0 Course Category: HMC	Credits:4 Semester: 1

Introduction: This course facilitates communication skills development by exposing the students to various nuances of effective communication. The course provides an in-depth understanding of several key concepts of Communication like importance and functions of communication, barriers to communication, active listening, group discussions, presentation skills etc. The course also provides valid inputs on the ethical dimension of communication to enable the students to be ethical communicators.

The highlight of the course is special emphasis on Employment Communication i.e. job application and resume writing along with preparing and appearing for Interviews. The students are also acquainted with various forms of business correspondence used in organizations on a regular basis like agenda and minutes of meetings, business letters, reports etc.

Course Objectives:

- To enable students to evaluate their personal communication styles and improve upon it.
- To help the students understand the contemporary trends in communication.
- To facilitate the students in becoming aware of different communication theories andtheir application.
- To encourage students to develop their own unique style of communication.

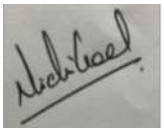
Pre-requisites: None

Course Outcomes – After completion of the course, the students should be able to:

- Evaluate and analyze their personal communication style while adapting their communication style to better expression of their ideas at workplace.
- Enhance their knowledge of contemporary trends for effective Communication
- Effective comprehension and application of different Communication theories.
- Synthesis their own unique communication style.

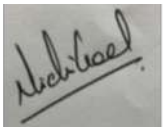
Pedagogy:

The teaching-learning of the course would be organized through lectures, assignments, projects/ presentations and quizzes. Faculty members strive to make the classes interactive so that students can correlate the theories with practical examples for better understanding. Use of ICT, web-based sources as well as flipped class room teaching will be adopted.



Contents

UNIT-I	7 Hours
Introducing Communication: Importance and function of Communication, Communication Cycle, Characteristics and Types of Communication, Channels and Medium of Communication, 7 C's of Communication, Barriers to Communication. Ethics of Communication (plagiarism, language sensitivity towards gender, caste, race, disability etc.	
UNIT-II	7 Hours
Everyday Communication: Non-Verbal Language (Symbols, Appearance, Paralanguageand Body Language, Proxemics, Chronemics), Listening Skills (Importance, Barriers, Essentials of Good Listening), Communication Skills (greetings, introducing, making requests, asking and giving permission, offering help and giving instructions and directions etc.), Understanding Telephone Skills (handling calls, leaving a message, asking and giving information and instructions etc.), Net Etiquettes.	
UNIT-III	7 Hours
Presentations & Employment Communication: Classroom Presentations (purpose, types, preparing and presenting - use of visual aids/ power point presentations), Group Discussion (purpose, strategies, guidelines etc.), Job Application (Resume and Cover Letter), Interview Skills (purpose, types of interviews, guidelines and preparing for facing the interviews). Presentation, Group discussion and Mock interview practice should be undertaken in class.	
UNIT-IV	7 Hours
Writing on the Job: Formal and Informal Writing, Basics of Paragraph Writing, Email Writing, Letters at the workplace, Meeting documentations (Agenda and Minutes of meeting etc.), Report Writing (characteristics, types, structure of formal report).	
Text Books	
1	M. Raman and S. Sharma. Technical Communication: Principles and Practice, 3rd Edition, Oxford University Press, 2011 or latest.
2	M. Ashraf Rizvi, Effective Technical Communication, Tata McGraw Hill Publications, 2005 or latest.
Reference Books	
1	Lewis and Hedwig, Body Language: A Guide for Professionals, New Delhi, Response Books, 2000 or latest.
2	Sides and H. Charles, How to Write & Present Technical Information, Cambridge, CUP, 1999 or latest.
3	S. Kumar and P. Lata. Language and Communication Skills for Engineers, Oxford University Press, 2018.
4	Hasson, Gill. Brilliant Communication Skills. Pearson Education, 2012 or latest.



DIGITAL ELECTRONICS	
Course Code: BEC-104 Contact Hours: L-3 T-0 P-2 Course Category: DCC	Credits: 4 Semester: 2

Introduction: Digital circuits are the basic blocks of modern electronic devices like mobile phones, digital cameras, microprocessors and several other devices. In this course, we will learn the fundamentals of digital circuits and how to engineer the building blocks that go into digital subsystems. We will first learn the basics of Boolean algebra and combinational logic. We will then have a thorough treatment of sequential circuits and state machines. Finally, we will learn how to analyse the performance of digital circuits and how to design high performance circuits.

Course Objective:

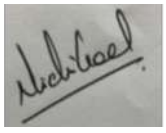
- To understand number representation and conversion between different representation indigital electronic circuits.
- To analyse logic processes and implement logical operations using combinational logiccircuits.
- To understand characteristics of memory and their classification.
- To understand concepts of sequential circuits and to analyse sequential systems in terms ofstate machines.
- To understand concept of Programmable Devices, PLA, PAL, TTL, ECL, CMOS logic families.

Pre-requisite: Basic understanding of diode, transistor operation. If this is not covered in 10+2 Boardof the students, then the same may be studied from Analog Electronics course.

Course Outcome: After successful completion of the course student will be able to

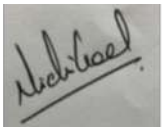
- Create a digital logic and apply it to solve real life problems.
- Analyse, design and implement combinational logic circuits.
- Understand different semiconductor memories.
- Analyse, design and implement sequential logic circuits.
- Analyse digital system design using PLA.

Pedagogy: The teaching-learning of the course would be organized through lectures, assignments, projects/ presentations and quizzes. Faculty members strive to make the classes interactive so that students can correlate the theories with practical examples for better understanding. Use of ICT, web-based sources as well as flipped class room teaching will be adopted.



Contents

UNIT-I	11 Hours
Analog & Digital signals, AND, OR, NOT, NAND, NOR & XOR gates, Boolean algebra. Standard representation of Logical functions, K-map representation and simplification of logical functions, Don't care conditions, X-OR & X-NOR simplification of K-maps. Combinational circuits: Multiplexers, demultiplexers, Decoders & Encoders, Adders & Subtractor, Code Converters, comparators, decoder/ drivers for display devices.	
UNIT-II	10 Hours
Flip Flops: S-R, J-K, D & T Flip-flops, excitation table of a flip-flop, race around condition. Sequential circuits: Shift registers, Ripple counter, Design of Synchronous counters and sequence detectors, sequence generators.	
UNIT-III	11 Hours
A/D and D/A converters: ADC Performance Characteristics - Resolution, Sampling Rate, Dynamic Range; Binary-weighted DAC, R-2R Ladder type networks, Successive-approximation ADC, Linear ramp ADC, Dual-slope ADC. Logic Families: Characteristics, RTL and DTL circuits, TTL, ECL and CMOS Logic families. Comparison of all Logic Families.	
UNIT-IV	10 Hours
Logic Implementations using ROM, PAL & PLA. Semiconductor Memories: Memory organization & operation, classification and characteristics of memories, RAM, ROM and content addressable memory.	
Text Books	
1	R.P. Jain, "Modern Digital Electronics", TMH, 4th Edition, 2014.
2	Morris Mano, "Digital Design", PHI, 5th Edition. 2014.
3	Malvino and Leach, "Digital principles and applications", TMH, 7th Edition, 2010.
Reference Books	
1	R. J. Tocci, "Digital Systems", PHI, 10th Edition, 2009.
2	I. J. Nagrath, "Electronics, Analog & Digital", PHI, 2nd Edition, 2013.
3	J. M. Yarbrough, "Digital Logic-Application and Design", PWS Publishing, 4th Edition, 2012.



SIGNAL AND SYSTEMS	
Course Code: BEC-106 Contact Hours: L-3 T-0 P-2 Course Category: DCC	Credits: 4 Semester:2

Introduction: Introduction to analog and digital signal processing, a topic that forms an integral partof engineering systems in many diverse areas, including seismic data processing, communications, speech processing, image processing, defense electronics, consumer electronics, and consumerproducts. The course presents and integrates the basic concepts for both continuous-time and discrete-time signals and systems. It addresses the following topics: classifications of signals and systems, basic signal operations, linear time-invariant (LTI) systems, time-domain analysis of LTI systems, signal representation using Fourier series, continuous-time Fourier transform, discrete-time Fourier transform, and Laplace transform.

Course Objective: The course will provide strong foundation on signals and systems which will be useful for creating foundation of communication and signal processing. The students will learn basiccontinuous time and discrete time signals and systems. Student will understand application of varioustransforms for analysis of signals and systems both continuous time and discrete time. Students will also explore to power and energy signals and spectrum.

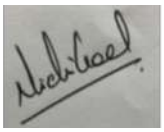
- Foundation of signals and systems for electrical, electronics and electronics and Communication engineering.
- Create strong foundation of communication and signal processing to be studied in the subsequent semester.
- Students will also explore to power and energy signals and spectrum.

Pre-requisite: Inclination to learn mathematics, basic knowledge of differential equations and difference equations, electrical circuits and networks.

Course Outcome: After successful completion of the course, student will be able to

- Understand about various types of signals, classify them, analyse them, and perform variousoperations on them.
- Understand about various types of systems, classify them, analyse them and understand theirresponse behaviour.
- Apply transforms in analysis of signals and system.
- Analyse the effects of applying various properties and operations on signals and systems bycarrying out simulation

Pedagogy: The teaching-learning of the course would be organized through lectures, assignments, projects/ presentations and quizzes. Faculty members strive to make the classes interactive so that students can correlate the theories with practical examples for better understanding. Use of ICT, web-based sources as well as flipped class room teaching will be adopted.



Contents

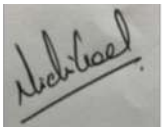
UNIT-I	11 Hours
Introduction: Continuous and Discrete – Time Signals & their Classification, Continuous & Discrete– Time system & their properties. Linear Time Invariant Systems, properties of LTI systems, State variable Description for LTI systems, Convolution for Continuous- time systems (CTS), convolution for Discrete time systems (DTS), Correlation of DTS.	
UNIT-II	10 Hours
Fourier analysis for CTS: Importance of Frequency Domain Analysis, Response of LTI systems to Exponential Signals, Periodic signals and properties, Fourier Transform (FT) its Properties, system analysis of LTI system using FT Fourier	
UNIT-III	11 Hours
Discrete Time Fourier Series (DFS), Discrete Time Fourier transform (DTFT) & its properties analysis of LTI system using DFS, DTFT. Time and Frequency Characterization of Signals and Systems: The Magnitude Phase Representation of the Fourier Transform, Classification of Linear and Nonlinear phase, Phase Delay and Group Delay. Min Phase system, Max phase system, all passsystem	
UNIT-IV	10 Hours
Sampling: The sampling Theorem, Effect of under sampling, aliasing, interpolation, signal reconstruction using zero order hold system, Sample and Hold circuit. Z- Transform: Definitions and Properties, Significance and properties of ROC, Inversion of Z-Transform using partial fractionsand residue theorem, Application of Z-transform for LTI system	

Text Books

1	Alan V. Oppenheim, Alan S. Wilsky and Nawab, "Signals and Systems", Prentice Hall ,2nd Edition ,2017
2	JG.Proakis and DG.Manolakis, "Digital Signal Processing Principles, Algorithms and Applications", 4th Edition, Pearson, 2009
3	Simon Haykin and Bary Van Veen," Signals and Systems", Wiley India Publications,2nd Edition,2002

Reference Books

1	Michal J. Roberts and Govind Sharma, "Signals and Systems", Tata Mc-Graw Hill Publications,2nd Edition ,2017
2	B.P.Lathi , "Linear Systems and Signals", Oxford University Press,3rd Edition, 2017
3	Ramesh Babu, "Signal & Systems", Scitech, 4th Edition, 2011



PROGRAMMING WITH PYTHON	
Course Code: BAI-110 Contact Hours: L-3 T-0 P-2 Course Category: DCC	Credits: 4 Semester: 2

Introduction: Python is a versatile programming language, suitable for projects ranging from small scripts to large systems. It is widely used in many scientific areas for data exploration. This course will be useful for both text and data processing.

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Course Objective:

- To know the basics of algorithmic problem solving for reading and writing Python programs.
- To develop Python programs with conditionals and loops.
- To use Python data structures – lists, tuples dictionaries.
- To define Python functions and call them.
- To do input/output with files in Python

Prerequisite: Nil

Course Outcomes:

Having successfully completed this course, the student will be able to

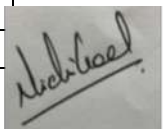
- Write python programs that solve simple business problems.
- Create python applications that are robust and multithreaded.
- Manage exceptions in Python
- Write simple GUI interfaces for a program to interact with users, and to understand the event-based GUI handling principles in python.

Pedagogy:

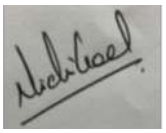
The teaching-learning of the course would be organized through lectures, assignments, projects/ presentations and quizzes. Faculty members strive to make the classes interactive so that students can correlate the theories with practical examples for better understanding. Use of ICT, web-based sources as well as flipped class room teaching will be adopted.

Contents

UNIT-I	10 Hours
Introduction to Python programming language, The concept of data types, variables, assignments, immutable variables, numerical types, arithmetic operators, Data and Expressions, Literals, Variables and Identifiers, Understanding error messages, Conditions, Boolean Logic, Logical Operators, ranges, Control statements: if-else, loops (for, while);	
UNIT-II	11 Hours
Strings and text files; manipulating files and directories, os and sys modules; text files: reading/writing text and numbers from/to a file; creating and reading a formatted file (csv or tab separated); String manipulations: subscript operator, indexing, slicing a string, Lists, Tuples, and Dictionaries; basic list operators, replacing, inserting, removing an element; searching and sorting lists; dictionary literals, adding and removing keys, accessing and replacing values; traversing dictionaries; Function, Execution of A Function, Keyword and Default Arguments, Scope Rules.	
UNIT-III	10 Hours



Exception, Testing and Debugging: Handling if exceptions to handle the code cracks, handling and helping file operations, coding with the exceptional handling and testing Anonymous method, Properties, Indexers, Exception Handling	
UNIT-IV	11 Hours
Python packages: Simple programs using the built-in functions of packages like matplotlib, numpy, pandas etc., Graphical user interfaces; Tkinter introduction, Tkinter and Python Programming, event-driven programming paradigm; creating simple GUI; buttons, Labels, entry fields, dialogs; widget attributes - sizes, fonts, colors layouts, nested frames.	
Textbooks	
1	C. Dierbach, Introduction to Computer Science Using PYTHON: A Computational Problem-Solving Focus (1st Edition), Wiley, 2015 or latest.
2	Let Us Python, Yashavant Kanetkar, BPB Publishers, 2019, 1st edition
Reference Books	
1	Allen B. Downey, Think Python: How to Think Like a Computer Scientist (2nd Edition), O'Reilly, 2016 or latest.
2	Martin C. Brown, Python: The Complete Reference (4th Edition), McGraw-Hill, 2018.



ENVIRONMENTAL SCIENCES	
Course Code: BAS-106 Contact Hours: L-2 T-1 P-2 Course Category: ASH	Credits: 4 Semester: 2

Introduction:

A scientific study of the natural world and how it is influenced by people. It Surveys environmental studies, examining ecological, socioeconomic, and technological factors that influence the quality of life on Earth.

Course Objectives:

- Environmental science prepares students for career success in environmental monitoring and remediation, natural resources and conservation, public health, industrial environmental management.
- The curriculum is so designed that the students get an in-depth knowledge of the environment and various issues arising due to mismanagement of resources.

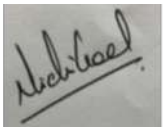
Pre-requisites: None

Course Outcomes:

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

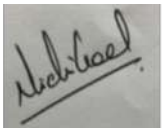
- Plan and execute experiments that demonstrate the use and understanding of modern instruments, accurate quantitative measurements, appropriate recording skills, safe lab practices.
- Understand and evaluate the transnational character of environmental problems and ways of addressing them, including interactions across local to global scales
- Analyze data statistically, assess reliability, interpret results and draw reasonable conclusions.
- Gain comprehensive knowledge of interdisciplinary branches like Toxicology, Green Technology, synthesis and applications of Eco friendly polymers.

Pedagogy: The teaching-learning of the course would be organized through lectures, assignments, projects/ presentations and quizzes. Faculty members strive to make the classes interactive so that students can correlate the theories with practical examples for better understanding. Use of ICT, web-based sources as well as flipped class room teaching will be adopted.

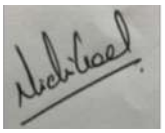


Contents

UNIT-I	6 Hours
Natural Resources, Conservation and Management: Forest resources: Use and over-exploitation, deforestation, Timber extraction, mining, dams and their effects on forest and tribal people. Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water. Mineral resources: Environmental effects of extracting and using mineral resources. Food resources: World food problems, changes caused by agriculture and over-grazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity. Energy resources: Growing energy needs renewable and non-renewable energy sources. Resource Management-Concept of Sustainable development, Environmental Management Systems, Environmental Impact Assessment, Biodiversity- conservation and threats.	
UNIT-II	8 Hours
Environmental Pollution and Control: Air Pollution: Types of air pollutants; Source, effects, sink & control of common air pollutants (CO, oxides of nitrogen & sulphur, hydrocarbons and particulates), Photochemical smog, acid rain, greenhouse effect, global warming, Carbon dioxide sequestration and the concept of Carbon Credits Water Pollution: Classification of pollutants and their sources, Waste water treatment (Primary, secondary and tertiary treatment), Impact of water pollution on hydrological ecosystems. Solid and Hazardous Waste Pollution: Classification, waste treatment and disposal methods: Sanitary landfill, thermal processes, chemical and biological processes, disposal methods for nuclear waste, nuclear disaster (case study), disposal methods for e-waste. Green Technology And Green Chemistry: Introduction to concept of Green Technology and Zero Waste Technology, Green Chemistry & its basic principles, Atom Economy, evaluation of feedstock, reaction types, methods, reagents and solvents.	
UNIT-III	8 Hours
Fuels and Alternate Energy Sources: Classification, Calorific value of fuels (gross and net), Dulong's formula, Determination of calorific value of fuels using bomb's calorimeter, Determination of calorific value of fuels using Boy's Gas Calorimeter (Numerical). Liquid fuels-petroleum chemical composition, fractional distillation, Cracking – Thermal & catalytic cracking, Octane & Cetane numbers with their significance. Analysis of flue gases (Orsat's Apparatus)-(Numerical), Combustion of fuels. Use of alternate energy sources including solar energy harnessing (photovoltaic), wind energy, hydro-energy, geothermal energy, ocean energy, biodiesel, power alcohol, biomass energy.	
UNIT-IV	6 Hours
Chemical Toxicology and Eco-Friendly Polymers Toxicology: terminology & toxic effects, chemical interactions, impact of toxic chemicals on enzymes, Biochemical effects of arsenic, mercury, lead, chromium, & cadmium. Polymers-Introduction: Functionality of monomer, polymerization, degree of polymerization, Number average and weight average molecular weight of polymers. Environmental degradation of polymers: Biodegradable, Photo-biodegradable polymers, Hydrolysis & Hydro-biodegradable polymers Biopolymers & Bioplastics.	



Text Books	
1	Ranu Gadi, Sunita Rattan, Sushmita Mohapatra. A Text book of Environmental Studies (with experiments), 4th Ed., S. K. Kataria & Sons, 2014.
2	S. Rattan, "Applied Chemistry", S.K. Kataria & Sons, 2013.
3	S. S. Dara, D. D. Mishra. A Textbook of Environmental Chemistry and Pollution Control (With Energy, Ecology, Ethics and Society) S. Chand and Company Pvt. Ltd. (India), 2011.
Reference Books	
1	Richard T. Wright, Environmental Science, 9th Edition, Pearson Education, 2007.
2	Gerard Kiely, Environmental Engineering, special Indian edition The McGraw-Hill Companies, 2007.
3	E. Barucha, Textbook of Environmental Studies for Undergraduate Courses, Universities Press (India) Pvt. Ltd., 2005.
4	C.N. Sawyer, P.L. McCarty, and G.F. Parkin, "Chemistry for Environmental Engg. and Science", 5th Ed., The McGraw-Hill Companies, 2003.
5	R. Rajagopalan, Environmental studies from crisis to cure, 3rd edition, Oxford University Press., 2016.



PROBABILITY AND STATISTICS	
Course Code: BAS-108 Contact Hours: L-3 T-1 P-0 Course Category: ASH	Credits: 4 Semester: 2

Students will learn fundamental rules of Probability, discrete and continuous distributions, and statistical methods most commonly used in Computer Science and & Engineering.

Course Objectives:

- This course aims at providing the required skill to apply the statistical tools in engineering problems.
- To introduce the basic concepts of probability and random variables.
- To introduce the basic concepts of two dimensional random variables.
- To acquaint the knowledge of testing of hypothesis for small and large samples which plays an important role in real life problems.

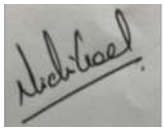
Course Outcomes:

On completion of the course, the student should be able to:

- Conduct simple calculations of probabilities and conditional probabilities, in particular by using methods for independent events;
- Give an account of basic properties for random variables and for the most common probability distributions, as well as calculations of expectations and variances for these distributions;
- Use probabilistic methods in some areas of applications;
- Explain the basics of statistical surveys and for methods of descriptive statistics;
- Implement the above concepts in EXCEL/R/Mathematica.

Prerequisite: NIL

Pedagogy: The teaching-learning of the course would be organized through lectures, assignments, projects/ presentations and quizzes. Faculty members strive to make the classes interactive so that students can correlate the theories with practical examples for better understanding. Use of ICT, web-based sources as well as flipped class room teaching will be adopted.



Contents

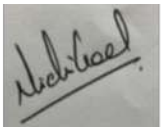
UNIT – I	14 Hours
PROBABILITY AND RANDOM VARIABLES Concept of probability, additive and multiplicative law of probability, total and conditional probabilities, Baye's theorem. Measures of Central Tendency, dispersion, kurtosis, moments. Random Variables, density and distribution functions, mathematical expectation, variance, standard deviation and moment generating function.	
UNIT – II	8 Hours
TWO – DIMENSIONAL RANDOM VARIABLES Jointly distributed random variables, Marginal and conditional distributions, Expected values, Covariance and Correlation. Central limit theorem (for independent and identically distributed random variables).	
UNIT – III	10 Hours
PROBABILITY DISTRIBUTIONS AND REGRESSION Binomial, Poisson, Geometric, Uniform, Exponential and Normal distributions. Linear Correlation, Correlation Coefficient, Rank Correlation Coefficient, Regression.	
UNIT –IV	10 Hours
APPLIED STATISTICS Formation of Hypothesis, Test of significance: Large sample test for single proportion, Difference of proportions, Single mean, Difference of means, and standard deviations. Test of significance for small samples: t- Test for single mean and difference of means, t-test for correlation coefficients, F- test for ratio of variances, Chi-square test for goodness of fit and independence of attributes.	
Case Study / Implementation of above concepts using Excel.	

Text Books

1.	Montgomery, Douglas C., and George C. Runger. "Applied Statistics and Probability for Engineers", John Wiley & Sons, 7th Edition (2018) or latest.
2.	Sheldon Ross M., Introduction to Probability and Statistics for Engineers and Scientists, Academic Press, 6th Edition (2020) or latest.
3.	Rukmangadachari E., and Keshava, Reddy E. Probability and Statistics, Pearson Education India (2015) or latest.
4.	Ravichandran J., Probability and Statistics for Engineers. Wiley India, 2010.

Reference Books

1.	Devore, Jay L. "Probability and Statistics for Engineering and the Sciences", 8th Edition, Cengage (2010) or latest.
2.	Scheaffer, Richard, Madhuri Mulekar, and James McClave. Probability and Statistics for Engineers. Nelson Education, 2010.
3.	Meyer, Paul L. Introductory Probability and Statistical Applications. 2nd Edition, Oxford and IBH publishing, 1965.
4.	Gupta S.C. and Kapoor V.K., Fundamentals of Mathematical Statistics, S Chand Publications, 11th Edition(20) or latest



IT WORKSHOP	
Course Code: BAI-108 Contact Hours: L-1 T-0 P-2 Course Category: DCC	Credits: 2 Semester: 2

Introduction: IT Workshop is a practical course where students will learn programming with R. R is capable of handling mathematical and statistical manipulations. It has its own programming language as well as built-in functions to perform any specialized task.

Course Objectives:

- To introduce students to the statistical package R for data analysis.
- To use R to perform descriptive statistics including graphics, perform basic inferential statistical analyses including regression analysis, read and write data files,
- To perform basic data manipulations (eg, creating new variables, merging data sets), write and use R script files, use R packages, write and use R functions, and perform basic programming in R.

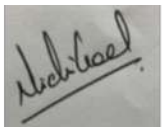
Pre-Requisites: Fundamentals of Mathematics background.

Course Outcomes:

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

- Perform simple calculations, make simple plots and perform multiple operations in sequence, or at once
- Troubleshoot errors
- Perform exploratory data analysis, data modeling and interpretation of results
- Format “clean” data and clean up “dirty” data

Pedagogy: The teaching-learning of the course would be organized mainly through lectures, and practical sessions in lab. Faculty members strive to make the classes interactive so that students can correlate the theories with practical examples for better understanding. Use of ICT, web-based sources as well as flipped class room teaching will be adopted.



Contents

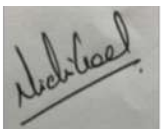
UNIT I	11 Hours
An overview of R language: Basic fundamentals, installation and use of software, data editing, use of R as a calculator, functions and assignments. getting R and running R, R packages expressions, objects, symbols, functions Special Values	
UNIT II	11 Hours
Constants, Numeric vectors, Character vectors, operators. R syntax, Data structure in R (Matrices, Arrays, Factors, Data frames), Attributes, Symbols and environment, Functions, Loading, saving, and editing data in R, combining datasets, transformations, Binning data	
UNIT III	10 Hours
Subsets, summarizing functions, data cleaning. Analyzing data, probability distribution, continuous data , discrete data, T-test design, Anova Test design, introduction to regression, linear model, smoothening	
UNIT IV	10 Hours
Graphics and Plots: Scatter plots, bar charts, pie charts, three-dimensional data, plotting distribution, customizing charts, basic graphic functions common arguments for chart functions.	

Text Books:

1	Long, James D., and Paul Teetor. R Cookbook: Proven Recipes for Data Analysis, Statistics, and Graphics. O' Reilly Media, 2019.
2	Christian Heumann, Michael Schomaker and Shalabh, Introduction to Statistics and Data Analysis - With Exercises, Solutions and Applications in R, Springer, 2016
3	Pierre Lafaye de Micheaux, Rémy Drouilhet, Benoit Liquet, The R Software-Fundamentals of Programming and Statistical Analysis, Springer 2013

Reference Books:

1	Alain F. Zuur, Elena N. Ieno, Erik H.W.G. Meesters, A Beginner's Guide to R (Use R), Springer 2009
2	Hadley Wickham, ggplot2 Elegant Graphics for Data Analysis, Springer 2016
3	Internet Sources: www.nptel.ac.in



INDIRA GANDHI DELHI TECHNICAL UNIVERSITY FOR WOMEN

(Established by Govt. of Delhi vide Act 9 of 2012)

Department of Artificial Intelligence and Data Sciences
Proposed Teaching Scheme BTech – CSE (AI)
Academic Session 2022-2026

SEMESTER I

Code	Subject	L-T-P	Credits	Category
BAI-101	Intelligent Systems	3-0-0	3	DCC
BAI-103	Computer Organization and Architecture	3-0-2	4	DCC
BAI-110	Programming with Python	3-0-2	4	DCC
BAS-107	Applied Physics	3-0-2	4	ASH
BAS-109	Applied Mathematics	3-1-0	4	ASH
HMC-110	Communication Skills	3-1-0	4	HMC
		Total	23	

SEMESTER II

Code	Subject	L-T-P	Credits	Category
BAI-102	Object Oriented Programming using Java	3-0-2	4	DCC
BAI-104	Introduction to Data Science	3-0-2	4	DCC
BAI-106	Database Management Systems	3-0-2	4	DCC
BAI-108	IT Workshop	1-0-2	2	DCC
BAS-106	Environmental Science	2-1-2	4	ASH
BAS-108	Probability and Statistics	3-1-0	4	ASH
		Total	22	

INTELLIGENT SYSTEMS

Course Code: BAI-101 Contact Hours: L-3 P-0 C-0 Course Category: DCC	Credits: 3 Semester: 1

Introduction

The field of computer science has continuously evolved to build intelligent systems. The design and development of intelligent systems grounded in the field of artificial intelligence is becoming quite popular in Computer Science. The fundamental question 'Can intelligent systems mimic humans and surpass them in all kinds of work?' has kept computer scientists occupied for many decades in the past, and will continue to occupy them in future. This course is a gentle introduction to the field of intelligent systems.

Course Objectives

- Understand the basic building blocks of Intelligent Systems.
- Appreciate some of the approaches to build Intelligent Systems.
- Understand the importance of application of Intelligent Systems in different domains.

Pre-requisites: None

Course Outcomes: Upon successful completion of the course, students will be able to:

CO1: Identify & explain the different characteristics and structure to design intelligent systems.

CO2: Learn and relate the different data-driven approaches to build intelligent systems.

CO3: Demonstrate the applicability of Intelligent systems with different technologies.

CO4: Apply the technologies of Intelligent systems in real-time applications.

CO-PO Mapping:

CO /PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	2	1	1	1	-	-	-	-	-	1	-	1	1	1	1
CO 2	2	2	1	1	-	-	-	-	-	1	-	1	2	2	2
CO 3	2	1	3	3	1	1	-	-	1	1	1	2	2	3	2
CO 4	3	2	3	2	2	1	-	-	1	1	2	2	3	2	2

Pedagogy

The teaching-learning of the course would be organized through lectures, assignments, case studies/presentations and quizzes. Faculty members strive to make the classes interactive so that students can correlate the theories with practical examples for better understanding. Use of ICT, web-based sources as well as flipped class room teaching will be adopted.

CONTENTS

COMPUTER ORGANIZATION AND ARCHITECTURE	
Course Code: BAI-103 Contact Hours: L-3 T-0 P-2 Course Category: DCC	Credits: 4 Semester: 1

Introduction:

In order to achieve complete understandings of computer systems, it is always important to consider both hardware and software design of various computer components. In other words, every functionality of the computer has to be studied to increase the performance of the computer. Computer organization and architecture mainly focuses on various parts of the computer in order to reduce the execution time of the program, improve the performance of each part.

Course Objectives:

- Understand the basics of computer organization: structure and operation of computers and their peripherals.
- Understand basic processing unit and organization of simple processor.
- Expose different ways of communicating with I/O devices and standard I/O interfaces.
- Understand concept of pipelining and other large computing system.

Pre-requisite: Fundamentals of computers and digital logic.

Course Outcomes: Upon successful completion of the course, students will be able to:

CO1: Define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation.
CO2: Understand the theory and architecture of the central processing unit.
CO3: Analyse some of the design issues in terms of speed, technology, cost, performance.
CO4: Explain the concepts of pipelining, memory management and interrupt handling.

CO-PO Mapping:

CO /PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	2	1	1	-	1	-	-	-	1	-	-	1	-	1	1
CO 2	2	2	1	-	-	-	-	-	1	-	-	1	-	1	1
CO 3	2	2	2	2	1	-	-	-	1	-	-	2	-	2	1
CO 4	1	1	2	-	-	-	-	-	1	-	-	1	-	1	1

Pedagogy:

The teaching-learning of the course would be organized through lectures, assignments, projects/ presentations and quizzes. Faculty members strive to make the classes interactive so that students can correlate the theories with practical examples for better understanding. Use of ICT, web-based sources as well as flipped class room teaching will be adopted.

CONTENTS

UNIT-I	12 Hours
Digital Logic Circuit: Basic Logic functions, Synthesis of logic functions using basic and universal gates, Boolean Algebra Properties, Flip-Flops, Registers, Shift- Registers, Counters, Decoders, Multiplexers, Functional Unit of computer system. Data Representation: Data types, R & (R-1)'s Complements, Fixed-Point representation, Floating point representation. Register Transfer and Micro operations: Register transfer language, register transfer, Bus and Memory transfer, Arithmetic Micro operations, Logic Micro operations, Shift Microoperations	
UNIT-II	**10 Hours**
Basic Computer Organisation and Design: Instruction Codes, Computer Instructions, Timing and Control, Instruction Cycle, Memory Reference Instructions, Input-Output and Interrupt. Micro programmed Control: Control Memory. Central Processing Unit: Stack Organization, Instruction Formats, Addressing Modes, Program Control, Reduced Instruction Set Computer: RISC characteristics, CISC characteristics. Performance and Metrics	
UNIT-III	**10 Hours**
Pipelining and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipelining, Instruction Pipelining, RISC Pipelining, Vector Processing, Array Processors. Computer Arithmetic: Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating- Point Arithmetic Operations.	
UNIT-IV	**10 Hours**
Input-Output Organization: Peripheral Devices, Input-Output interface, Asynchronous data transfer, Modes of transfer, Priority Interrupt, Direct Memory Access. Memory organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware.	
Text Books	
1.	M. Morris Mano, Computer System Architecture, PHI, 3rd/Latest Edition
2.	Carl Hamacher, Zvonko Vranesic, Safwat Zaky, Computer Organization, 5th/Latest Edition, McGraw Hill.
3.	Martin S, Computer Organization, PHI publication, 2012
Reference Books	
1.	William Stallings, Computer Organization and Architecture, 6th/Latest Edition, Pearson/PHI.

2.	John L. Hennessy and David A. Patterson, Computer Architecture a quantitative approach, 4th Edition (Kindle)

PROGRAMMING WITH PYTHON	
Course Code: BAI-110 Contact Hours: L-3 T-0 P-2 Course Category: DCC	Credits: 4 Semester: 1

Introduction: Python is a versatile programming language, suitable for projects ranging from small scripts to large systems. It is widely used in many scientific areas for data exploration. This course will be useful for both text and data processing.

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Course Objective:

- To know the basics of algorithmic problem solving for reading and writing Python programs.
- To develop Python programs with conditions and loops.
- To use Python data structures –- lists, tuples dictionaries.
- To define Python functions and call them.
- To do input/output with files in Python

Prerequisite: Nil

Course Outcomes: Upon successful completion of the course, students will be able to:

CO1: Learn the basic syntax & structure of python programming language.
CO2: Implement the manipulation of string files, iterable objects using functions.
CO3: Interpret and apply exception handling for error free execution of python programs.
CO4: Write simple GUI interfaces for a program to interact with users, and to understand the event-based GUI handling principles in python.

CO-PO Mapping:

CO /PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	2	2	2	1	1	-	-	-	1	-	-	1	1	1	2
CO 2	2	2	2	2	1	-	-	-	1	-	-	1	2	1	2
CO 3	1	2	1	1	2	-	-	-	1	-	1	2	1	2	2
CO 4	1	2	3	2	2	-	-	-	2	1	2	2	3	3	3

Pedagogy
Lectures will be imparted along with hands-on lab sessions and the latest real-world case studies where python can be used.

CONTENTS

UNIT-1	10 hours
The Structuring Programming Principle, Program Structuring, Stepwise refinement, Introduction to Python programming language, The concept of data types, variables, assignments, immutable variables, numerical types, arithmetic operators, Data and Expressions, Literals, Variables and Identifiers, Understanding error messages, Conditions, Boolean Logic, Logical Operators, ranges, Control statements: if-else, loops (for, while);	
UNIT-2	**10 hours**
Strings and text files; manipulating files and directories, os and sys modules; text files: reading/writing text and numbers from/to a file; creating and reading a formatted file (csv or tab separated); String manipulations: subscript operator, indexing, slicing a string, Lists, Tuples, and Dictionaries; basic list operators, replacing, inserting, removing an element; searching and sorting lists; dictionary literals, adding and removing keys, accessing and replacing values; traversing dictionaries; Function, Execution of A Function, Keyword and Default Arguments, Scope Rules.	
UNIT-3	**10 hours**
Exception, Testing and Debugging: Handling if exceptions to handle the code cracks, handling and helping file operations, coding with the exceptional handling and testing Anonymous method, Properties, Indexers, Exception Handling	
UNIT-4	**10 hours**
Python packages: Simple programs using the built-in functions of packages like matplotlib, numpy, pandas etc., Graphical user interfaces; Tkinter introduction, Tkinter and Python Programming, event-driven programming paradigm; creating simple GUI; buttons, labels, entry fields, dialogs; widget attributes - sizes, fonts, colors layouts, nested frames.	
Textbooks	
1. C. Dierbach, Introduction to Computer Science Using PYTHON: A Computational Problem-Solving Focus (1st Edition), Wiley, 2015.	
2. Let Us Python, Yashavant Kanetkar, BPB Publishers, 2019, 1st edition	
Reference Books	
1. Allen B. Downey, Think Python: How to Think Like a Computer Scientist (2nd Edition), O'Reilly, 2016.	
2. Martin C. Brown, Python: The Complete Reference (4th Edition), McGraw-Hill, 2018.	

APPLIED PHYSICS	
Course Code: BAS-107 Contact Hours: L-2T-1 P-2 Course Category: BAS	Credits: 4 Semester: 1

Introduction: Physics is a subject that is continuously evolving with latest research. The scientific principles of physics are basis of various devices, applications and technological breakthrough. This Applied Physics course has been designed to cover the wide ranging topics of the physics that have direct impact on technological advancements. In this course you will learn various concepts of modern and device-oriented physics that will enhance your ability to apply fundamentals to various applications.

Course Objectives:

- To introduce the students with the wide-ranging topics of the modern physics such as electromagnetic theory, quantum mechanics, optics, and its applications in the form of lasers and optical fiber communication. These topics form the underlying principles of various technologies.
- To impart an in-depth knowledge of everyday systems and phenomena surrounding them and explain the underlying physics.
- To enhance the ability of students to apply physics fundamentals to various modern applications for societal benefits.
- To develop a quantitative aptitude for solving engineering problems.
- To perform and interpret experiments using modern tools, techniques and write effective lab reports to various engineering problems, with an understanding of the limitations

Pre-requisites: None

Course Outcomes: Having successfully completed this course, the student will be able to

CO1: Gain knowledge of different concepts in Optics and optical devices.

CO2 : Understandthelawsof Electromagnetic(EM) theoryand solveengineering problems, based on propagation of EM waves in different media.

CO3 : Explain the basic principles and laws of Quantum Mechanics and examine the quantum mechanicalbehavior of a particle in a 1-D box.

CO4: Describe the principles of LASER and optical fibers and study their modern-day applications.

Pedagogy: Classroom teaching which focuses upon relating the textbook concepts with real world phenomena, supplemented with periodic tutorial classes to enhance the problem-solving ability. The students would perform experiments to develop a deeper insight into the underlying principles of Physics.

CO-PO Mapping:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PS02	PSO3
CO1	3	2	1	2	2	-	-	1	1	1	-	-	-	-	-
CO2	3	3	-	2	-	1	-	1	-	-	-	-	-	-	-
CO3	3	2	-	2	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	2	2	2	2	1	1	1	1	-	-	-	-	-
Average	3	2.25	0.75	2	1	0.75	0.25	0.75	0.5	0.5	-	-	-	-	

CONTENTS

UNIT-1 **8 Hours**

OPTICS

Coherent Sources, Temporal and Spatial Coherence, Interference due to Division of wave-front and Division of Amplitude, Interference in Parallel Thin Films, Fresnel Diffraction at Straight Edge, Fraunhofer Diffraction due to Single Slit, N Slits, Diffraction Grating (absent spectra, maxima, resolving and dispersive power of grating (Formula only without derivation)

Polarization, Malus Law, Brewster Law, Double Refraction, Nicol Prism, Production of Plane, Elliptically and Circularly Polarized Light.

UNIT-2 **8 Hours**

ELECTRO MAGNETIC THEORY

Introduction to gradient divergence, curl, Gauss divergence theorem and Stoke's theorem (without proof). Electromagnetic Waves, Electromagnetic spectrum, Equation of Continuity, Maxwell's Equations, Poynting Theorem (No Derivation), Propagation of Electromagnetic Waves in Free Space, Dielectric and Conducting Medium (Qualitative), Skin Depth.

UNIT-3 **7 Hours**

QUANTUM MECHANICS

Origin of Quantum Mechanics, De Broglie Hypothesis, Heisenberg Uncertainty Principle, Postulates of Quantum Mechanics, Wave Function and Properties, Group and Phase velocity, Time Independent Schrodinger Wave Equation, Particle in 1-D Box.

UNIT-4 **5 Hours**

LASER AND OPTICAL FIBER COMMUNICATION

Stimulated and Spontaneous Emission, Principle of LASER, Einstein's A and B Coefficients, Components of LASER, He-Ne LASER.

Optical Fibers, Step Index and Graded Index Fibers, Numerical Aperture, Acceptance angle, Pulse Dispersion in Optical Fibers, Schematic of optical fiber communication.

Textbooks

1	H. K. Malik and A. K. Singh, "Engineering Physics", 2nd Edition, Mc Graw Hill Ed, 2017.
2	M. C. Jain, "Textbook of Engineering Physics", 1st Edition, Vol. I and II, Phi Learning Pvt Limited, 2009.
3	G. Aruldhas, "Engineering Physics", Phi Learning Pvt Limited 2010.
4	Abhijit Nayak, "Engineering Physics", S K Kataria and sons, 2011
5	M N Avadhanulu, P G Kshirsagar and TVS Arun Murthy, "A Textbook of Engineering Physics", S Chand Publishing, 11th Edition, 2018.

Reference Books	
1	Wilson and J.F.B Hawkes, "Optoelectronics", 3rd Edition, Prentice Hall Europe, 1998.
2	F. K. Richtmyer, E. H. Kennard, and J. N. Cooper, "Introduction to Modern Physics" 6th Edition, Tata Mc Graw Hill, 1997.
	D.J. Griffith, "Introduction to Electrodynamics ",4thEdition, Pearson Education India Learning Private Limited, 2015.
3	Arthur Beiser, Shobhit Mahajan and S. Rai Choudhury, "Concepts of Modern Physics", 7th Edition, Mc Graw Hill,2015 Eugene Hecht and A.R. Ganesan, "Optics",5th Edition, Pearson Education, 2019.
4	William H. Hayt and J. A Buck, 6th Edition, "Engineering Electromagnetism", 2001.
5	Ajoy K. Ghatak, "Optics", 7th Edition, McGraw Hill Education India Private Limited, 2020.
6	David J Griffiths and Darrell F. Schroeter, "Introduction to Quantum Mechanics", 3rd Edition, Cambridge University Press India Pvt Ltd, 2019.

APPLIED MATHEMATICS	
Course Code: BAS-109 Contact Hours: L-3 T-1 P-0 Course Category: BAS	Credits: 4 Semester: 1

Introduction: Mathematics is used in almost every field of engineering be it computer science and information technology wherein it may be used in modeling, machine learning, image processing etc., or by electrical engineers for signal processing, control engineering or by mechanical engineers for design, modeling, manufacturing etc. But the problem faced by engineers is to how to apply the basic mathematical concepts in engineering problem which they would be dealing in coming years. The course covers the various topics of engineering mathematics such as matrices, sequences and series, calculus of functions of more than one variable and vector calculus.

Course Objective:

- The students will be made familiar with the concepts of matrices, sequences and series.
- To provide students with skills and knowledge of calculus of functions of several variables and vector calculus which would enable them to devise solutions for given situations they may encounter in day to day engineering problems.

Prerequisite: Fundamentals of matrices, calculus of functions of single variable, vectors.

Course Outcomes (CO)

Having successfully completed this course, the student will be able to

CO1: Determine rank, inverse, eigen values and eigen vectors of a matrix and apply them in engineering problems.

CO2: Find the basis and dimension of vector spaces and apply the concept of vector spaces using linear transform.Also, understand the concept of Laplace Transforms and solve initial and boundary value problems using Laplace transforms.

CO3: Evaluate partial derivatives and find the maxima/minima for functions of two or more variables to solve applied problems in engineering.

CO4: Understand gradient, directional derivatives, divergence and curl.Use Greens', Stokes, Gauss theorems to evaluate multiple integrals.

CO-PO Mapping:

PO / CO	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO 1	3	3	2	1	1	-	-	-	-	-	-	-	-	-	-
CO 2	2	2	1	1	1	-	-	-	-	-	-	-	-	-	-
CO 3	3	3	2	1	1	-	-	-	-	-	-	-	-	-	-
CO 4	3	2	2	1	1	-	-	-	-	-	-	-	-	-	-

Pedagogy: Apart from class room teaching, main focus is to enhance problem solving ability supported by weekly assignments and discussing individual's doubts.

CONTENTS

UNIT-I	**08 Hours**
Inverse of a matrix by elementary transformations, Rank of a matrix (Echelon & Normal form), Linear dependence, Consistency of linear system of equations and their solution, Characteristic equation, Eigen values and eigen vectors, Cayley-Hamilton Theorem (without proof)..	
UNIT-II	**12 Hours**
A brief Introduction to Vector Spaces, Subspaces, Rank and Nullity, Linear Transformations Laplace Transforms: Defn, Laplace transforms of some standard functions, inverse Laplace transforms, Convolution theorem. Fourier Series: Fourier Series, Fourier Series of even and odd functions, Fourier Series of functions having arbitrary periods, half range expansion. Fourier Transforms: Fourier transform, Sine and Cosine transforms	
UNIT-III	**12 Hours**
Differential Calculus: Functions of several variables: Limits, continuity and differentiability, Successive differentiation, Leibnitz theorem, Partial differentiation, Euler's Theorem for homogenous equations. Composite functions, Change of variables, Taylor's and Maclaurin's Series, maxima and minima, Lagrange's method of undetermined multiplier.	
UNIT-IV	**10 Hours**
Vector Calculus : Vector point functions, Gradient, Divergence and Curl and their physical interpretation, Line integrals, Multiple Integrals, Change of order of integration, Surface and Volume integrals, Green's, Gauss Divergence and Stoke's theorems (without proof).	

1.	D. G. Zill and W. S. Wright, "Advanced Engineering Mathematics", 6th Edition, The Jones and Bartlett Learning Publishers, 2016.
2.	Jain R. K. and Iyengar S. R. K., "Advanced Engineering Mathematics", 5th Edition, Narosa Publishing House Pvt. Ltd.2016.
3.	Grewal, B. S. , "Higher Engineering Mathematics", 44th Edition, Khanna Publishers, 2017.
4.	Krishnamurthy, V.K., Mainra, V.P. and Arora, J.L., An introduction to Linear Algebra, Affiliated East West Press
Reference Books	
1.	George B. Thomas Jr., Ross L. Finney, "Calculus and Analytic Geometry", 9th Edition, Pearson Education India, 2010

2.	Greenberg M., “Advanced Engineering Mathematics”, 2nd Edition, Pearson Education, 1998.
3.	KreyszigE. , “Advanced Engineering Mathematics”, 10th Edition, John Wiley & Sons, 2010.

COMMUNICATION SKILLS	
Course Code: HMC-110 Contact Hours: L-3 T-1 P-0	Credits: 4 Semester: Odd

Introduction: This course facilitates communication skills development by exposing the students to various nuances of effective communication. The course provides an in-depth understanding of several key concepts of Communication like importance and functions of communication, barriers to communication, active listening, group discussions, presentation skills etc. The course also provides valid inputs on the *ethical* dimension of communication to enable the students to be ethical communicators.

The highlight of the course is special emphasis on Employment Communication i.e. job application and resume writing along with preparing and appearing for Interviews and Group Discussions. The students will also be acquainted with various forms of business correspondence used in organizations on a regular basis like agenda and minutes of meetings, business letters, reports etc.

Course Objectives:

- To enable students to evaluate their personal communications styles and improve upon it.
- To help the students understand the contemporary trends in communication.
- To facilitate the students in becoming aware of different communication theories and their application.
- To encourage students to develop/create their own unique style of communication.

Pre-requisites: None

Course Outcomes – After completion of the course, the students should be able to:

CO1: Evaluate and analyze their personal communication style while adapting their communication to better expression of their ideas at workplace.

CO2: Enhance their knowledge of contemporary trends for effective Communication.

CO3: Effective comprehension and application of different Communication theories.

CO4: Synthesis their own unique communication style.

CO-PO mapping:

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	-	-	-	-	-	-	-	-	2	3	-	3	-	-	-
CO 2	-	-	-	-	-	-	-	1	2	3	-	3	-	-	-
CO 3	-	-	-	-	-	-	-	-	-	3	-	2	-	-	-
CO 4	-	-	-	-	-	-	-	-	-	3	-	2	-	-	-

Pedagogy: Apart from interactive class teaching, various individual and group assignments are given. Group discussions, JAMs, role plays and presentations are conducted in class to enable students to practically apply the theories learnt during the course.

CONTENTS

UNIT-I	10 Hours
Introducing Communication: Importance and function of Communication, Communication Cycle, Characteristics and Types of Communication, Channels and Medium of Communication, 7 C's of Communication, Barriers to Communication. Ethics of Communication (plagiarism, language sensitivity towards gender, caste, race, disability etc.	
UNIT-II	**11 Hours**
Everyday Communication: Non-Verbal Language (Symbols, Appearance, Paralanguage and Body Language, Proxemics, Chronemics), Listening Skills (Importance, Barriers, Essentials of Good Listening), Communication Skills (greetings, introducing, making requests, asking and giving permission, offering help and giving instructions and directions etc.), Understanding Telephone Skills (handling calls, leaving a message, asking and giving information and instructions etc.), Net Etiquettes.	
UNIT-III	**11 Hours**
Presentations & Employment Communication: Classroom Presentations (purpose, types, preparing and presenting – use of visual aids/ power point presentations), Group Discussion (purpose, strategies, guidelines etc.), Job Application (Resume and Cover Letter), Interview Skills (purpose, types of interviews, guidelines and preparing for facing the interviews). Presentation, Group discussion and Mock interview practice should be undertaken in class.	
UNIT-IV	**10 Hours**
Writing on the Job: Formal and Informal Writing, Basics of Paragraph Writing**,** Email Writing, Letters at the workplace, Meeting documentations (Agenda and Minutes of meeting etc.), Report Writing (characteristics, types, structure of formal report).	
Text Books	
1.	M. Raman and S. Sharma. Technical Communication: Principles and Practice, 3rd Edition, Oxford University Press, 2011.
2.	M. Ashraf Rizvi, Effective Technical Communication, Tata McGraw Hill Publications, 2005.
Reference Books	
1.	Lewis and Hedwig, Body Language: A Guide for Professionals, New Delhi, Response Books, 2000
2.	Sides and H. Charles, How to Write & Present Technical Information, Cambridge, CUP, 1999.
3.	S. Kumar and P. Lata. Language and Communication Skills for Engineers, Oxford University Press, 2018.
4.	Hasson, Gill. Brilliant Communication Skills. Pearson Education, 2012.

OBJECT ORIENTED PROGRAMMING USING JAVA	
Course Code: BAI-102 Contact Hours: L-3 T-0 P-2 Course Category: DCC	Credits: 4 Semester: 2

Introduction:

Java Programming is one of the most widely used programming language among developers and are preferred over other languages. This course introduces students to object-oriented concepts and its implementation in Java Language. The objective is to provide students with the use of the Java programming language for writing complex and stand-alone applications at the Intermediate level.

Course Objectives:

- To understand object oriented programming concepts, and apply them in solving problems.
- To introduce the principles of inheritance and polymorphism; and demonstrate how they relate to the design of abstract classes
- To introduce the implementation of packages and interfaces
- To introduce the concepts of exception handling and multithreading.
- To introduce the design of Graphical User Interface using applets and swing controls.

Prerequisite: Any programming knowledge

Course Outcomes: Upon successful completion of the course, students will be able to:

CO1: Understand the basic principles of object-oriented programming and to solve real world problems using OOP techniques with Java.
CO2: Able to learn the java programming principles in the development of small to medium- sized application programs.
CO3: Interpret and apply exception handling for error free execution of JAVA programs.
CO4: Demonstrate an introductory understanding of graphical user interfaces, multithreaded programming, and event-driven programming.

CO-PO Mapping:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1	1	1	-	-	-	-	1	-	1	1	1	1
CO2	2	2	1	1	1	-	-	-	1	1	-	1	1	2	2
CO3	2	2	2	1	2	-	-	-	2	1	1	2	2	2	1
CO4	3	2	3	2	3	-	-	-	2	2	2	2	3	2	2

Pedagogy:

The teaching-learning of the course would be organized through lectures, assignments, projects/ presentations and quizzes. Faculty members strive to make the classes interactive so that students can correlate the theories with practical examples for better understanding. Use of ICT, web-based sources as well as flipped class room teaching will be adopted.

CONTENTS

UNIT I	10 Hours
An Overview of Java, Data types, Variables and Arrays, operators, expressions, control statements. Object-oriented thinking- A way of viewing world – Agents and Communities, messages and methods, Responsibilities, Classes and Instances, Class Hierarchies- Inheritance, Method binding, Overriding and Exceptions, Summary of Object-Oriented concepts. Java buzzwords, Introducing classes, Methods and Classes, String handling.	
UNIT II	**10 Hours**
Inheritance– Inheritance concept, Inheritance basics, Member access, Constructors, Creating Multilevel hierarchy, super uses, using final with inheritance, Polymorphism-ad hoc polymorphism, pure polymorphism, method overriding, abstract classes, Object class, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Packages- Defining a Package, CLASSPATH, Access protection, importing packages.	
UNIT III	**10 Hours**
Interfaces- defining an interface, implementing interfaces, Nested interfaces, applying interfaces, variables in interfaces and extending interfaces. Stream based I/O(java.io) – The Stream classes-Byte streams and Character streams, Reading console Input and Writing Console Output, File class, Reading and writing Files, Random access file operations, The Console class, Serialization, Enumerations, auto boxing, generics. Exception handling – Fundamentals of exception handling, Exception types, Termination or resumptive models, Uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws and finally, built- in exceptions, creating own exception sub classes.	
UNIT IV	**10 Hours**
Multithreading- Differences between thread-based multitasking and process-based multitasking, Java thread model, creating threads, thread priorities, synchronizing threads, inter thread communication. Event and GUI programming : Event handling in java, Event types, Mouse and key events, GUI Basics, Panels, Frames, Layout Managers: Flow Layout, Border Layout, Grid Layout, GUI components like Buttons, Check Boxes, Radio Buttons, Labels, Text Fields, Text Areas, Combo Boxes, Lists, Scroll Bars, Sliders, Windows, Menus, Dialog Box, Applet and its life cycle, Introduction to swing.	

Text Books	
1	Java The complete reference, Herbert Schildt, McGraw Hill Education (India) Pvt. Ltd., 11th/Latest Edition, 2020
2	Understanding Object-Oriented Programming with Java, T. Budd, Pearson Education, Latest Edition
3	Core Java Volume-I Fundamentals, Eight Edition, Horstmann & Cornell, Pearson Education, 2020
Reference Books	
1	Introduction to Java Programming (Comprehensive Version), Daniel Liang, 10th/Latest Edition, Pearson, 2018
2	Programming in Java, Sachin Malhotra & Saurabh Chaudhary, Oxford University Press, 1st/Latest Edition, 2018

INTRODUCTION TO DATA SCIENCE	
Course Code: BAI-104 Contact Hours: L-3 T-0 P-2 Course Category: DCC	Credits: 4 Semester: 2

Introduction:
This course serves as an introduction to the basics of Data Science including programming for Data Analytics, File Management and Data Visualization. The course aims to understand the underlying core concepts and emerging technologies in data science. The foundation is laid for big data applications ranging from social networks to medical and business informatics.

Course Objectives:
- To learn the Data Science concepts and its various Applications
- To understand the Data Science processes including Data Wrangling, Data Exploration and Data Visualization
- To explore various Packages and Libraries in Python for Mathematical Computing

Prerequisite: Python Programming

Course Outcomes: Upon successful completion of the course, students will be able to:

CO1: Understand the basic principles and ethics of data science to process the data.
CO2: Explore different data preprocessing and manipulating techniques.
CO3: Use the visualization techniques to translate analytical data into visual results.
CO4: Analyze data using Tableau for designing various visual features like Carts, Graphs, Plots and others.

CO-PO Mapping:

CO /PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	1	1	1	1	1	-	-	-	-	1	-	1	1	1	1
CO 2	2	2	2	2	1	-	-	-	-	1	1	1	2	2	2
CO 3	2	1	2	2	2	-	-	-	1	2	1	2	2	2	2
CO 4	3	2	3	2	3	-	-	-	1	2	1	2	3	2	2

Pedagogy:
The teaching-learning of the course would be organized through lectures, assignments, projects/ presentations and quizzes. Faculty members strive to make the classes interactive so that students can correlate the theories with practical examples for better understanding. Use of ICT, web-based sources as well as flipped class room teaching will be adopted.

CONTENTS

UNIT-I	10 Hours
Data Science Overview, Evolution of Data Science, Data Science Roles, Tools for Data Science, Applications of Data Science Data Science Process Overview, Defining Goals, Retrieving Data, Data Preparation, Data Exploration, Data Modeling, Presentation Data Science Ethics, Doing good Data Science, Owners of the Data, Valuing different aspects of Privacy, Getting Informed Consent, The Five Cs of Data Science, Diversity, Inclusion, Future Trends in Data Science.	
UNIT-II	**12 Hours**
Mathematical Computing with Python (NumPy):Working with NumPy Arrays, Data Types, Array Creation, Indexing and Slicing, Numerical Operations on Arrays, Array Functions, Data Processing using Arrays**,** Loading and Saving Data, Saving an Array, Loading an Array, Numpy Random Numbers Data Manipulation with Pandas: Data Wrangling, Data Exploration, Cleaning Data, Filtering, Merging Data, Reshaping Data, Data Aggregation**,** Reading and Writing Files, Loading and Saving Data with Pandas	
UNIT-III	**10 Hours**
Data Visualization in Python, Understanding Data Visualization, Creating different Visualization like Bar Charts, Line Plot, Area Plots, Histograms, Pie Charts, Box Plots, Scatter Plots, Time Series plots, Figures and Subplots, Plotting Functions with Pandas .	
UNIT-IV	**10 Hours**
Data Visualization using non programming tools like Tableau. Work with Filter, Parameters, Sets. Arithmetic and logical table. Data visualization techniques such as heat map, tree map, Pareto. Interactive dashboards, story interfaces, and how to share your work.	

Texts Books:

1.	Davy Cielen, Arno D. B. Meysman, Mohamed Ali, Introducing Data Science, Manning Publications Company, 1st/Latest Edition (2016).
2.	Wes McKinney, Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython, O'Reilly Media, 2017
3.	Joshua N. Milligan, Learning Tableau 2020: Create effective data visualizations, build interactive visual analytics and transform your organization, Packt Publishing Limited, 4th/Latest Edition (2020).

Reference Books

1.	Prateek Gupta, Data Science with Jupyter, BPB Publication, 1st/Latest Edition (2017)
2.	Joel Grus, Data Science from Scratch, O'Reilly, 2nd/Latest Edition (2019)
3.	Cathy O'Neil, Rachel Schutt, Doing Data Science, Straight Talk from the Frontline, O' Reilly, 1st/Latest Edition (2013)

DATABASE MANAGEMENT SYSTEMS	
Course Code: BAI-106 Contact Hours: L-3 T-0 P-2 Course Category: DCC	Credits: 4 Semester: 2

Introduction:
Database Management System (DBMS) is used for creating and managing the databases. The main aim of a DBMS is to supply a way to store-up and retrieve the desired database information as per the application requirement, which is both convenient and efficient.

Course Objectives:

- To introduce the concepts of Database Management Systems
- To design the relational databases by applying normalization techniques to normalize the database
- Strong practice in SQL programming through a variety of database problems.
- Understand the needs of database processing and learn techniques for controlling the consequences of concurrent data access and recovery from failures.
- To write PL/SQL programs using Cursors, Exception, Procedures, Functions and Triggers

Pre-requisites:
Concepts of basic Mathematics and Programming

Course Outcomes: Upon successful completion of the course, students will be able to:

CO1: Comprehend major DBMS components, their functions and to model an application's data requirements using conceptual modeling tools like ER diagrams and design database schemas based on the conceptual model.
CO2: Construct and interpret SQL commands to create tables and indexes, insert/update/delete data, and query data in a relational DBMS.
CO3: Describe the concept of normalization, Transaction, concurrency, Recovery and Query processing.
CO4: Implement DBMS concepts through procedures, functions and triggers.

CO-PO Mapping:

CO /PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	1	1	2	-	1	-	-	-	1	-	1	1	1	1	1
CO 2	2	1	2	1	2	-	-	-	1	-	1	2	1	2	2
CO 3	1	2	2	1	2	-	-	-	1	-	1	2	2	1	2
CO 4	2	1	2	1	2	-	-	-	2	1	1	2	2	2	2

Pedagogy:

The teaching-learning of the course would be organized through lectures, assignments, projects/ presentations and quizzes. Faculty members strive to make the classes interactive so that students can correlate the theories with practical examples for better understanding. Use of ICT, web-based sources as well as flipped class room teaching will be adopted.

CONTENTS

UNIT-I	10 Hours
Overview of Concepts and Conceptual Database Design, Characteristics of the Database, DBMS Architecture, File System vs Database System, Database Administrator and Database Users, Data Models, Schemes and Instances, Data Independence, Database Languages and Interfaces, Data Models	
UNIT-II	**11 Hours**
Entity-Relationship Model, Strong and Weak Entity Sets, Generalization, Specialization, and Aggregation, Relational Model, Languages and Systems: Relational Model Concepts, Relational Model Constraints, Translating your ER Model into Relational Model, Relational Algebra. SQL: A Relational Database Language, Data Definition/Manipulation/Control in SQL, Specifying Constraints and Indexes in SQL, View and Queries in SQL, Practicing SQL commands	
UNIT-III	**11 Hours**
Relational Database Design: Functional Dependencies & Normalization for Relational Databases, Functional Dependencies, Normal Forms (1NF, 2NF, 3NF, BCNF, 4NF, 5NF), Lossless Join and Dependency Preserving Decomposition, Multivalued Dependency, Join Dependency. Transaction Management: Transaction Concept and State, ACID Properties, Concurrency Control: Lock-Based Protocols, Timestamp-based Protocols, Recovery from Transaction Failures, Log based Recovery, Checkpoints, Deadlock Handling	
UNIT-IV	**10 Hours**
Query Processing: Query Processing Overview, Measures of Query Cost. Introduction to Object Oriented and Object Relational Data Models Database Programming: Exceptions, Cursors, Procedures, Functions, Triggers	

Text Books	
1	Elmasri Ramez and Navathe Shamkant, Fundamentals of Database System, Pearson, 6th/Latest Edition (2017).
2	Abraham Silberschatz, Henry F. Korth, S. Sudarshan, Database System Concepts, McGraw Hill, 6th/Latest Edition (2013)
3	Raghu Ramkrishnan and Johannes Gehrke, Database Management Systems, McGraw-Hill, 3rd/Latest Edition (2003)
Reference Books	
1	Ceri and Pelagatti, Distributed Databases: Principles & Systems, McGraw-Hill, (2017)
2	Conolly & Begg, Database Management Systems, Pearson Education Asia, 5th/Latest Edition (2010)

IT WORKSHOP	
Course Code: BAI-108 Contact Hours: L-1 T-0 P-2 Course Category: DCC	Credits: 2 Semester: 2

Introduction: IT Workshop is a practical course where students will learn programming with R. R is capable of handling mathematical and statistical manipulations. It has its own programming language as well as built-in functions to perform any specialized task.

Course Objectives:

- To introduce students to the statistical package R for data analysis.
- To use R to perform descriptive statistics including graphics, perform basic inferential statistical analyses including regression analysis, read and write data files,
- To perform basic data manipulations (eg, creating new variables, merging data sets), write and use R script files, use R packages, write and use R functions, and perform basic programming in R.

Pre-Requisites: Fundamentals of Mathematics background.

Course Outcomes: Upon successful completion of the course, students will be able to:

CO1: Learn the fundamentals and usage of R software.

CO2: Understand the basic syntax and structure of R language.

CO3: Explore different data preprocessing and analytical techniques.

CO4: Use the visualization techniques to translate the analytical data into visual results.

CO-PO Mapping:

CO /PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	1	1	1	1	1	-	-	-	-	-	1	1	1	1	1
CO 2	2	2	1	1	1	-	-	-	-	-	1	2	2	1	1
CO 3	2	2	2	2	3	1	-	-	1	-	2	2	2	2	2
CO 4	2	2	2	2	3	1	-	-	1	-	2	2	2	3	2

Pedagogy: The teaching-learning of the course would be organized mainly through lectures, and practical sessions in lab. Faculty members strive to make the classes interactive so that students can correlate the theories with practical examples for better understanding. Use of ICT, web-based sources as well as flipped class room teaching will be adopted.

CONTENTS

UNIT I	11 Hours
An overview of R language: Basic fundamentals, installation and use of software, data editing, use of R as a calculator, functions and assignments. Getting R and Running R, R Packages Expressions, Objects, Symbols, Functions Special Values	
UNIT II	**11 Hours**
Constants, Numeric vectors, Character Vectors, Operators. R Syntax, Data Structure in R (Matrices, Arrays, Factors, Data frames), Attributes, Symbols and Environment, Functions, Loading, Saving, and Editing Data in R, Combining Datasets, Transformations, Binning Data	
UNIT III	**10 Hours**
Subsets, Summarizing Functions, Data Cleaning. Analyzing Data, Probability Distribution, Continuous Data , Discrete Data, T-test Design, Anova Test Design, Introduction to Regression, Linear model, Smoothening	
UNIT IV	**10 Hours**
Graphics and Plots: Scatter Plots, Bar Charts, Pie Charts, Three-dimensional Data, Plotting Distribution, Customizing Charts, Basic Graphic Functions, Common Arguments for Chart Functions.	

Text Books:

1	Long, James D., and Paul Teetor. R Cookbook: Proven Recipes for Data Analysis, Statistics, and Graphics. O' Reilly Media, 2019.
2	Christian Heumann, Michael Schomaker and Shalabh, Introduction to Statistics and Data Analysis - With Exercises, Solutions and Applications in R, Springer, 2016
3	Pierre Lafaye de Micheaux, Rémy Drouilhet, Benoit Liquet, The R Software-Fundamentals of Programming and Statistical Analysis, Springer 2013

Reference Books:

1	Alain F. Zuur, Elena N. Ieno, Erik H.W.G. Meesters, A Beginner's Guide to R (Use R), Springer 2009
2	Hadley Wickham, ggplot2 Elegant Graphics for Data Analysis, Springer 2016
3	Internet Sources: www.nptel.ac.in

ENVIRONMENTAL SCIENCES	
Course Code: BAS-106 Contact Hours: L-2 T-1 P-2 Course Category: BAS	Credits: 4 Semester: 2

Introduction: A scientific study of the natural world and how it is influenced by people. It Surveys environmental studies, examining ecological, socioeconomic, and technological factors that influence the quality of life on Earth.

Course Objectives:

- Environmental science prepares students for career success in environmental monitoring and remediation, natural resources and conservation, public health, industrial environmental management.
- The curriculum is so designed that the students get an in-depth knowledge of the environment and various issues arising due to mismanagement of resources.

Pre-requisites: None

Course Outcomes: Having successfully completed this course,

CO1: Students will be able understand about the availability and sustainable use of natural resources and concept of ecosystems and biodiversity.

CO2: Students will understand and evaluate the transnational character of environmental problems, their sources, sinks and control strategies along with their short-term and long term impacts to humans. Students will also learn to apply green methodologies to find solutions to address various environmental issues.

CO3: Students will understand the concept of fuel technology and implement their interpretative skills to evaluate the usage and application of alternate energy sources for sustainability.

CO4: Young graduates would understand the interconnected and interdisciplinary branches like Toxicology, synthesis and applications of Eco friendly polymers and demonstrate an integrative approach to environmental issues with a focus on sustainability.

CO-PO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	1	1	2	1	-	1	2	1	-	1	1	2	-	-	-
CO2	1	1	2	2	-	2	2	-	2	1	1	2	-	-	-
CO3	2	1	2	2	-	1	2	-	2	1	1	2	-	-	-
CO4	1	1	2	2	-	2	2	-	2	1	1	2	-	-	-

Pedagogy: Classroom teaching which focuses upon relating the textbook concepts with real world phenomena, along with periodic tutorial classes to enhance the problem-solving ability.

CONTENTS

UNIT-I	6 Hours
Natural Resources, Conservation and Management: Forest resources: Use and over-exploitation, deforestation, Timber extraction, mining, dams and their effects on forest and tribal people. Water resources: Use and overutilization of surface and ground water, floods, drought, conflicts over water. Mineral resources: Environmental effects of extracting and using mineral resources. Food resources: World food problems, changes caused by agriculture and over-grazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity. Energy resources: Growing energy needs renewable and non-renewable energy sources. Resource Management-Concept of Sustainable development, Environmental Management Systems, Environmental Impact Assessment, Biodiversity- conservation and threats.	
UNIT-II	**8 Hours**
Environmental Pollution and Control: Air Pollution: Types of air pollutants; Source, effects, sink & control of common air pollutants (CO, oxides of nitrogen & sulphur, hydrocarbons and particulates), Photochemical smog, acid rain, greenhouse effect, global warming, Carbon dioxide sequestration and the concept of Carbon Credits Water Pollution: Classification of pollutants and their sources, Waste water treatment (Primary, secondary and tertiary treatment), Impact of water pollution on hydrological ecosystems. Solid and Hazardous Waste Pollution: Classification, waste treatment and disposal methods: Sanitary landfill, thermal processes, chemical and biological processes, disposal methods for nuclear waste, nuclear disaster (case study), disposal methods for e-waste. Green Technology And Green Chemistry: Introduction to concept of Green Technology and Zero Waste Technology, Green Chemistry & its basic principles, Atom Economy, evaluation of feedstock, reaction types, methods, reagents and solvents.	
UNIT-III	**8 Hours**
Fuels and Alternate Energy Sources: Classification, Calorific value of fuels (gross and net), Dulong's formula, Determination of calorific value of fuels using bomb's calorimeter, Determination of calorific value of fuels using Boy's Gas Calorimeter (Numericals). Liquid fuels-petroleum chemical composition, fractional distillation, Cracking – Thermal & catalytic cracking, Octane &Cetane numbers with their significance. Analysis of flue gases (Orsat's Apparatus)-(Numericals), Combustion of fuels. Use of alternate energy sources including solar energy harnessing (photovoltaics), wind energy, hydroenergy, geothermal energy, ocean energy, biodiesel, power alcohol, biomass energy.	
UNIT IV	**6 Hours**
Chemical Toxicology and Eco-Friendly Polymers : Toxicology: terminology & toxic effects, chemical interactions, impact of toxic chemicals on enzymes, Biochemical effects of arsenic, mercury, lead, chromium, & cadmium. PolymersIntroduction: Functionality of monomer, polymerization, degree of polymerization, Number average and weight average molecular weight of polymers. Environmental degradation of polymers: Biodegradable, Photo-biodegradable polymers, Hydrolysis &	
Hydro-biodegradable polymers Biopolymers & Bioplastics.	

Text Books	
1	RanuGadi, Sunita Rattan, SushmitaMohapatra. A Text book of Environmental Studies (with experiments), 4th Ed., S.K. Kataria& Sons, 2014.
2	S. Rattan, "Applied Chemistry", S.K.Kataria& Sons, 2013.
3	S.S.Dara, D.D.Mishra. A Textbook of Environmental Chemistry and Pollution Control (With Energy, Ecology, Ethics and Society) S. Chand and Company Pvt. Ltd. (India), 2011.
Reference Books	
1	Richard T. Wright, Environmental Science, 9thEdition, Pearson Education, 2007.
2	Gerard Kiely, Environmental Engineering, special Indian edition The McGraw-Hill Companies, 2007.
3	E. Barucha, Textbook of Environmental Studies for Undergraduate Courses, Universities Press (India) Pvt. Ltd., 2005.
4	C.N. Sawyer, P.L. McCarty, and G.F. Parkin, "Chemistry for Environmental Engg. and Science", 5th Ed., The McGraw-Hill Companies, 2003.
5	R. Rajagopalan, Environmental studies from crisis to cure, 3rd edition, Oxford University Press., 2016.

PROBABILITY AND STATISTICS	
Course Code: BAS 108 Contact Hours:L-3 T-1 P-0 Course Category: BAS	Credits: 4 Semester: II

Students will learn fundamental rules of Probability, discrete and continuous distributions, and statistical methods most commonly used in Computer Science and & Engineering.

Course Objectives:

- This course aims at providing the required skill to apply the statistical tools in engineering problems.
- To introduce the basic concepts of probability and random variables.
- To introduce the basic concepts of two dimensional random variables.
- To acquaint the knowledge of testing of hypothesis for small and large samples which plays animportant role in real life problems.

Course Outcomes: On completion of the course, the student should be able to:

CO1. Recall the basics of probability and apply it to determine total and conditional probabilities.

CO2. Understand the concepts of Random variable, different discrete and continuous probability distributions and use it to solve the statistical situations.

CO3. Evaluate the correlation between two variables and analyze statistical data using MS-Excel.

CO4. Determine probabilities of making errors in hypothesis testing and draw conclusions using critical values.

CO-PO Mapping:

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	1	1	-	-	-	-	-	-	-	-	-	-
CO2	2	2	1	1	1	-	-	-	-	-	-	-	-	-	-
CO3	2	2	2	1	1	-	-	-	-	-	-	-	-	-	-
CO4	3	3	2	1	1	-	-	-	-	-	-	-	-	-	-

Prerequisite: NIL

Pedagogy: The teaching-learning of the course would be organized through lectures, assignments, projects/ presentations and quizzes. Faculty members strive to make the classes interactive so that students can correlate the theories with practical examples for better understanding

CONTENTS

UNIT – I: PROBABILITY AND RANDOM VARIABLES	**14 Hours**
Concept of probability, additive and multiplicative law of probability, total and conditional probabilities, Baye's theorem. Measures of central tendency, dispersion, kurtosis, moments. Random Variables, density and distribution functions, mathematical expectation, variance, standard deviation and moment generating function.	
UNIT – II: TWO – DIMENSIONAL RANDOM VARIABLES	**8 Hours**
Jointly distributed random variables, Marginal and conditional distributions, Expected values, Covariance and Correlation. Central limit theorem (for independent and identically distributed random variables).	
UNIT – III: **PROBABILITY DISTRIBUTIONS AND REGRESSION**	10 Hours
Binomial, Poisson, Geometric, Uniform, Exponential and Normal distributions. Linear Correlation, Correlation Coefficient, Rank Correlation Coefficient, Regression.	
UNIT –IV: APPLIED STATISTICS	**10 Hours**
Formation of Hypothesis, Test of significance: Large sample test for single proportion, Difference of proportions, Single mean, Difference of means, and standard deviations. Test of significance for small samples: t- Test for single mean and difference of means, t-test for correlation coefficients, F- test for ratio of variances, Chi-square test for goodness of fit and independence of attributes.	
Case Study / Implementation of above concepts using Excel.	

Text Books

1.	Montgomery, Douglas C., and George C. Runger. "Applied Statistics and Probability for Engineers", Seventh Edition. John Wiley & Sons, 2018.
2.	Sheldon Ross M., Introduction to Probability and Statistics for Engineers and Scientists, Academic Press, 6thEdtion, 2020.
3.	Rukmangadachari E., and Keshava, Reddy E. Probability and Statistics, Pearson Education India, 2015.
4.	Ravichandran J., Probability and Statistics for Engineers. Wiley India, 2010.

Reference Books

1.	Devore, Jay L. "Probability and Statistics for Engineering and the Sciences", 8th Edition, Cengage, 2010.
2.	Scheaffer, Richard, Madhuri Mulekar, and James McClave. Probability and Statistics for Engineers. Nelson Education, 2010.
3.	Meyer, Paul L. Introductory Probability and Statistical Applications. 2nd Edition, Oxford and IBH publishing, 1965.
4.	Gupta S.C. and Kapoor V.K., Fundamentals of Mathematical Statistics, S Chand Publications, 11th Edition, 2002

INDIRA GANDHI DELHI TECHNICAL UNIVERSITY FOR

WOMEN (Established by Govt. of Delhi vide Act 9 of 2012)

Department of Information Technology
Teaching Scheme B.Tech (Artificial Intelligence and Machine Learning) From Academic Session August 2022 (Odd semester) onwards

SEMESTER I

Code	Subject	L-T-P	Credits	Category
BAI-101	Intelligent Systems	3-0-0	3	DCC
BAI-103	Computer Organization and Architecture	3-0-2	4	DCC
BAI-110	Programming with Python	3-0-2	4	DCC
BAS-107	Applied Physics	3-0-2	4	ASH
BAS-109	Applied Mathematics	3-1-0	4	ASH
HMC-110	Communication Skills	3-1-0	4	HMC
		Total	**23**	

SEMESTER II

Code	Subject	L-T-P	Credits	Category
BAI-102	Object Oriented Programming using Java	3-0-2	4	DCC
BAM-102	Fundamentals of Data Structure	3-0-2	4	DCC
BAI-104	Introduction to Data Science	3-0-2	4	DCC
BAI-108	IT Workshop	1-0-2	2	DCC
BAS-106	Environmental Science	2-1-2	4	ASH
BAS-108	Probability and Statistics	3-1-0	4	ASH
		Total	**22**	

SEMESTER III

Code	Subject	L-T-P		Category
BAI-201	Artificial Intelligence	3-0-2	4	DCC
BAM-201	Database Management Systems	3-0-2	4	DCC
BCS-203	Discrete Structures	3-1-0	4	DCC
BIT-203	Software Engineering	3-0-2	4	DCC
Bxx-2xx	Open Elective Courses	-	4	OEC
GEC-201	Generic Open Elective	0-2-0 0-0-4 2-0-0	2	GEC
BAM-253	Industrial Training/Internship	-	1	DCC
		Total	**23**	

List of Open Elective Courses (New Courses may be added)

Code	Subject	Code	Credits
BAS-201	Material Science and Engineering	3-1-0	4
BAS-203	Numerical Methods	3-1-0	4
BEC-209	Analog and Digital Electronics	3-0-2	4
BMA-209	Engineering Measurement and Metrology	3-0-2	4
BAI-203	IT Workshop using R (for other Dept.)	2-0-4	4
	……		

SEMESTER IV

Code	Subject	L-T-P		Category
BAI-202	Computer Networks	3-0-2	4	DCC
BIT-202	Operating Systems	3-0-2	4	DCC
BAM-202	Machine Learning	3-0-2	4	DCC
BCS-204	Design and Analysis of Algorithms	3-0-2	4	DCC
Bxx-2xx	Open Elective Courses	3-0-2	4	OEC
HMC-202	Disaster Management	2-0-0	2	HMC
		Total	**22**	

List of Open Elective Courses (New Courses may be added)

Code	Subject	L-T-P	Credits
BAS-202	Nano Structures & Materials in	3-1-0	4
BAS-204	Engineering Optical Engineering	3-0-2	4
BAS-206	Optimization Techniques	3-1-0	4
BEC-210	Elements of Information Theory	3-1-0	4
BMA-210	Operations Management	3-1-0	4
BAI-206	Introduction to Data Science (for other Dept.)	3-0-2	4
	… .		

SEMESTER V

Code	Subject	L-T-P		Category
BAM-301	Optimization Techniques and Decision Making	3-0-2	4	DCC
BAM-303	Cryptography and Network Security	3-0-2	4	DCC
BAM-305	Social Networking and Mining	3-0-2	4	DCC
BCS-303	Theory of Computation	3-1-0	4	DCC
HMC-301	Professional Ethics and Human Values	3-0-0	3	HMC
BAM-353	Industrial Training/Internship	-	1	DCC
GEC-301	Generic Open Elective	0-2-0 0-0-4 2-0-0	2	GEC
		Total	**22**	

SEMESTER VI

Code	Subject	L-T-P		Category
BAM-302	Reinforcement Learning	3-0-2	4	DCC
BAM-304	Neural Networks and Deep Learning	3-0-2	4	DCC
BAM-306	Computer Vision	3-0-2	4	DCC
BAM/BAI 3xx	Departmental Elective - I	-	4	DEC

BAM/BAI 3xx	Departmental Elective – II	-	4	DEC
HMC-30x	Management Elective	-	2	HMC
		Total	**22**	

List of Departmental Elective Courses (New Courses may be added)

Category	Course Code	Subject	L-T-P	Credits
Departmental Elective-I	BAI-306 BAI-308 BAI-310 BAM-308	Cloud computing & IoT Blockchain Technologies Quantum Computing Cyber Security and Forensics	3-0-2 3-0-2 3-0-2 3-0-2	4 4 4 4
Departmental Elective II	BAI-312 BAI-314 BAI-316 BAM-309 BEC-318	Information Retrieval Recommender Systems Semantic Web Natural Language Processing Digital Image Processing	3-0-2 3-0-2 3-0-2 3-0-2 3-0-2	4 4 4 4 4

List of Management Elective Courses (New Courses may be added)

Course Code	Subject	L-T-P	Credits
HMC-302	Principles of Management	2-0-0	2
HMC-304	Marketing Management	2-0-0	2
HMC-306	Financial Management	2-0-0	2
HMC-308	Human Resource Management…	2-0-0	2

SEMESTER VII

Code	Subject	L-T-P	Credits	Category
BAI-410	Recent Trends in AI	3-0-2	4	DCC
BIT-407	Big Data Analytics	3-0-2	4	DCC
BAI-401	Multimodal Data Processing	3-0-2	4	DCC
BAM-4xx/BAI 4xx	Departmental Elective - III	-	4	DEC

BAM-4xx/BAI 4xx	Departmental Elective - IV	-	4	DEC
BAI-451	Minor Project	0-0-8	4	DCC
BAI-453	Internship	-	1	
		Total	25	

List of Departmental Elective Courses (New Courses may be added)

Category	Code	Subject	L-T-P	Credits
Departmental Elective -III	BAM-401	Data Warehousing and Data Mining	3-0-2	4
	BAM-403	Applications of Machine Learning in Cyber Security	3-0-2	4
	BIT-405	Soft Computing	3-0-2	4
	BAI-405	Speech Technology	3-0-2	4
	BAI-407	Pattern Recognition	3-0-2	4
	BIT-413	Software Project Management	3-1-0	4
Departmental Elective -IV	BAI-409	Conversational AI	3-0-2	4
	BIT-409	Distributed Systems	3-0-2	4
	BIT-417	E-Commerce	3-1-0	4
	BAI-411	Parallel and Distributed AI	3-0-2	4
	BAI-413	AI and Humanity	3-0-2	4

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SEMESTER VIII

Code	Subject	L-T-P	Credits	category
HMC-401	Creativity, Innovation and Entrepreneurship	3-0-0	3	HMC
BAI/BIT 4xx	Departmental Elective – V	-	4	DEC
BAI-4xx	Departmental Elective – VI	-	4	DEC
BAI-452	Industrial Project/R&D Project/Start-up Project	-	8	DCC
GEC-402	Generic Open Elective	0-2-0 0-0-4 2-0-0	2	GEC
		Total	21	

List of Departmental Elective Courses (New Courses may be added)

Category	Code	Subject	L-T-P	credits
Departmental Elective-V	BAI-402	Augmented Reality and Virtual	3-0-2	4
	BAI-404	Reality Social Media Analytics	3-0-2	4
	BAI-406	AI for Games	3-0-2	4
	BAI-408	Multi-agent Systems	3-0-2	4
	BIT-404	Requirement Estimation Theory	3-0-2	4
	BIT 412	Advanced Software Engineering	3-0-2	4
Departmental Elective VI	BAI-410	Internet of Things	3-0-2	4
	BAI-412	Embedded Systems	3-0-2	4
	BAI-414	Bioinformatics and Computational	3-0-2	4
	BAI-416	Genomics AI in Healthcare	3-0-2	4
		…		

BBA First Semester (2022-2023)

w.e.f 07 November, 2022

Mentor for BBA first year Students – Dr.Hansika Singhal (8954073604)

[Management Block Above Library Room No – 1]

Time / Day	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5
MON			Principles of Management (BMS-101)	Business Mathematics (AMC-101)	Business Mathematics (AMC-101)	Computer Application in Managemen(AMC -105)		
TUES		Business Communication -I AMC103	Business Communication -I AMC103	Computer Application in Management (AMC-105)	Computer Application in Management (AMC-105)	Principles of Management (BMS-101)	Principles of Management (BMS-101)	
WED	Computer Application in Management Lab(AMC-105)	Computer Application in Management Lab(AMC-105)	Micro Economics(BMS-105)	Micro Economics (BMS-105)	Financial Accounting (BMS-103)			
THUR			Financial Accounting (BMS-103)	Financial Accounting (BMS-103)		Environmental Management (AMC-107)	Environmental Management (AMC-107)	
FRI		Micro Economics (BMS-105)	Financial Accounting (BMS-103)	Business Mathematics (AMC-101)	Business Mathematics (AMC-101)			

BMS101	Principles of Management	Dr. Dhanjay Yadav
BMS103	Financial Accounting	Ms. Rabia Khan
BMS105	Micro Economics	Dr. Shikha Gupta
AMC101	Business Mathematics	Dr. LuckshayBatra
AMC103	Business Communication -I	Ms. Himani Sharma
AMC105	Computer Application in Management (CAM)	Ms. SaumyaSatija
AMC107	Environmental Management (EM)	Ms. Shuchi

Prof. Arvind Kr. Jayant
(HOD, Dept. of Management)

Dr.Dhanjay Yadav
(Table In-charge,BBA)

Indira Gandhi Delhi Technical University for Women
B.Arch Ist Yr.: FIRST SEMESTER(2022-2023)

w.e.f.28October,2022 STUDIO 1: RM.NO.123 FACULTYMENTOR/COORDINATOR:AR.MONALIWANKAR

Mob: 9729391008, email: monaliwankar@igdtuw.ac.in

TIME / DAY	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5
MON	BAP103					BAP103	BAP117	
TUES	BAP113		BAP101			BAP101		LIBRARY
WED	BAP105					BAP109		LIBRARY
THURS	BAP107					BAP111		LIBRARY
FRI	BAP115		BAP101			BAP101		LIBRARY

SUBJECTS:T-THEORY,S-STUDIO,P-PRACTICAL

BAP101	IntroductiontoArchitecturalDesign–I(S-8)	Ar. MonaliVWankar, Ar.AmitaKhodankar,Ar.JaiPrakash
BAP103	BuildingMaterials&ConstructionTechnology–I(S-5)	Ar.RupeshKumar,Ar.CharuMathur,Ar.GauravKr.
BAP105	ArchitecturalDrawing–I(S-4)	Ar.CharuMathur, Ar. Shivani Goel
BAP107	ArchitecturalGraphics–I(P-4)	Ar.JaiPrakash, Ar.CharuMathur
BAP109	HistoryofArchitecture-I(T-2)	Dr. Rashmi Ashtt
BAP111	Structures–I(T-2)	Er.MousumiBiswas
BAP113	ClimatologyandEnvironmentalStudiesI(T-2)	Ar.RupeshKumar
BAP115	ArchitecturalWorkshop–I(P-2)	Ar.PreetiChauhan, Ar. Mani Gupta
BAP117	MathematicsinArchitecture(T-2)	Dr.LuckshayBatra

4/11/22

Ar. Jai Prakash
(Assistant Professor)
DAP, IGDTUW.

Scan QR Code to Join
2022 Batch
WhatsApp Group

Rashmi Ashtt

Dr. Rashmi Ashtt
(Professor) DAP,
IGDTUW

Indira Gandhi Delhi Technical University for Women
B.Arch2ndYr. THIRD SEMESTER (2022-2023)

w.e.f.28 October, 2022 **STUDIO 1: RM.NO.112**

FACULTY MENTOR/COORDINATOR:**AR.JAHNABIKALITA**
Mob: 9716509847, Email: jahnabikalita@igdtuw.ac.in

TIME / DAY	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5
MON	RESEARCH		BAP201			BAP201		
TUES	BAP213		BAP203			BAP203		
WED	BAP205					BAP207		LIBRARY
THURS	BAP209		BAP201			BAP201		
FRI	BAP215		BAP211			LIBRARY		LIBRARY

SUBJECTS:T-THEORY,S-STUDIO,P-PRACTICAL

BAP201	ArchitecturalDesign–III(S-10)	Ar.JahnabiKalita,Ar.Deshbandhu
BAP203	BuildingMaterials&ConstructionTechnology–III(S-5)	Ar.PeuBanerji,Ar.Deshbandhu
BAP205	ComputerAidedDesignTechniques–I(P-4)	Ar.JahnabiKalita,Ar.ShwetaSrivastava,
BAP207	HistoryofArchitecture-III(T-2)	Ar.VenusKashyap
BAP209	Structures–III(T-2)	Er.MousumiBiswas
BAP211	TheoryofDesignI(T-2)	Ar.SnehaMaji
BAP213	BuildingServices-I:WaterSupplyandSanitation(T-2)	Ar.JaiPrakash
BAP215	AdvancedSurveyingandLeveling(P-2)	Ar.RupeshKumar

4/11/22

Ar. Jai Prakash
(Assistant Professor)
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Dr. Rashmi Ash
(Professor) DAI
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Indira Gandhi Delhi Technical University for Women

B.Arch 3rd Yr.:FIFTH SEMESTER(2022-2023)

w.e.f.28 October, 2022 STUDIO 1: RM.NO.111 FACULTYMENTOR/COORDINATOR:AR.SNEHAMAJI

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TIME / DAY	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5
MON	LIBRARY		GEC301			BAP303		
TUES	BAP305		BAP301			BAP301		
WED	BAP315/BAP319					LIBRARY	BAP311	
THURS	BAP307		BAP309			BAP303		
FRI	BAP313		BAP301			BAP301		

SUBJECTS:T-THEORY,S-STUDIO,P-PRACTICAL

BAP301	ArchitecturalDesign–V(S-10)	Ar.PreetiChauhan, Ar.RupeshKumar,Ar.NeetuKaushal,Ar.GarimaSingh
BAP303	BuildingMaterials&ConstructionTechnology–V(S-6)	Ar.AbhishekJain,Ar.NeetuKaushal,Ar.GarimaSingh
BAP305	SociologyandPsychologyinArchitecture(T-2)	Ar.PreetiChauhan
BAP307	HistoryofArchitecture-V(T-2)	Ar.SnehaMaji
BAP309	Structures–V(T-2)	Er.MousumiBiswas
BAP311	BuildingServices–III(HVAC)(T-2)	Ar.GauravKumar
BAP313	ResearchMethodology(P-2)	Ar.MonaliWankar,Ar.ShwetaSrivastava
BAP315	SustainableDevelopment(E)(P-4)	Ar.VenusKashyap,Ar.ShilpiMittal
BAP319	ArchitecturalJournalism(E)(P-4)	Ar.MohitKumar
GEC301	GeneralOpenElective(EMP)(P-2)	Ar.VishalRai-Coordinator

4/11/22

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Indira Gandhi Delhi Technical University for Women
B.Arch 4th Yr.: SEVENth SEMESTER (2022-2023)

w.e.f.28 October, 2022 STUDIO 1: RM.NO.101

FACULTYMENTOR/COORDINATOR:AR.KSHITIJKR.SINHA
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TIME / DAY	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5
MON	GEC401/BAP409		BAP401			BAP401		
TUES	BAP403					BAP409		
WED	BAP405			BAP 409		BAP 409	BAP 407	
THURS	BAP409/GEC 401		BAP401			BAP401		
FRI	BAP409		BAP403			BAP411		

***BAP409(Seminar)istobeengagedforONLY03(THREE)HOURSinaweekbyeachallocatedfacultyamongsttheBAP409periodoptionsoptedbythem*

SUBJECTS:T-THEORY,S-STUDIO,P-PRACTICAL

BAP401	ArchitecturalDesign–VII(S-10)	Ar.SnehaMaji,Ar.KshitijKumarSinha,Ar.DeepakBhatia
BAP403	BuildingMaterials&ConstructionTechnology–VII(S-6)	Ar.MohitKumar,Ar.GauravKumar
BAP405	WomenandSustainableDevelopment(S-3)	Ar.SabinaSuri, Ar. Aarti Sharma Chhabra
BAP407	AdvancedBuildingServicesVII(T-2)	Ar.JaiPrakash
BAP409**	Seminar(c+5groupsof6/7studentsx3hours/group=19hoursload)(P-3)	Ar.MonaliVWankar(c),Ar.RupeshKumar(3), Ar.JaiPrakash(3), Ar.Deshbandhu(3),Ar.MohitKumar(3),Ar.AbhishekJain(3)
BAP411	StrategicDesignThinking(P-3)	Ar.SnehaMaji,Ar.ShwetaSrivastava
GEC401	GeneralOpenElective(P-2)	Ar.KshitijKr.Sinha-Coordinator

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B.Arch 5th Yr.:NINTH SEMESTER(2022-2023)

w.e.f.28 October, 2022 STUDIO 1: RM.NO.104 FACULTYMENTOR/COORDINATOR:AR.VENUSKASHYAP
Mob: 9643762528, Email: venuskashyap@igdtuw.ac.in

TIME	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5
DAY								
MON	BAP503			BAP511		BAP511		
TUES	BAP511		BAP501			BAP501		
WED	BAP507		BAP517			BAP517	BAP505	
THURS	BAP511		BAP513			BAP509		
FRI	BAP511		BAP501			BAP501		

***BAP511(Dissertation)istobeengagedforONLY03(THREE)HOURSinaweekbyeachallocatedfacultyamongsttheBAP511periodoptionsoptedbythem*

SUBJECTS-T-THEORY,S-STUDIO,P-PRACTICAL

BAP501	ArchitecturalDesign–UrbanStudio(S-10)	Ar. VenusKashyap,Ar.SabinaSuri, Ar. Shweta Srivastava
BAP503	IntroductiontoAdvancedConstructionSystems(S-3)	Ar.MohitKr.,Ar.AbhishekJain
BAP505	IntroductiontoLandscapeArchitecture(T-2)	Ar.JahnabiKalita
BAP507	TownPlanning(T-2)	Ar.VishalRai
BAP509	DisasterManagement(P-3)	Ar.MonaliWankar,Ar.ShilpiMittal
BAP511*	Dissertation(c+33students,1hour/student)(P-3)	Ar,SnehaMaji(c),Ar.PreetiChauhan(4),Ar.VishalRai(4),Ar.MonaliWankar(2),Ar.VenusKashyap(4),Ar.JahnabiKalita(4),Ar.KshitijKumarSinha(4),Ar.PeuBanerji(4),Ar.SabinaSuri(4),Ar.Mohit Kumar(3)
BAP513	UrbanIssues(P-2)	Ar.ShilpiMittal
BAP517	InteriorDesign(P-3)	Ar.GauravKr.,Ar.DeepakBhatia

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Indira Gandhi Delhi Technical University for Women
M.Plan 2nd Yr.:THIRD SEMESTER(2022-2023)

w.e.f.28 October, 2022 **STUDIO 1: RM.NO.106**

FACULTYMENTOR/COORDINATOR:**PROF.(DR.)RASHMIASHTT**
Mob: 9728231244, Email: rashmiashtt@igdtuw.ac.in

TIME / DAY	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5
MON	RESEARCH/FIELDWORK					MUP201		
TUES	RESEARCH/FIELDWORK					RESEARCH/FIELDWORK		
WED	MUP 207		MUP 203			MUP 203		LIBRARY
THURS	MUP201					MUP201	GEC201	
FRI	MUP205		MUP215			MUP215		LIBRARY
SAT	MUP209							

SUBJECTS:T-THEORY,S-STUDIO,P-PRACTICAL

MUP201	PlanningforRegion-Studio(P-8)	Dr.RashmiAshtt,Ar.VishalRai, Ar. Aarti Sharma Chhabra
MUP203	Thesis(Stage-1)(S-4)	Ar.VishalRai, Dr.RashmiAshtt
MUP205	ProjectPlanningandManagement(T-2)	Ar.KshitijKumarSinha
MUP207	UrbanEconomicsandFinance(T-2)	Ar.AbhishekJain
MUP209	AdvancedGeoinformaticsLab(P-4)	Ar.PallaviTiwari, Ar. Mehak Swami
MUP215	DisasterMitigationandManagement(P-4)	Ar.KshitijKr.Sinha, Ar. Aarti Sharma Chhabra
GEC201	GeneralOpenElective(P-2)	Ar. Mani Gupta

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Ar. Jai Prakash
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