माधव प्रौद्योगिकी एवं विज्ञान संस्थान, ग्वालियर (म.प्र.), भारत
MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR (M.P.), INDIA
Deemed University
(Declared under Distinct Category by Ministry of Education, Government of India)
NAAC ACCREDITED WITH A++ GRADE

CSBS/24
08.10.24
D.No 491
10/12/2024

BOARD OF STUDIES (BoS) PROCEEDING IN DEPARTMENT OF COMPUTER SCIENCE AND BUSINESS SYSTEMS

(Meeting Dated – 12th September, 2024)

Department of Computer Science and Business Systems

Date: 12/09/2024

Minutes of Meeting of Board of Studies (BoS)

The Meeting of Board of Studies (BoS) in the department of Computer Science and Business Systems (DoCSBS) at Madhav Institute of Technology & Science-Deemed University (MITS-DU), Gwalior, was held on 12th September 2024 at 11:30 A.M. onwards in offline / online mode (through video conferencing). During the meeting, following were present.

1.	Dr. Akhilesh Tiwari, *Professor & Head, DoCSBS, MITS-DU.*	Chairman
2.	Dr. Naval Bajpai, *Professor, Department of Management Studies, ABV-IIITM, Gwalior.*	External Member
3.	Dr. Ritu Tiwari, *Professor & Head, Department of Artificial Intelligence, SVNIT, Surat.*	External Member
4.	Dr. Saurabh Chandra, *Professor, Indian Institute of Management (IIM), Indore.*	External Member
5.	Dr. Saumil Maheshwari, *Assistant Professor, DoCSBS, MITS-DU.*	Member
6.	Dr. Trilok Pratap Singh, *Assistant Professor, DoCSBS, MITS-DU.*	Member
7.	Dr. Monica Chauhan Bhadoriya, *Assistant Professor, DoCSBS, MITS-DU.*	Member
8.	Dr. Abhishek Dixit, *Assistant Professor, DoCSBS, MITS-DU.*	Member
9.	Dr. Devanshu Tiwari, *Assistant Professor, DoCSBS, MITS-DU.*	Member

The following external member could not attend the meeting.

1.	Dr. Poornima Tapas, *Professor, Symbiosis Institute of Business Management Pune (SIBM),Pune.*	External Member

The following deliberation took place in the meeting:

ITEM CSBS-1:	To propose the scheme structure for the Batch admitted in 2024-25 academic session under the Madhav Institute of Technology & Science-Deemed University (MITS-DU) *(The total credits from I- VIII semester should not be less than 160 for this batch)* **The scheme structure of B. Tech Computer Science and Business Systems (CSBS) for the Batch admitted in 2024-25 academic session were discussed and recommended. Moreover, the scheme structure was confirmed to total 160 credits.** ***The same is enclosed as Annexure –I.***
ITEM CSBS-2:	To review & finalize the syllabi for all courses of B. Tech I Semester (for batch admitted in 2024-25) under the flexible curriculum along with their COs. **The syllabi for all courses (along with their COs) which are to be offered during I Semester of B. Tech Computer Science and Business Systems (for**

	batch admitted in 2024-25) were discussed, finalized and recommended. ***The same is enclosed as Annexure –II.***
ITEM CSBS-3:	To review and finalize the Experiment list/ Lab manual for all the Laboratory Courses and Micro Project-I to be offered in B.Tech. I semester along with their COs. **The list of experiment for the laboratory courses and Micro Project-I for I semester of B. Tech Computer Science and Business Systems along with their COs were discussed, finalized and recommended.** ***The same is enclosed as Annexure –III.***
ITEM CSBS-4:	To discuss and recommend the scheme structure for the Batch admitted in 2024-25 academic session & syllabi of I semester PG Programme under the Madhav Institute of Technology & Science-Deemed University (MITS-DU) (M.E./M.Tech./MCA/MBA/MUP) along with their Course Outcomes (COs) **The scheme structure of Master of Business Administration (MBA) for the Batch admitted in 2024-25 academic session and syllabi (along with their Course Outcomes (COs)) of I semester were discussed and recommended.** ***The same is enclosed as Annexure –IV.***
ITEM CSBS-5:	To review and finalize the syllabus/module of Classified Novel Engaging Course to be offered in I semester of PG programme. **The syllabus/module of Classified Novel Engaging Course (CNEC) to be offered in I semester of MBA programme were reviewed, finalized and recommended.** ***The same is enclosed as Annexure –V.***
ITEM CSBS-6:	To review and finalize the scheme structure for the Batch admitted in 2024-25 academic session & syllabi of Research Methodology and Ethics for Ph.D. Programme under the Madhav Institute of Technology & Science-Deemed University (MITS-DU) **The scheme structure of Ph.D Programme (course work) for the Batch admitted in 2024-25 academic session and syllabi of Research Methodology and Ethics were discussed and recommended.** ***The same is enclosed as Annexure –VI.***

Suggestions by External Experts/Members.

- *It was suggested that the course organizational behavior may be offered in B. Tech programme (Computer Science and Business Systems).*
- *In the scheme of PG programme (MBA), it was suggested to offer Business Statistics and Business Research Methods as two separate courses in place of one course Business Statistics and Research Methods.*
- *It was suggested to change the name of the courses "Total Quality Management & six sigma" and "Exploratory Data Analysis" as "Total Quality Management" and "Statistical Data Analysis" respectively.*
- *It was suggested to offer discipline specific course contents under the Research Methodology & Ethics course of Ph.D Programme course work.*

The meeting ended with the vote of thanks to all the members.

Department of Computer Science and Business Systems

Dr. Devanshu Tiwari

Dr. Abhishek Dixit

Dr. Monica Chauhan Bhadoriya

Dr. Trilok Pratap Singh

Dr. Saumil Maheshwari

Absent / Not Attended

Dr. Poornima Tapas, *Professor, Symbiosis Institute of Business Management Pune (SIBM),Pune*

present online

Dr. Saurabh Chandra, *Professor, Indian Institute Of Management (IIM), Indore*

present online

Dr. Ritu Tiwari, *Professor & Head, Department of Artificial Intelligence, SVNIT, Surat.*

present online

Dr. Naval Bajpai, *Professor, Department of Management Studies, ABV-IIITM, Gwalior.*

Dr. Akhilesh Tiwari, *Professor & Head, Department of Computer Science and Business Systems, MITS-DU, Gwalior.*
[Chairman, BoS]

Dean
Faculty of Engineering & Technology
MITS-DU

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Department of Computer Science and Business Systems

ANNEXURE - I

Scheme Structure of B. Tech Programme Computer Science and Business Systems for Batch Admitted in 2024-25 Under Flexible Curriculum

[ITEM CSBS – 1]

Recommended in the Board of Studies Meeting of DoCSBS held on 12th September 2024

Semester-Wise General Scheme Structure & Important Guidelines for Flexible Curriculum

(Batch admitted in Academic Session 2024-25 onwards)

Abbreviations Used

L	Lecture
T	Tutorial
P	Practical
HSMC	Humanities and Social Sciences including Management Courses
BSC	Basic Science Courses
ESC	Engineering Science Courses
DC	Departmental Core
DE	Departmental Elective
SPC	Specialization Courses
OC	Open Category
DLC	Departmental Laboratory Courses
MOOC	Massive Open Online Course
MWS	Mandatory Workshop
SP	Semester Proficiency
SIP	Skill Internship Program
SLP	Self-learning Presentation
PDC	Professional Development Component
PBL	Project Based Learning
PC	Professional Certification
MAC	Mandatory Audit Course
NEC	Novel Engaging Course

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Department of Computer Science and Business Systems

Scheme of Evaluation

B. Tech. I Semester *(Computer Science and Business Systems)* *(for batch admitted in academic session 2024-25)*

S. No.	Course Code	Category Code	Course Name	Maximum Marks Allotted						Total Marks	Contact Hours per week			Total Credits	Mode of Learning	Mode of Major Evaluation	Duration of Major Evaluation
				Theory Block				Practical Block									
				Continuous Evaluation			Major Evaluation	Continuous Evaluation	Major Evaluation		L	T	P				
				Minor Evaluation I	Minor Evaluation II	Quiz/ Assignment		Lab Work & Sessional									
1.	30241101	DC	Introduction to Computer Science and Business Systems	20	20	30	30	-	-	100	3	-	-	3	Face to Face	MCQ	2 Hrs
2.	30241102	ESC	Computer Programming	20	20	30	30	-	-	100	2	-	-	2	Face to Face	MCQ	2 Hrs
3.	30241103	DC	Digital Logic Design	20	20	30	30	-	-	100	2	1	-	3	Face to Face	MCQ	2 Hrs
4.	30241104	DC	**Business Communication**	20	20	30	30	-	-	100	2	1	-	3	Face to Face	PP	2 Hrs
5.	30241105	BSC	Matrices and Calculus	20	20	30	30	-	-	100	3	-	-	3	Face to Face	PP	2 Hrs
6.	30241106	DLC	Computer Programming Lab	-	-	-	-	70	30	100	-	-	2	1	Experimental	AO	-
7.	30241107	DLC	Business Communication Lab	-	-	-	-	70	30	100	-	-	2	1	Experimental	AO	-
8.	30241108	SP	Semester Proficiency[$]	-	-	-	-	50	-	50	-	-	2	1	Face to Face	SO	-
9.	30241109	PBL	Micro Project-I[#]	-	-	-	-	70	30	100	-	-	2	1	Experiential	SO	-
10.	30241110	HSMC	Language Lab	-	-	-	-	70	30	100	-	-	2	1	Blended	AO	-
11.	NECXXXXX	NEC	Novel Engaging Course (Activity Based Learning)	-	-	-	-	-	50	50	-	1	-	1	Interactive	SO	-
			Total	**100**	**100**	**150**	**150**	**330**	**170**	**1000**	**12**	**03**	**10**	**20**	-	-	-
12.	30241111	MAC	Universal Human Values & Professional Ethics (UHVPE)	20	20	30	30	-	-	100	2	-	-	GRADE	Blended	MCQ	1.5 Hrs
13.	30241112	MWS	Mandatory Workshop on Indian Constitution and Traditional Knowledge at Department Level (Duration: Two Days)											GRADE	Interactive	MCQ	-

Induction programme of three weeks (MC): Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations.

Skill Internship Program (Soft Skill): Minimum 45 hours duration: To be Credited in II Semester.

[$]Semester Proficiency– includes the weightage towards ability/ skill/ competency /knowledge level /expertise attained etc. in the semester courses

MCQ: Multiple Choice Question **AO:** Assignment + Oral **PP:** Pen Paper **SO:** Submission + Oral **OB:** Open Book

[#]Micro Project-I will be presented and evaluated through an interdisciplinary project evaluation committee.

HSMC	BSC	ESC	DC	DE	SPC	OC	DLC	NEC	SP	SIP	SLP	PDC	PBL	MAC	MWS
1	1	1	3	0	0	0	2	1	1	0	0	0	1	1	1

Mode of Learning							Mode of Examination						Total Credits
Theory		NEC	Lab				Theory			NEC	Lab		
Face to Face	Online	Interactive	Face to Face	Blended	Experiential	Experimental	PP	MCQ	OB	SO	AO	SO	
14	00	01	01	01	02	01	06	08	00	01	03	02	20
70%	-	5%	5%	5%	10%	5%	30%	40%	-	5%	15%	10%	Credits %

Recommended in the Board of Studies Meeting of DoCSBS held on 12th September 2024

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Department of Computer Science and Business Systems
Scheme of Evaluation
B. Tech. II Semester *(Computer Science and Business Systems)* *(for batch admitted in academic session 2024-25)*

S. No.	Course Code	Category Code	Course Name	Maximum Marks Allotted						Total Marks	Contact Hours per week			Total Credits	Mode of Learning	Mode of Major Evaluation	Duration of Major Evaluation
				Theory Block				Practical Block									
				Continuous Evaluation			Major Evaluation	Continuous Evaluation	Major Evaluation								
				Minor Evaluation I	Minor Evaluation II	Quiz/ Assignment		Lab Work & Sessional			L	T	P				
1.	30241201	DC	Data Structures	20	20	30	30	-	-	100	3	-	-	3	Face to Face	MCQ	2 Hrs
2.	30241202	DC	Object Oriented Programming	20	20	30	30	-	-	100	2	1	-	3	Face to Face	MCQ	2 Hrs
3.	30241203	DC	Discrete Structures	20	20	30	30	-	-	100	3	-	-	3	Face to Face	PP	2 Hrs
4.	30241204	BSC	Probability and Random Processes	20	20	30	30	-	-	100	3	-	-	3	Face to Face	PP	2 Hrs
5.	30241205	ESC	Basic Electrical & Electronics Engineering	20	20	30	30	-	-	100	2	-	-	2	Face to Face	MCQ	2 Hrs
6.	30241206	DLC	Data Structures Lab	-	-	-	-	70	30	100	-	-	2	1	Experimental	AO	-
7.	30241207	DLC	Object Oriented Programming Lab	-	-	-	-	70	30	100	-	-	2	1	Experimental	AO	-
8.	30241208	DLC	Electrical & Electronics Engineering Lab	-	-	-	-	70	30	100	-	-	2	1	Experimental	AO	-
9.	30241209	SP	Semester Proficiency[$]	-	-	-	-	50	-	50	-	-	2	1	Face to Face	SO	-
10.	30241210	PBL	Micro Project-II[#]	-	-	-	-	70	30	100	-	-	2	1	Experiential	SO	-
11.	NECXXXXX	NEC	Novel Engaging Course (Activity Based Learning)	-	-	-	-	-	50	50	-	1	-	1	Interactive	SO	-
12.	SIP1XXXX	SIP	Skill Internship Program (Soft Skill)	-	-	-	-	42	18	60	-	-	-	2**	Experiential	SO	-
			Total	**100**	**100**	**150**	**150**	**442**	**218**	**1160**	**13**	**02**	**10**	**22**	-	-	-
13.	30241211	MAC	Sustainability & Environmental Science	20	20	30	30	-	-	100	2	-	-	GRADE	Blended	MCQ	1.5 Hrs
14.	30241212	MWS	Mandatory Workshop on Indian Knowledge System at Department Level (Duration: Two Days)											GRADE	Interactive	MCQ	-

Summer Semester of six-eight week duration will be conducted for makeup of I & II semester examination.

[$]Semester Proficiency– includes the weightage towards ability/ skill/ competency /knowledge level /expertise attained etc. in the semester courses

MCQ: Multiple Choice Question **AO:** Assignment + Oral **PP:** Pen Paper **SO:** Submission + Oral **OB:** Open Book

** These credits will be transferred from Skill Internship Program (Soft Skill).

[#]Micro Project-II will be presented and evaluated through an interdisciplinary project evaluation committee.

HSMC	BSC	ESC	DC	DE	SPC	OC	DLC	NEC	SP	SIP	SLP	PDC	PBL	MAC	MWS
0	1	1	3	0	0	0	3	1	1	1	0	0	1	1	1

Mode of Learning							Mode of Examination						Total Credits
Theory		NEC	Lab				Theory			NEC	Lab		
Face to Face	Online	Interactive	Face to Face	Blended	Experiential	Experimental	PP	MCQ	OB	SO	AO	SO	
14	00	01	01	00	03	03	06	08	00	01	03	04	22
63.64%	-	4.55%	4.55%	-	13.64%	13.64%	27.27%	36.36%	-	4.55%	13.64%	18.18%	Credits %

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Department of Computer Science and Business Systems

Scheme of Evaluation

B. Tech. III Semester *(Computer Science and Business Systems)* *(for batch admitted in academic session 2024-25)*

S. No.	Course Code	Category Code	Course Name	Maximum Marks Allotted						Total Marks	Contact Hours per week			Total Credits	Mode of Learning	Mode of Major Evaluation	Duration of Major Evaluation
				Theory Block				Practical Block									
				Continuous Evaluation			Major Evaluation	Continuous Evaluation	Major Evaluation								
				Minor Evaluation I	Minor Evaluation II	Quiz/ Assignment		Lab Work & Sessional			L	T	P				
1.	30242101	BSC	Statistics and Numerical Methods	20	20	30	30	-	-	100	3	-	-	3	Face to Face	PP	2 Hrs
2.	30242102	DC	Design and Analysis of Algorithms	20	20	30	30	-	-	100	2	1	-	3	Face to Face	MCQ	2 Hrs
3.	30242103	DC	Computer Networks	20	20	30	30	-	-	100	2	1	-	3	Face to Face	MCQ	2 Hrs
4.	30242104	DC	Computer Organization and Architecture	20	20	30	30	-	-	100	2	1	-	3	Face to Face	MCQ	2 Hrs
5.	30242105	DC	**Fundamentals of Economics**	20	20	30	30	-	-	100	3	-	-	3	Face to Face	PP	2 Hrs
6.	30242106	DLC	Design and Analysis of Algorithms Lab	-	-	-	-	70	30	100	-	-	2	1	Experimental	AO	-
7.	30242107	DLC	Numerical Computation using MATLAB	-	-	-	-	70	30	100	-	-	2	1	Experimental	AO	-
8.	30242108	DLC	Problem Solving through Python Programming	-	-	-	-	70	30	100	-	-	2	1	Experimental	AO	-
9.	30242109	SP	Semester Proficiency[$]	-	-	-	-	50	-	50	-	-	2	1	Face to Face	SO	-
10.	30242110	PBL	Macro Project-I[*]	-	-	-	-	70	30	100	-	-	2	1	Experiential	SO	-
11.	30242111	SLP	Self-learning/Presentation[$$$] (SWAYAM/NPTEL/MOOC)	-	-	-	-	40	-	40	-	-	2	1	Mentoring	SO	-
12.	NECXXXXX	NEC	Novel Engaging Course (Activity Based Learning)	-	-	-	-	-	50	50	-	1	-	1	Interactive	SO	-
			Total	100	100	150	150	300	140	940	12	04	12	22	-	-	-
13.	30242112	MAC	Cyber Security	20	20	30	30	-	-	100	2	-	-	GRADE	Blended	MCQ	1.5 Hrs
14.	30242113	MWS	Mandatory Workshop on Internet of Things(IoT) at Department Level (Duration: Two Days)											GRADE	Interactive	MCQ	-
			Skill Internship Program (Institute Level) (Qualifier): Minimum 30 hours duration: To be Credited in IV Semester														

[$]Semester Proficiency– includes the weightage towards ability/ skill/ competency /knowledge level /expertise attained etc. in the semester courses

MCQ: Multiple Choice Question **AO:** Assignment + Oral **PP:** Pen Paper **SO:** Submission + Oral **OB:** Open Book

[*]Macro Project-I will be presented and evaluated through an interdisciplinary project evaluation committee.

[$$$]Compulsory registration for one online course using SWAYAM/NPTEL/ MOOC, evaluation through attendance and presentation.

HSMC	BSC	ESC	DC	DE	SPC	OC	DLC	NEC	SP	SIP	SLP	PDC	PBL	MAC	MWS
0	1	0	4	0	0	0	3	1	1	0	1	0	1	1	1

Mode of Learning								Mode of Examination						Total Credits
Theory		NEC	Lab					Theory			NEC	Lab		
Face to Face	Online	Interactive	Mentoring	Face to Face	Blended	Experiential	Experimental	PP	MCQ	OB	SO	AO	SO	
15	00	01	01	01	00	01	03	06	09	00	01	03	03	22
68.18%	-	4.55%	4.55%	4.55%	-	4.55%	13.64%	27.27%	40.91%	-	4.55%	13.64%	13.64%	Credits %

Recommended in the Board of Studies Meeting of DoCSBS held on 12th September 2024

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Scheme of Evaluation

B. Tech. IV Semester *(Computer Science and Business Systems)* *(for batch admitted in academic session 2024-25)*

S. No.	Course Code	Category Code	Course Name	Maximum Marks Allotted						Total Marks	Contact Hours per week			Total Credits	Mode of Learning	Mode of Major Evaluation	Duration of Major Evaluation
				Theory Block				Practical Block									
				Continuous Evaluation			Major Evaluation	Continuous Evaluation	Major Evaluation		L	T	P				
				Minor Evaluation I	Minor Evaluation II	Quiz/ Assignment		Lab Work & Sessional									
1.	30242201	BSC	Linear Algebra and Optimization	20	20	30	30	-	-	100	3	-	-	3	Face to Face	PP	2 Hrs
2.	30242202	DC	Database Management System	20	20	30	30	-	-	100	2	1	-	3	Face to Face	MCQ	2 Hrs
3.	30242203	DC	Operating Systems	20	20	30	30	-	-	100	2	1	-	3	Face to Face	MCQ	2 Hrs
4.	30242204	DC	**Financial Management**	20	20	30	30	-	-	100	3	-	-	3	Face to Face	PP	2 Hrs
5.	30242205	DC	Data Science	20	20	30	30	-	-	100	3	-	-	3	Face to Face	MCQ	2 Hrs
6.	30242206	DLC	Data Science Lab	-	-	-	-	70	30	100	-	-	2	1	Experimental	AO	-
7.	30242207	DLC	Database Management System Lab	-	-	-	-	70	30	100	-	-	2	1	Experimental	AO	-
8.	30242208	DLC	Competitive Programming	-	-	-	-	70	30	100	-	-	2	1	Experimental	AO	-
9.	30242209	SP	Semester Proficiency[$]	-	-	-	-	50	-	50	-	-	2	1	Face to Face	SO	-
10.	30242210	PBL	Macro Project-II[#]	-	-	-	-	70	30	100	-	-	2	1	Experiential	SO	-
11.	30242211	PC	Professional Certification	-	-	-	-	50	-	50	-	-	2	1	Blended	SO	-
12.	NECXXXXX	NEC	Novel Engaging Course (Activity Based Learning)	-	-	-	-	-	50	50	-	1	-	1	Interactive	SO	-
13.	SIP3XXXX	SIP	Skill Internship Program	-	-	-	-	42	18	60	-	-	-	2**	Experiential	SO	-
			Total	100	100	150	150	422	188	1110	13	03	12	24	-	-	-
14.	30242212	MAC	Project Management, Economics & Financing	20	20	30	30	-	-	100	2	-	-	GRADE	Blended	MCQ	1.5 Hrs
15.	30242213	MWS	Mandatory Workshop on Computer Vision at Department Level (Duration: Two Days)											GRADE	Interactive	MCQ	-
16.	30242214	MWS	Mandatory Workshop on Life Skills at Department Level (Duration: Two Days)											GRADE	Interactive	MCQ	-

Summer Semester of six-eight week duration will be conducted for makeup of previous semester examination.

Additional Course for Honours or Minor Degree: Permitted to opt for maximum two additional courses for the award of Honours or Minor Degree

[$]Semester Proficiency– includes the weightage towards ability/ skill/ competency /knowledge level /expertise attained etc. in the semester courses

MCQ: Multiple Choice Question **AO:** Assignment + Oral **PP:** Pen Paper **SO:** Submission + Oral **OB:** Open Book

[#]Macro Project-II will be presented and evaluated through an interdisciplinary project evaluation committee.

** These credits will be transferred from Skill Internship Program.

PC	BSC	ESC	DC	DE	SPC	OC	DLC	NEC	SP	SIP	SLP	PDC	PBL	MAC	MWS
1	1	0	4	0	0	0	3	1	1	1	0	0	1	1	2

Mode of Learning							Mode of Examination						Total Credits
Theory		NEC	Lab				Theory			NEC	Lab		
Face to Face	Online	Interactive	Face to Face	Blended	Experiential	Experimental	PP	MCQ	OB	SO	AO	SO	
15	00	01	01	01	03	03	06	09	00	01	03	05	24
62.50%	-	4.17%	4.17%	4.17%	12.50%	12.50%	25.00%	37.50%	-	4.17%	12.50%	20.83%	Credits %

Recommended in the Board of Studies Meeting of DoCSBS held on 12th September 2024

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Department of Computer Science and Business Systems
Scheme of Evaluation
B. Tech. V Semester *(Computer Science and Business Systems)* **(for batch admitted in academic session 2024-25)**

S. No.	Course Code	Category Code	Course Name	Maximum Marks Allotted								Total Marks	Contact Hours per week			Total Credits	Mode of Learning	Mode of Major Evaluation	Duration of Major Evaluation
				Theory Block				Practical Block		MOOCs									
				Continuous Evaluation			Major Evaluation	Continuous Evaluation	Major Evaluation	Assignment	Exam		L	T	P				
				Minor Evaluation I	Minor Evaluation II	Quiz/ Assignment		Lab Work & Sessional											
1.	30243101	DC	Formal Language and Automata Theory	20	20	30	30	-	-	-	-	100	2	1	-	3	Face to Face	MCQ	2 Hrs
2.	30243102	DC	Software Engineering	20	20	30	30	-	-	-	-	100	2	1	-	3	Face to Face	MCQ	2 Hrs
3.	30243103	DC	Artificial Intelligence and Machine Learning	20	20	30	30	-	-	-	-	100	2	1	-	3	Face to Face	MCQ	2 Hrs
4.	302431XX	DE	Departmental Elective* (DE-1)	-	-	-	-	-	-	25	75	100	3	-	-	3	Online	MCQ	3 Hrs
5.	302431XX	SPC	Specialization Course (SPC-1)	20	20	30	30	-	-	-	-	100	2	1	-	3	Face to Face	PP	2 Hrs
6.	30243104	DLC	Software Engineering Lab	-	-	-	-	70	30	-	-	100	-	-	2	1	Experimental	AO	-
7.	30243105	DLC	Artificial Intelligence and Machine Learning Lab	-	-	-	-	70	30	-	-	100	-	-	2	1	Experimental	AO	-
8.	30243106	SP	Semester Proficiency[$]	-	-	-	-	50	-	-	-	50	-	-	2	1	Face to Face	SO	-
9.	30243107	PBL	Cornerstone Project	-	-	-	-	70	30	-	-	100	-	-	4	2	Experiential	SO	-
Total				80	80	120	120	260	90	25	75	850	11	04	10	20	-	-	-
10.	30243114	MAC	Supply Chain Management	20	20	30	30	-	-			100	2	-	-	GRADE	Blended	MCQ	1.5 Hrs
11.	30243115	MWS	Mandatory Workshop on Blockchain at Department Level (Duration: Two Days)													GRADE	Interactive	MCQ	-
Additional Course for Honours or Minor Degree: Permitted to opt for maximum two additional courses for the award of Honours or Minor Degree																			

[$]Semester Proficiency– includes the weightage towards ability/ skill/ competency /knowledge level /expertise attained etc. in the semester courses

MCQ: Multiple Choice Question AO: Assignment + Oral PP: Pen Paper SO: Submission + Oral OB: Open Book

* Course run through SWAYAM/NPTEL/ MOOC Learning Based Platform

HSMC	BSC	ESC	DC	DE	SPC	OC	DLC	NEC	SP	SIP	SLP	PDC	PBL	MAC	MWS
0	0	0	3	1	1	0	2	0	1	0	0	0	1	1	1

Mode of Learning					Mode of Examination					Total Credits
Theory		Lab			Theory			Lab		
Face to Face	Online	Face to Face	Experiential	Experimental	PP	MCQ	OB	AO	SO	
12	03	01	02	02	03	12	00	02	03	20
60.00%	15.00%	5.00%	10.00%	10.00%	15.00%	60.00%	0.00%	10.00%	15.00%	Credits %

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(Deemed University)

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Department of Computer Science and Business Systems

Scheme of Evaluation

B. Tech. VI Semester *(Computer Science and Business Systems)* *(for batch admitted in academic session 2024-25)*

S. No.	Course Code	Category Code	Course Name	Maximum Marks Allotted								Total Marks	Contact Hours per week			Total Credits	Mode of Learning	Mode of Major Evaluation	Duration of Major Evaluation
				Theory Block				Practical Block		MOOCs									
				Continuous Evaluation			Major Evaluation	Continuous Evaluation	Major Evaluation										
				Minor Evaluation I	Minor Evaluation II	Quiz/ Assignment		Lab Work & Sessional		Assignment	Exam		L	T	P				
1.	30243201	DC	Marketing Research & Marketing Management	20	20	30	30	-	-	-	-	100	2	1	-	3	Face to Face	MCQ	2 Hrs
2.	30243202	DC	Compiler Design	20	20	30	30	-	-	-	-	100	2	1	-	3	Face to Face	MCQ	2 Hrs
3.	302432XX	DE	Departmental Elective* (DE-2)	-	-	-	-	-	-	25	75	100	3	-	-	3	Online	MCQ	3 Hrs
4.	302432XX	OC	Open Category Course (OC-1)	20	20	30	30	-	-	-	-	100	2	1	-	3	Face to Face	PP	2 Hrs
5.	302432XX	SPC	Specialization Course (SPC-2)	20	20	30	30	-	-	-	-	100	3	-	-	3	Face to Face	PP	2 Hrs
6.	30243203	DLC	Compiler Design Lab	-	-	-	-	70	30	-	-	100	-	-	2	1	Experimental	AO	-
7.	30243204	DLC	IoT Lab	-	-	-	-	70	30	-	-	100	-	-	2	1	Experimental	AO	-
8.	30243205	SP	Semester Proficiency[$]	-	-	-	-	50	-	-	-	50	-	-	2	1	Face to Face	SO	-
9.	30243206	PBL	Capstone Project	-	-	-	-	70	30	-	-	100	-	-	4	2	Experiential	SO	-
			Total	80	80	120	120	260	90	25	75	850	12	03	10	20	-	-	-
10.	30243216	MAC	Disaster Management	20	20	30	30	-	-	-	-	100	2	-	-	GRADE	Blended	MCQ	1.5 Hrs
11.	30243217	MWS	Mandatory Workshop on Intellectual Property Rights at Department Level (Duration: Two Days)													GRADE	Interactive	MCQ	-
			Skill Enhancement Program/Research Internship/On Job Training for Four weeks duration (Optional)																
			Summer Semester of six-eight week duration will be conducted for makeup of Previous semester examination.																
			Additional Course for Honours or Minor Degree: Permitted to opt for maximum two additional courses for the award of Honours or Minor Degree																

[$]Semester Proficiency– includes the weightage towards ability/ skill/ competency /knowledge level /expertise attained etc. in the semester courses

MCQ: Multiple Choice Question **AO:** Assignment + Oral **PP:** Pen Paper **SO:** Submission + Oral **OB:** Open Book

* Course run through SWAYAM/NPTEL/ MOOC Learning Based Platform

HSMC	BSC	ESC	DC	DE	SPC	OC	DLC	NEC	SP	SIP	SLP	PDC	PBL	MAC	MWS
0	0	0	2	1	1	1	2	0	1	0	0	0	1	1	1

Mode of Learning					Mode of Examination					Total Credits
Theory		Lab			Theory			Lab		
Face to Face	Online	Face to Face	Experiential	Experimental	PP	MCQ	OB	AO	SO	
12	03	01	02	02	06	09	00	02	03	20
60.00%	15.00%	5.00%	10.00%	10.00%	30.00%	45.00%	-	10.00%	15.00%	Credits %

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Department of Computer Science and Business Systems

Scheme of Evaluation

B. Tech. VII Semester *(Computer Science and Business Systems)* *(for batch admitted in academic session 2024-25)*

S. No.	Course Code	Category Code	Course Name	Maximum Marks Allotted								Total Marks	Contact Hours per week			Total Credits	Mode of Learning	Mode of Major Evaluation	Duration of Major Evaluation
				Theory Block				Practical Block		MOOCs									
				Continuous Evaluation			Major Evaluation	Continuous Evaluation Lab Work & Sessional	Major Evaluation	Assignment	Exam		L	T	P				
				Minor Evaluation I	Minor Evaluation II	Quiz/ Assignment													
1.	302441XX	DE	Departmental Elective (DE-3)	20	20	30	30	-	-	-	-	100	3	-	-	3	Face to Face	PP	2 Hrs
2.	302441XX	DE	Departmental Elective* (DE-4)	-	-	-	-	-	-	25	75	100	3	-	-	3	Online	MCQ	3 Hrs
3.	302441XX	OC	Open Category Course (OC-2)	20	20	30	30	-	-	-	-	100	2	1	-	3	Face to Face	PP	2 Hrs
4.	302441XX	SPC	Specialization Course (SPC-3)	20	20	30	30	-	-	-	-	100	2	1	-	3	Face to Face	MCQ	2 Hrs
5.	30244101	SP	Semester Proficiency[$]	-	-	-	-	50	-	-	-	50	-	-	2	1	Face to Face	SO	-
6.	30244102	DLC	Creative Problem Solving	-	-	-	-	70	30	-	-	100	-	-	2	1	Experiential	SO	-
			Total	**60**	**60**	**90**	**90**	**120**	**30**	**25**	**75**	**550**	**10**	**02**	**04**	**14**	-	-	-
7.	30244115	MWS	Mandatory Workshop on Advanced Intellectual Property Rights at Department Level (Duration: Two Days)													GRADE	Interactive	MCQ	-
Additional Course for Honours or Minor Degree: Permitted to opt for maximum two additional courses for the award of Honours or Minor Degree																			

[$]Semester Proficiency– includes the weightage towards ability/ skill/ competency /knowledge level /expertise attained etc. in the semester courses

MCQ: Multiple Choice Question **AO:** Assignment + Oral **PP:** Pen Paper **SO:** Submission + Oral **OB:** Open Book

*Course run through SWAYAM/NPTEL/ MOOC Learning Based Platform

HSMC	BSC	ESC	DC	DE	SPC	OC	DLC	NEC	SP	SIP	SLP	PDC	PBL	MAC	MWS
0	0	0	0	2	1	1	1	0	1	0	0	0	0	0	1

Mode of Learning					Mode of Examination					Total Credits
Theory		Lab			Theory			Lab		
Face to Face	Online	Face to Face	Experiential	Experimental	PP	MCQ	OB	AO	SO	
09	03	01	01	00	06	06	00	00	02	14
64.29%	21.43%	7.14%	7.14%	-	42.86%	42.86%	-	-	14.29%	Credits %

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Department of Computer Science and Business Systems
Scheme of Evaluation
B. Tech. VIII Semester *(Computer Science and Business Systems)* *(for batch admitted in academic session 2024-25)*

S. No.	Course Code	Category Code	Course Name	Maximum Marks Allotted								Total Marks	Contact Hours per week			Total Credits	Mode of Learning	Mode of Major Evaluation	Duration of Major Evaluation
				Theory Block				Practical Block		MOOCs									
				Continuous Evaluation			Major Evaluation	Continuous Evaluation	Major Evaluation	Assignment	Exam		L	T	P				
				Minor Evaluation I	Minor Evaluation II	Quiz/ Assignment													
1.	302442XX	DE	Departmental Elective* (DE-5)	-	-	-	-	-	-	25	75	100	3	-	-	3	Online	MCQ	3 Hrs
2.	302442XX	OC	Open Category Course* (OC-3)	-	-	-	-	-	-	25	75	100	3	-	-	3	Online	MCQ	3 Hrs
3.	30244201	PBL	Industry Internship/ Research Internship/ Innovation & Start-up	-	-	-	-	280	120	-	-	400	-	-	20	10	Experiential	SO	-
4.	30244202	PDC	Professional Development**	-	-	-	-	-	50	-	-	50	-	-	4	2	Interactive	SO	-
Total				-	-	-	-	280	170	50	150	650	06	-	24	18	-	-	-
Summer Semester of six-eight week duration will be conducted to complete any backlog courses.																			
Additional Course for Honours or Minor Degree: Permitted to opt for maximum two additional courses for the award of Honours or Minor Degree																			

MCQ: Multiple Choice Question **AO:** Assignment + Oral **PP:** Pen Paper **SO:** Submission + Oral **OB:** Open Book

*Course run through SWAYAM/NPTEL/ MOOC Learning Based Platform

** Evaluation will be based on participation/laurels brought by the students to the institution in national/state level technical and other events during the complete tenure of the UG programme (participation in professional chapter activities, club activities, cultural events, sports, personality development activities, collaborative events, MOOCs, technical events, institute/department committees, etc.)

HSMC	BSC	ESC	DC	DE	SPC	OC	DLC	NEC	SP	SIP	SLP	PDC	PBL	MAC	MWS
0	0	0	0	1	0	1	0	0	0	0	0	1	1	0	0

Mode of Learning					Mode of Examination					Total Credits
Theory		Lab		PDC	Theory			Lab		
Face to Face	Online	Face to Face	Experiential	Interactive	PP	MCQ	OB	AO	SO	
00	06	00	10	02	00	06	00	00	12	18
-	33.33%	-	55.56%	11.11%	-	33.33%	-	-	66.67%	Credits %

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Department of Computer Science and Business Systems

ANNEXURE - II

Syllabi of
Courses
B. Tech I Semester
(Batch Admitted in 2024-25)
(Computer Science and Business Systems)
Under Flexible Curriculum
[ITEM CSBS – 2]

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Department of Computer Science and Business Systems

INTRODUCTION TO COMPUTER SCIENCE AND BUSINESS SYSTEMS
30241101

COURSE OBJECTIVES

- To provide the basic understanding of computer hardware, software, and their interaction within systems.
- To present the basics and difference of Data, Information and knowledge.
- To understand the role of business systems and their role in supporting business functions like operations, finance, marketing, and HR.

Unit I

Overview of Computer Systems: Architecture and Components, Hardware Components: CPU, Memory, Storage Devices, I/O Devices, Peripherals, Software: System Software (Operating Systems), Application Software, Programming Languages, Introduction to Operating Systems: Types, Functions, Examples (Windows, Linux, MacOS).

Unit II

Data and its Sources: Data vs Information vs Knowledge, Sources of Data Generation, **Type of Data:** Structure, Non Structure, Semi Structure, Images, Video, Temporal, Real Time, **Data Types:** Categorical/Nominal/Ordinal, Data Types Conversion, Knowledge Discovery through Data.

Unit III

Overview of the Data Analytics Lifecycle: Data Collection, Storage, Processing, Analysis, **Types of Data Repositories:** Data Warehouse, Pattern Data Warehouse etc. Basics of Machine Learning Models: Supervised and Unsupervised Learning, Case Studies of Data-Driven Business Decisions in Industries like Retail, Finance, Healthcare.

Unit IV

Introduction to Business Systems: Organizational Structure (Functional, Divisional, Matrix), Business Functions (Operations, Marketing, Finance, Human Resources), Business Processes (Supply Chain, Customer Relationship Management), Introduction to Business Economics and Finance, **Overview of Financial Markets:** Stock Market, Bonds, Mutual Funds, and their Role in Business. **Technology in Business:** Impact of

Technology on Business Operations (Efficiency, Productivity, Innovation), Information Systems and their Role in Decision-Making, Ethical Considerations in Technology use (Privacy, Security, Intellectual Property).

Unit V

Introduction to Marketing: Definition, Functions, Importance in Business, **Marketing Mix:** Product, Price, Place, Promotion, **Market Research:** Understanding Consumer Behavior and Trends, **Basics of Digital Marketing:** Social Media, SEO, Email Marketing, **Introduction to Entrepreneurship:** Traits, Challenges, Opportunities, Case Studies of Successful Entrepreneurs and Startups.

RECOMMENDED BOOKS

1. "Operating Systems: Internals and Design Principles" by William Stallings.
2. "Computer System Architecture" by M. Morris Mano.
3. "Principles of Management" by Stephen P. Robbins and Mary Coulter.
4. "Data Mining Concepts and Techniques" Han & Kamber.
5. "Fundamentals of Financial Management" by James C. Van Horne.
6. "Marketing Management" by Philip Kotler.

COURSE OUTCOMES

After completion of the course students would be able to:

CO1. explain the fundamental components and architecture of computer systems.
CO2. discuss the basic marketing concepts and their application in real-world business.
CO3. compare various types of software and their roles in computer systems.
CO4. perform data type conversions to ensure compatibility for analysis
CO5. analyze data to make informed business decisions using analytics platforms

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CO-PO Mapping Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3		1	1	2	1	1	1	1	2	3	2	2	
CO2	1			1		1	1	1	1	2	2	2	3	3
CO3	1			1		1	1	1	1	2		2	3	2
CO4	1	1	1			1	1	1	1	2		2	3	
CO5	1	1				1	1	1	1	2	2	2	3	3

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Department of Computer Science and Business Systems

COMPUTER PROGRAMMING
30241102

COURSE OBJECTIVES

- To develop ability to write a computer program to solve specified problems.
- To develop skills in algorithmic problem-solving, expressed in a programming language like C++.
- To understand fundamentals of programming such as variables, conditional and iterative statement, function and its execution etc.

Unit I

Introduction to Programming: Machine Level Languages, Assembly Level Languages, High Level Languages, Program, Program Execution & Translation Process, Problem solving using Algorithms and Flowcharts. Introduction to C++ Programming: Data Types, Constants, Keywords, Operators & Expressions, Precedence of operators and input/output functions.

Unit II

Control Statements and Decision Making: The if statement, The if-else statement, Nesting of if statements, The conditional expression, The switch statement, The while loop, The do…while loop, The for loop, The nesting of for loops, The break and continue statement.

Unit III

Arrays, Strings & Pointers: One Dimensional Array, 2D array, Passing Array to Functions, Multidimensional Array, Strings, Basics of Pointers & Addresses, type of pointers, Application of pointers, Pointer to Pointer, Pointer to Array, Array of Pointers, Pointer to Strings.

Unit IV

Functions & Structures: Function, Function Prototypes, Passing Parameter by Value and by Reference, Passing String & Array to Function, Function Returning Address, Recursion, Structures, Dynamic Memory Allocation by Call of Function, Storage Classes.

Unit V

File Handling: Defining and Opening a File, Closing Files, Input/output Operations on

Files, Predefined Streams, Error Handling during I/O Operations, Command Line Arguments, Preprocessor Directives, Formatted I/O.

RECOMMENDED BOOKS

1. E. Balagurusamy, "Programming in ANSI C++", Sevenths Edition, Tata McGraw Hill, 2017.
2. Reema Thareja, "Programming in C++", Second Edition, Oxford publication, 2016.
3. W. Kernighan and Dennis M. Ritchie, "The C/C++ Programming Language", Pearson, 2015.
4. Matthias Felleisen, Robert Bruce Findler, Mathew Flatt, Shriram Krishnamurthi, "How to Design Programs: An Introduction to Programming and Computing", Second Edition, MIT Press, 2018.
5. E. Balagurusamy, "Object Oriented Programming with C++", Tata McGraw Hill, 2009.
6. B.S. Gottfried, "Programming with C++", 3rd edition, Tata McGraw Hill, 2018.
7. Abhiram G. Ranade, "An Introduction to Programming through C++", McGraw Hill Education.
8. Yashavant Kanetkar, "Let Us C++", BPB Publication.

COURSE OUTCOMES

After completion of the course students would be able to:

CO1. explain basic programming terms, syntax, algorithm and flow chart.
CO2. apply programming concept to implement, debug and test any C++ program.
CO3. solve computational problems using decision control and loops.
CO4. design a program using the concept of array, pointer and functions.
CO5. choose appropriate file handling operations to work efficiently with files.

CO-PO Mapping Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	1			1	1	1	1	2	1	2	2	3
CO2	3	1	1			1	1	1	1	2	1	2	1	3
CO3	3	3	1			1	1	1	1	2	1	2	3	3
CO4	3	1	3		2	1	1	1	1	2	1	2	2	3
CO5	3					1	1	1	1	2	1	2	2	3

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Department of Computer Science and Business Systems

DIGITAL LOGIC DESIGN
30241103

COURSE OBJECTIVES

- To familiarize with number representation and conversion between various representations in digital electronic circuits.
- To expose the logical operations using combinational logic circuits, sequential logic circuits and the characteristics of memory and their classification.

Unit I

Introduction to Digital Electronics, Needs and Significance, Different Number System: Binary, Decimal, Octal and Hexadecimal Numbers, Conversions, Complement's, Signed Binary Numbers, Binary Arithmetic's, Binary Codes: BCD, ASCII Codes.

Unit II

Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Boolean Relations, Digital Logic Gates, De Morgan's Theorem, Karnaugh Maps and simplifications.

Unit III

Combinational Circuits, Half Adder, Full Adder, Binary Adder-Subtractor, Binary Multiplier, Comparator, Decoders, Encoders, Multiplexers.

Unit IV

Sequential Circuits, Latches, Flip-Flops: RS Latches, Level Clocking, D Latches, Edge-Triggered D Flip-flop, Edge-Triggered JK Flip-flop, JK Master-Slave Flip-flop; Registers, Shift Registers, Counters, Ripple Counters, Synchronous Counters.

Unit V

Introduction to Memory, Classification of Memories, Memory Decoding, Programmable Devices: Programmable Logic Array (PLA), Programmable Array Logic (PAL).

RECOMMENDED BOOKS

1. Fundamentals of Digital Logic Design by Charles H. Roth, Jr. Cengage, 7th Edition.
2. Digital Design, Morris Mano M. and Michael D. Ciletti, Pearson Education, 6th Edition.
3. Digital Electronics: Principles, Devices and Applications, Anil K. Maini, Wiley.

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COURSE OUTCOMES

After completion of the course students would be able to:

CO1. explain different number systems and conversion among them and codes.
CO2. simplify the logic expressions using Boolean laws, and map methods and design them by using logic gates.
CO3. develop the understanding of combinational circuits and design them.
CO4. analyze different types of flip-flops and design a sequential logic circuit.
CO5. compare various memories used in computers.

CO-PO Mapping Matrix														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2	1			1	1	1	1	1	2	1	2	1	
CO2	2	2	2		1	1	1	1	1	2	1	2	1	
CO3	2	1	3		1	1	1	1	1	2	1	2	1	
CO4	2	3	3		1	1	1	1	1	2	1	2	1	
CO5	2	1			1	1	1	1	1	2	1	2	1	

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Department of Computer Science and Business Systems

BUSINESS COMMUNICATION
30241104

COURSE OBJECTIVES

- The course intends to build the required communication skills of the students to communicate effectively in real-life situations like starting a talk and be comfortable using English language.
- The students are expected to enrich their knowledge of language, culture, and ethics through this course.

Unit I

Communication: Approaches, Elements, Barriers to Communication; Johari Communication Window, Proxemics, Chronemics, Language of Spaces, Time, Silence, Touch, and Para Language, Classification of Communication as Interpersonal, Intrapersonal, Extra-personal, Mass, Conflict and Negotiation, Communication and Perception.

Unit II

Interpersonal Communication: Interpersonal Communication and Interpersonal relations; Interpersonal barriers to Communication, Motivation in Interpersonal Communication, Interpersonal Skills, Importance of Interpersonal skills, Role of Self-Disclosure in Interpersonal Communication.

Unit III

Corporate Communication: Organizational and/or Management Communication, Corporate Communication Tools (Lobbying, Networking, Media, Identity, Reputation) Dealing with Financial Matters, Ethics, Laws, Role of Technology and Social Media in Corporate Communication. **Report writing:** Formal reports, Writing effective letters, Different types of business Letters, Interview techniques, Communication etiquettes.

Unit IV

Listening: Factors Affecting Listening, Kinds of Listening, Improving Listening, **Public Speaking:** Group Discussions, Small Group Talks, Debates, Meetings, Delivering Presentation, 7Cs of Delivering a Presentation, Personal Interviews. **Barriers of Communication:** Types of barriers, Technological, Socio-Psychological Barriers, Overcoming barriers.

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Unit V

Soft Skills: Introduction to Soft Skills, How to Groom Personality, Difference Between Personalist And Character, Role of Attitudes, Emotions and Feelings, Developing Interpersonal Relations, Emotional Intelligence, Creativity and Mind Mapping.

RECOMMENDED BOOKS

1. "Understanding Human Communication", Ronald & Alderman, OUP.
2. "Communication Skills for Engineers", Pearson Education.
3. "Corporate Communication", Joep P Cornelissen, Sage Publications.
4. "Effective Presentation Skills", Asha Kaul, Sage Response.
5. "Corporate Reputation Decoded", Asha Kaul, Sage Response.
6. "Personality Development & Soft Skills", Barun K Mitra, Oxford University Press.

COURSE OUTCOMES

After completion of the course students would be able to:

CO1. learn the importance of communication to serve a variety of audiences and purposes.
CO2. prepare oral dialogues and arguments within the profession effectively.
CO3. demonstrate ability to deliver on a topic in a professional setting.
CO4. delineate issues assessing the results in arguments using appropriate material for support.
CO5. validate professional behaviour and conduct while in a communication situation.

CO-PO Mapping Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	1			2	2	2	1	3	2	1	3	3
CO2	1	1	1			2	2	2	1	3	2	1	3	3
CO3	1	1	1			2	2	2	1	3	2	1	3	3
CO4	1	1	1			2	2	2	1	3	2	1	3	3
CO5	1	1	1			2	2	2	1	3	2	1	3	3

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Department of Computer Science and Business Systems

MATRICES AND CALCULUS
30241105

COURSE OBJECTIVES

- To understand types of matrices and their properties.
- To know the concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
- To understand Eigen values and eigenvectors and to reduce the quadratic form to canonical form.
- To expose the concept of ordinary and partial differentiation, evaluation of improper integrals using Beta and Gamma functions, finding maxima and minima of function of two and three variables, evaluation of multiple integrals and their applications.

Unit I

Matrices-I: Types of Matrix, Hermitian and Skew Hermitian Matrix, Unitary Matrix, Matrix Rank of a Matrix by Echelon Form and Normal Form, Inverse of Non-Singular Matrix by Elementary Transformation, Solution of System of Homogeneous and Non-Homogeneous Equations by Elementary Transformation, Consistency of Equation.

Unit II

Matrices-II: Linear Dependence of Vectors, Eigen Values and Eigenvectors with their Properties, Cayley Hamilton Theorem and its application to finding Inverse of Matrix, Diagonalization of a Matrix.

Unit III

Differential Calculus–I: n^{th} Derivative, Leibnitz's Theorem, Partial Derivatives, Euler's Theorem for Homogeneous Functions, Total Derivatives, Change of Variables.

Unit IV

Differential calculus-II: Taylor's and Maclaurin's Theorems, Expansion of Function of Several Variables, Jacobian, Properties of Jacobian, Approximation of Errors, Extrema of Functions of Several Variables (Maxima and Minima of Function of One and Two Variables), Lagrange's Method of Multipliers (Simple Applications).

Unit V

Integral Calculus: Beta and Gamma Function and its Properties, Transformation of Beta Function and Gama Function, Relation Between Beta and Gama Function, Double

and Triple Integrals, Change of Order of Integration, Application of Integration to Volumes and Surface Areas.

RECOMMENDED BOOKS

1. E. Kreyszig: Advance Engineering Mathematics, John Wiley & Sons, 10th Edition (2011).
2. C.L Liu: Discrete Mathematics, 4th Edition 2012.
3. R. K. Jain, S. R. K. Iyengar: Advance Engineering Mathematics, Narosa Publishing House Pvt. Ltd, 5th Edition (2016).
4. F. B. Hildebrand: Advanced Calculus for application, Englewood Cliffs, N. J. Prentice- Hall, 2nd Edition (1980).
5. B. S. Grewal: Higher Engineering Mathematics, Khanna Publishers, 43rd Edition (2015).
6. B.V. Ramanna: Higher Engineering Mathematics, McGraw Hill Education, 1st Edition (2017).

COURSE OUTCOMES

After completion of the course students would be able to:

CO1. solve the problem of matrix.
CO2. make use of various matrix in engineering problems.
CO3. apply differential Calculus in basic engineering problems.
CO4. determine the solution of various complex problems using integration techniques.
CO5. estimate the engineering problems using series methods.

CO-PO Mapping Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	1		1	1	1	1			2	1	
CO2	3	3	3	1		1	1	1	1			2	1	
CO3	3	3	3	1		1	1	1	1			2	1	
CO4	3	3	3	1		1	1	1	1			2	1	
CO5	3	3	3	1		1	1	1	1			2	1	

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LANGUAGE LAB
30241110

COURSE OBJECTIVES

- The course intends to build the required communication skills of the students to communicate effectively in real-life situations like starting a talk and be comfortable using English language.
- It aims at teaching students to appreciate English language through the study of scientific, creative, and academic text.
- The course is designed to acquaint students with structure of English language used in literature, functional varieties, figurative language, and verbal concomitance.
- The students are expected to enrich their knowledge of language, culture, and ethics through this course.

Unit I

Communication: Approaches, Elements, Verbal and Nonverbal Communication; Barriers to Communication; Johari Communication Window.

Unit II

Listening: Factors Affecting Listening and Improving Listening.

Unit III

Speaking: Public Speaking & Delivering Presentation.

Unit IV

Reading: Reading Passages & Comprehension: Steps and Methods.

Unit V

Writing: Essentials of good writing; Drafting CV/biodata/Résumé)

Language Laboratory:

The objective of the language lab is to expose students to a variety of listening and speaking drills. This would especially benefit students who are deficient in English and it also aims at confidence building for interviews and competitive examinations. The Lab is to cover following syllabus.

1. Communication lab exercises as specified in Lab Manual
2. Listening skills (using Marc Hancock, CUP).
3. Speaking skills

4. Oral presentation.

RECOMMENDED BOOKS

1. "Understanding Human Communication", By Ronald Alderman by OUP
2. "Communication Skills for Engineers", Pearson Education.
3. "Practical English Grammar by Thomson Martinet", Oxford University Press
4. "A Handbook of Language laboratory by P Sreekumar", Cambridge University Press.

COURSE OUTCOMES

After completion of the course students would be able to:

CO1. speak clearly effectively and appropriately in a public forum to a variety of audiences and purposes.
CO2. prepare oral dialogues and arguments within the engineering profession effectively.
CO3. demonstrate knowledge and comprehension of major text and traditions in language as well as its social, cultural, and historical context.
CO4. read a variety of Text analytically to demonstrate in writing and/or speech the interpretation of texts.
CO5. interpret text written in english assessing the results in written and oral arguments using appropriate material for support.

CO-PO Mapping Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1					1	1	1	1	3	3	3	2	1	1
CO2	3	1			1	1	1	1	3	3	3	2	1	1
CO3			3		1	3	3	1	3	3	3	2	1	1
CO4					1	1	1	1	3	3	3	2	1	1
CO5					1	1	1	1	3	3	3	2	1	1

Department of Computer Science and Business Systems

UNIVERSAL HUMAN VALUES & PROFESSIONAL ETHICS (UHVPE) 30241111

COURSE OBJECTIVES

- To sensitization of student towards self, family (relationship), society and nature.
- To understand (or developing clarity) of nature, society and larger systems, on the basis of human relationships and resolved individuals.
- To strengthening of self-reflection.
- To development of commitment and courage to act.

Unit I

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education:

- Self-Exploration–what is it? - Its content and process; 'Natural Acceptance' and Experiential Validation- as the process for self-exploration
- Continuous Happiness and Prosperity- A look at basic Human Aspirations
- Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority
- Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario

Unit II

Understanding Harmony in the Human Being:

- Understanding human being as a co-existence of the sentient 'I' and the material 'Body'
- Understanding the needs of Self ('I') and 'Body' - happiness and physical facility
- Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)
- Understanding the characteristics and activities of 'I' and harmony in 'I'
- Understanding the harmony of 'I' with the Body

Unit III

Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship:

- Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship
- Understanding the meaning of Trust; Difference between intention and competence
- Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship
- Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals
- Visualizing a universal harmonious order in society

Unit IV

Understanding Harmony in the Nature and Existence - existence as Coexistence:

- Understanding the harmony in the Nature
- Interconnectedness and mutual fulfilment among the four orders of nature recyclability and self-regulation in nature
- Understanding Existence as Co-existence of mutually interacting units in all pervasive space
- Holistic perception of harmony at all levels of existence.

Unit V

Holistic Understanding of Harmony on Professional Ethics:

- Natural acceptance of human values
- Definitiveness of Ethical Human Conduct
- Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order
- Competence in professional ethics:
  a. Ability to utilize the professional competence for augmenting universal human order
  b. Ability to identify the scope and characteristics of people friendly and eco-friendly production systems,
  c. Ability to identify and develop appropriate technologies and management patterns for above production systems.
- Strategy for transition from the present state to Universal Human Order:
  a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers
  b. At the level of society: as mutually enriching institutions and organizations

Gender Sensitization:

- Introduction to Sex, Gender & Culture
- Introduction to Women Studies and Socialisation, including man-woman relationship, work distribution
- A brief review of Feminism, Patriarchy, Feminist Studies, Feminist Ideologies.
- Women and Law Constitutional Provisions and Fundamental rights related to Women.

RECOMMENDED BOOKS

1. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
5. On Education - J Krishnamurthy
6. Siddhartha - Hermann Hesse
7. Old Path White Clouds - Thich Nhat Hanh
8. On Education - The Mother
9. Diaries of Anne Frank - Anne Frank
10. Life and Philosophy of Swami Vivekananda
11. Swami Vivekananda on Himself
12. Small is Beautiful - E. F Schumacher.
13. Slow is Beautiful - Cecile Andrews

14. Economy of Permanence - J C Kumarappa
15. Bharat Mein Angreji Raj - Pandit Sunderlal
16. Mahatma and the Rose
17. The Poet and the Charkha
18. Rediscovering India - by Dharampal
19. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
20. Swaraj by Arvind Kejriwal
21. India Wins Freedom - Maulana Abdul Kalam Azad
22. Ramakrishna ki jeevani - Romain Rolland (English)
23. Vivekananda - Romain Rolland (English)
24. Gandhi - Romain Rolland (English)
25. Autobiography of a Yogi – by Paramhansa Yogananda
26. Gandhi and Question of Science – Sahatsrabudhe

COURSE OUTCOMES

After completion of the course students would be able to:

CO1. identify problems related to society, social and their sustainable solutions.
CO2. become sensitive to their commitment towards what they believe in (humane values. humane relationships and humane society).
CO3. apply what they have learnt to their own self in different day-to-day settings in real life.
CO4. sustain human relationships and human nature in mind.
CO5. change living in harmony with self and others.

CO-PO Mapping Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		1	3			3	3	3	1	1	1	2		
CO2		1	2			2	2	3	1	1	1	2		
CO3		1	2			2	2	3	1	1	1	2		
CO4		1	2			2	2	3	1	1	1	2		
CO5		1	2			2	2	3	1	1	1	2		

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ANNEXURE - III

List of Programs for Laboratory Courses B. Tech I Semester (Batch Admitted in 2024-25) (Computer Science and Business Systems) Under Flexible Curriculum

[ITEM CSBS – 3]

Recommended in the Board of Studies Meeting of DoCSBS held on 12th September 2024

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COMPUTER PROGRAMMING
30241106

LIST OF PROGRAMS

1. Write a program to add two numbers and display its sum.
2. Write a Program to calculate and display the volume of a cylinder for height and radius parameters to be input from the user.
3. Write a program to realize the following expressions:
   a. $V = u + at$
   b. $S = ut+1/2a$
   c. $T=2*a+\sqrt{b}+9c$
4. Write a program to take input of name, rollno and marks obtained by a student in 5 subjects of 100 marks each and display the name, rollno with percentage score secured.
5. Write a program to swap values of two variables with and without using the third variable.
6. Write a program to illustrate the use of unary prefix and postfix increment and decrement operators.
7. Write a program to find the largest of three numbers using ternary operators.
8. Write a program to find the roots of quadratic equation.
9. Write a Program to Check Whether a Number is Prime or not.
10. Write a program to check whether the entered year is leap year or not (a year is leap if it is divisible by 4 and divisible by 100 or 400.)
11. Write a program to print the sum of digits of a number using for loop.
12. Write a program to display the following pattern using for loops.

(i)
```
*****
****
***
**
*
```

(ii)
```
1
22
333
4444
55555
```

(iii)
```
    1
   12
  123
 1234
12345
```

(iv)
```
A
AB
ABC
ABCD
A BCDE
```

(v)
```
    *
   ***
  *****
 *******
*********
```

(vi)
```
*********
 *******
  *****
   ***
    *
```

(vii)
```
    1
   121
  12321
 1234321
123454321
```

(viii)
```
ABCDEF
ABCDE
ABCD
ABC
AB
A
```

13. Write a program to calculate factorial of a number using recursion.
14. Write a program to add two matrices of the same order.
15. Write a program to add two complex numbers, use structure data-type to represent complex numbers.

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COURSE OUTCOMES

After completing this, the students will be able to:

CO1. write computer program in C++ language.
CO2. develop algorithms and flowchart for a given problem.
CO3. apply programming syntax to implement program.
CO4. apply knowledge of programming to solve real-world problems
CO5. design suitable programming solutions using procedural paradigms.

CO-PO Mapping Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	3	1	3	1	1	1	1		1	2	3	
CO2	3	3	3	1	3	1	1	1	1		1	2	3	
CO3	3	1	3	1	3	1	1	1	1		1	2	3	
CO4	3	1	3	1	1	1	1	1	1	2	1	2	2	
CO5	3	2	3	1	2	1	1	1	1		1	2	3	

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Department of Computer Science and Business Systems

BUSINESS COMMUNICATION
30241107

LIST OF ACTIVITIES

1. **Business terminology:** Learning the terminology required for communications in business.
2. **Public Speaking Exercises:** Students can give speeches, presentations, or impromptu talks on various business topics.
3. **Business Letter Writing:** Students can write formal letters, emails, or memos for different business scenarios (e.g., job applications, complaints, proposals).
4. **Group Discussions:** Students can participate in group discussions on various business topics, practicing their listening, speaking, and critical thinking skills.
5. **Team Presentations:** Students can work in teams to prepare and deliver presentations on assigned topics.
6. **SWOT analysis:** Identifying the strengths,weaknesses,opportunities and threats of themselves.
7. **Conflict management:** Students can practice handling workplace conflicts.
8. **Role Play: Client Meetings:** Students can practice verbal communication and active listening.
9. **Mock Interviews:** This will improve their interview and interpersonal communication skills.

   Task: One student acts as a job candidate while another acts as the interviewer. The interviewer asks standard business interview questions, and the candidate practices responding professionally.
10. **Non-Verbal Communication Exercise:** Students will learn to recognize the role of body language and tone in communication.
11. **Crisis Communication Simulation:** Students will develop skills for handling communication during a crisis.
12. **Telephone Communication Practice:** This will improve their verbal communication over the phone.
13. **Right use of social media:** Understanding the role of social media in today's era.
14. **Organization Repute:** Maintaining the image and pride of the organization.

COURSE OUTCOMES

After completing this, the students will be able to:

CO1. use business vocabulary and take part comfortably in business conversations in English.
CO2. draft letters and reports with appropriate formats and choice of words.
CO3. perform well in team and group, resolve conflicts in workplaces and acquire leadership skills.

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CO4. deliver a public speech according to the need of the audience and also be aware of positive body language to be manifested during a speech.

CO5. deal with the deeper parameters of working in teams like team motivation, multicultural team activity and team conflict resolution

---

CO-PO Mapping Matrix														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1			1			1	1	1	1	3	1	2	3	3
CO2			1			1	1	1	1	1	1	2	1	1
CO3			1			1	1	1	3	1	3	2	1	1
CO4			1			1	1	1	1	3	1	2	1	1
CO5			1			1	1	1	3	1	1	2	1	1

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List of
Micro Project - I
B. Tech I Semester
(Batch Admitted in 2024-25)
(Computer Science and Business Systems)
Under Flexible Curriculum

Recommended in the Board of Studies Meeting of DoCSBS held on 12th September 2024

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LIST OF MICRO PROJECT-1
30241109

1. Write a program to convert temperatures between Celsius, Fahrenheit, and Kelvin.
2. Create a calculator that performs addition, subtraction, multiplication, and division.
3. Implement a program to check if a given string is a palindrome.
4. Generate the Fibonacci sequence up to a specified number of terms.
5. Simulate a simple ATM system with basic functionalities like check balance, deposit, and withdraw.
6. Create a basic banking application with functionality to add, view, and delete account details.
7. Develop a game where the user guesses a randomly generated number within a certain range.
8. Count the frequency of each character in a given string and display the results.
9. Develop a system to manage books in a library, including adding, removing, and searching for books.
10. Two strings A and B are given, each consisting of lower case alphabets. Write a program to find whether it is possible to choose some non-empty strings s1 and s2 where s1 is a substring of A, s2 is a substring of B such that s1 + s2 is a palindromic string. Here '+' denotes the concatenation between the strings, and if there are such strings S1 and S2 then print S1+S2.
11. Following conditions are given based on three subjects marks:
    a. Physics marks must be greater than 80
    b. Chemistry marks must be greater than 80
    c. English marks must be greater than 70
    d. Students are awarded grade 10 if all three conditions are met. Grade 9 is given if conditions a and b are met. Grade 8 is given if conditions b and c are met. Grade 7 is given if a and c are met. Grade is 6 if only one condition is met . Grade is 5 if none of the three conditions are met. Write a program to display the grade of students, based on the values of physics, chemistry and English, given by the user. Also, display the calculated grade only if the overall marks (out of 300) are greater than 32%, otherwise display 'the student is Fail'.
12. Design a flowchart to implement the Tic-Tac-Toe game and hence implement the same using C++.
13. Write a program in C++ that implements the operations performed by an ATM. The operations include: Balance check, Withdraw Cash, Deposit cash etc.
14. Create a login module using C++ with below mentioned features:
    a. Verify username and password correctly.
    b. Register new user and set its password.
    c. Change password of any registered user.
15. The mouse pointer can be restricted in particular rectangle. The idea is to create a function called restrictmouse() which takes four parameters which containing X coordinate and Y coordinate. First point mention the top of the rectangle and the second point mention the bottom of the rectangle. Below are the functions used for the same:
    initmouse(): use to initialize mouse.
    showmouse(): shows the mouse pointer on the output screen.

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restrictmouse(): used to set Horizontal and vertical limit of the mouse pointer by setting the following parameters. AX = 7 for horizontal and AX = 8 for vertical.

16. This following program makes use of some sub function, which were already discussed previously, and shows how they can be used to write useful programs like free-hand drawing. Below are the functions used:
    initmouse(): use to initialize mouse.
    showmouse(): shows mouse pointer on the output screen.
    hidemouse(): used to hide mouse while drawing.
    getmouseposition(): Fetches current location of the pointer and draw line accordingly.
17. (The Sieve of Eratosthenes) A prime integer is any integer greater than 1 that can be divided evenly only by itself and 1. The Sieve of Eratosthenes is a method of finding prime numbers. It works as follows:
    a) Create an array with all elements initialized to 1 (true). Array elements with prime subscripts will remain 1. All other array elements will eventually be set to zero.
    b) Starting with array subscript 2 (subscript 1 is not prime), every time an array element is found whose value is 1, loop through the remainder of the array and set to zero every element whose subscript is a multiple of the subscript for the element with value 1. For array subscript 2, all elements beyond 2 in the array that are multiples of 2 will be set to zero (subscripts 4, 6, 8, 10, and so on.). For array subscript 3, all elements beyond 3 in the array that are multiples of 3 will be set to zero (subscripts 6, 9, 12, 15, and so on.).

    When this process is complete, the array elements that are still set to 1 indicate that the subscript is a prime number. Write a program that uses an array of 1000 elements to determine and print the prime numbers between 1 and 999. Ignore element 0 of the array.
18. (Airline Reservations System) A small airline has just purchased a computer for its new automated reservations system. The president has asked you to program the new system. You'll write a program to assign seats on each flight of the airline's only plane (capacity: 10 seats). Your program should display the following menu of alternatives:
    Please type 1 for "first class"
    Please type 2 for "economy"
    If the person types 1, then your program should assign a seat in the first class section (seats 1–5). If the person types 2, then your program should assign a seat in the economy section (seats 6–10). Your program should then print a boarding pass indicating the person's seat number and whether it's in the first class or economy section of the plane.
    Use a single-subscripted array to represent the seating chart of the plane. Initialize all the elements of the array to 0 to indicate that all seats are empty. As each seat is assigned, set the corresponding element of the array to 1 to indicate that the seat is no longer available.
    Your program should, of course, never assign a seat that has already been assigned. When the first class section is full, your program should ask the person if it's acceptable to be placed in the economy section (and vice versa). If yes, then make the appropriate seat assignment. If no, then print the message "Next flight leaves in 3 hours."

19. (Total Sales) Use a double-subscripted array to solve the following problem. A company as four salespeople (1 to 4) who sell five different products (1 to 5). Once a day, each salesperson passes in a slip for each different type of product sold. Each slip contains:

a) The salesperson number
b) The product number
c) The total dollar value of that product sold that day

Thus, each salesperson passes in between 0 and 5 sales slips per day. Assume that the information from all of the slips for last month is available. Write a program that will read all this information for last month's sales and summarize the total sales by salesperson by product. All totals should be stored in the double-subscripted array sales. After processing all the information for last month, print the results in tabular format with each of the columns representing a particular salesperson and each of the rows representing a particular product. Cross total each row to get the total sales of each product for last month; cross total each column to get the total sales by salesperson for last month. Your tabular printout should include these cross totals to the right of the totaled rows and to the bottom of the totaled columns.

20. Missing number in array: Given an array of size N-1 such that it only contains distinct integers in the range of 1 to N. Displaymissing element. Complete the function MissingNumber() that takes array and N as input parameters and returns the value of the missing number.

a) Input:
b) N = 5
c) A[] = {1,2,3,5}
d) Output: 4

21. Corporate Newsletter Creation

a) **Objective:** Create a sample corporate newsletter for a real or hypothetical company.
b) **Tasks:** Write articles, design the layout, and ensure alignment with company branding and messaging.
c) **Skills Developed:** Writing, editing, graphic design, and understanding of corporate culture.

22. Presentation Skills Workshop

a) **Objective:** Develop a workshop to improve presentation skills in a business setting.
b) **Tasks:** Identify key presentation skills, create training materials (slides, practice exercises), and deliver a mock workshop.
c) **Skills Developed**: Public speaking, coaching, material development, and feedback analysis.

23. Employee On boarding Manual

a) **Objective:** Create an on boarding manual for new employees of a specific company or department.

b) **Tasks**: Research the company's policies, procedures, and culture; write and design a user-friendly manual.
c) **Skills Developed:** Writing, document design, research, and understanding of organizational culture.

24. Virtual Team Communication Plan

a) **Objective:** Develop a communication plan for managing a virtual team effectively.
b) **Tasks**: Identify tools and platforms, establish communication norms, create a schedule, and draft templates for regular updates.
c) **Skills Developed:** Virtual collaboration, strategic planning, time management, and digital communication.

25. Crisis Communication Case Study

a) Research a past crisis and analyze the company's communication response.

26. Interview Analysis: Conduct an interview with a business professional and analyze their communication style.

27. Negotiation Simulation: Role-play a negotiation scenario with a partner, focusing on effective communication, persuasion, and compromise.

28. Public Speaking Practice: Public Speaking Practice: Develop and deliver a public speech on a business-related topic, focusing on clarity, confidence, and audience engagement.

29. Customer Feedback Analysis

a) **Objective:** Analyze customer feedback for a product or service to identify trends and areas for improvement.
b) **Tasks:** Collect customer feedback from online reviews, social media, or surveys. Categorize feedback and suggest actionable recommendations.
c) **Skills Developed:** Data analysis, critical thinking, report writing, and customer relationship management.

30. Designing a Training Workshop

a) **Objective:** Create and present a training workshop on effective communication skills for a specific audience (e.g., customer service staff, sales team).
b) **Tasks:** Research communication challenges, develop training materials (slides, handouts), and present the workshop.
c) **Skills Developed**: Public speaking, instructional design, research, and facilitation.

COURSE OUTCOMES

After completing this, the students will be able to:

CO1. apply knowledge of programming to solve real-world problems.
CO2. analyze the problems and choose suitable programming techniques to develop solutions.

CO3. design, implement, debug and test programs.
CO4. design, implement, and refine a C++ application, collaboratively within a team.
CO5. deal with the deeper parameters of working in teams like team motivation, multicultural team activity and team conflict resolution

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CO-PO Mapping Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	1		1	1	1	1	3	1	1	2	2	1
CO2	3	3	3		1	1	1	1	3	1	1	2	2	1
CO3	1	1	3		1	1	1	1	3	1	1	2	2	1
CO4	1	1	3		1	1	1	1	3	1	1	2	2	1
CO5	1	1	1		1	1	1	1	3	1	1	2	2	1

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Department of Computer Science and Business Systems

ANNEXURE - IV

Scheme Structure
&
Syllabi of
MBA Programme
for Batch Admitted in 2024-25
(Computer Science and Business Systems)
Under Flexible Curriculum

[ITEM CSBS – 4]

Recommended in the Board of Studies Meeting of DoCSBS held on 12th September 2024

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Department of Computer Science and Business Systems

Semester-Wise General Scheme Structure & Important Guidelines for Flexible Curriculum

MASTER OF BUSINESS ADMINISTRATION (MBA)

(Batch admitted in Academic Session 2024-25 onwards)

Abbreviations Used

L	Lecture
T	Tutorial
P	Practical
DC	Departmental Core
DE	Departmental Elective
SPC	Specialization Courses
DLC	Departmental Laboratory Courses
MOOC	Massive Open Online Course
MWS	Mandatory Workshop
SLP	Self-learning Presentation
MAC	Mandatory Audit Course
CNEC	Classified Novel Engaging Course

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Department of Computer Science and Business Systems

Scheme of Evaluation

MBA I Semester

(for batch admitted in academic session 2024-25)

S. No.	Course Code	Category Code	Course Name	Maximum Marks Allotted						Total Marks	Contact Hours per week			Total Credits	Mode of Learning	Mode of Major Evaluation	Duration of Major Evaluation
				Theory Block				Practical Block									
				Continuous Evaluation			Major Evaluation	Continuous Evaluation	Major Evaluation								
				Minor Evaluation I	Minor Evaluation II	Quiz/ Assignment		Lab Work & Sessional			L	T	P				
1.	70241101	DC	Project Management	20	20	30	30	-	-	100	2	1	-	3	Face to Face	PP	2 Hrs
2.	70241102	DC	Principles of Management	20	20	30	30	-	-	100	3	-	-	3	Face to Face	PP	2 Hrs
3.	70241103	DC	Managerial Economics	20	20	30	30	-	-	100	2	1	-	3	Face to Face	PP	2 Hrs
4.	70241104	DC	Marketing Management	20	20	30	30	-	-	100	3	-	-	3	Face to Face	PP	2 Hrs
5.	70241105	DC	Financial Accounting	20	20	30	30	-	-	100	2	1	-	3	Face to Face	PP	2 Hrs
6.	70241106	DC	Organizational Behaviour	20	20	30	30	-	-	100	3	-	-	3	Face to Face	PP	2 Hrs
7.	70241107	DC	Data Mining and Warehousing	20	20	30	30	-	-	100	3	-	-	3	Face to Face	PP	2 Hrs
8.	70241108	DC	Business Statistics	20	20	30	30	-	-	100	2	1	-	3	Face to Face	PP	2 Hrs
9.	70241109	SLP	Seminar/Presentation	-	-	-	-	70	30	100	-	-	2	1	Mentoring	SO	-
10.	70241110	CNEC	Classified Novel Engaging Course (Activity Based Learning)	-	-	-	-	-	50	50	-	1	-	1	Interactive	SO	-
Total				160	160	240	240	70	80	950	20	5	2	26	-	-	-
11.	70241111	MAC	Managerial Communication	20	20	30	30	-	-	100	2	-	-	GRADE	Blended	MCQ	1.5 Hrs
12.	70241112	MWS	Mandatory Workshop on Internet of Things at Department Level (Duration: Two Days)											GRADE	Interactive	-	-
13.	70241113	MWS	Mandatory Workshop on Intellectual Property Rights at Department Level (Duration: Two Days)											GRADE	Interactive	-	-

MCQ: Multiple Choice Question AO: Assignment + Oral PP: Pen Paper SO: Submission + Oral OB: Open Book

Mode of Learning						Mode of Examination				Total Credits
Theory		CNEC	Lab			Theory			Lab	
Face to Face	Online	Interactive	Mentoring	Experiential	Experimental	PP	MCQ	OB	SO	
24	0	1	1	0	0	24	0	0	2	26
92.3	0	3.85	3.85	0	0	92.3	0	0	7.7	Credits %

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Department of Computer Science and Business Systems

Scheme of Evaluation

MBA II Semester

(for batch admitted in academic session 2024-25)

S. No.	Course Code	Category Code	Course Name	Maximum Marks Allotted						Total Marks	Contact Hours per week			Total Credits	Mode of Learning	Mode of Major Evaluation	Duration of Major Evaluation
				Theory Block				Practical Block									
				Continuous Evaluation			Major Evaluation	Continuous Evaluation	Major Evaluation								
				Minor Evaluation I	Minor Evaluation II	Quiz/ Assignment		Lab Work & Sessional			L	T	P				
1.	70241201	DC	Human Resource Management	20	20	30	30	-	-	100	3	-	-	3	Face to Face	PP	2 Hrs
2.	70241202	DC	Supply Chain Management	20	20	30	30	-	-	100	3	-	-	3	Face to Face	PP	2 Hrs
3.	70241203	DC	Financial Management	20	20	30	30	-	-	100	2	1	-	3	Face to Face	PP	2 Hrs
4.	70241204	DC	Operations Management	20	20	30	30	-	-	100	2	1	-	3	Face to Face	PP	2 Hrs
5.	70241205	DC	Business Research Methods	20	20	30	30	-	-	100	2	1	-	3	Face to Face	PP	2 Hrs
6.	70241206	DC	Data Science using Python	20	20	30	30	-	-	100	2	1	-	3	Face to Face	PP	2 Hrs
7.	70241207	DC	Digital Marketing	20	20	30	30	-	-	100	3	-	-	3	Face to Face	PP	2 Hrs
8.	702412XX	DE	Departmental Elective (DE-1)	20	20	30	30	-	-	100	3	-	-	3	Face to Face	PP	2 Hrs
9.	702412XX	SPC	Specialization Course (SPC-1)	20	20	30	30	-	-	100	3	-	-	3	Face to Face	PP	2 Hrs
10.	70241208	SLP	Seminar/Presentation*	-	-	-	-	70	30	100	-	-	2	1	Mentoring	SO	-
11.	70241209	CNEC	Classified Novel Engaging Course (Activity Based Learning)	-	-	-	-	-	50	50	-	1	-	1	Interactive	SO	-
			Total	180	180	270	270	70	80	1050	23	5	2	29	-	-	-
12.	70241221	MAC	Business and Legal Environment	20	20	30	30	-	-	100	2	-	-	GRADE	Blended	MCQ	1.5 Hrs
13.	70241222	MWS	Mandatory Workshop on Computer Vision at Department Level (Duration: Two Days)											GRADE	Interactive	-	-
14.	70241223	MWS	Mandatory Workshop on Spreadsheet Modeling at Department Level (Duration: Two Days)											GRADE	Interactive	-	-
			Summer Internship: 4-6 weeks' duration: To be Credited in III Semester														

MCQ: Multiple Choice Question AO: Assignment + Oral PP: Pen Paper SO: Submission + Oral OB: Open Book

*Seminar/Presentation through SWAYAM / NPTEL (Registration in a course will be compulsory for students but assessment will be based on internal seminar presentation).

DE-1			
S. No.	Course Code	Category Code	Course Name
1	70241210	DE	Total Quality Management
2	70241211	DE	Service Marketing
3	70241212	DE	Financial Institution & Markets

Mode of Learning						Mode of Examination				Total Credits
Theory		CNEC	Lab			Theory			Lab	
Face to Face	Online	Interactive	Mentoring	Experiential	Experimental	PP	MCQ	OB	SO	
27	0	1	1	0	0	27	0	0	2	29
93.1	0	3.45	3.45	0	0	93.1	0	0	6.9	Credits %

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Department of Computer Science and Business Systems

Scheme of Evaluation

MBA III Semester

for batch admitted in academic session 2024-25)

S. No.	Course Code	Category Code	Course Name	Maximum Marks Allotted						Total Marks	Contact Hours per week			Total Credits	Mode of Learning	Mode of Major Evaluation	Duration of Major Evaluation
				Theory Block				Practical Block									
				Continuous Evaluation			Major Evaluation	Continuous Evaluation	Major Evaluation		L	T	P				
				Minor Evaluation I	Minor Evaluation II	Quiz/ Assignment		Lab Work & Sessional									
1.	70242101	DC	Strategic Management	20	20	30	30	-	-	-	-	100	3	-	-	3	Face to Face
2.	70242102	DC	Decision Modeling	20	20	30	30	-	-	-	-	100	2	1	-	3	Face to Face
3.	70242103	DC	Behavioral Economics	20	20	30	30	-	-	-	-	100	2	1	-	3	Face to Face
4.	70242104	DC	Artificial Intelligence	20	20	30	30	-	-	-	-	100	2	1	-	3	Face to Face
5.	70242305	DC	Entrepreneurship & Start-ups	20	20	30	30	-	-	-	-	100	3	-	-	3	Face to Face
6.	70242106	DC	International Trade & Business	20	20	30	30	-	-	-	-	100	3	-	-	3	Face to Face
7.	702421XX	DE	Departmental Elective (DE-2)	20	20	30	30	-	-	-	-	100	3	-	-	3	Face to Face
8.	702421XX	DE	Departmental Elective (DE-3)	20	20	30	30	-	-	-	-	100	3	-	-	3	Face to Face
9.	702421XX	SPC	Specialization Course (SPC-2)	20	20	30	30	-	-	-	-	100	3	-	-	3	Face to Face
10.	70242107	DLC	Preliminary Dissertation/ Capstone Project	-	-	-	-	50	50	-	-	100	-	-	6	3	Interactive
11.	70242108	DLC	Summer Internship*	-	-	-	-	100	100	-	-	200	-	-	-	6*	Mentoring
			Total	100	100	Total	180	180	270	270	150	150	0	0	1200	24	3
12.	70242123	MWS	Mandatory Workshop on Cyber Security at Department Level (Duration: Two Days)											GRADE	Interactive	-	-
13.	70242124	MWS	Mandatory Workshop on SPSS at Department Level (Duration: Two Days)											GRADE	Interactive	-	-

MCQ: Multiple Choice Question **AO:** Assignment + Oral **PP:** Pen Paper **SO:** Submission + Oral **OB:** Open Book

* These credits will be transferred from Summer Internship.

DE-2			
S. No.	Course Code	Category Code	Course Name
1	70242109	DE	Lean Manufacturing
2	70242110	DE	Retail Management
3	70242111	DE	Banking & Insurance
DE-3			
S. No.	Course Code	Category Code	Course Name
1	70242112	DE	Service Operations Management
2	70242113	DE	Customer Relationship Management
3	70242114	DE	Corporate Finance

Mode of Learning					Mode of Examination				Total Credits
Theory		Lab			Theory			Lab	
Face to Face	Online	Interactive	Mentoring	Experimental	PP	MCQ	OB	SO	
27	0	3	6	0	27	0	0	9	36
75	0	8.3	16.7	0	75	0	0	25	Credits %

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Scheme of Evaluation

MBA IV Semester

for batch admitted in academic session 2024-25)

S. No.	Course Code	Category Code	Course Name	Maximum Marks Allotted						Total Marks	Contact Hours per week			Total Credits	Mode of Learning	Mode of Major Evaluation	Duration of Major Evaluation
				Theory Block				Practical Block			L	T	P				
				Continuous Evaluation			Major Evaluation	Continuous Evaluation	Major Evaluation								
				Minor Evaluation I	Minor Evaluation II	Quiz/ Assignment		Lab Work & Sessional									
1.	702422XX	DE	Departmental Elective (DE-4)*	-	-	-	-	-	-	75	25	100	3	0	0	3	Online
2.	702422XX	DE	Departmental Elective (DE-5)*	-	-	-	-	-	-	75	25	100	3	0	0	3	Online
3.	702422XX	SPC	Specialization Course (SPC-3)*	-	-	-	-	-	-	75	25	100	3	0	0	3	Online
4.	70242216	DLC	Dissertation/ Internship	-	-	-	-	200	100	-	-	300	0	0	20	10	Interactive
Total				0	0	0	0	200	100	225	75	600	9	0	20	19	-

MCQ: Multiple Choice Question **AO:** Assignment + Oral **PP:** Pen Paper **SO:** Submission + Oral **OB:** Open Book

*This course will run through SWAYAM / NPTEL /MOOC based learning platform (with credit transfer facility). The course can be related & relevant to other domain as well.

Mode of Learning					Mode of Examination				Total Credits
Theory		Lab			Theory			Lab	
Face to Face	Online	Interactive	Experiential	Experimental	PP	MCQ	OB	SO	
0	9	10	0	0	0	9	0	10	19
0	47.4	52.6	0	0	0	47.4	0.0	52.6	Credits %

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Department of Computer Science & Business Systems

PROJECT MANAGEMENT
70241101

COURSE OBJECTIVES

- To develop a thorough understanding of the subject, tools and techniques used for managing the projects.
- To learn project selection criteria and organization methods.
- To learn project costing and controlling techniques.

Unit I

Introduction to Project Management: Concept of project, project management, Project managers, Functions of Project Managers, PM as a Profession, Project Goals, Functions; Categories of Projects, Phases Project Management, Project Life Cycle, Project Environment, The 7 S of Project Management.

Unit II

Project selection: Criteria for selection Checklist Model, Scoring Model, Analytic Hierarchy Process, Profile Model; identification of the project; Request for Proposal; Project appraisal: Technical, Commercial, Economic, Financial and Management appraisal; Feasibility Study: Project Selection and Criteria (qualitative and quantitative): Cost Benefit Analysis, NPV, IRR, Payback period, etc.

Unit III

Project Organization: Types of project organization: Pure, Matrix, Mixed; Project Planning: Planning steps, Master plan; Defining Project Scope, Developing Work Breakdown Structure Project Activity, Project Coordination, Scheduling Charts; Schedule, Gantt Charts, Project Evaluation Techniques, PERT, CPM, Critical Chain Method Critical Chain Project Management.

Unit IV

Project Costing: Social Cost Benefit Analysis Project Cash Flow, Cost of Capital, WACC, Cost Estimating Process, Budgets and Estimates; Cost-Time Overrun; Risk analysis.

Unit V

Project Control Process & Techniques: Cybernetic controls, Go-No-go Controls, Post controls; Project Quality Control; Project Closure; Project Termination; Project Audit, Abandonment Analysis

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RECOMMENDED BOOKS

1. Project Management, Gray Larson (2008), Tata McGraw-Hill
2. The Essentials of Project Management (for HR Professionals) Harvard Business School Press (2007),
3. Project Management Kerzner (2008), Wiley
4. A Guide to the Project Management Body of Knowledge (PMBOK Guide) By Project Management Institute (PMI)

COURSE OUTCOMES

After completion of the course students would be able to:

CO1. interpret how project management aligns with overall organizational strategy and goals.
CO2. analyze various projects and attributes of their success and failure.
CO3. apply project management tools to sharpen their project management skills.
CO4. evaluate the optimum cost of the project for assigned deadlines.
CO5. examine the risks involved in modern time's project and develop mitigation strategies to deal with them.

CO-PO Mapping Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO 1	PSO2	PSO3
CO1	2	3		3	2		1	1	1	2	2
CO2	3	3		2	3	1				1	3
CO3	2	2		2	1			1	1	2	3
CO4	2	1		1	1					2	2
CO5	3	2		2	2			1			1

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Department of Computer Science & Business Systems

PRINCIPLES OF MANAGEMENT
70241102

COURSE OBJECTIVES

- To acquaint the students with the basic nature of management, its process, tasks, and responsibilities of a professional manager.
- To understand the organizational behavioral dynamics governing an organization.
- To learn employee motivation techniques.

Unit I

Introduction: Concept, Nature, Significance, Process & levels of Management; Managerial Roles and functions; An Overview of Functional areas of Management-Marketing, Finance, Production, HRM, IT, R&D; Evolution of Management Thought-Classical, Neo -classical, System and Contingency Approaches

Unit II

Planning: Concept, Significance, & steps; Types of Plans, Objective or Goals, Strategies, Policies, Procedure; Types of Planning; Steps of planning Management by Objectives, Strategic Planning Process; Decision– making: concept, characteristics, and process

Unit III

Organizing: Concept, nature, process, and significance; Organization Levels and the Span of Management. Principles of Organizing: Authority, Delegation, Span of Control, Line and Staff Authority. Centralization vs Decentralization; Organizational Structure; Formal and Informal Organization; Organizational Charts.

Unit IV

Staffing: Meaning, Nature, Importance, Staffing process. Manpower Planning, Recruitment, Selection, Orientation and Placement, Training, Remuneration Performance Appraisal, Promotion, Separation and Transfer; Direction - Definition, Nature, Need and Importance, Principles of Directing. Supervision - Role and Functions of a Supervisor, Effective Supervision, Direction and Supervision.

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Unit V

Motivation, Controlling and Coordination: Motivation: Concept, Forms of employee motivation, Need for motivation. Theories of motivation; Controlling -Meaning, Features, Importance, Control Process, Characteristics of an effective control system, Types of Control. Coordination - characteristics, essentials, Types and Techniques; Leadership: Definition, Ingredients, Styles, Committees and Group Decision Making, Strategic leadership, Shared vision

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RECOMMENDED BOOKS

1. Principles and Practice of Management, L.M. Prasad, (2010), 7th edition, Sultan & Chand.
2. Essentials of Management. Koontz, H (2010). New Delhi: Tata McGraw-hill Education.
3. Principles of Management. Robbins & Coulter (2013). Prentice Hall Richard L. Daft,
4. Fundamentals of Management: Essential Concepts and Applications. Robbins, S.P.& Decenzo, D.A.(2014). New Delhi: Pearson Education.

COURSE OUTCOMES

After completion of the course students would be able to:

CO1. explore the idea that "there is no one best way to manage"
CO2. understand the process of setting SMART (Specific, Measurable, Achievable, Relevant, time-bound objectives.
CO3. develop the ability to clearly define roles, responsibilities & expectations for each position within the organization.
CO4. formulate strategies to identify and groom future leaders within the organization.
CO5. apply theories to different work environments to influence employee behavior and performance.

	CO-PO Mapping Matrix										
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	1	2		2	2	1	3	1	1
CO2	2	3		1	2				1	3	
CO3		2	1			3		2	1		
CO4	2			1				3		2	3
CO5		1				3			2		2

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Relationship in the short-run. Cost output relationship in the Long-run. Estimation of Revenue, Average Revenue, Marginal Revenue, Case study on cost output relationship.

Unit IV

Market structures: Perfect and Imperfect Market Structures, Perfect Competition, features, determination of price under perfect competition. Monopoly: Feature, pricing under monopoly, Oligopoly: Features Pricing, Cost-Based Pricing: Cost-plus/Make-up Pricing, Break-even Pricing, Marginal Pricing; Value Based Pricing; Competition-Based Pricing; Demand-Based Pricing, price skimming, penetration pricing, Case study on Market Structure.

Unit V

National Income Aggregates and their Measurement: Inflation: Nature and Causes; Fiscal Policy: Taxes and Transfer of Payments, Role of Fiscal Policy; Monetary Policy: Role of Monetary Policy in India, Instruments of Monetary Control; Liberalization, Privatization and Globalization; Foreign Direct Investment (FDI), Case study on different Investment Proposal.

RECOMMENDED BOOKS

1. Managerial Economics, GEETIKA, McGraw-Hill Education.
2. Managerial Economics: Concepts and Applications (SIE), THOMAS & MAURICE, McGraw-Hill Education.
3. Managerial Economics, H. L Ahuja, S. Chand.
4. Managerial Economics, D.N. Dwivedi, Vikas Publication.
5. Managerial Economics–Theory and Applications, Dr. D.M.Mithani, Himalaya Publications.

Department of Computer Science & Business Systems

MANAGERIAL ECONOMICS
70241103

COURSE OBJECTIVES

- To provide the tools and techniques to make informed decisions to maximize the profits and minimize the losses of a firm.
- To assist with Indian Management Case studies.
- To understand the market structure, and concepts of national income.

Unit I

Basic Concepts and principles: Definition, Nature, and Scope of Economics-Micro Economics and Macro Economics, Managerial Economics and its relevance in business decisions, Fundamental Principles of Managerial Economics - Incremental Principle, Marginal Principle, Opportunity Cost Principle, Discounting Principle, and Concept of Time Perspective. Equi-Marginal Principle, Utility Analysis, Cardinal Utility and Ordinal Utility, Case study on Opportunity Cost.

Unit II

Demand and Supply Analysis: Theory of Demand. Types of Demand, Determinants of demand, Demand Function, Demand Schedule, Demand curve, Law of Demand, Exceptions to the law of Demand, Shifts in demand curve, Elasticity of Demand and its measurement, Price Elasticity. Income Elasticity, Arc Elasticity, Cross Elasticity and Advertising Elasticity. Uses of Elasticity of Demand for managerial decision making, Demand forecasting meaning, significance and methods (numerical Exercises) Supply Analysis; Law of Supply, Supply Elasticity; Analysis and its uses for managerial decision making, Case study on income elasticity.

Unit III

Production and cost Analysis: Production concepts & analysis; Production function, Types of production function, Laws of production: Law of diminishing returns, Law of returns to scale. Cost concept and analysis: Cost, Types of costs, Cost output

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COURSE OUTCOMES

After completion of the course students would be able to:

CO1. compare macroeconomics with microeconomics
CO2. recommend demand forecasting method for service industry.
CO3. distinguish short run cost output relationship with long run cost output relationship
CO4. formulate price strategy for automobile company.
CO5. judge the role of fiscal policy.

CO-PO Mapping Matrix											
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2		3	1		1	3	1	2	3
CO2	3	2		3	1		1			3	3
CO3	2	2		1	1			1	1	3	3
CO4	3	3		1	2			1	1	2	2
CO5	3	1		2	2			1		3	3

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Department of Computer Science & Business Systems

MARKETING MANAGEMENT
70241104

COURSE OBJECTIVES

- This course enables a student to understand the fundamentals of marketing concept and the role marketing plays in business.
- To understand the 'Marketing mix' elements and the strategies and principles underlying the modern marketing practices.
- To demonstrate their comprehension of marketing concepts and knowledge by applying those in their written exams, case studies discussions, presentations and projects.

Unit I

Introduction to marketing concepts: Definition, Importance and scope of Marketing, Philosophies of marketing management, Elements of marketing - Needs, Wants, Demands, Customer, Consumer, Markets and marketers; Marketing vs. Selling, Consumer market and Industrial markets, Concept of marketing management, Marketing - Mix, Functions of marketing management, Marketing environment, Factors affecting marketing environment, Marketing information system and Marketing research, Strategic marketing planning, Marketing Myopia.

Unit II

Segmentation, Targeting and Positioning: Introduction, Concept of Market Segmentation, Benefits of Market Segmentation, Requisites of Effective Market Segmentation, The Process of Market Segmentation, Bases for Segmenting Consumer Markets, Targeting (T), Market Positioning (P). Product Management: Decisions, Development and Life cycle Strategies: Introduction, Levels of Products, Classification of Products, Product Hierarchy, Product Line Strategies, Product Mix Strategies, Packaging and Labeling, New Product Development, Product Life Cycle (PLC), differentiating the product, Product positioning strategy, Consumer behavior - Introduction, Importance & process.

Unit III

Product development and product life cycle: Mix decisions, Product decisions, New product Development-Concept and necessity for development, Failure of new products, New product planning and Development process, Product-mix, Branding and Packaging decisions, Product life cycle - Stages and strategies for different stages of PLC; Pricing decisions, Pricing objectives, Policies methods of setting price, Pricing strategies.

Unit IV

Distribution Channels: Channels of distribution for consumer/ industrial products, Factors affecting channel distribution, Management of channels: Current trends in wholesaling and retailing, Retail distribution system in India. Promotion: Promotion-mix, Advertising, Sales promotion, Personal selling, Publicity and Public relations. A Brief account of marketing of services, CRM, Emerging trends in marketing: Rural marketing, electronic marketing; B2C, B2B and C2C, Direct marketing through internet, international marketing, green marketing.

Unit V

Personal Communication Channels: Introduction, Personal Selling, Sales Management Basics, HR Practices in Sales Management, Evaluation of Training, Personal Selling Process, Direct Marketing, Channels of distribution – concept and importance; Role of Channel intermediaries and their functions, IMC Channel, Futuristic research in marketing, Channel dynamics :Vertical Marketing System, Horizontal Marketing System, Factors Affecting Distribution channel, Channel conflict, Retailing/wholesaling: Functions and Classifications, Marketing 5.0

RECOMMENDED BOOKS

1. Marketing Management (16th ed.). Kotler, P., Keller, K. L.,Koshy, A., & Jha, M. (2020), Pearson Education.
2. Marketing: An Introduction (14th ed.). Armstrong,G.,& Kotler,P.(2019),Pearson.
3. Principles of Marketing (17th ed.). Kotler, P., &Armstrong,G.(2017),Pearson Education.

4. Marketing Management: A South Asian perspective (15th ed.). Kotler, P., Keller, K. L., Koshy, A., &Jha, M. (2017), Pearson Education.
5. Consumer Behavior (12th ed.). Schiffman, L.G., & Wisenblit, J (2019), Pearson Education.

COURSE OUTCOMES

After completion of the course students would be able to:

CO1. demonstrate the consequences of not adopting a customer-focused approach.
CO2. develop market segmentation, targeting, and positioning (STP) strategy for existing product.
CO3. apply the stages of the Product Life Cycle (PLC) to real-world products and identify suitable strategies for each stage.
CO4. sketch how companies can implement sustainable marketing practices.
CO5. interpret sales management basics and HR practices to improve the performance and motivation of sales teams in real-world scenarios

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CO-PO Mapping Matrix											
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PSO1**	**PSO2**	**PSO3**
CO1	3										3
CO2	1			2						3	
CO3	3		2			1			2		3
CO4		2	1				3				
CO5	1				3				2		

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FINANCIAL ACCOUNTING
70241105

COURSE OBJECTIVES

- This Course will help the student with the basic concepts, standards, and practices of financial and Management Accounting.
- To describe how to maintain accounting books.
- To be able to prepare financial statements for decision making.

Unit I

Financial Accounting: Basic Accounting Concepts, Business entity concept, Money measurement concept, going concern concept, accounting period concept, accounting cost concept, Dual aspect concept, Matching concept, Realization concept, Accrual concept. Fundamental Conventions, case study on accounting concepts.

Unit II

Double entry system: Concept and definition, Process of Accounting, Types of account, various stages of Double entry system accounting: Journal, Ledger, Trial Balance, Numerical Practice, case study on DES.

Unit III

Book entries: Closing Entries, Opening Entries, Subsidiary Books and Rectification of Errors, Numerical Practice. Excel Modeling, case study on accounting errors.

Unit IV

Final accounts: Preparation of Final Accounts with Adjustments: Manufacturing, Trading and Profit and Loss Account and Balance Sheet, Financial Statement Analysis cases study on final account.

Unit V

Financial statements: An overview of Financial Statement Analysis, Objectives, Methods and Importance, Ratio Analysis, Numerical Problems, case study on ratio analysis.

Recommended in the Board of Studies Meeting of DoCSBS held on 12th September 2024

RECOMMENDED BOOKS

1. Accounting theory and practices 9th edition, Porwal, L.S Tata McGraw Hill publication.
2. Financial Accounting Rajasekaran, V. and Lalitha R. Pearson publication.
3. Financial Management: Text & Problems; Khan M. Y. Jain and Jain, P.K., Tata McGraw- Hill Publishing Company Limited.
4. Financial Management, P. Chandra, Tata McGraw-Hill Publishing Company Limited.
5. Financial Management, I.M. Pandey, Vikas Publishing House Pvt. Ltd.

COURSE OUTCOMES

After completion of the course students would be able to:

CO1. compare realization concept with accrual concept.
CO2. recommend trial balance format concept.
CO3. distinguish sales book with purchase book.
CO4. analyze balance sheet for liquidity study.
CO5. examine financial statement of service sector.

	CO-PO Mapping Matrix										
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PSO1**	**PSO2**	**PSO3**
CO1	3		2					2	1		
CO2	1				2				3		
CO3	2		1	3						3	
CO4					2		3				1
CO5		1			2						3

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ORGANIZATIONAL BEHAVIOR
70241106

COURSE OBJECTIVES

- To provide students with a better understanding of behavioral processes of individuals.
- To learn the functioning of groups in organizations enabling them to function more effectively in their roles.
- To understand ways to manager people at organizational level.

Unit I

Introduction to organizational behavior: Concepts of Manager, Organizational Behaviour, Nature, Mintzberg's Managerial Roles, Management Skills, Disciplines Contributing to OB, Evolution of OB, Assumptions, Scope and Importance of OB, Elements of OB, Models of OB, Limitations of OB.

Unit II

Managing Individual's Behavior at Work: Personality and its frameworks, Learning: Types of learners, learning process, learning theories, Attitude, Emotions, Values, and Emotional Intelligence. Perceptions and individual decision making, Motivation, Types of Motivation, Theories of Motivation: early theories and contemporary theories

Unit III

Foundations of Group Behavior at work- Part 1: Stages of group development: The Five-stage model, Group Properties, Group Decision Making and techniques. Team building: Importance of Teams, Difference between teams and groups, Types of teams, creating effective team, turning individual in team player. Communication: Functions and Process, Direction of communication, modes of communication, barriers to effective communication, Johari window

Unit IV

Foundations of Group Behavior at work- Part 2: Leadership: Leadership styles and Theories, Leader's v/s Managers, Mentoring, Power and Politics, Conflicts: Definition and Meaning, Sources of Conflict, The conflict process, Types of conflict, Conflict Management Approaches, Negotiations.

Recommended in the Board of Studies Meeting of DoCSBS held on 12th September 2024

Unit V

Managing People at Organizational level: Organization structure, Organizational design and employee behavior, new design options, Organizational Culture, Managing Cultural Diversity, Organizational change: Approaches, creating a culture of change, Work stress and its management. Organizational development: Characteristics, Objectives, Organizational effectiveness, OD intervention.

RECOMMENDED BOOKS

1. Organizational Behavior, S.P. Robbins, Pearson Publication.
2. Organizational Behavior–Text and Problem, K. Aswathappa, Himalaya Publication.

COURSE OUTCOMES

After completion of the course students would be able to:

CO1. describe the various models of OB.
CO2. formulate employee motivation techniques.
CO3. construct Johari Window for employees.
CO4. conduct negotiation process for organization.
CO5. design organizational development intervention.

CO-PO Mapping Matrix											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3		1		1	2	1				1
CO2	3	2	3		1	3	1	1	1	1	2
CO3	3	2	3		2	3	1	1		1	2
CO4	2	3	2	2	2	2	2	2	1	2	3
CO5	3	1	1	2	2	1	2			2	2

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DATAMINING AND WAREHOUSING
70241107

COURSE OBJECTIVES

- To understand the significance of data mining in a real-world perspective.
- To gain understanding of data mining techniques, algorithms and commonly used tools.
- To develop the ability for applying data mining techniques and tools for solving real-world problems.

Unit I

Introduction: Motivation, importance, Data type for Data Mining: Relational Databases, Data Ware-Houses. Transactional Databases, Advanced Database System and Its Applications, Data Mining Functionalities, Concept/Class Description, Association Analysis Classification & Prediction, Cluster Analysis, Outlier Analysis, Classification of Data Mining Systems, Major Issues in Data Mining.

Unit II

Data Pre-processing: Data Cleaning, Data Integration and Transformation and Data Reduction. Discretization and concept Hierarchy Generation. Data Mining Primitives Languages and System Architectures, Concept Description, Characterization and Comparison Analytical, Characterization.

Data Warehouse and OLTP Technology for Data Mining: Differences between Operational Database Systems & Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Data Cube Technology.

Unit III

Mining Association Rules in Large Databases: Association Rule Mining: Market Basket Analysis, Basic Concepts, Mining Single Dimensional Boolean Association Rules from Transactional Databases: The Apriori Algorithm, Generating Association Rules from Frequent Items, Improving the Efficiency of Apriori, other Algorithms & their Comparison, Mining Multilevel Association Rules, Multidimensional Association Rules, Constraint Based Association Rule Mining.

Unit IV

Classification & Prediction and Cluster Analysis: Issues Regarding Classification & Prediction, Different Classification Methods, Prediction, Cluster Analysis, Major Clustering Methods, Currently Available Tools.

Unit V

Pattern Warehousing System: Pattern Warehouse, Process flow for Pattern Warehouse, Benefits of Pattern Warehousing, Difference between Pattern Warehousing and Data Warehousing, Architectural aspects of Pattern Warehousing, Types of Pattern Warehouses, Challenging Issues in Pattern Warehouse, Profitable Pattern Mining, Hesitation Mining, Case Study in Stock Market, Super Market.

RECOMMENDED BOOKS

1. Data Mining: Concepts and Techniques, Hanand Kamber, Morgan Kaufmann Publications.
2. Data Mining Techniques, A.K .Pujari, Universities Press Pvt. Ltd.

COURSE OUTCOMES

After completion of this course, the student would be able to:

CO1. describe fundamentals of data mining and pattern warehousing.
CO2. distinguish various data base systems and data models/schemas of data warehouses.
CO3. compare different methods for storing & amp; retrieving data from numerous data sources/ repositories.
CO4. apply data mining techniques for knowledge extraction from large amounts of data.
CO5. analyze data for knowledge discovery & prediction using appropriate algorithms.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	1	1				1	1			1
CO2	2	1						1			
CO3	3	2			1			1		1	1
CO4	2	2		1	1	2				2	2
CO5	3	1		1	1	2				2	2

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Department of Computer Science & Business Systems

BUSINESS STATISTICS
70241108

COURSE OBJECTIVES

- To have knowledge of Central Tendency & amp; Skewness, Kurtosis.
- To familiarize Correlation and Regression
- To know about the Hypothesis analysis

Unit 1

Concept, Nature, Importance and Scope of statistics, limitations of statistics, Functions of statistics, Distrust of statistics, Misuse of statistics, planning of statistical enquiry, Definition of data, Types of data-Primary and Secondary, Collection of data, Editing of statistical data, Classification and Tabulation of data, Census and Sample investigation

Unit 2

Arithmetic average, Weighted mean, Mode, Median and Geometric mean, weighted geometric mean, uses of various averages and Limitations of averages.

Unit 3

Concept of Dispersion, Methods of measuring dispersion, Quartile deviation, Mean deviation and Standard deviation, Coefficient of variation, Co-efficient of skewness - Karl Pearson and Bowley.

Unit 4

Meaning and Uses of index number, Methods of constructing index numbers: Simple, Aggregative method, Weighted aggregative methods, Fisher ideal method.

Unit 5

Concept and Importance of correlation, Types of correlation, Co-efficient of correlation method by Karl Pearson, Spearman and Concurrent deviation, Probable error. Regression equations, difference between correlation and regression, Co-efficient and standard deviation regression.

RECOMMENDED BOOKS

1. Mathematical Statistics, M Ray and H.S. Sharma, Ram Prasad Publications, 3rd Edition2017.
2. Statistical Methods, V.K. Kapoor & S.C.Gupta, S.Chand, 11th Edition2018.
3. Probability, Statistics and Random Processes, T. Veerarajan, McGraw Higher Ed, 3rd Edition 2008.

Recommended in the Board of Studies Meeting of DoCSBS held on 12th September 2024

4. Introduction to Probability Models, S.M Rose, Elsevier India Pvt Limited,10th Edition 2011.

COURSE OUTCOMES

After completing this course, the students will be able to:

CO1. describe the foundational principles and practical applications of statistics.
CO2. interpret key measures of central tendency for summarizing data sets.
CO3. analyze the spread and distribution of data through various dispersion metrics.
CO4. construct and interpret index numbers for comparing economic or statistical data over time.
CO5. apply correlation and regression techniques.

CO-PO Mapping Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO 1	PSO 2	PSO3
CO1	3		1		2		1				3
CO2	2			1		2	3		1	2	
CO3	1	3		2		1		1			3
CO4		2	3			1	2			3	2
CO5		1		1	3	3		2	1		1

MANAGERIAL COMMUNICATION (MAC)
70241111

COURSE OBJECTIVES

- Students will develop effective communication skills for professional settings, including written, oral, and interpersonal communication.
- They will enhance their ability to deliver persuasive presentations, engage in active listening, and collaborate in diverse teams.
- Students will also cultivate critical thinking, problem-solving, and leadership skills to succeed in the business environment.

Unit I

Introduction to Business Communication: Importance, objectives, and principles of effective business communication, Verbal Communication: Developing clarity, brevity, and precision in oral communication, Nonverbal Communication: Understanding body language, gestures, and facial expressions, Interpersonal Communication. Building rapport, active listening, and feedback skills, Cross-Cultural Communication: Recognizing cultural differences and adapting communication styles accordingly.

Unit II

Business Writing Essentials: Developing clear, concise, and professional writing skills, Email and Electronic Communication: Crafting effective and professional emails, managing inbox etiquette, Business Reports and Proposals: Structuring, writing, and presenting comprehensive reports and persuasive proposals, Business Correspondence: Writing professional letters, memos, and other formal business documents, Grammar and Mechanics: Enhancing writing skills through proper grammar, punctuation, and sentence structure.

Unit III

Effective Public Speaking: Techniques for overcoming nervousness, improving vocal delivery, and engaging the audience, Presentation Structure and Design: Planning, organizing, and designing effective presentations, Visual Aids and Multimedia: Effective use of visual aids and multimedia tools to enhance presentations, Persuasive Communication: Techniques for influencing and persuading others through effective communication, Handling Questions and Feedback: Responding to audience questions

and feedback in a confident and professional manner.

Unit IV

Team Communication Dynamics: Understanding team communication processes and roles, Virtual Communication: Strategies for effective communication in virtual teams and remote work settings, Conflict Resolution: Techniques for managing and resolving conflicts within teams, Collaborative Decision Making: Engaging in group decision-making processes and fostering consensus, Effective Meeting Management: Planning, facilitating, and participating in productive meetings.

Unit V

Professional Etiquette: Understanding workplace etiquette, professionalism, and business ethics, Networking and Relationship Building: Strategies for building and maintaining professional relationships, Job Search and Interview Skills: Resume writing, cover letters, job search strategies, and interview preparation, Personal Branding: Developing a personal brand and utilizing social media for professional growth, Communication for Leadership: Effective communication strategies for leadership roles, managing teams, and influencing others.

RECOMMENDED BOOKS

1. Business Communication: Process and Product (10th ed.) guffey, M.E., & Loewy,D. (2021). Cengage Learning.
2. Effective Business Communications (8th ed.). Murphy, H. A., & Hildebrandt, H. W. (2017). McGraw-Hill Education.
3. Simply Said: Communicating Better at Work and Beyond. Sullivan,J. (2016). John Wiley & Sons.
4. The Communication Book: 44 Ideas for Better Conversations Every Day Krogerus, M., & T schäppeler, R. (2015). W. W. Norton & Company.
5. Influence: The Psychology of Persuasion (Rev.ed.). Cialdini,R.B. (2021).Harper Business.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. describe the principles and concepts of business communication.
CO2. apply effective communication strategies to various business contexts.
CO3. evaluate and synthesize information to develop persuasive and well-structured written and oral communication.

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CO4. develop problem-solving skills in communication, addressing conflicts, and challenges in the workplace.

CO5. demonstrate active listening, constructive feedback, and adaptability to diverse communication styles and cultural differences, fostering effective teamwork.

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ANNEXURE - V

Syllabus/Module of Classified Novel Engaging Course MBA Programme for Batch Admitted in 2024-25 (Computer Science and Business Systems) Under Flexible Curriculum

[ITEM CSBS – 5]

Recommended in the Board of Studies Meeting of DoCSBS held on 12th September 2024

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ESSENTIALS OF DATA BASE SYSTEM
70241110

COURSE OBJECTIVES

- To provide a comprehensive understanding of data base management systems.
- To understand and prepare entity -relationship model.
- To learn the concept of query languages, normalization, transaction management, and storage techniques, ensuring students can effectively model, create, and manage databases.

MODULE I

Introduction to Database Systems and Data Structures: Advantages of DBMS approach, various views of data, data independence. Schema and subschema, primary concepts of data models. Overview of database languages, transaction management, role of database administrators and uses. Data dictionary, overall system architecture. Introduction to Data structures, Definition of Data Structure, Classification of Data, Arrays, Various types of Data Structure, Static and Dynamic Memory Allocation Introduction to Arrays, Pointers, Strings, Stacks, and Queue Introduction to Linked list and trees

MODULE II

Relational Model and SQL: Entity-Relationship (ER) Model: Basic concepts of ER modeling, design issues, mapping constraints. Keys (Primary, Candidate, and Foreign), ER diagrams. Weak and strong entity sets, specialization, generalization, aggregation, inheritance. Design of ER schema and conversion to relational tables .Relational Model: Domains, relations, relational databases, and types of keys (candidate, primary, alternate, and foreign keys).

Structured Query Language (SQL): Basic structure of SQL, set operations, aggregate functions, handling null values. Nested sub queries, derived relations, views ,and database modification. Join operations and Data Definition Language (DDL) in SQL.

MODULE III

Designing and Developing ER models for organizations: Students are required to submit minor projects in groups by preparing ER models for organizations along with their data sheet that could be accessed through SQL queries.

RECOMMENDED BOOKS

1. Database System Concepts-By Silberschatz, Korth, Sudarshan
2. My S L(TM): The Complete Reference-by Vikram Vaswani
3. An Introduction to Database Systems: Eighth Edition- C.J.
4. Database Management Systems-G. Gupta

CO1. elaborate the fundamental concepts of data base management systems, including data models, and architecture.
CO2. explain the basic concepts of data structures.
CO3. apply the concept of ER models in real life problems
CO4. implement relational databases using SQL, covering queries, views, and various data manipulation techniques.
CO5. design ER models for organizations

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Department of Computer Science and Business Systems

ANNEXURE - VI

Scheme Structure
&
Syllabi of "Research Methodology and Ethics"
Ph.D. Programme
for Batch Admitted in 2024-25
(Computer Science and Business Systems)
Under Flexible Curriculum

[ITEM CSBS – 6]

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Department of Computer Science and Business Systems

General Scheme Structure for Doctor of Philosophy

(Batch admitted in Academic Session 2024-25 onwards)

Abbreviations Used

L	Lecture
T	Tutorial
P	Practical
DLC	Departmental Laboratory Courses
MOOC	Massive Open Online Course
MC	Mandatory Course

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Department of Computer Science and Business Systems

Scheme of Evaluation

Doctor of Philosophy

S. No.	Course Code	Category Code	Course Name	Maximum Marks Allotted						Total Marks	Contact Hours per week			Total Credits	Mode of Learning	Mode of Exam.	Duration of Exam.
				Theory Block				Practical Block									
				Continuous Evaluation			Major Evaluation	Continuous Evaluation	Major Evaluation		L	T	P				
				Minor Evaluation I	Minor Evaluation II	Quiz/ Assignment		Lab Work & Sessional									
1.		MC	Research Methodology and Ethics[#]	20	20	30	30	-	-	100	3	1	-	4	Face to Face	PP	2 Hrs
2.		DC	Course-1 (Traditional)	20	20	30	30	-	-	100	3	-	-	3	Face to Face	PP	2 Hrs
3.		MOOC	Course-2 (NPTEL)*	20	20	30	30	-	-	100	2	1	-	3	Online	MCQ	2 Hrs
4.		DLC	Departmental Lab	-	-	-	-	70	30	100	-	-	4	2	Experimental	AO	-
5.		OS	Open Seminar	-	-	-	-	70	30	100	-	-	2	1	Interactive	SO	-
Total Minimum 12 Credits for the student admitted after PG and Minimum of 24 credits for the students admitted directly after B.Tech. degree																	

[#] Research Methodology and Ethics: Mandatory course for all

*Course(s) can be offered through NPTEL

This scheme of evaluation shall continue for next semester till the minimum requirement of credits are earned by the student within the maximum permissible time

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Department of Computer Science and Business Systems

RESEARCH METHODOLOGY AND ETHICS
25100001

OBJECTIVE:

- To distinguish between the scientific method and common sense knowledge while lying the foundation for research.
- To identify and apply appropriate research methodology in order to plan, conduct and evaluate basic research.
- To explore the statistical methods and tools in research.
- To understand the philosophy of research and ethics, research integrity and publication ethics.
- To understand indexing and citation databases, open access publication, research metrics.

Introduction to Research Methodology: Meaning of Research, Objectives of Research, Motivations in Research, types of Research, Research Approaches, Significance of Research, Research Methods v/s Methodology, Scientific Methods, Research Process, Criteria of Good Research. Define the Research Problem: Concept and need of Research problem, Identification of Research problem, defining and delimiting Research problem.

Research Design: Problem Definition, variables, research design concepts, Literature survey and review, Research design process, Errors In research. Data Collection and Representation: Primary Data Secondary Data, Data Presentation. Processing and Analysis of Data:

Data Collection: Collections of Primary Data, Collection of Data through questionnaire and Schedules, other Observation Interview Methods, Collection of Secondary Data, Selection of appropriate method for data collection, Case Study, Focus Group Discussion, Techniques of developing research tools, viz. Questionnaire and rating scales etc. Reliability and validity of Research tools.

Descriptive Statistics: Measurement Scales, Sources of error in measurement. Measures of central Tendency (Mean, medium, Mode), Measures of dispersion (range, mean deviation, standard deviation), Moments, Moments generating Function, Graphical representation of Data, Measures of Asymmetry (Skewness), Kurtosis, Correlation and Regression, Curve fitting.

Sampling Methods and Distributions: Sampling Methods, Sampling Distribution of mean, Sampling Distributions of Variance. Testing of Hypotheses-I : Basic Concepts Concerning Testing

of Hypotheses, Procedure for Hypothesis Testing, Flow Diagram for Hypothesis Testing, Measuring the Power of a Hypothesis Test, Type I and Type II errors. Important Parametric Tests, Limitations of the Tests of Hypothesis, Chi-square Test, Non Parametric Tests. Analysis of Variance components (ANOVA) for fixed effect model; Total, treatment and error of squares, Degrees of freedom, Confidence interval, some special distribution.

Report Writing: Pre writing considerations,, Thesis writing, Formats of report writing, Formats of publications in Research journals. Technique of Interpretation, Precaution in Interpretation, Significance of Report Writing, Different Steps in Writing Report, Layout of the Research Report, Types of Reports, Report Format, Typing Instructions, Oral Presentation.

Philosophy and Theory of Ethics:

Nature, scope and Meaning of Ethics. Role of judgment in ethics, Ethics with respect to science and research - Intellectual honesty and research integrity – Scientific, Conduct and Plagiarism. Redundant Publications: duplicate and overlapping publications.

Publication ethics: definition: introduction and importance - Best practices / standards setting initiatives and guidelines. Publication misconduct: definition, concept, problems that lead to unethical behavior and vice versa, types - Violation of publication ethics, authorship and contributor ship - Identification of publication misconduct, complaints and appeals, Vanity Publications.

Reference Books:

1. C.R. Kothari: Research Methodology Methods and Techniques (Second Revised Edition), New Age. International Publication.
2. R. Panneerselvam, Research Methodology, PHI
3. Ranjit Kumar, Research methodology: a step-by-step guide for beginners, SAGE Publication. Ltd.
4. Montgomery, Douglas C: Design and Analysis of Experiments, Wiley India, Fifth edition.
5. Montgomery, Douglas C. and Runger, George C.: Applied Statistics & Probability for Engineers (Wiley India), Third edition.
6. Krishimswamy, K. N. Sivakumar, Appalyer and Mathirattian M.: Research Methodology; Integration of Principles, Methods and Techniques (Pearson Education, New Delhi)