NIRF-2023
Engineering Rank Band (151-200)
Pharmacy Rank - 88
Innovation Rank Band (51-100)

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Department of Information Technology

Course Outcomes and CO-PO/PSO Mapping

Session 2023-24 Even Sem

Department of Information Technology

13 KM STONE, GHAZIABAD-MEERUT ROAD, GHAZIABAD – 201206

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Department of Information Technology

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4th Semester		
S No.	**Subject Code**	**Subject Name**
1	BAS 403	Maths-IV
2	BAS 401	Technical Communication
3	BCS 402	Theory of Automata & Formal Language
4	BCS 401	Operating System
5	BCS 403	Object Oriented Programming with Java
6	BCC 401	Cyber Security
7	BCS 451	Operating Systems Lab
8	BCS 452	Object Oriented Programming with Java Lab
9	BCS 453	Cyber Security Workshop

6th Semester		
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1	KCS 601	Software Engineering
2	KIT 601	Data Analytics
3	KCS 603	Computer Networks
4	KCS 062	Image Processing
5	KOE 061	Real Time Systems
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7	KCS 651	SE Lab
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9	KCS 653	Computer Networks Lab

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1	KHU 802	Project Management & Entrepreneurship
2	KOE 081	Cloud Computing
3	KOE 093	Data Warehousing & Data Mining
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Department of Information Technology

Program Name: B. Tech **Academic Session: 2023-24** **Year: 2nd** **Semester: 4th**

Course Name: Maths-IV **Course Code: BAS 403** **Course Coordinator Name: Dr. Deepti Goel**

Course Outcomes

After completion of the course, the student will be able to		Relevant POs/ PSOs	Revised Bloom's Level (BL)	Knowledge Category (KC)
CO No.	Statement of Course Outcome			
CO1	Solve partial differential equations by Lagrange, Charpit and other particular methods.	1,2,12/1,2	Apply	Conceptual & Procedural
CO2	Apply the method of separation of variables to solve Wave , Heat and Laplace equation. Application of Fourier transform.	1,2,3,12/1,2	Apply	Conceptual & Procedural
CO3	Determine moments, correlation, linear regression lines and obtain best fitting curves to the given data.	1,2,3,4,5,12/1,2	Apply	Conceptual & Procedural
CO4	Apply the concept of probability to solve discrete and continuous probability problems.	1,2,3,4,5,12/1,2	Apply	Conceptual & Procedural
CO5	Apply the theory of sampling to solve t-test, z-test and Chisquare test problems.	1,2,3,4,5,6,7,12/1,2	Apply	Conceptual & Procedural

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Dr. Deepti Goel			
2.			
3.			

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The theory courses/ project having credits 3 to 6 should have 5 number of COs. The laboratory course/ mini project/ seminar/ industrial training having credits less than 3 should have 3 number of COs. The Project having 7 to 12 credits should have 6 to 10 number of COs.
- The statement of a CO must be formed considering a proper structure having mandatory and optional parts. The mandatory parts are Action & Knowledge and optional parts are Condition and Criteria.

Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 2nd | Semester: 4th

Course Name: Maths-IV | Course Code: BAS 403 | Course Coordinator Name: Dr. Deepti Goel

CO - PO/PSO/APO Matrix

CO No.	Programme Outcome (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2	2	-	-	-	-	-					2	1	-
CO2	2	2	2	-	-	-	-					2	-	1
CO3	2	2	2	2	2	-	-					2	1	1
CO4	2	2	1	1	1	-	-					1	-	1
CO5	2	1	2	2	2	2	2					2	1	-
PO Target	2	1.8	1.7	1.6	1.6	2	2					1.8	1	1

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Dr. Deepti Goel			

Signature of Course Coordinator | Assoc./ Asst. Head DOC | Signature of Addl. HoD | Signature of HoD

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The strength of correlation between COs and POs/ PSOs/APOs should be represented as 1 (low correlation), 2 (medium correlation) and 3 (high correlation) in CO - PO/APO/PSO Matrix.
- If there is no correlation, then put a "-" (dash).

Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 2nd | Semester: 4th

Course Name: Technical Communication | Course Code: BAS 401 | Course Coordinator Name: Ms. Jigyasa Chaudhary

Course Outcomes

After completion of the course, the student will be able to		Relevant POs/ PSOs	Revised Bloom's Level (BL)	Knowledge Category (KC)
CO No.	Statement of Course Outcome			
CO1	**UNDERSTAND** the nature and objective of technical communication relevant for the work place as engineers.	PO-9, PO-10.	Understand	C
CO2	**DEVELOP** an understanding of key concepts of writing, designing and speaking.	PO-9, PO-10.	Apply	P
CO3	**UTILIZE** the technical writing skills for the purposes of technical communication and its exposure in various dimensions.	PO-9, PO-10.	Apply	P
CO4	**BUILD UP** interpersonal communication traits that will make the transition from institution to the workplace smoother and help them to excel in their jobs.	PO-9, PO-10.	Apply	C
CO5	**APPLY** technical communication to build their personal brand and handle crisis communication.	PO-9, PO-10.	Apply	C

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. **Ms. Jigyasa Chaudhary**	Jigyasa	Ms. Jigyasa Chaudhary	Jigyasa

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The theory courses/ project having credits 3 to 6 should have 5 number of COs. The laboratory course/ mini project/ seminar/ industrial training having credits less than 3 should have 3 number of COs. The Project having 7 to 12 credits should have 6 to 10 number of COs.
- The statement of a CO must be formed considering a proper structure having mandatory and optional parts. The mandatory parts are Action & Knowledge and optional parts are Condition and Criteria.

Department of Information Technology

Program Name: B. Tech **Academic Session: 2023-24** **Year: 2nd** **Semester: 4th**

Course Name: Technical Communication **Course Code:BAS 401** **Course Coordinator Name: Ms. Jigyasa Chaudhary**

CO - PO/PSO/APO Matrix

CO No.	Programme Outcome (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1									3	3				
CO2									3	3				
CO3									3	3				
CO4									3	3				
CO5									3	3				
PO Target														

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. **Ms. Jigyasa Chaudhary**		Ms. Jigyasa Chaudhary	

Signature of Course Coordinator **Assoc./ Asst. Head DOC** **Signature of Addl. HoD** **Signature of HoD**

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The strength of correlation between COs and POs/ PSOs/APOs should be represented as 1 (low correlation), 2 (medium correlation) and 3 (high correlation) in CO - PO/APO/PSO Matrix.
- If there is no correlation, then put a "-" (dash).

Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 2nd | Semester: 4th

Course Name: Theory of Automata & Formal Language | Course Code:BCS-402 | Course Coordinator Name: Prof. Dinesh Kumar

Course Outcomes

After completion of the course, the student will be able to		Relevant POs/ PSOs	Revised Bloom's Level (BL)	Knowledge Category (KC)
CO No.	Statement of Course Outcome			
CO1	**Understand** basic concepts of automata theory and formal languages.	PO1, PO12, PSO1	Understand	C
CO2	**Construct** finite automata for regular expressions and regular languages.	PO1, PO2, PO3, PO12, PSO1	Apply	C, P
CO3	**Illustrate** regular and context-free grammar for formal languages.	PO1, PO2, PO3, PO12, PSO1	Apply	C, P
CO4	**Construct** the pushdown automata for context-free languages.	PO1, PO2, PO3, PO12, PSO1	Apply	C, P
CO5	**Explore** Turing machines for formal languages.	PO1, PO2, PO3, PO12, PSO1	Analyze	C, P

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Prof. Dinesh Kumar			
2. Prof. Minakshi			
3.			

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The theory courses/ project having credits 3 to 6 should have 5 number of COs. The laboratory course/ mini project/ seminar/ industrial training having credits less than 3 should have 3 number of COs. The Project having 7 to 12 credits should have 6 to 10 number of COs.
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Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 2nd | Semester: 4th

Course Name: Theory of Automata & Formal Language | Course Code: BCS 402 | Course Coordinator Name: Prof. Dinesh Kumar

CO - PO/PSO/APO Matrix

CO No.	Programme Outcome (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2	-	-	-	-	-	-	-	-	-	-	1	2	-
CO2	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO3	3	2	1	-	-	-	-	-	-	-	-	1	2	-
CO4	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO5	3	3	2	-	-	-	-	-	-	-	-	1	2	-
PO Target	2.8	2.25	1.75	-	-	-	-	-	-	-	-	1	2	-

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. **Prof. Dinesh Kumar**			
2. **Prof. Minakshi**	Minakshi		

Signature of Course Coordinator | **Assoc./ Asst. Head DOC** | **Signature of Addl. HoD** | **Signature of HoD**

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The strength of correlation between COs and POs/ PSOs/APOs should be represented as 1 (low correlation), 2 (medium correlation) and 3 (high correlation) in CO - PO/APO/PSO Matrix.
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Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 2nd | Semester: 4th

Course Name: Operating System | Course Code:BCS 401 | Course Coordinator Name: Dr. Sanjeev Kumar

Course Outcomes

After completion of the course, the student will be able to		Relevant POs/ PSOs	Revised Bloom's Level (BL)	Knowledge Category (KC)
CO No.	Statement of Course Outcome			
CO1	**Acquire** knowledge of the operating system and its functionalities, components, and terminologies used in the subject.	PO1, PO2, PO3, PO4, PO5, PO10,PO12, PSO1, PSO2	Understand	F, C
CO2	**Analyse** the role of process synchronization and the concept of concurrent processes in the operating system	PO1, PO2, PO3, PO4, PO5, PO10,PO12, PSO1, PSO2	Analyse	C, P
CO3	**Evaluate** the process scheduling scenarios based on the existing methods and techniques used in the operating system.	PO1, PO2, PO3, PO4, PO5, PO10,PO12, PSO1, PSO2	Evaluate	C,P
CO4	**Analyse** the memory management mechanism used in the operating system and how the operating system optimizes memory usage.	PO1, PO2, PO3, PO4, PO5, PO10,PO12, PSO1, PSO2	Analyse	C,P
CO5	**Analyse** the working of input and output management; and how the operating system performs the disk management.	PO1, PO2, PO3, PO4, PO5, PO10,PO12, PSO1, PSO2	Analyse	C,P

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Dr. Sanjeev Kumar			
2. Dr. Vikas Goel			
3. Prof. Arushi Singh			

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

The theory courses/ project having credits 3 to 6 should have 5 number of COs. The laboratory course/ mini project/ seminar/ industrial training having credits less than 3 should have 3 number of COs. The Project having 7 to 12 credits should have 6 to 10 number of COs.

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Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 2nd | Semester: 4th

Course Name: Operating System | Course Code:BCS 401 | Course Coordinator Name: Dr. Sanjeev Kumar

CO - PO/PSO/APO Matrix

CO No.	Programme Outcome (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	1	1	1	1					1		3	1	1
CO2	3	3	3	3	3					1		3	2	1
CO3	3	3	2	3	3					1		3	2	1
CO4	3	3	2	3	3					1		3	2	1
CO5	3	3	3	3	3					1		3	2	2
PO Target	3	2.6	2.2	2.6	2.6					1		3	1.8	1.2

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Dr. Sanjeev Kumar			
2. Dr. Vikas Goel			
3. Prof. Arushi Singh			

Signature of Course Coordinator | Assoc./ Asst. Head DOC | Signature of Addl. HoD | Signature of HoD

Program Name: B. Tech | Academic Session: 2023-24 | Year: 2nd | Semester: 4th

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The strength of correlation between COs and POs/ PSOs/APOs should be represented as 1 (low correlation), 2 (medium correlation) and 3 (high correlation) in CO - PO/APO/PSO Matrix.
- If there is no correlation, then put a "-" (dash).

Department of Information Technology

Course Name: Operating System Lab Course Code: BCS 451 Course Coordinator Name: Dr. Sanjeev Kumar

Course Outcomes

After completion of the course, the student will be able to		Relevant POs/ PSOs	Revised Bloom's Level (BL)	Knowledge Category (KC)
CO No.	Statement of Course Outcome			
CO1	Students will be able to apply knowledge of basic UNIX System calls to solve various software problems.	PO1, PO2, PO3, PO4, PO5, PO9, PO10,PO12, PSO1, PSO2,PSO1,PSO2	K3,K4	C, P
CO2	Students will be able to design, develop and implement programs for deadlock handling and interpret various CPU scheduling algorithms.	PO1, PO2, PO3, PO4, PO5, PO9, PO10,PO12, PSO1, PSO2,PSO1,PSO2	K3,K5	C, P
CO3	Students will be able to apply and analyze different page replacement algorithms and disk scheduling algorithms.	PO1, PO2, PO3, PO4, PO5, PO9, PO10,PO12, PSO1, PSO2,PSO1,PSO2	K3,K4	C, P

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Dr. Sanjeev Kumar			
2. Dr. Vikas Goel			
3. Prof. Arushi Singh			

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

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Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 2nd | Semester: 4th

Course Name: Operating System Lab | Course Code: BCS 451 | Course Coordinator Name: Dr. Sanjeev Kumar

CO - PO/PSO/APO Matrix

CO No.	Programme Outcome (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	2	2	1	1				2	2		1	2	1
CO2	3	2	2	1	1				2	2		1	2	1
CO3	3	2	2	1	1				2	2		1	2	1
PO Target	3	2	2	1	1				2	2		1	2	1

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Dr. Sanjeev Kumar			
2. Dr. Vikas Goel			
3. Prof. Arushi Singh			

Signature of Course Coordinator | Assoc./ Asst. Head DOC | Signature of Addl. HoD | Signature of HoD

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

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Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 2nd | Semester: 4th

Course Name: OOPs with JAVA | Course Code: BCS 403 | Course Coordinator Name: Dr. Surendra Kr. Keshari

Course Outcomes

After completion of the course, the student will be able to		Relevant POs/ PSOs	Revised Bloom's Level (BL)	Knowledge Category (KC)
CO No.	Statement of Course Outcome			
CO1	Implement core Java concepts that model real world entities.	PO1 –PO5, PO12	3	P
CO2	Implement special features of Java like Exception Handling and Multithreading	PO1 –PO5, PO12	3	P
CO3	Develop Programs based on New Java features (JDK 8+).	PO1 –PO5, PO12	3	P
CO4	Apply a collection framework to build modular Java programs.	PO1 –PO5, PO11, PO12	3	P
CO5	Implement web and RESTful Web Services with Spring Boot using Spring Framework concepts	PO1 –PO5, PO11, PO12	3	P

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Dr. Surendra Kr. Keshari			
2. Prof. Rajeev Singh			
3. Dr. Jitendra Kr. Seth			

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

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Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 2nd | Semester: 4th

Course Name: OOPs with JAVA | Course Code: BCS 403 | Course Coordinator Name: Dr. Surendra Kr. Keshari

CO - PO/PSO/APO Matrix

CO No.	Programme Outcome (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2	3	2	2	2	-	-	-	-	-	-	2		
CO2	2	3	2	2	2	-	-	-	-	-	-	2	2	2
CO3	2	3	2	2	2	-	-	-	-	-	-	3	2	2
CO4	2	2	2	2	3	-	-	-	-	-	2	3	2	2
CO5	2	3	3	3	2	-	-	-	-	-	2	3	2	2-
PO Target	2	2.8	2.2	2.25	2.2						2	2.6	2	2

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Dr. Surendra Kr. Keshari			
2. Prof. Rajeev Singh			
3. Dr. Jitendra Kr. Seth			

Signature of Course Coordinator | **Assoc./ Asst. Head DOC** | **Signature of Addl. HoD** | **Signature of HoD**

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Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 2nd | Semester: 4th

Course Name: OOPs with JAVA Lab | Course Code: BCS 452 | Course Coordinator Name: Dr. Surendra Kr. Keshari

Course Outcomes

After completion of the course, the student will be able to		Relevant POs/ PSOs	Revised Bloom's Level (BL)	Knowledge Category (KC)
CO No.	**Statement of Course Outcome**			
CO1	Perform core JAVA OOPS concepts on an integrated development environment to solve real world problems.	PO1 –PO5, PO12, PSO1-PSO2	3	P
CO2	Apply Exception Handling and Multithreading JAVA features in problem solving.	PO1 –PO5, PO12, PSO1-PSO2	3	P
CO3	Solve problems in context of programming code based on New Java features (JDK 8+).	PO1 –PO5, PO12, PSO1-PSO2	3	P
CO4	Develop a solution for case study-based problem using JAVA Collection framework.	PO1 –PO5, PO11, PO12, PSO1-PSO2	3	P
CO5	Design RESTful Web Services with Spring Boot Test using Spring Framework concepts	PO1 –PO5, PO11, PO12, PSO1-PSO2	3	P

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Dr. Surendra Kr. Keshari			
2. Prof. Rajeev Singh			
3. Dr. Jitendra Kr. Seth			

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

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Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 2nd | Semester: 4th

Course Name: OOPs with JAVA Lab | Course Code: BCS 452 | Course Coordinator Name: Dr. Surendra Kr. Keshari

CO - PO/PSO/APO Matrix

CO No.	Programme Outcome (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2	2	2	2	2	-	-	-	-	-	-	2	2	2
CO2	2	2	2	2	2	-	-	-	-	-	-	2	2	2
CO3	2	2	2	2	2	-	-	-	-	-	-	3	2	2
CO4	2	2	2	2	2	-	-	-	-	-	2	2	2	2
CO5	2	2	3	3	2	-	-	-	-	-	2	2	2	2
PO Target	2	2	2	2.2	2	-	-	-	-	-	2	2.2	2	2

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Dr. Surendra Kr. Keshari			
2. Prof. Rajeev Singh			
3. Dr. Jitendra Kr. Seth			

Signature of Course Coordinator | **Assoc./ Asst. Head DOC** | **Signature of Addl. HoD** | **Signature of HoD**

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

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Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 2nd | Semester: 4th

Course Name: Cyber Security | Course Code: BCC 401 | Course Coordinator Name: Dr. Urvashi Chugh

Course Outcomes

After completion of the course, the student will be able to		Relevant POs/ PSOs	Revised Bloom's Level (BL)	Knowledge Category (KC)
CO No.	Statement of Course Outcome			
CO1	Understand the basic concepts and terminology of cyber security and cyber-crimes.	PO1,PO2,PO4,PO7,PO8, PO12	BL-2	F/C
CO2	Understand the security issues and preventive measures in mobile communication.	PO1,PO2,PO4, PO5, PO7,PO8, PO12	BL-2	F/C
CO3	Understand various cyber attacks along with the tools and methods used in cyber crime	PO1,PO2,PO4,PO5,PO7,PO8, PO12, PSO1	BL-2	F/C
CO4	Understand the concepts of cyber forensics and its implication in Social Networking websites	PO1,PO2,PO4,PO7,PO8, PO12	BL-2	F/C
CO5	Understand the cyber security policies and cyber laws	PO1,PO2,PO4,PO5,PO6, PO7,PO8, PO12	BL-2	F/C

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Dr. Urvashi Chugh	Urvashi		
2. Prof. Kamal Kant Sharma			
3. Dr. Urvashi Chugh	Urvashi		

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The theory courses/ project having credits 3 to 6 should have 5 number of COs. The laboratory course/ mini project/ seminar/ industrial training having credits less than 3 should have 3 number of COs. The Project having 7 to 12 credits should have 6 to 10 number of COs.
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Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 2nd | Semester: 4th

Course Name: Cyber Security | Course Code: BCC 401 | Course Coordinator Name: Dr. Urvashi Chugh

CO - PO/PSO/APO Matrix

CO No.	Programme Outcome (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2	1	-	3	-	-	1	2	-	-	-	2	-	-
CO2	2	1	-	3	1	-	1	2	-	-	-	2	-	-
CO3	2	1	-	3	3	-	1	2	-	-	-	2	1	-
CO4	2	1	-	3	-	-	1	2	-	-	-	2	-	-
CO5	1	1	-	3	1	3	1	3	-	-	-	2	-	-
PO Target	2	1	-	3	-	-	1	2	-	-	-	2	-	-

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Dr. Urvashi Chugh	Urvashi		
2. Prof. Kamal Kant Sharma			
3. Dr. Urvashi Chugh	Urvashi		

Signature of Course Coordinator | **Assoc./ Asst. Head DOC** | **Signature of Addl. HoD** | **Signature of HoD**

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The strength of correlation between COs and POs/ PSOs/APOs should be represented as 1 (low correlation), 2 (medium correlation) and 3 (high correlation) in CO - PO/APO/PSO Matrix.
- If there is no correlation, then put a "-" (dash).

Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 2nd | Semester: 4th

Course Name: Cyber Security Workshop | Course Code: BCS 453 | Course Coordinator Name: Dr. Urvashi Chugh

Course Outcomes

After completion of the course, the student will be able to		Relevant POs/ PSOs	Revised Bloom's Level (BL)	Knowledge Category (KC)
CO No.	Statement of Course Outcome			
CO1	Understand various web application protocols used in data transmission and demonstrate by capturing and analyzing network transmission.	PO1,PO2,PO4,PO5,PO6,PO7,PO8, PO12, PSO1	BL-2, BL-3	Procedural
CO2	Understand principles of web security monitoring and analyzing the nature of attacks through cyber/computer forensics software/tools	PO1,PO2,PO4,PO5,PO6,PO7, PO8, PO12, PSO1	BL-2, BL-3	Procedural
CO3	Recognize web application security vulnerabilities and demonstrate how to determine if they are present in web applications using cyber/computer forensics software/tools.	PO1,PO2,PO4,PO5,PO6,PO7, PO8, PO12, PSO1	BL-2, BL-3	Procedural
CO4				
CO5				

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Dr. Urvashi Chugh	Urvashi		
2. Prof. Kamal Kant Sharma			
3.			

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The theory courses/ project having credits 3 to 6 should have 5 number of COs. The laboratory course/ mini project/ seminar/ industrial training having credits less than 3 should have 3 number of COs. The Project having 7 to 12 credits should have 6 to 10 number of COs.
- The statement of a CO must be formed considering a proper structure having mandatory and optional parts. The mandatory parts are Action & Knowledge and optional parts are Condition and Criteria.

Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 2nd | Semester: 4th

Course Name: Cyber Security Workshop | Course Code: BCS 453 | Course Coordinator Name: Dr. Urvashi Chugh

CO - PO/PSO/APO Matrix

CO No.	Programme Outcome (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	2	-	2	3	1	2	3	-	-	-	2	2	-
CO2	3	3	-	2	3	1	2	3	-	-	-	2	2	-
CO3	3	3	-	2	3	1	2	3	-	-	-	2	2	-
CO4														
CO5														
PO Target	3	3	-	2	3	1	2	3	-	-	-	2	2	-

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Dr. Urvashi Chugh	Urvashi		
2. Mr. Kamal Kant Sharma			
3.			

Signature of Course Coordinator | **Assoc./ Asst. Head DOC** | **Signature of Addl. HoD** | **Signature of HoD**

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The strength of correlation between COs and POs/ PSOs/APOs should be represented as 1 (low correlation), 2 (medium correlation) and 3 (high correlation) in CO - PO/APO/PSO Matrix.
- If there is no correlation, then put a "-" (dash).

Department of Information Technology

- Program Name: B. Tech | Academic Session: 2023-24 | Year: 3rd | Semester: 6th
- Course Name: Software Engineering | Course Code: KCS 601 | Course Coordinator Name: Prof. Ruchin Gupta

Course Outcomes

After completion of the course, the student will be able to		Relevant POs/ PSOs	Revised Bloom's Level (BL)	Knowledge Category (KC)
CO No.	Statement of Course Outcome			
CO1	**Explain** various software characteristics and different types of software development models.	PO1, PO2, PO3, PO4, PO11, PSO1, PSO2	K3	C
CO2	**Prepare** the contents of SRS and apply basic software quality assurance practices.	PO1, PO2, PO3, PO4, PO11, PSO1, PSO2	K3	P
CO3	**Compare** various methods for software design.	PO1, PO2, PO3, PO4, PO11, PSO1, PSO2	K3	P
CO4	**Illustrate** various software testing techniques.	PO1, PO2, PO3, PO4, PO11, PSO1, PSO2	K3	P
CO5	**Analyze** various software maintenance and project management techniques.	PO1, PO2, PO3, PO4, PO11, PSO1, PSO2	K4	P

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Dr. Ajay Kumar			
2. Prof. Ruchin Gupta			
3. Prof. Deepak Vishwakarma			

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The theory courses/ project having credits 3 to 6 should have 5 number of COs. The laboratory course/ mini project/ seminar/ industrial training having credits less than 3 should have 3 number of COs. The Project having 7 to 12 credits should have 6 to 10 number of COs.
- The statement of a CO must be formed considering a proper structure having mandatory and optional parts. The mandatory parts are Action & Knowledge and optional parts are Condition and Criteria.

Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 3rd | Semester: 6th

Course Name: Software Engineering | Course Code: KCS 601 | Course Coordinator Name: Prof. Ruchin Gupta

CO - PO/PSO/APO Matrix

CO No.	Programme Outcome (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1	1	1	2		1				1	1	2	3	1
CO2	1	2	1	1		1		2	1	2	1	2	3	1
CO3	2	2	2	2	2	1				2	1	2	3	1
CO4	2	2	2	2	2	1		1	1	1	1	2	3	1
CO5	2	2	2	2		1				1	1	1	3	1
PO Target	1.6	1.8	1.6	1.8	2	1		**1.5**	**1**	**1.4**	**1**	**1.8**	**3**	**1**

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Dr. Ajay Kumar			
2. Prof. Ruchin Gupta			
3. Prof. Deepak Vishwakarma			

Signature of Course Coordinator | **Assoc./ Asst. Head DOC** | **Signature of Addl. HoD** | **Signature of HoD**

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The strength of correlation between COs and POs/ PSOs/APOs should be represented as 1 (low correlation), 2 (medium correlation) and 3 (high correlation) in CO - PO/APO/PSO Matrix.
- If there is no correlation, then put a "-" (dash).

Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 3rd | Semester: 6th

Course Name: Software Engineering Lab | Course Code: KCS 651 | Course Coordinator Name: Prof. Ruchin Gupta

Course Outcomes

After completion of the course, the student will be able to		Relevant POs/ PSOs	Revised Bloom's Level (BL)	Knowledge Category (KC)
CO No.	Statement of Course Outcome			
CO1	**Discover** ambiguities, inconsistencies and incompleteness in SRS document and to identify its functional and non-functional requirements.	PO1, PO2, PO3, PO4, PO8,PO9, PO11, PSO1, PSO2	K3	P
CO2	**Demonstrate** Use Case diagrams, class diagram and other UML diagram through a problem statement.	PO1, PO2, PO3, PO4, PO8,PO9, PO11, PSO1, PSO2	K3	P
CO3	**Articulate** the use of modern engineering tools for software design and testing.	PO1, PO2, PO3, PO4, PO8,PO9, PO11, PSO1, PSO2	K3	P

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Dr. Ajay Kumar			
2. Prof. Ruchin Gupta			
3. Prof. Deepak Vishwakarma			

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The theory courses/ project having credits 3 to 6 should have 5 number of COs. The laboratory course/ mini project/ seminar/ industrial training having credits less than 3 should have 3 number of COs. The Project having 7 to 12 credits should have 6 to 10 number of COs.
- The statement of a CO must be formed considering a proper structure having mandatory and optional parts. The mandatory parts are Action & Knowledge and optional parts are Condition and Criteria.

Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 3rd | Semester: 6th

Course Name: Software Engineering Lab | Course Code: KCS 651 | Course Coordinator Name: Prof. Ruchin Gupta

CO - PO/PSO/APO Matrix

CO No.	Programme Outcome (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2	2	1	2				1	1	2	1		3	
CO2	1	2	2	2	2				1	2	1		3	
CO3	2	2	2	3	2				1	1	1		3	
PO Target														

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Dr. Ajay Kumar			
2. Prof. Ruchin Gupta			
3. Prof. Deepak Vishwakarma			

Signature of Course Coordinator | **Assoc./ Asst. Head DOC** | **Signature of Addl. HoD** | **Signature of HoD**

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The strength of correlation between COs and POs/ PSOs/APOs should be represented as 1 (low correlation), 2 (medium correlation) and 3 (high correlation) in CO - PO/APO/PSO Matrix.
- If there is no correlation, then put a "-" (dash).

Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 3rd | Semester: 6th

Course Name: Data Analytics | Course Code: KIT 601 | Course Coordinator Name: Dr. Sartaj Amad

Course Outcomes

After completion of the course, the student will be able to		Relevant POs/ PSOs	Revised Bloom's Level (BL)	Knowledge Category (KC)
CO No.	Statement of Course Outcome			
CO1	Understand different types of data and their importance in data analytics.	PO1, PO5, PO12, and PSO2	Understand	C
CO2	Apply advanced statistical techniques to analyze real-world data and extract insights.	PO1,PO2,PO3,PO4, PO5,PO9,PO12,PSO1,PSO2	Apply	C,P
CO3	Analyze streaming data to extract real-time insights for decision-making.	PO1,PO2,PO3,PO4, PO5,PO9,PO11,PO12,PSO1,PSO2	Analyze	C,P
CO4	Evaluate itemset mining and clustering for data patterns.	PO1,PO2,PO3,PO4, PO5,PO9,PO11,PO12,PSO1,PSO2	Evaluate	C,P
CO5	Develop advanced big data processing and visualization methods for large-scale unstructured data using python.	PO1,PO2,PO3,PO4, PO5,PO9,PO10, PO11,PO12,PSO1,PSO2	Create	C,P

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Dr. Sartaj Ahmad			
2. Prof. Deepika Kamboj	Deepika		

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The theory courses/ project having credits 3 to 6 should have 5 number of COs. The laboratory course/ mini project/ seminar/ industrial training having credits less than 3 should have 3 number of COs. The Project having 7 to 12 credits should have 6 to 10 number of COs.
- The statement of a CO must be formed considering a proper structure having mandatory and optional parts. The mandatory parts are Action & Knowledge and optional parts are Condition and Criteria.

Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 3rd | Semester: 6th

Course Name: Data Analytics | Course Code: KIT 601 | Course Coordinator Name: Dr. Sartaj Amad

CO - PO/PSO/APO Matrix

CO No.	Programme Outcome (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1	-	-	-	3	-	-	-	-	-	-	2	-	1
CO2	3	2	1	2	3	-	-	-	3	-	-	3	2	1
CO3	3	3	2	3	3	-	-	-	3	-	2	3	2	2
CO4	3	3	2	3	3	-	-	-	3	-	2	3	2	2
CO5	3	3	3	3	3	-	-	-	3	3	2	3	3	2
PO Target														

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Dr. Sartaj Ahmad			
2. Prof. Deepika Kamboj			

Signature of Course Coordinator | Assoc./ Asst. Head DOC | Signature of Addl. HoD | Signature of HoD

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The strength of correlation between COs and POs/ PSOs/APOs should be represented as 1 (low correlation), 2 (medium correlation) and 3 (high correlation) in CO - PO/APO/PSO Matrix.
- If there is no correlation, then put a "-" (dash).

Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 3rd | Semester: 6th

Course Name: Data Analytics Lab | Course Code: KIT 651 | Course Coordinator Name: Dr. Sartaj Amad

Course Outcomes

After completion of the course, the student will be able to		Relevant POs/ PSOs	Revised Bloom's Level (BL)	Knowledge Category (KC)
CO No.	Statement of Course Outcome			
CO1	Understand data classification and the importance of analytics, using tools like Python or Weka.	PO1, PO5, PO12, PSO2	Understand	C
CO2	Apply data analytics lifecycle, covering preparation, modeling, and result communication across diverse tasks.	PO1,PO2,PO3,PO4, PO5,PO9,PO12,PSO1,PSO 2	Apply	C, P
CO3	Analyze advanced data analysis techniques like regression, Bayesian methods, and neural networks.	PO1,PO2,PO3,PO4, PO5,PO9,PO11, PO12,PSO1,PSO2	Analyze	C, P
CO4	Explain data stream mining and real-time analytics techniques, including sampling, filtering, and analysis methods.	PO1,PO2,PO3,PO4, PO5,PO9,PO11,PO12,PSO 1,PSO2	Evaluate	C, P
CO5	Develop frequent itemset mining and clustering algorithms.	PO1,PO2,PO3,PO4, PO5,PO9,PO10,PO11,PO1 2,PSO1,PSO2	Create	C, P

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Prof. Deepika Kamboj			
2. Dr. Sartaj Ahmad			

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The theory courses/ project having credits 3 to 6 should have 5 number of COs. The laboratory course/ mini project/ seminar/ industrial training having credits less than 3 should have 3 number of COs. The Project having 7 to 12 credits should have 6 to 10 number of COs.
- The statement of a CO must be formed considering a proper structure having mandatory and optional parts. The mandatory parts are Action & Knowledge and optional parts are Condition and Criteria.

Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 3rd | Semester: 6th

Course Name: Data Analytics Lab | Course Code: KIT 651 | Course Coordinator Name: Dr. Sartaj Amad

CO - PO/PSO/APO Matrix

CO No.	Programme Outcome (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1	-	-	-	3	-	-	-	-	-	-	2	-	1
CO2	3	2	1	2	3	-	-	-	3	-	-	3	2	1
CO3	3	3	2	3	3	-	-	-	3	-	2	3	2	2
CO4	3	3	2	3	3	-	-	-	3	-	2	3	2	2
CO5	3	3	3	3	3	-	-	-	3	3	2	3	3	2
PO Target														

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Prof. Deepika Kamboj			
2. Dr. Sartaj Ahmad			

Signature of Course Coordinator | **Assoc./ Asst. Head DOC** | **Signature of Addl. HoD** | **Signature of HoD**

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The strength of correlation between COs and POs/ PSOs/APOs should be represented as 1 (low correlation), 2 (medium correlation) and 3 (high correlation) in CO - PO/APO/PSO Matrix.
- If there is no correlation, then put a "-" (dash).

Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 3rd | Semester: 6th

Course Name: Computer Networks | Course Code: KCS 603 | Course Coordinator Name: Prof. Veepin Kumar

Course Outcomes

After completion of the course, the student will be able to		Relevant POs/ PSOs	Revised Bloom's Level (BL)	Knowledge Category (KC)
CO No.	Statement of Course Outcome			
CO1	.Apply the knowledge of networking concepts and functionality of physical layer.	PO1, PO2, PO3, PO4, PO5,PO11,PO12, PSO1, PSO2	Apply	C, P
CO2	Explore the concept of elementary data link layer protocol to build a robust network.	PO1, PO2, PO3, PO4, PO5,PO11,PO12, PSO1, PSO2	Apply	C, P
CO3	Analyze the concept of routing and IP addressing in network layer.	PO1, PO2, PO3, PO4, PO5,PO11,PO12, PSO1, PSO2	Analyze	C, P
CO4	Examine the usage and working of transport layer.	PO1, PO2, PO3, PO4, PO5,PO6,PO11,PO12, PSO1, PSO2	Analyze	C, P
CO5	Determine the performance of different protocols used at application layer.	PO1, PO2, PO3, PO4, PO5,PO6,PO11,PO12, PSO1, PSO2	Apply	C, P

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Prof. Anjali Jain			
2. Prof. Anjali Jain			
3. Mr. Veepin Kumar			

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The theory courses/ project having credits 3 to 6 should have 5 number of COs. The laboratory course/ mini project/ seminar/ industrial training having credits less than 3 should have 3 number of COs. The Project having 7 to 12 credits should have 6 to 10 number of COs.
- The statement of a CO must be formed considering a proper structure having mandatory and optional parts. The mandatory parts are Action & Knowledge and optional parts are Condition and Criteria.

Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 3rd | Semester: 6th

Course Name: Computer Networks | Course Code: KCS 603 | Course Coordinator Name: Prof. Veepin Kumar

CO - PO/PSO/APO Matrix

CO No.	Programme Outcome (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	2	1	1	2	-	-	-	-	-	1	2	1	1
CO2	3	3	1	1	1	-	-	-	-	-	1	2	2	2
CO3	3	2	1	1	2	-	-	-	-	-	3	2	2	3
CO4	3	3	1	1	2	1	-	-	-	-	1	2	3	3
CO5	3	2	1	1	2	2	-	-	-	-	1	2	2	3
PO Target	3	2.4	1	1	1.8	1.5	-	-	-	-	1.4	2	2	2.4

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Prof. Anjali Jain			
2. Prof. Anjali Jain			
3. Mr. Veepin Kumar			

Signature of Course Coordinator | **Assoc./ Asst. Head DOC** | **Signature of Addl. HoD** | **Signature of HoD**

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The strength of correlation between COs and POs/ PSOs/APOs should be represented as 1 (low correlation), 2 (medium correlation) and 3 (high correlation) in CO - PO/APO/PSO Matrix.
- If there is no correlation, then put a "-" (dash).

Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 3rd | Semester: 6th

Course Name: Computer Networks Lab | Course Code: KCS 653 | Course Coordinator Name: Prof. Veepin Kumar

Course Outcomes

After completion of the course, the student will be able to		Relevant POs/ PSOs	Revised Bloom's Level (BL)	Knowledge Category (KC)
CO No.	**Statement of Course Outcome**			
CO1	Understand the fundamental concepts of computer networking and Network topologies.	PO1, PO2, PO3, PO4, PO5,PO10,PO11,PO12, PSO1, PSO2	Understand	C, P
CO2	Analyze different types of network devices and simple computer networks.	PO1, PO2, PO3, PO4,PO5,PO8,PO9, PO11, PO12, PSO1,PSO2	Analyze	C, P
CO3	Implement the basic network commands and use techniques, skills, and modern networking tools necessary for engineering practice.	PO1, PO2, PO3, PO5, PO6, PO7, PO8, PO10, PO11, PO12, PSO1,PSO2	Analyze	C, P

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Prof. Anjali Jain			
2. Prof. Veepin Kumar			

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The theory courses/ project having credits 3 to 6 should have 5 number of COs. The laboratory course/ mini project/ seminar/ industrial training having credits less than 3 should have 3 number of COs. The Project having 7 to 12 credits should have 6 to 10 number of COs.
- The statement of a CO must be formed considering a proper structure having mandatory and optional parts. The mandatory parts are Action & Knowledge and optional parts are Condition and Criteria.

Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 3rd | Semester: 6th

Course Name: Computer Networks Lab | Course Code: KCS 653 | Course Coordinator Name: Prof. Veepin Kumar

CO - PO/PSO/APO Matrix

CO No.	Programme Outcome (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1	1	1	2	2	-	-	-	-	2	1	2	2	3
CO2	1	2	2	2	1	-	-	2	1	-	1	2	2	3
CO3	1	2	2	-	2	2	1	2	-	2	1	1	2	3
PO Target	1	1.6	1.6	2	1.6	2	1	2	1	2	1	1.6	2	3

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Prof. Anjali Jain			
2. Prof. Anjali Jain			
3. Mr. Veepin Kumar			

Signature of Course Coordinator | **Assoc./ Asst. Head DOC** | **Signature of Addl. HoD** | **Signature of HoD**

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The strength of correlation between COs and POs/ PSOs/APOs should be represented as 1 (low correlation), 2 (medium correlation) and 3 (high correlation) in CO - PO/APO/PSO Matrix.
- If there is no correlation, then put a "-" (dash).

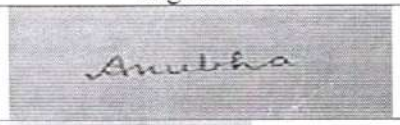
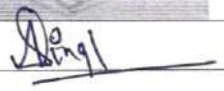
Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 3rd | Semester: 6th

Course Name: Image Processing | Course Code: KCS 062 | Course Coordinator Name: Prof. Analp Pathak

Course Outcomes

After completion of the course, the student will be able to		Relevant POs/ PSOs	Revised Bloom's Level (BL)	Knowledge Category (KC)
CO No.	**Statement of Course Outcome**			
CO1	Understand the basic concepts of two-dimensional signal acquisition, sampling, quantization and color models	PO1, PO2, PO11, PO12, PSO1, PSO2	Understand	C
CO2	Apply image processing techniques for image enhancement in both the spatial and frequency domains	PO1, PO2, PO3, PO4, PO5, PO6, PO11, PO12, PSO1, PSO2	Apply	C, P
CO3	Analyze Image restoration techniques in both the spatial and frequency domains	PO1, PO2, PO3, PO4, PO5, PO6, PO11, PO12, PSO1, PSO2	Analyze	C, P
CO4	Analyze edge-based and region-based segmentation algorithms for ROI extraction	PO1, PO2, PO3, PO4, PO5, PO6, PO11, PO12, PSO1, PSO2	Analyze	C, P
CO5	Explore compression techniques and descriptors for image processing	PO1, PO2, PO3, PO4, PO5, PO6, PO11, PO12, PSO1, PSO2	Explore	C, P

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Prof. Anubha			
2. Prof. Analp Pathak			
3. Prof. Arushi Singh			

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The theory courses/ project having credits 3 to 6 should have 5 number of COs. The laboratory course/ mini project/ seminar/ industrial training having credits less than 3 should have 3 number of COs. The Project having 7 to 12 credits should have 6 to 10 number of COs.
- The statement of a CO must be formed considering a proper structure having mandatory and optional parts. The mandatory parts are Action & Knowledge and optional parts are Condition and Criteria.

Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 3rd | Semester: 6th

Course Name: Image Processing | Course Code: KCS 062 | Course Coordinator Name: Prof. Analp Pathak

CO - PO/PSO/APO Matrix

CO No.	Programme Outcome (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2	1	-	-	-	-	-	-	-	-	2	2	2	1
CO2	3	3	2	1	2	1	-	-	-	-	2	2	3	2
CO3	1	2	3	2	2	1	-	-	-	-	1	2	3	2
CO4	1	2	3	2	2	1	-	-	-	-	1	2	3	2
CO5	1	2	2	2	2	1	-	-	-	-	1	2	2	1
PO Target	1.6	2	2.5	1.75	2	1	-	-	-	-	1.4	2	2.6	1.6

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Prof. Anubha	Anubha		
2. Prof. Analp Pathak			
3. Prof. Arushi Singh			

Signature of Course Coordinator | **Assoc./ Asst. Head DOC** | **Signature of Addl. HoD** | **Signature of HoD**

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The strength of correlation between COs and POs/ PSOs/APOs should be represented as 1 (low correlation), 2 (medium correlation) and 3 (high correlation) in CO - PO/APO/PSO Matrix.
- If there is no correlation, then put a "-" (dash).

Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 3rd | Semester: 6th

Course Name: Real Time Systems | Course Code: KOE 061 | Course Coordinator Name: Prof. Priya Singh

Course Outcomes

After completion of the course, the student will be able to		Relevant POs/ PSOs	Revised Bloom's Level (BL)	Knowledge Category (KC)
CO No.	Statement of Course Outcome			
CO1	Understand the fundamental concepts of Real-Time systems and modeling.	PO1, PO2, PO3, PO4, PO5, PO6, PSO1	Understand	F,C
CO2	Analyze various task scheduling algorithms in context of recognizing characteristics of real time systems	PO1, PO2, PO3, PO4, PO5, PO6, PSO1, PSO2	Analyze	C,P
CO3	Evaluate various resource contention management protocols and access control mechanisms	PO1, PO2, PO3, PO4, PO5, PO6, PSO1, PSO2	Evaluate	C,P
CO4	Understand real time communication systems by the knowledge of real time models and protocols	PO1, PO2, PO3, PO4, PO5, PO6, PO10, PSO1, PSO2	Understand	F,C
CO5	Analyze the basics of RTOS in interpretation of real time systems	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO10, PSO1, PSO2	Analyze	F,C

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Prof. Ila Kaushik	Ilaukaushik		
2. Prof. Priya Singh	Priya		
3. Prof. Ila Kaushik	Ilaukaushik		

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The theory courses/ project having credits 3 to 6 should have 5 number of COs. The laboratory course/ mini project/ seminar/ industrial training having credits less than 3 should have 3 number of COs. The Project having 7 to 12 credits should have 6 to 10 number of COs.
- The statement of a CO must be formed considering a proper structure having mandatory and optional parts. The mandatory parts are Action & Knowledge and optional parts are Condition and Criteria.

Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 3rd | Semester: 6th

Course Name: Real Time Systems | Course Code: KOE 061 | Course Coordinator Name: Prof. Priya Singh

CO - PO/PSO/APO Matrix

CO No.	Programme Outcome (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2	1	1	1	1	1							1	
CO2	3	3	2	2	1	2							1	2
CO3	3	3	2	2	1	2							1	2
CO4	2	1	1	2	2	1				2			1	1
CO5	2	3	3	3	3	3	2			1			1	3
PO Target														

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Prof. Ila Kaushik	Ila Kaushik		
2. Prof. Priya Singh	Priya		
3. Prof. Ila Kaushik	Ila Kaushik		

Signature of Course Coordinator | **Assoc./ Asst. Head DOC** | **Signature of Addl. HoD** | **Signature of HoD**

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The strength of correlation between COs and POs/ PSOs/APOs should be represented as 1 (low correlation), 2 (medium correlation) and 3 (high correlation) in CO - PO/APO/PSO Matrix.
- If there is no correlation, then put a "-" (dash).

Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 3rd | Semester: 6th

Course Name: Indian Tradition, Culture and Society | Course Code: KNC 602 | Course Coordinator Name: Prof. Shashank Yadav

Course Outcomes

After completion of the course, the student will be able to		Relevant POs/ PSOs	Revised Bloom's Level (BL)	Knowledge Category (KC)
CO No.	**Statement of Course Outcome**			
CO1	To understand the roots and details of Society State and Polity in India.	PO6, PO12	Understand	F/C
CO2	To understand the importance of Indian Literature, Culture, Tradition, Practices and to apply in present system.	PO6, PO7, PO12	Understand	F/C
CO3	To understand the Indian Religion, Philosophy, Practices and in shadow of Pre-Vedic and Vedic Religion, Buddhism, Jainism, Six System Indian Philosophy and to apply in present system .	PO6, PO12	Understand	F/C
CO4	To Understand the Science, Management and Indian Knowledge System and to apply in present system.	PO1, PO6, PO11, PO12	Understand	F/C
CO5	To Understand the Indian Architect, Engineering and Architecture in Ancient India, Indian's Cultural Contribution to the World and to create environment in Arts and Cultural for the present system.	PO6, PO7, PO12	Understand	F/C

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Prof. Deepak Vishwakarma	Deepak		
2. Dr. Jitendra Kr. Seth			
3. Prof. Shashank Yadav	Shashank		

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The theory courses/ project having credits 3 to 6 should have 5 number of COs. The laboratory course/ mini project/ seminar/ industrial training having credits less than 3 should have 3 number of COs. The Project having 7 to 12 credits should have 6 to 10 number of COs.
- The statement of a CO must be formed considering a proper structure having mandatory and optional parts. The mandatory parts are Action & Knowledge and optional parts are Condition and Criteria.

Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 3rd | Semester: 6th

Course Name: Indian Tradition, Culture and Society | Course Code: KNC 602 | Course Coordinator Name: Prof. Shashank Yadav

CO - PO/PSO/APO Matrix

CO No.	Programme Outcome (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1						2						2		
CO2						2	2					2		
CO3						2						2		
CO4	1					2					2	3		
CO5						2	2					3		
PO Target	1					2	2				2	2.4		

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Prof. Deepak Vishwakarma	Dipak		
2. Dr. Jitendra Kr. Seth			
3. Prof. Shashank Yadav	Shashank		

Shashank

Signature of Course Coordinator | **Assoc./ Asst. Head DOC** | **Signature of Addl. HoD** | **Signature of HoD**

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The strength of correlation between COs and POs/ PSOs/APOs should be represented as 1 (low correlation), 2 (medium correlation) and 3 (high correlation) in CO - PO/APO/PSO Matrix.
- If there is no correlation, then put a "-" (dash).

Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 4th | Semester: 8th

Course Name: Project Management & Entrepreneurship Course Code: KHU 802 | Course Coordinator Name: Prof. Anubha

Course Outcomes

After completion of the course, the student will be able to		Relevant POs/ PSOs	Revised Bloom's Level (BL)	Knowledge Category (KC)
CO No.	Statement of Course Outcome			
CO1	**Understand** the theories of entrepreneurship and entrepreneurial development programmes.	PO6, PO9, PO11	BL2	F
CO2	**Explain** innovative business ideas and market opportunities for business development.	PO6, PO9, PO11, PSO2	BL2	C
CO3	**Understand** the importance of project life cycle and different types of appraisal techniques.	PO6, PO7, PO9, PO10, PO11, PO12	BL2	C
CO4	**Define** different types of project financing requirements on the basis of cash flow statements.	PO6, PO9, PO10, PO11, PO12	BL3	P
CO5	**Describe** social entrepreneurship opportunities and risk management techniques in social enterprises.	PO6, PO7, PO9, PO11, PO12, PSO2	BL2	C

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Prof. Priya Singh			
2. Prof. Anubha			
3. Dr. Sanjeev Kumar			

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The theory courses/ project having credits 3 to 6 should have 5 number of COs. The laboratory course/ mini project/ seminar/ industrial training having credits less than 3 should have 3 number of COs. The Project having 7 to 12 credits should have 6 to 10 number of COs.
- The statement of a CO must be formed considering a proper structure having mandatory and optional parts. The mandatory parts are Action & Knowledge and optional parts are Condition and Criteria.

Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 4th | Semester: 8th

Course Name: Project Management & Entrepreneurship Course Code: KHU 802 | Course Coordinator Name: Prof. Anubha

CO - PO/PSO/APO Matrix

CO No.	Programme Outcome (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1						1			2		2			
CO2						1			1		1			1
CO3						2	1		2	1	1	1		
CO4						1			2	2	2	1		
CO5						2	2		2		1	1		2
PO Target						**1.4**	**1.5**		**1.8**	**1.5**	**1.4**	**1**		**1.5**

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Prof. Priya Singh			
2. Prof. Anubha	Anubha		
3. Dr. Sanjeev Kumar			

Signature of Course Coordinator | **Assoc./ Asst. Head DOC** | **Signature of Addl. HoD** | **Signature of HoD**

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The strength of correlation between COs and POs/ PSOs/APOs should be represented as 1 (low correlation), 2 (medium correlation) and 3 (high correlation) in CO - PO/APO/PSO Matrix.
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Department of Information Technology

Program Name: B. Tech **Academic Session: 2023-24** **Year: 4th** **Semester: 8th**

Course Name: Cloud Computing **Course Code: KOE 081** **Course Coordinator Name: Prof. Kamal Kant Sharma**

Course Outcomes

After completion of the course, the student will be able to		Relevant POs/ PSOs	Revised Bloom's Level (BL)	Knowledge Category (KC)
CO No.	Statement of Course Outcome			
CO1	Understand the evolution & principles of cloud computing.	PO1, PO2, PO5, PO8,PO9 PO12, PSO2	Understand	Conceptual
CO2	Understand various cloud services and their examples.	PO1, PO2, PO5, PO8,PO9, PO10, PO12, PSO1, PSO2	Understand	Conceptual & Procedural
CO3	Apply cloud-based tools for efficient email communication, CRM management, project and event management.	PO1, PO2, PO3, PO4, PO5, PO8, PO10, PO12, PSO1, PSO2	Apply	Conceptual & Procedural
CO4	Analyze the techniques of virtualization.	PO1, PO2, PO3, PO4, PO5, PO12, PSO1, PSO2	Analyze	Conceptual & Procedural
CO5	Analyze security, standards, and applications of cloud technologies.	PO1, PO2, PO3, PO4, PO5, PO12, PSO1, PSO2	Analyze	Conceptual & Procedural

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Prof. Ruchin Gupta			
2. Prof. Kamal Kant Sharma			
3. Prof. Veepin Kumar			

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The theory courses/ project having credits 3 to 6 should have 5 number of COs. The laboratory course/ mini project/ seminar/ industrial training having credits less than 3 should have 3 number of COs. The Project having 7 to 12 credits should have 6 to 10 number of COs.
- The statement of a CO must be formed considering a proper structure having mandatory and optional parts. The mandatory parts are Action & Knowledge and optional parts are Condition and Criteria.

Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 4th | Semester: 8th

Course Name: Cloud Computing | Course Code: KOE 081 | Course Coordinator Name: Prof. Kamal Kant Sharma

CO - PO/PSO/APO Matrix

CO No.	Programme Outcome (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2	2	-	-	2	-	-	1	1	-	-	2	-	2
CO2	2	2	-	-	2	-	-	1	1	2	-	2	1	2
CO3	3	2	1	1	3	-	-	1	-	2	-	2	2	2
CO4	3	3	2	2	3	-	-	-	-	-	-	2	2	2
CO5	3	3	2	2	3	-	-	-	-	-	-	2	2	2
PO Target														

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Prof. Ruchin Gupta			
2. Prof. Kamal Kant Sharma			
3. Prof. Veepin Kumar			

Signature of Course Coordinator | **Assoc./ Asst. Head DOC** | **Signature of Addl. HoD** | **Signature of HoD**

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

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Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 4th | Semester: 8th

Course Name: Data Warehousing & Data Mining | Course Code: KOE 093 | Course Coordinator Name: Prof. Mukul Agarwal

Course Outcomes

After completion of the course, the student will be able to		Relevant POs/ PSOs	Revised Bloom's Level (BL)	Knowledge Category (KC)
CO No.	Statement of Course Outcome			
CO1	Able to demonstrate the data warehouse architecture and its functionalities	PO1, PO2, PO4, PO11, PSO1	2	C, P
CO2	Able to illustrate the various design methodologies of Data Warehouse	PO1, PO2, PO3, PO5, PO9, PO11,PSO1, PSO2	3	C, P
CO3	Able to apply Data mining the concept of preprocessing in data mining.	PO1, PO2, PO3, PO4, PO5, PSO1,PSO2	3	C, P
CO4	Able to compare different methodologies used in data mining like classification and clustering	PO1, PO2, PO3, PO4, PO5,PSO2	4	C, P
CO5	Able to assess different approaches of data warehousing and data mining with various technologies	PO1, PO2, PO4, PO5, PSO1, PSO2	5	C, P

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Prof. Mukul Agarwal			
2. Prof. Mukul Agarwal			
3. Dr. Ajay Kumar			

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The theory courses/ project having credits 3 to 6 should have 5 number of COs. The laboratory course/ mini project/ seminar/ industrial training having credits less than 3 should have 3 number of COs. The Project having 7 to 12 credits should have 6 to 10 number of COs.
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Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 4th | Semester: 8th

Course Name: Data Warehousing & Data Mining | Course Code: KOE 093 | Course Coordinator Name: Prof. Mukul Agarwal

CO - PO/PSO/APO Matrix

CO No.	Programme Outcome (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2	2	-	1	-	-	-	-	-	-	2	-	3	-
CO2	2	2	3	-	2	-	-	-	2	-	2	-	2	2
CO3	3	2	2	1	1	-	-	-	-	-	-	-	2	2
CO4	2	2	2	1	2	-	-	-	-	-	-	-	-	2
CO5	1	3	-	2	2	-	-	-	-	-	-	-	1	2
PO Target	2	2.2	2.33	1.25	1.75	-	-	-	2	-	2	-	2	2

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
Prof. Mukul Agarwal			
Prof. Mukul Agarwal			
Dr. Ajay Kumar			

Signature of Course Coordinator | Assoc./ Asst. Head DOC | Signature of Addl. HoD | Signature of HoD

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

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Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 4th | Semester: 8th

Course Name: Project | Course Code: KIT 851 | Course Coordinator Name: Prof. Mukul Agarwal

Course Outcomes

After completion of the course, the student will be able to		Relevant POs/ PSOs	Revised Bloom's Level (BL)	Knowledge Category (KC)
CO No.	Statement of Course Outcome			
CO1	Select and summarize all aspects of the real life problem through survey.	PO1, PO2, PO3, PO4, PO5, PO6, PSO1	1,2	C
CO2	Apply acquired knowledge to develop working model and plan different phases for its execution.	PO1, PO2, PO3, PO4, PO5, PO6, PSO1, PSO2	3	C,P
CO3	Analyze outcome of each phase using various tools, techniques, and coding practices.	PO1, PO2, PO3, PO4, PO5, PO6, PSO1, PSO2	4	C,P
CO4	Justify/defend opinions, validity of ideas or quality of work based on a set of criteria.	PO1, PO2, PO3, PO4, PO5, PO6, PO10, PSO1, PSO2	5	C,P
CO5	Test the working model and modify related phase accordingly. Finally integrate all phases	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO10, PSO1, PSO2	6	C,P

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Prof. Mukul Agarwal			
2. Prof. Kamal Kant Sharma			
3. Prof. Mukul Agarwal			

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

- The theory courses/ project having credits 3 to 6 should have 5 number of COs. The laboratory course/ mini project/ seminar/ industrial training having credits less than 3 should have 3 number of COs. The Project having 7 to 12 credits should have 6 to 10 number of COs.
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Department of Information Technology

Program Name: B. Tech | Academic Session: 2023-24 | Year: 4th | Semester: 8th

Course Name: Project | Course Code: KIT 851 | Course Coordinator Name:

CO - PO/PSO/APO Matrix

CO No.	Programme Outcome (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	3	3	3	3	2	1	1	3	3	3	3	1	1
CO2	3	3	3	3	2	2	1	1	3	2	3	3	2	2
CO3	3	3	3	3	2	2	1	1	3	2	3	3	2	3
CO4	3	3	3	3	2	2	1	1	3	2	2	3	2	3
CO5	3	3	3	3	2	2	1	1	3	2	1	2	2	3
PO Target	3	3	3	3	2.2	2	1	1	3	2.2	2.4	2.8	2.2	2.4

Faculty Members Teaching the Course	Signature	Faculty Members Teaching the Course	Signature
1. Mukul Aggarwal			
2. Kamal Kant Sharma			
3.			

Signature of Course Coordinator | **Assoc./ Asst. Head DOC** | **Signature of Addl. HoD** | **Signature of HoD**

Please Note (Reference: OBE Guidelines wef. Session 2021 – 22)

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