COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: PROBABILITY AND STATISTICS

COURSE CODE: MCA22101

CREDITS: 3

DEPARTMENT: M.C.A

PROGRAMME OUTCOMES Or POS(MCA):

PROGRAM OBJECTIVES (POs)

- **PO1: Engineering knowledge**: Apply the knowledge of mathematics, computer science, various programming languages, databases and operating system to develop a software system.
- **PO2: Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems to reach substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO3: Design/development of solutions**: Design solutions for complex engineering problems and System components or processes that meet the specified needs of public health and safety.

- **PO4: Continuous learning**: Recognize the needs and improves the ability to engage in independent and life-long learning as trends changes in technology.

PROGRAMME SPECIFIC OUTCOME:

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO1**: To consolidate foundation of mathematics, computer science and problem solving methodology for effective implementation in the area of software development. To inculcate advance knowledge about various sub-domains of computer science and applications.

- **PSO2**: To prepare graduates to achieve peer-recognition, as an individual and in a team, through demonstration of good analytical, design and implementation skills.

- **PSO3**: To improve the ability to test and analyze the qualities of various subsystems and to integrate them together to evolve a larger and better computing system, that includes the concept of mathematics, computer engineering and related disciplines to meet the user objective .

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	**Understanding** of Linear Algebra will boost the ability to understand and apply various data science algorithms.	II (UNDERSTAND)
CO2	**Calculate** probabilities by applying probability laws and theoretical results, knowledge of important discrete and continuous distributions, their inter relations with real time applications.	III (APPLY)
CO3	**Understanding** the use of sample statistics to estimate unknown parameters.	II (UNDERSTAND)
CO4	**Evaluating** the proficiency in learning to interpret outcomes.	V (EVALUATE)
CO5	**Application of** Correlation Analysis, regression lines and multiple regression analysis.	III (APPLY)

Table 1: CO, PO, PSO MAPPING

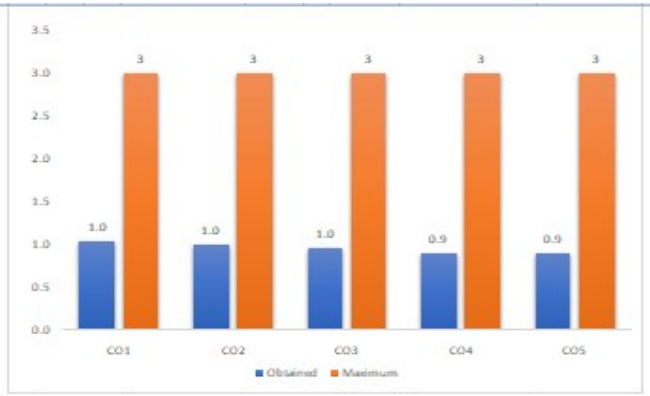
Course outcomes	Programme Outcomes								Program Specific outcomes				
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**P08**	**PSO1**	**PSO2**	**PSO3**		
1	H	S	S	S					S	S	S		
2	S	S	S	H					H	S	S		
3	S	S	H	S					S	S	S		
4	H	H	S	S					S	H	H		
5	S	H	S	S					H	S	H		

H: Highly Supportive **S: Supportive**

Table 2: COURSE OUTCOME ATTAINMENT

ATTAINMENT SCALE:

Pass percent of 85% and above= 3
Pass percent between 75% - 85%= 2
Pass percent between 75%- 65%= 1
Pass percent of less than 65%= 0



co	mid exam 1		mid exam 2		group discussion		assignment		viva		Attendence			External Exam			
	pass%	Attainment level	pass %	Attainment level	pass %	Attainment level	pass %	Attainment level	pass %	Attainment level	pass %	Attainment level	co wise internal	pass %	Attainment level	co wise external average	co wise total
CO1	89.5	3.0			100.0	3.0	100.0	3.0	100.0	3.0	66.7	1.0	2.6	56.1	0.0	0.0	1.0
CO2	89.5	3.0			100.0	3.0			100.0	3.0	66.7	1.0	2.5	56.1	0.0	0.0	1.0
CO3	89.5	3.0	84.2	2.0	100.0	3.0			100.0	3.0	66.7	1.0	2.4	56.1	0.0	0.0	1.0
CO4			84.2	2.0	100.0	3.0			100.0	3.0	66.7	1.0	2.3	56.1	0.0	0.0	0.9
CO5			84.2	2.0	100.0	3.0			100.0	3.0	66.7	1.0	2.3	56.1	0.0	0.0	0.9

AVERAGE	AVERAGE
0	0.96

RESULT ANALYSIS: (Only write a comment on the total CO attainment for the course and areas of improvement, how less it is from 3, which exam are they losing marks in, how can we attain 3)

The total CO attainment of the course is satisfactory. Performance in the mid semester exam needs to improve to improve overall course outcome attainment level.

Table 3: PROGRAMME OUTCOME MAPPING

Instruction:

1. Copy the completed table 1.

2. Retain only the POs and the Highly supportive (H) points. [Delete the PSO columns and the 'S' points]

3. Write the respective CO-wise total average (column K in table 2) wherever each CO is mapped as (H) under each PO.]

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	H 1.04							
CO2				H 1				
CO3			H 0.96					
CO4	H 0.9	H 0.9						
CO5		H 0.9						
AVERAGE OF COS FOR POS	0.97	0.9	0.96	1				
AVERAGE OF POS	0.935	0.9	0.96	1				
AVERAGE	0.94875							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

COURSE CODE: MCA20102

CREDITS: 4

DEPARTMENT: M.C.A

PROGRAMME OUTCOMES Or POS(MCA):

PROGRAM OBJECTIVES (POs)

- **PO1: Engineering knowledge**: Apply the knowledge of mathematics, computer science, various programming languages, databases and operating system to develop a software system.
- **PO2: Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems to reach substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO3: Design/development of solutions**: Design solutions for complex engineering problems and System components or processes that meet the specified needs of public health and safety.
- **PO4: Continuous learning**: Recognize the needs and improves the ability to engage in independent and life-long learning as trends

changes in technology.

PROGRAMME SPECIFIC OUTCOME:

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO1**: To consolidate foundation of mathematics, computer science and problem solving methodology for effective implementation in the area of software development. To inculcate advance knowledge about various sub-domains of computer science and applications.

- **PSO2**: To prepare graduates to achieve peer-recognition, as an individual and in a team, through demonstration of good analytical, design and implementation skills.

- **PSO3**: To improve the ability to test and analyze the qualities of various subsystems and to integrate them together to evolve a larger and better computing system, that includes the concept of mathematics, computer engineering and related disciplines to meet the user objective .

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Define Statements, connectives, how to apply connectives ,working with sets, subsets and represent them in venn diagrams	(I)Remember
CO2	Explains about relations ,ordering, functions, lattices and Boolean algebra illustrating with examples.	(II)Understand
CO3	Explains about algebraic structures and groups by applying various theorems and solving for an appropriate result	(III)Apply
CO4	Compare the Homogeneous Recurrence Relations and Non-Homogneous Recurrence Relations along with examples.	(IV)Analyze
CO5	Constructs graphs, trees and planar graphs	(VI)Create

Table 1: CO, PO, PSO MAPPING

Course outcomes	Programme Outcomes								Program Specific Outcomes				
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**P08**	**PSO1**	**PSO2**	**PSO3**		
1	H	H	S	S					H	S	S		
2	S	H	S	H					H	S	S		
3	H	S	H	S					S	S	H		
4	S	S	S	S					S	H	S		
5	S	S	H	S					S	S	S		

H: Highly Supportive **S: Supportive**

Table 2: COURSE OUTCOME ATTAINMENT

ATTAINMENT SCALE:

Pass percent of 85% and above= 3
Pass percent between 75% - 85%= 2
Pass percent between 75%- 65%= 1
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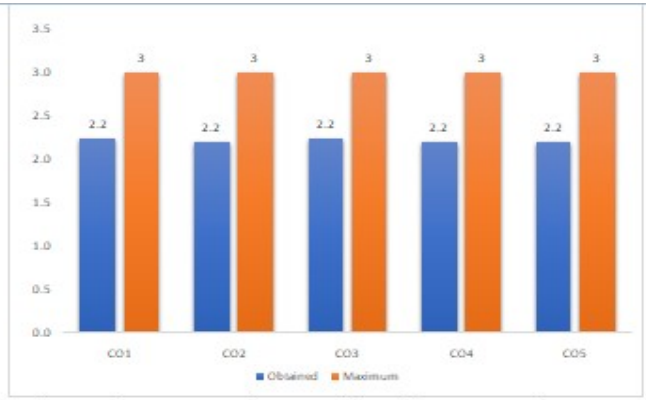

co	mid exam 1		mid exam 2		group discussion		assignment		viva		Attendence			External Exam			
	pass%	Attainment level	pass %	Attainment level	pass %	Attainment level	pass %	Attainment level	pass %	Attainment level	pass %	Attainment level	co wise internal	pass %	Attainment level	co wise external average	co wise total
CO1	94.7	3.0			100.0	3.0	100.0	3.0	100.0	3.0	70.2	1.0	2.6	78.9	2.0	2.0	2.2
CO2	94.7	3.0			100.0	3.0			100.0	3.0	70.2	1.0	2.5	78.9	2.0	2.0	2.2
CO3	94.7	3.0	91.2	3.0	100.0	3.0			100.0	3.0	70.2	1.0	2.6	78.9	2.0	2.0	2.2
CO4			91.2	3.0	100.0	3.0			100.0	3.0	70.2	1.0	2.5	78.9	2.0	2.0	2.2
CO5			91.2	3.0	100.0	3.0			100.0	3.0	70.2	1.0	2.5	78.9	2.0	2.0	2.2

AVERAGE	AVERAGE
2	2.216

RESULT ANALYSIS: (Only write a comment on the total CO attainment for the course and areas of improvement, how less it is from 3, which exam are they losing marks in, how can we attain 3)

The total CO attainment of the course is satisfactory. Performance in the mid semester exam needs to improve to improve overall course outcome attainment level.

Table 3: PROGRAMME OUTCOME MAPPING

Instruction:

1. Copy the completed table 1.

2. Retain only the POs and the Highly supportive (H) points. [Delete the PSO columns and the 'S' points]

3. Write the respective CO-wise total average (column K in table 2) wherever each CO is mapped as (H) under each PO.]

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	H 2.24	H 2.24						
CO2		H 2.2		H 2.2				
CO3	H 2.24		H 2.24					
CO4								
CO5			H 2.2					
AVERAGE OF COS FOR POS	2.24	2.22	2.22	2.2				
AVERAGE OF POS	2.24	2.21	2.22	2.2				
AVERAGE	2.2175							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: COMPUTER ARCHITECTURE

COURSE CODE: MCA20103

CREDITS: 3

DEPARTMENT: M.C.A

PROGRAMME OUTCOMES Or POS(MCA):

PROGRAM OBJECTIVES (POs)

- **PO1: Engineering knowledge**: Apply the knowledge of mathematics, computer science, various programming languages, databases and operating system to develop a software system.
- **PO2: Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems to reach substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
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- **PO4: Continuous learning**: Recognize the needs and improves the ability to engage in independent and life-long learning as trends changes in technology.

PROGRAMME SPECIFIC OUTCOME:

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO1**: To consolidate foundation of mathematics, computer science and problem solving methodology for effective implementation in the area of software development. To inculcate advance knowledge about various sub-domains of computer science and applications.

- **PSO2**: To prepare graduates to achieve peer-recognition, as an individual and in a team, through demonstration of good analytical, design and implementation skills.

- **PSO3**: To improve the ability to test and analyze the qualities of various subsystems and to integrate them together to evolve a larger and better computing system, that includes the concept of mathematics, computer engineering and related disciplines to meet the user objective .

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	**Demonstrate** knowledge of digital logic circuits and organization of a basic computer system.	II (UNDERSTAND)
CO2	**Explain** machine language of a basic computer system.	II (UNDERSTAND)
CO3	**Analyse** in-depth understanding of control unit organization and micro programmed control.	IV (ANALYZE)
CO4	**Apply** various algorithms to perform arithmetic operations and propose suitable hardware for them.	III (APPLY)
CO5	**Analyze** and emphasize various communication media in the basic computer system using design of various memory structures.	IV (ANALYZE)

Table 1: CO, PO, PSO MAPPING

Course outcomes	Programme Outcomes								Program Specific outcomes				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	P08	PSO1	PSO2	PSO3		
1	H	H	S	H					H	H	S		
2	H	H	S	H					H	H	S		
3	H	H	S	H					S	H	H		
4	H	S	H	H					H	S	H		
5	H	H	S	H					S	H	H		

H: Highly Supportive **S: Supportive**

Table 2: COURSE OUTCOME ATTAINMENT

ATTAINMENT SCALE:

Pass percent of 85% and above= 3
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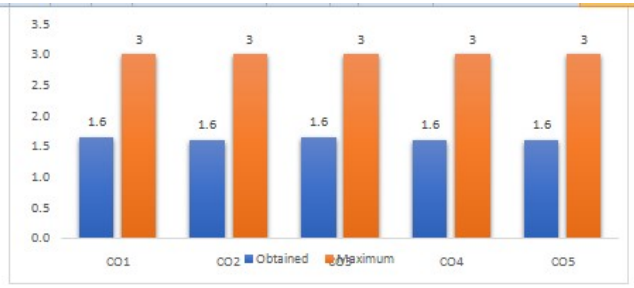
Pass percent of less than 65%= 0



co	mid exam 1		mid exam 2		group discussion		assignment		viva		Attendence			External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	co wise internal average	pass%	Attainment level	co wise external average	co wise total average
CO1	93.0	3.0			100.0	3.0	100.0	3.0	100.0	3.0	66.7	1.0	2.6	66.7	1.0	1.0	1.6
CO2	93.0	3.0			100.0	3.0			100.0	3.0	66.7	1.0	2.5	66.7	1.0	1.0	1.6
CO3	93.0	3.0	94.7	3.0	100.0	3.0			100.0	3.0	66.7	1.0	2.6	66.7	1.0	1.0	1.6
CO4			94.7	3.0	100.0	3.0			100.0	3.0	66.7	1.0	2.5	66.7	1.0	1.0	1.6
CO5			94.7	3.0	100.0	3.0			100.0	3.0	66.7	1.0	2.5	66.7	1.0	1.0	1.6

RESULT ANALYSIS: (Only write a comment on the total CO attainment for the course and areas of improvement, how less it is from 3, which exam are they losing marks in, how can we attain 3)

The total CO attainment of the course is satisfactory. Performance in the mid semester exam needs to improve to improve overall course outcome attainment level.

Table 3: PROGRAMME OUTCOME MAPPING

Instruction:

1. Copy the completed table 1.

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3. Write the respective CO-wise total average (column K in table 2) wherever each CO is mapped as (H) under each PO.]

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	H 1.64	H 1.64		H 1.64				
CO2	H 1.6	H 1.6		H 1.6				
CO3	H 1.64	H 1.64		H 1.64				
CO4	H 1.6		H 1.6	H 1.6				
CO5	H 1.6	H 1.6		H 1.6				
AVERAGE OF COS FOR POS	1.616	1.62	1.6	1.616				
AVERAGE OF POS	1.6112	1.615	1.6	1.6112				
AVERAGE	1.60935							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: DATA SRUCTURES USING C

COURSE CODE: MCA20104

CREDITS: 3

DEPARTMENT: M.C.A

PROGRAMME OUTCOMES Or POS(MCA):

PROGRAM OBJECTIVES (POs)

- **PO1: Engineering knowledge**: Apply the knowledge of mathematics, computer science, various programming languages, databases and operating system to develop a software system.
- **PO2: Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems to reach substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
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changes in technology.

PROGRAMME SPECIFIC OUTCOME:

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO1**: To consolidate foundation of mathematics, computer science and problem solving methodology for effective implementation in the area of software development. To inculcate advance knowledge about various sub-domains of computer science and applications.

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- **PSO3**: To improve the ability to test and analyze the qualities of various subsystems and to integrate them together to evolve a larger and better computing system, that includes the concept of mathematics, computer engineering and related disciplines to meet the user objective .

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Implement linear and non-linear data structure operations using C	III (APPLY)
CO2	Suggest appropriate linear / non-linear data structure for any given data set.	VI (CREATE)
CO3	Apply hashing concepts for a given problem	III (APPLY)
CO4	Modify or suggest new data structure for an application	VI (CREATE)
CO5	Implementing sorting algorithm for an application	III (APPLY)

Table 1: CO, PO, PSO MAPPING

Course outcomes	Programme Outcomes								Program Specific Outcomes				
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**P08**	**PSO1**	**PSO2**	**PSO3**		
1	S	H	S	S					H	S	S		
2	H	H	S	S					H	S	H		
3	S	H	H	S					H	S	H		
4	S	H	S	H					H	H	H		
5	S	S	H	S					H	S	H		

H: Highly Supportive **S: Supportive**

Table 2: COURSE OUTCOME ATTAINMENT

ATTAINMENT SCALE:

Pass percent of 85% and above= 3
Pass percent between 75% - 85%= 2
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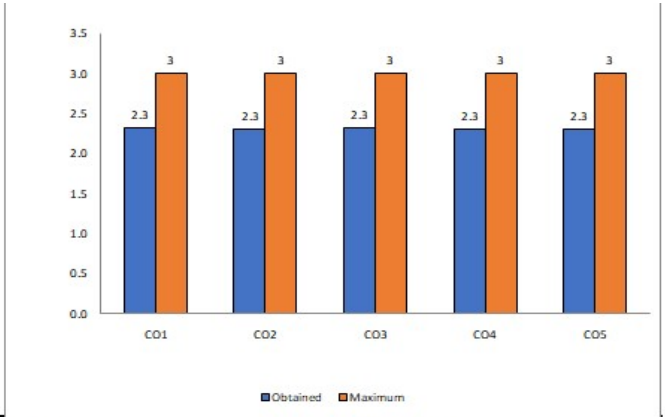
Pass percent of less than 65%= 0



co	mid exam 1		mid exam 2		group discussion		assignment		viva		Attendence			External Exam			
	pass%	Attainment	pass%	Attainment	pass%	Attainment	pass%	Attainment	pass%	Attainment	pass%	Attainment	co wise internal	pass%	Attainment	co wise external	co wise total
CO1	91.2	3.0			100.0	3.0	100.0	3.0	100.0	3.0	75.4	2.0	2.8	82.5	2.0	2.0	2.3
CO2	91.2	3.0			100.0	3.0			100.0	3.0	75.4	2.0	2.8	82.5	2.0	2.0	2.3
CO3	91.2	3.0	91.2	3.0	100.0	3.0			100.0	3.0	75.4	2.0	2.8	82.5	2.0	2.0	2.3
CO4			91.2	3.0	100.0	3.0			100.0	3.0	75.4	2.0	2.8	82.5	2.0	2.0	2.3
CO5			91.2	3.0	100.0	3.0			100.0	3.0	75.4	2.0	2.8	82.5	2.0	2.0	2.3

AVERAGE	AVERAGE
2	2.308

RESULT ANALYSIS: (Only write a comment on the total CO attainment for the course and areas of improvement, how less it is from 3, which exam are they losing marks in, how can we attain 3)

The total CO attainment of the course is satisfactory. Performance in the mid semester exam needs to improve to improve overall course outcome attainment level.

Table 3: PROGRAMME OUTCOME MAPPING

Instruction:

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3. Write the respective CO-wise total average (column K in table 2) wherever each CO is mapped as (H) under each PO.]

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1		H 2.32						
CO2	H 2.3	H 2.3						
CO3		H 2.32	H 2.32					
CO4		H 2.3		H 2.3				
CO5			H 2.3					
AVERAGE OF COS FOR POS	2.3	2.31	2.31	2.3				
AVERAGE OF POS	2.3	2.3075	2.31	2.3				
AVERAGE	2.304375							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: DATABASE MANAGEMENT SYSTEMS

COURSE CODE: MCA20105

CREDITS: 3

DEPARTMENT: M.C.A

PROGRAMME OUTCOMES Or POS(MCA):

PROGRAM OBJECTIVES (POs)

- **PO1: Engineering knowledge**: Apply the knowledge of mathematics, computer science, various programming languages, databases and operating system to develop a software system.
- **PO2: Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems to reach substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
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PROGRAMME SPECIFIC OUTCOME:

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO1**: To consolidate foundation of mathematics, computer science and problem solving methodology for effective implementation in the area of software development. To inculcate advance knowledge about various sub-domains of computer science and applications.

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	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	**Explain** logical database using Entity Relationship.	(II)UNDERSTAND
CO2	**Construct** database using relational algebra and relational calculus &SQL	(III)APPLYING
CO3	**Classify** the storage and file structure, storage access, indexing and hashing techniques of the database.	(II)UNDERSTAND
CO4	**Defines** client server architecture, Parallel databases, and distributed databases.	(I)REMEMBER
CO5	**Create** NOSQL Databases	(VI)CREATE

Table 1: CO, PO, PSO MAPPING

Course outcomes	Programme Outcomes								Program Specific outcomes				
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**P08**	**PSO1**	**PSO2**	**PSO3**		
1	H	H	H	H					H	H	H		
2	H	H	H	H					H	H	H		
3	S	S	S	S					S	S	S		
4	S	H	H	S					S	S	S		
5	S	H	H	S					S	S	H		

H: Highly Supportive **S: Supportive**

Table 2: COURSE OUTCOME ATTAINMENT

ATTAINMENT SCALE:

Pass percent of 85% and above= 3
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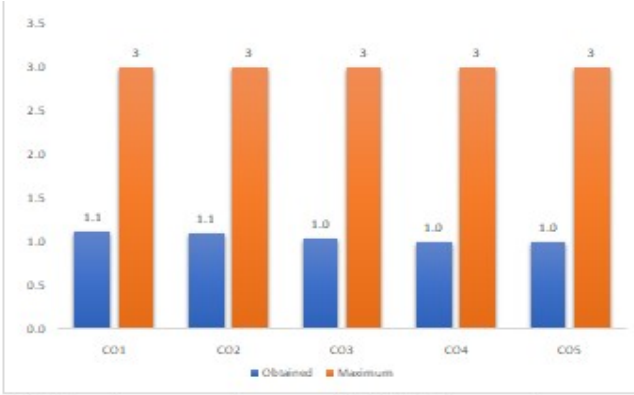


co	mid exam 1		mid exam 2		group discussion		assignment		viva		Attendence			External Exam			
	pass%	Attainment level	pass %	Attainment level	pass %	Attainment level	pass %	Attainment level	pass %	Attainment level	pass %	Attainment level	co wise internal	pass %	Attainment level	co wise external average	co wise total
CO1	91.2	3.0			100.0	3.0	100.0	3.0	100.0	3.0	75.4	2.0	2.8	61.4	0.0	0.0	1.1
CO2	91.2	3.0			100.0	3.0			100.0	3.0	75.4	2.0	2.8	61.4	0.0	0.0	1.1
CO3	91.2	3.0	84.2	2.0	100.0	3.0			100.0	3.0	75.4	2.0	2.6	61.4	0.0	0.0	1.0
CO4			84.2	2.0	100.0	3.0			100.0	3.0	75.4	2.0	2.5	61.4	0.0	0.0	1.0
CO5			84.2	2.0	100.0	3.0			100.0	3.0	75.4	2.0	2.5	61.4	0.0	0.0	1.0

AVERAGE	AVERAGE
0	1.052

RESULT ANALYSIS: (Only write a comment on the total CO attainment for the course and areas of improvement, how less it is from 3, which exam are they losing marks in, how can we attain 3)

The total CO attainment of the course is satisfactory. Performance in the mid semester exam needs to improve to improve overall course outcome attainment level.

Table 3: PROGRAMME OUTCOME MAPPING

Instruction:

1. Copy the completed table 1.

2. Retain only the POs and the Highly supportive (H) points. [Delete the PSO columns and the 'S' points]

3. Write the respective CO-wise total average (column K in table 2) wherever each CO is mapped as (H) under each PO.]

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	H 1.12	H 1.12	H 1.12	H 1.12				
CO2	H 1.1	H 1.1	H 1.1	H 1.1				
CO3								
CO4		H 1	H 1					
CO5		H 1	H 1					
AVERAGE OF COS FOR POS	1.11	1.055	1.055	1.11				
AVERAGE OF POS	1.105	1.0388	1.0388	1.105				
AVERAGE	1.071875							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: COMPUTER NETWORKS

COURSE CODE: MCA20202

CREDITS: 4

DEPARTMENT: M.C.A

PROGRAMME OUTCOMES Or POS(MCA):

PROGRAM OBJECTIVES (POs)

- **PO1: Engineering knowledge**: Apply the knowledge of mathematics, computer science, various programming languages, databases and operating system to develop a software system.
- **PO2: Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems to reach substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO3: Design/development of solutions**: Design solutions for complex engineering problems and System components or processes that meet the specified needs of public health and safety.

- **PO4: Continuous learning**: Recognize the needs and improves the ability to engage in independent and life-long learning as trends changes in technology.

PROGRAMME SPECIFIC OUTCOME:

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO1**: To consolidate foundation of mathematics, computer science and problem solving methodology for effective implementation in the area of software development. To inculcate advance knowledge about various sub-domains of computer science and applications.

- **PSO2**: To prepare graduates to achieve peer-recognition, as an individual and in a team, through demonstration of good analytical, design and implementation skills.

- **PSO3**: To improve the ability to test and analyze the qualities of various subsystems and to integrate them together to evolve a larger and better computing system, that includes the concept of mathematics, computer engineering and related disciplines to meet the user objective .

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	**Defines** Data Communication, components of networks, explains the type of transmission media and describes the functions of each layer in OSI and TCP/IP model.	I (REMEMBER)
CO2	**Describes** the functions of each layer and explains the various protocols	V (EVALUATE)
CO3	**Classify** the routing protocols and analyze how to assign the IP addresses for the given network.	II (UNDERSTAND)
CO4	**Describe** the Transport layer header format and services.	V (EVALUATE)
CO5	**Explain** the functions of Presentation layer and Application Layer.	II (UNDERSTAND)

Table 1: CO, PO, PSO MAPPING

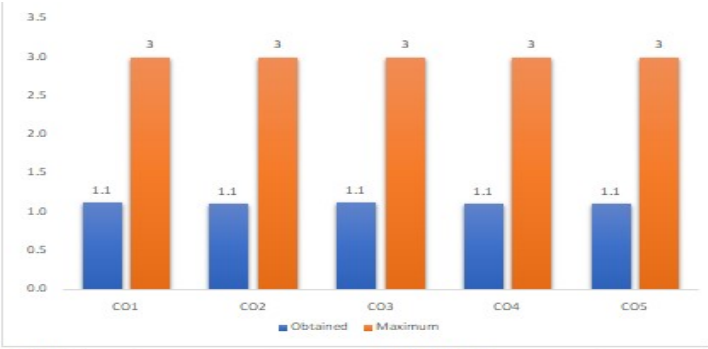
Course outcomes	Programme Outcomes								Program Specific Outcomes				
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**P08**	**PSO1**	**PSO2**	**PSO3**		
1	H	S	H	S					S	S	H		
2	S	S	H	H					H	S	S		
3	S	H	H	H					H	S	S		
4	H	S	S	H					S	S	H		
5	S	S	S	H					S	H	S		

H: Highly Supportive **S: Supportive**

Table 2: COURSE OUTCOME ATTAINMENT

ATTAINMENT SCALE:

Pass percent of 85% and above= 3
Pass percent between 75% - 85%= 2
Pass percent between 75%- 65%= 1
Pass percent of less than 65%= 0



co	mid exam 1		mid exam 2		group discussion		assignment		viva		Attendence			External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	co wise internal average	pass%	Attainment level	co wise external average	co wise total average
CO1	100.0	3.0			100.0	3.0	100.0	3.0	98.2	3.0	76.8	2.0	2.8	62.5	0.0	0.0	1.1
CO2	100.0	3.0			100.0	3.0			98.2	3.0	76.8	2.0	2.8	62.5	0.0	0.0	1.1
CO3	100.0	3.0	91.1	3.0	100.0	3.0			98.2	3.0	76.8	2.0	2.8	62.5	0.0	0.0	1.1
CO4			91.1	3.0	100.0	3.0			98.2	3.0	76.8	2.0	2.8	62.5	0.0	0.0	1.1
CO5			91.1	3.0	100.0	3.0			98.2	3.0	76.8	2.0	2.8	62.5	0.0	0.0	1.1

AVERAGE	AVERAGE
0	1.108

RESULT ANALYSIS: (Only write a comment on the total CO attainment for the course and areas of improvement, how less it is from 3, which exam are they losing marks in, how can we attain 3)

The total CO attainment of the course is satisfactory. Performance in the mid semester exam needs to improve to improve overall course outcome attainment level.

Table 3: PROGRAMME OUTCOME MAPPING

Instruction:

1. Copy the completed table 1.

2. Retain only the POs and the Highly supportive (H) points. [Delete the PSO columns and the 'S' points]

3. Write the respective CO-wise total average (column K in table 2) wherever each CO is mapped as (H) under each PO.]

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	H 1.12		H 1.12					
CO2			H 1.1	H 1.1				
CO3		H 1.12	H 1.12	H 1.12				
CO4	H 1.1			H 1.1				
CO5				H 1.1				
AVERAGE OF COS FOR POS	1.11	1.12	1.113333333	1.105				
AVERAGE OF POS	1.105	1.12	1.111111	1.105				
AVERAGE	1.110277778							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: ARTIFICIAL INTELLIGENCE

COURSE CODE: MCA20203

CREDITS: 4

DEPARTMENT: M.C.A

PROGRAMME OUTCOMES Or POS(MCA):

PROGRAM OBJECTIVES (POs)

- **PO1: Engineering knowledge**: Apply the knowledge of mathematics, computer science, various programming languages, databases and operating system to develop a software system.
- **PO2: Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems to reach substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO3: Design/development of solutions**: Design solutions for complex engineering problems and System components or processes that meet the specified needs of public health and safety.

- **PO4: Continuous learning**: Recognize the needs and improves the ability to engage in independent and life-long learning as trends changes in technology.

PROGRAMME SPECIFIC OUTCOME:

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO1**: To consolidate foundation of mathematics, computer science and problem solving methodology for effective implementation in the area of software development. To inculcate advance knowledge about various sub-domains of computer science and applications.

- **PSO2**: To prepare graduates to achieve peer-recognition, as an individual and in a team, through demonstration of good analytical, design and implementation skills.

- **PSO3**: To improve the ability to test and analyze the qualities of various subsystems and to integrate them together to evolve a larger and better computing system, that includes the concept of mathematics, computer engineering and related disciplines to meet the user objective .

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	**Defines** Artificial Intelligence, Problem Solving, Heuristic Search Techniques.	(I)Remembering
CO2	**Explains** about Knowledge Representation using Predicate Logic.	(II)Understanding
CO3	**Explains** about Expert Systems and Probability Theory.	(II)Understanding
CO4	**Compares** the various Artificial Neural Networks	(IV) Analyzing
CO5	**Constructs** the various Advance Knowledge Representation Techniques.	(VI)Creating

Table 1: CO, PO, PSO MAPPING

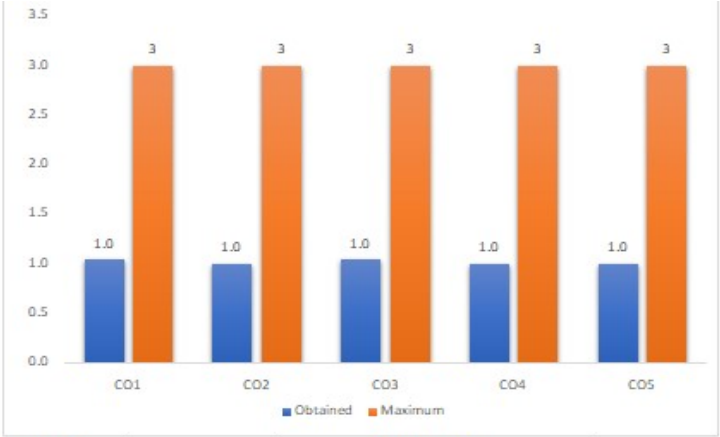
Course outcomes	Programme Outcomes								Program Specific Outcomes				
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**P08**	**PSO1**	**PSO2**	**PSO3**		
1	H	S	H	S					H	S	S		
2	S	S	H	H					S	H	S		
3	S	H	H	H					H	H	S		
4	H	S	S	H					S	S	S		
5	S	S	S	H					S	S	H		

H: Highly Supportive **S: Supportive**

Table 2: COURSE OUTCOME ATTAINMENT

ATTAINMENT SCALE:

Pass percent of 85% and above= 3
Pass percent between 75% - 85%= 2
Pass percent between 75%- 65%= 1
Pass percent of less than 65%= 0



co	mid exam 1		mid exam 2		group discussion		assignment		viva		Attendence			External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	co wise internal average	pass%	Attainment level	co wise external average	co wise total average
CO1	100.0	3.0			96.4	3.0	100.0	3.0	100.0	3.0	69.6	1.0	2.6	55.4	0.0	0.0	1.0
CO2	100.0	3.0			96.4	3.0			100.0	3.0	69.6	1.0	2.5	55.4	0.0	0.0	1.0
CO3	100.0	3.0	94.6	3.0	96.4	3.0			100.0	3.0	69.6	1.0	2.6	55.4	0.0	0.0	1.0
CO4			94.6	3.0	96.4	3.0			100.0	3.0	69.6	1.0	2.5	55.4	0.0	0.0	1.0
CO5			94.6	3.0	96.4	3.0			100.0	3.0	69.6	1.0	2.5	55.4	0.0	0.0	1.0

AVERAGE	AVERAGE
0	1.016

RESULT ANALYSIS: **(Only write a comment on the total CO attainment for the course and areas of improvement, how less it is from 3, which exam are they losing marks in, how can we attain 3)**

The total CO attainment of the course is satisfactory. Performance in the mid semester exam needs to improve to improve overall course outcome attainment level.

Table 3: PROGRAMME OUTCOME MAPPING

Instruction:

1. Copy the completed table 1.

2. Retain only the POs and the Highly supportive (H) points. [Delete the PSO columns and the 'S' points]

3. Write the respective CO-wise total average (column K in table 2) wherever each CO is mapped as (H) under each PO.]

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	H 1.04		H 1.04					
CO2			H 1	H 1				
CO3		H 1.04	H 1.04	H 1.04				
CO4	H 1			H 1				
CO5				H 1				
AVERAGE OF COS FOR POS	1.02	1.04	1.026666667	1.01				
AVERAGE OF POS	1.01	1.04	1.022222	1.01				
AVERAGE	1.020555556							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: DESIGN AND ANALYSIS OF ALGORITHMS

COURSE CODE: MCA20204

CREDITS: 3

DEPARTMENT: M.C.A

PROGRAMME OUTCOMES Or POS(MCA):

PROGRAM OBJECTIVES (POs)

- **PO1: Engineering knowledge**: Apply the knowledge of mathematics, computer science, various programming languages, databases and operating system to develop a software system.
- **PO2: Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems to reach substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO3: Design/development of solutions**: Design solutions for complex engineering problems and System components or processes that meet the specified needs of public health and safety.

- **PO4: Continuous learning**: Recognize the needs and improves the ability to engage in independent and life-long learning as trends changes in technology.

PROGRAMME SPECIFIC OUTCOME:

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO1**: To consolidate foundation of mathematics, computer science and problem solving methodology for effective implementation in the area of software development. To inculcate advance knowledge about various sub-domains of computer science and applications.

- **PSO2**: To prepare graduates to achieve peer-recognition, as an individual and in a team, through demonstration of good analytical, design and implementation skills.

- **PSO3**: To improve the ability to test and analyze the qualities of various subsystems and to integrate them together to evolve a larger and better computing system, that includes the concept of mathematics, computer engineering and related disciplines to meet the user objective .

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Define Elementary data structures	I (Remembering)
CO2	Explaining divide and conquer, greedy methods with examples	II (Understand)
CO3	Explaining divide and conquer, greedy methods with examples	II (Understand)
CO4	Explaining back tacking and branch and bound	II (Understand)
CO5	Analysis of NP-Hard and NP-Complete problem	(IV)Analyze

Table 1: CO, PO, PSO MAPPING

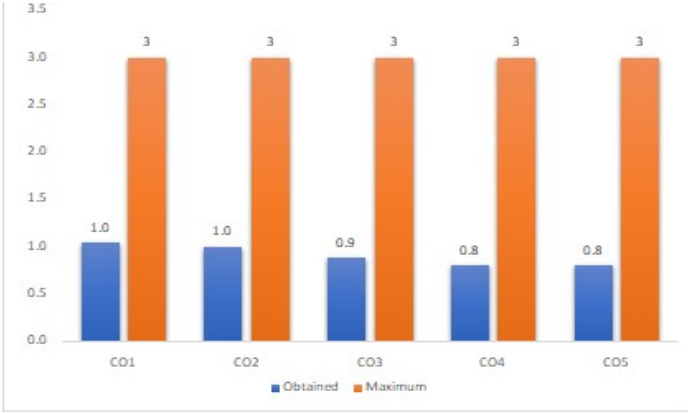
Course outcomes	Programme Outcomes								Program Specific outcomes				
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**P08**	**PSO1**	**PSO2**	**PSO3**		
1	H	S	S	S					H	S	S		
2	S	H	H	S					H	H	S		
3	S	H	H	S					S	H	S		
4	H	H	S	S					S	S	H		
5	S	S	S	H					S	S	H		

H: Highly Supportive **S: Supportive**

Table 2: COURSE OUTCOME ATTAINMENT

ATTAINMENT SCALE:

Pass percent of 85% and above= 3
Pass percent between 75% - 85%= 2
Pass percent between 75%- 65%= 1
Pass percent of less than 65%= 0



co	mid exam 1		mid exam 2		group discussion		assignment		viva		Attendence			External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	co wise internal average	pass%	Attainment level	co wise external average	co wise total average
CO1	92.9	3.0			96.4	3.0	100.0	3.0	100.0	3.0	69.6	1.0	2.6	53.6	0.0	0.0	1.0
CO2	92.9	3.0			96.4	3.0			100.0	3.0	69.6	1.0	2.5	53.6	0.0	0.0	1.0
CO3	92.9	3.0	73.2	1.0	96.4	3.0			100.0	3.0	69.6	1.0	2.2	53.6	0.0	0.0	0.9
CO4			73.2	1.0	96.4	3.0			100.0	3.0	69.6	1.0	2.0	53.6	0.0	0.0	0.8
CO5			73.2	1.0	96.4	3.0			100.0	3.0	69.6	1.0	2.0	53.6	0.0	0.0	0.8

AVERAGE	AVERAGE
0	0.904

RESULT ANALYSIS: (Only write a comment on the total CO attainment for the course and areas of improvement, how less it is from 3, which exam are they losing marks in, how can we attain 3)

The total CO attainment of the course is satisfactory. Performance in the mid semester exam needs to improve to improve overall course outcome attainment level.

Table 3: PROGRAMME OUTCOME MAPPING

Instruction:

1. Copy the completed table 1.

2. Retain only the POs and the Highly supportive (H) points. [Delete the PSO columns and the 'S' points]

3. Write the respective CO-wise total average (column K in table 2) wherever each CO is mapped as (H) under each PO.]

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	H 1.04							
CO2		H 1	H 1					
CO3		H 0.88	H 0.88					
CO4	H 0.8	H 0.8						
CO5				H 0.8				
AVERAGE OF COS FOR POS	0.92	0.893333333	0.94	0.8				
AVERAGE OF POS	0.86	0.893333	0.94	0.8				
AVERAGE	0.873333333							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: OPERATING SYSTEMS

COURSE CODE: MCA20205

CREDITS: 4

DEPARTMENT: M.C.A

PROGRAMME OUTCOMES Or POS(MCA):

PROGRAM OBJECTIVES (POs)

- **PO1: Engineering knowledge**: Apply the knowledge of mathematics, computer science, various programming languages, databases and operating system to develop a software system.
- **PO2: Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems to reach substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO3: Design/development of solutions**: Design solutions for complex engineering problems and System components or processes that meet the specified needs of public health and safety.

- **PO4: Continuous learning**: Recognize the needs and improves the ability to engage in independent and life-long learning as trends changes in technology.

PROGRAMME SPECIFIC OUTCOME:

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO1**: To consolidate foundation of mathematics, computer science and problem solving methodology for effective implementation in the area of software development. To inculcate advance knowledge about various sub-domains of computer science and applications.

- **PSO2**: To prepare graduates to achieve peer-recognition, as an individual and in a team, through demonstration of good analytical, design and implementation skills.

- **PSO3**: To improve the ability to test and analyze the qualities of various subsystems and to integrate them together to evolve a larger and better computing system, that includes the concept of mathematics, computer engineering and related disciplines to meet the user objective .

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	**Understand** fundamental operating system abstractions, Analyzing the algorithms	IV (ANALYZE)
CO2	**Describe** list resources involved in process creation and management	V (EVALUATE)
CO3	**Explain** the use of paging and segmentation	II (UNDERSTAND)
CO4	**Explain** the function and structure of the I/O system.	II (UNDERSTAND)
CO5	**Describe** path names and directory structure visible to end users	IV (ANALYZE)

Table 1: CO, PO, PSO MAPPING

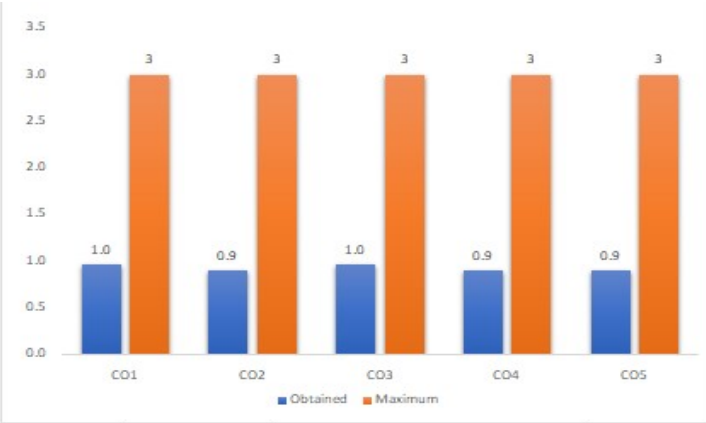
Course outcomes	Programme Outcomes								Program Specific outcomes				
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**P08**	**PSO1**	**PSO2**	**PSO3**		
1	H	H	S	S					H	H	S		
2	S	H	H	S					H	S	H		
3	H	H	S	H					H	H	S		
4	H	H	S	H					H	H	S		
5	H	H	S	H					S	H	H		

H: Highly Supportive **S: Supportive**

Table 2: COURSE OUTCOME ATTAINMENT

ATTAINMENT SCALE:

Pass percent of 85% and above= 3
Pass percent between 75% - 85%= 2
Pass percent between 75%- 65%= 1
Pass percent of less than 65%= 0



co	mid exam 1		mid exam 2		group discussion		assignment		viva		Attendence			External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	co wise internal average	pass%	Attainment level	co wise external average	co wise total average
CO1	92.9	3.0			85.7	3.0	100.0	3.0	100.0	3.0	62.5	0.0	2.4	55.4	0.0	0.0	1.0
CO2	92.9	3.0			85.7	3.0			100.0	3.0	62.5	0.0	2.3	55.4	0.0	0.0	0.9
CO3	92.9	3.0	87.5	3.0	85.7	3.0			100.0	3.0	62.5	0.0	2.4	55.4	0.0	0.0	1.0
CO4			87.5	3.0	85.7	3.0			100.0	3.0	62.5	0.0	2.3	55.4	0.0	0.0	0.9
CO5			87.5	3.0	85.7	3.0			100.0	3.0	62.5	0.0	2.3	55.4	0.0	0.0	0.9

AVERAGE	AVERAGE
0	0.924

RESULT ANALYSIS: (Only write a comment on the total CO attainment for the course and areas of improvement, how less it is from 3, which exam are they losing marks in, how can we attain 3)

The total CO attainment of the course is satisfactory. Performance in the mid semester exam needs to improve to improve overall course outcome attainment level.

Table 3: PROGRAMME OUTCOME MAPPING

Instruction:

1. Copy the completed table 1.

2. Retain only the POs and the Highly supportive (H) points. [Delete the PSO columns and the 'S' points]

3. Write the respective CO-wise total average (column K in table 2) wherever each CO is mapped as (H) under each PO.]

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	H 0.96	H 0.96						
CO2		H 0.9	H 0.9					
CO3	H 0.96	H 0.96		H 0.96				
CO4	H 0.9	H 0.9		H 0.9				
CO5	H 0.9	H 0.9		H 0.9				
AVERAGE OF COS FOR POS	0.93	0.924	0.9	0.92				
AVERAGE OF POS	0.9225	0.9168	0.9	0.92				
AVERAGE	0.914825							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: JAVA PROGRAMMING

COURSE CODE: MCA20206

CREDITS: 3

DEPARTMENT: M.C.A

PROGRAMME OUTCOMES Or POS(MCA):

PROGRAM OBJECTIVES (POs)

- **PO1: Engineering knowledge**: Apply the knowledge of mathematics, computer science, various programming languages, databases and operating system to develop a software system.
- **PO2: Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems to reach substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO3: Design/development of solutions**: Design solutions for complex engineering problems and System components or processes that meet the specified needs of public health and safety.
- **PO4: Continuous learning**: Recognize the needs and improves the ability to engage in independent and life-long learning as trends changes in technology.

PROGRAMME SPECIFIC OUTCOME:

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO1**: To consolidate foundation of mathematics, computer science and problem solving methodology for effective implementation in the area of software development. To inculcate advance knowledge about various sub-domains of computer science and applications.

- **PSO2**: To prepare graduates to achieve peer-recognition, as an individual and in a team, through demonstration of good analytical, design and implementation skills.

- **PSO3**: To improve the ability to test and analyze the qualities of various subsystems and to integrate them together to evolve a larger and better computing system, that includes the concept of mathematics, computer engineering and related disciplines to meet the user objective .

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	**Explain** the benefit of JAVA's compared to other Programming Language. The student will be able to identify classes, objects, Interfaces and will be able to **demonstrate** the concepts of polymorphism and inheritance	(II)UNDERSTAND
CO2	**Create** Java programs to implement error handling techniques using exception handling and Multi Threading concepts	(VI)CREATE
CO3	**Identify** usage of collection framework.	(III)APPLYING
CO4	**Distinguish** different Byte Streams and Character Streams and **construct** applets.	(IV)ANALYZE
CO5	**Describe** different AWT and Swings Classes. Students can design GUI based applications.	(V)EVALUATING

Table 1: CO, PO, PSO MAPPING

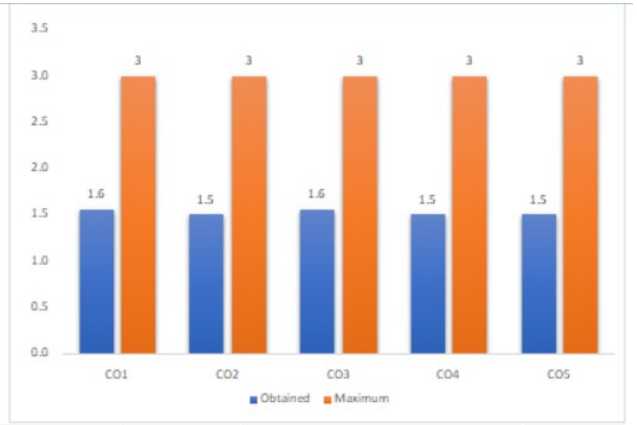
Course outcomes	Programme Outcomes								Program Specific outcomes				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	P08	PSO1	PSO2	PSO3		
1	H	H	S	H					S	S	S		
2	S	H	S	S					H	S	S		
3	S	H	S	S					H	S	S		
4	S	H	S	S					S	S	H		
5	S	S	H	S					S	H	H		

H: Highly Supportive **S: Supportive**

Table 2: COURSE OUTCOME ATTAINMENT

ATTAINMENT SCALE:

Pass percent of 85% and above= 3
Pass percent between 75% - 85%= 2
Pass percent between 75%- 65%= 1
Pass percent of less than 65%= 0



co	mid exam 1		mid exam 2		group discussion		assignment		viva		Attendence			External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	co wise internal average	pass%	Attainment level	co wise external average	co wise total average
CO1	94.6	3.0			100.0	3.0	100.0	3.0	100.0	3.0	58.9	0.0	2.4	71.4	1.0	1.0	1.6
CO2	94.6	3.0			100.0	3.0			100.0	3.0	58.9	0.0	2.3	71.4	1.0	1.0	1.5
CO3	94.6	3.0	94.6	3.0	100.0	3.0			100.0	3.0	58.9	0.0	2.4	71.4	1.0	1.0	1.6
CO4			94.6	3.0	100.0	3.0			100.0	3.0	58.9	0.0	2.3	71.4	1.0	1.0	1.5
CO5			94.6	3.0	100.0	3.0			100.0	3.0	58.9	0.0	2.3	71.4	1.0	1.0	1.5

AVERAGE	AVERAGE
1	1.524

RESULT ANALYSIS: (Only write a comment on the total CO attainment for the course and areas of improvement, how less it is from 3, which exam are they losing marks in, how can we attain 3)

The total CO attainment of the course is satisfactory. Performance in the mid semester exam needs to improve to improve overall course outcome attainment level.

Table 3: PROGRAMME OUTCOME MAPPING

Instruction:

1. Copy the completed table 1.

2. Retain only the POs and the Highly supportive (H) points. [Delete the PSO columns and the 'S' points]

3. Write the respective CO-wise total average (column K in table 2) wherever each CO is mapped as (H) under each PO.]

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	H 1.56	H 1.56		H 1.56				
CO2		H 1.5						
CO3		H 1.56						
CO4		H 1.5						
CO5			H 1.5					
AVERAGE OF COS FOR POS	1.56	1.53	1.5	1.56				
AVERAGE OF POS	1.56	1.5225	1.5	1.56				
AVERAGE	1.535625							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: DATA SCIENCE

COURSE CODE: MCA22207

CREDITS: 3

DEPARTMENT: M.C.A

PROGRAMME OUTCOMES Or POS(MCA):

PROGRAM OBJECTIVES (POs)

- **PO1: Engineering knowledge**: Apply the knowledge of mathematics, computer science, various programming languages, databases and operating system to develop a software system.
- **PO2: Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems to reach substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO3: Design/development of solutions**: Design solutions for complex engineering problems and System components or processes that meet the specified needs of public health and safety.

- **PO4: Continuous learning**: Recognize the needs and improves the ability to engage in independent and life-long learning as trends changes in technology.

PROGRAMME SPECIFIC OUTCOME:

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO1**: To consolidate foundation of mathematics, computer science and problem solving methodology for effective implementation in the area of software development. To inculcate advance knowledge about various sub-domains of computer science and applications.

- **PSO2**: To prepare graduates to achieve peer-recognition, as an individual and in a team, through demonstration of good analytical, design and implementation skills.

- **PSO3**: To improve the ability to test and analyze the qualities of various subsystems and to integrate them together to evolve a larger and better computing system, that includes the concept of mathematics, computer engineering and related disciplines to meet the user objective .

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Use various data structures and packages in R for data visualization and summarization	(II)UNDERSTANDING
CO2	Use linear , non-linear regression models, and classification techniques for data analysis	(III)APPLYING
CO3	Use clustering methods including K-means and CURE algorithm	(III)APPLYING

Table 1: CO, PO, PSO MAPPING

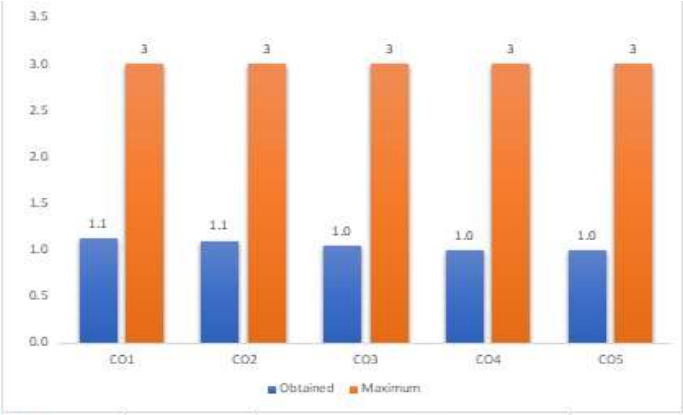
Course outcomes	Programme Outcomes								Program Specific outcomes				
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**P08**	**PSO1**	**PSO2**	**PSO3**		
1	S	S	S	H					S	S	S		
2	H	H	H	S					S	S	H		
3	H	H	H	S					S	S	H		

H: Highly Supportive **S: Supportive**

Table 2: COURSE OUTCOME ATTAINMENT

ATTAINMENT SCALE:

Pass percent of 85% and above= 3
Pass percent between 75% - 85%= 2
Pass percent between 75%- 65%= 1
Pass percent of less than 65%= 0



co	mid exam 1		mid exam 2		group discussion		assignment		viva		Attendence			External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	co wise internal average	pass%	Attainment level	co wise external average	co wise total average
CO1	92.9	3.0			100.0	3.0	100.0	3.0	100.0	3.0	78.6	2.0	2.8	53.6	0.0	0.0	1.1
CO2	92.9	3.0			100.0	3.0			100.0	3.0	78.6	2.0	2.8	53.6	0.0	0.0	1.1
CO3	92.9	3.0	78.6	2.0	100.0	3.0			100.0	3.0	78.6	2.0	2.6	53.6	0.0	0.0	1.0
CO4			78.6	2.0	100.0	3.0			100.0	3.0	78.6	2.0	2.5	53.6	0.0	0.0	1.0
CO5			78.6	2.0	100.0	3.0			100.0	3.0	78.6	2.0	2.5	53.6	0.0	0.0	1.0

AVERAGE	AVERAGE
0	1.052

RESULT ANALYSIS: (Only write a comment on the total CO attainment for the course and areas of improvement, how less it is from 3, which exam are they losing marks in, how can we attain 3)

The total CO attainment of the course is satisfactory. Performance in the mid semester exam needs to improve to improve overall course outcome attainment level.

Table 3: PROGRAMME OUTCOME MAPPING

Instruction:

1. Copy the completed table 1.

2. Retain only the POs and the Highly supportive (H) points. [Delete the PSO columns and the 'S' points]

3. Write the respective CO-wise total average (column K in table 2) wherever each CO is mapped as (H) under each PO.]

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1				H 1.12				
CO2	H 1.1	H 1.1	H 1.1					
CO3	H 1.04	H 1.04	H 1.04					
CO4								
CO5								
AVERAGE OF COS FOR POS	1.07	1.07	1.07	1.12				
AVERAGE OF POS	1.07	1.07	1.07	1.12				
AVERAGE	1.0825							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: INTERNET OF THINGS

COURSE CODE: MCA21302A

CREDITS: 3

DEPARTMENT: M.C.A

PROGRAMME OUTCOMES Or POS(MCA):

PROGRAM OBJECTIVES (POs)

- **PO1: Engineering knowledge**: Apply the knowledge of mathematics, computer science, various programming languages, databases and operating system to develop a software system.
- **PO2: Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems to reach substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO3: Design/development of solutions**: Design solutions for complex engineering problems and System components or processes that meet the specified needs of public health and safety.

- **PO4: Continuous learning**: Recognize the needs and improves the ability to engage in independent and life-long learning as trends changes in technology.

PROGRAMME SPECIFIC OUTCOME:

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO1**: To consolidate foundation of mathematics, computer science and problem solving methodology for effective implementation in the area of software development. To inculcate advance knowledge about various sub-domains of computer science and applications.

- **PSO2**: To prepare graduates to achieve peer-recognition, as an individual and in a team, through demonstration of good analytical, design and implementation skills.

- **PSO3**: To improve the ability to test and analyze the qualities of various subsystems and to integrate them together to evolve a larger and better computing system, that includes the concept of mathematics, computer engineering and related disciplines to meet the user objective .

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Understand the concepts of IoT and IoT enabling technologies	II (UNDERSTAND)
CO2	Explain IOT and system management.	II (UNDERSTAND)
CO3	To develop an understanding Programming Raspberry Pi with Python	III(APPLY)
CO4	To understand IoT Physical Servers and Cloud Offerings	II (UNDERSTAND)
CO5	Gain knowledge on IoT programming and able to develop IoT applications	IV(APPLY)

Table 1: CO, PO, PSO MAPPING

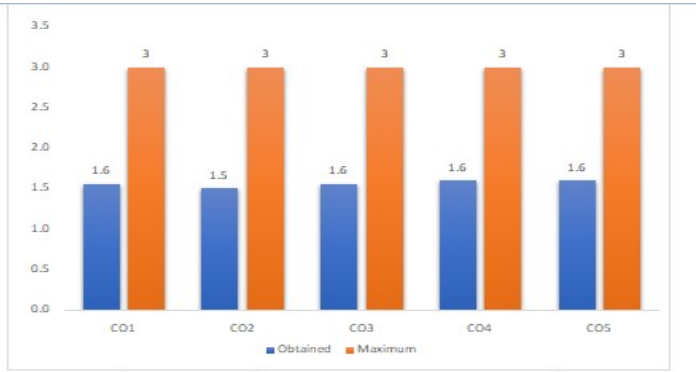
Course outcomes	Programme Outcomes								Program Specific outcomes				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	P08	PSO1	PSO2	PSO3		
1	S	H	H	H					S	H	H		
2	S	H	H	H					S	H	H		
3	H	H	S	H					H	H	H		
4	S	H	H	H					S	H	H		
5	H	H	S	H					H	H	H		

H: Highly Supportive **S: Supportive**

Table 2: COURSE OUTCOME ATTAINMENT

ATTAINMENT SCALE:

Pass percent of 85% and above= 3
Pass percent between 75% - 85%= 2
Pass percent between 75%- 65%= 1
Pass percent of less than 65%= 0



co	mid exam 1		mid exam 2		group discussion		assignment		viva		Attendence			External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	co wise internal average	pass%	Attainment level	co wise external average	co wise total average
CO1	82.1	2.0			100.0	3.0	100.0	3.0	100.0	3.0	75.0	1.0	2.4	67.9	1.0	1.0	1.6
CO2	82.1	2.0			100.0	3.0			100.0	3.0	75.0	1.0	2.3	67.9	1.0	1.0	1.5
CO3	82.1	2.0	89.3	3.0	100.0	3.0			100.0	3.0	75.0	1.0	2.4	67.9	1.0	1.0	1.6
CO4			89.3	3.0	100.0	3.0			100.0	3.0	75.0	1.0	2.5	67.9	1.0	1.0	1.6
CO5			89.3	3.0	100.0	3.0			100.0	3.0	75.0	1.0	2.5	67.9	1.0	1.0	1.6

AVERAGE	AVERAGE
1	1.564

RESULT ANALYSIS: (Only write a comment on the total CO attainment for the course and areas of improvement, how less it is from 3, which exam are they losing marks in, how can we attain 3)

The total CO attainment of the course is satisfactory. Performance in the mid semester exam needs to improve to improve overall course outcome attainment level.

Table 3: PROGRAMME OUTCOME MAPPING

Instruction:

1. Copy the completed table 1.

2. Retain only the POs and the Highly supportive (H) points. [Delete the PSO columns and the 'S' points]

3. Write the respective CO-wise total average (column K in table 2) wherever each CO is mapped as (H) under each PO.]

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1		H 1.56	H 1.56	H 1.56				
CO2		H 1.5	H 1.5	H 1.5				
CO3	H 1.56	H 1.56		H 1.56				
CO4		H 1.6	H 1.6	H 1.6				
CO5	H 1.6	H 1.6		H 1.6				
AVERAGE OF COS FOR POS	1.58	1.564	1.553333333	1.564				
AVERAGE OF POS	1.58	1.5648	1.551111	1.5648				
AVERAGE	1.565177778							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: DISTRIBUTED SYSTEMS

COURSE CODE: MCA21302B

CREDITS: 3

DEPARTMENT: M.C.A

PROGRAMME OUTCOMES Or POS(MCA):

PROGRAM OBJECTIVES (POs)

- **PO1: Engineering knowledge**: Apply the knowledge of mathematics, computer science, various programming languages, databases and operating system to develop a software system.
- **PO2: Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems to reach substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO3: Design/development of solutions**: Design solutions for complex engineering problems and System components or processes that meet the specified needs of public health and safety.
- **PO4: Continuous learning**: Recognize the needs and improves the ability to engage in independent and life-long learning as trends

changes in technology.

PROGRAMME SPECIFIC OUTCOME:

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO1**: To consolidate foundation of mathematics, computer science and problem solving methodology for effective implementation in the area of software development. To inculcate advance knowledge about various sub-domains of computer science and applications.

- **PSO2**: To prepare graduates to achieve peer-recognition, as an individual and in a team, through demonstration of good analytical, design and implementation skills.

- **PSO3**: To improve the ability to test and analyze the qualities of various subsystems and to integrate them together to evolve a larger and better computing system, that includes the concept of mathematics, computer engineering and related disciplines to meet the user objective .

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Defines Distributed systems, goals, processes and identifies the advantages and challenges in designing distributed algorithms for different primitives like mutual exclusion, deadlock detection, agreement, etc.	(I)REMEMBERING
CO2	Explains about Name entities and illustrates the various synchronization algorithms	(II)UNDERSTANDING
CO3	Differentiate between different types of faults and fault handling techniques in order to implement fault tolerant systems	(IV)ANALYZING
CO4	Compares the various Distributed Object Systems along with their related Case studies	(V)EVALUATING
CO5	Constructs the algorithms related to Distributed Shared memory and Distributed Scheduling.	(VI)CREATING

Table 1: CO, PO, PSO MAPPING

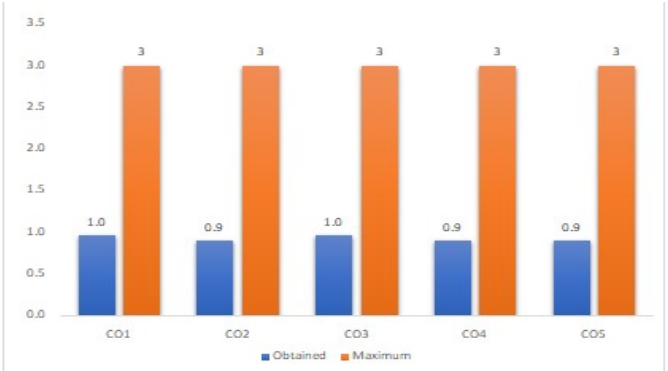
Course outcomes	Programme Outcomes								Program Specific outcomes				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	P08	PSO1	PSO2	PSO3		
1	S	H	H	H					H	H	H		
2	H	H	H	S					S	H	H		
3	H	H	S	H					H	S	H		
4	H	H	S	H					S	H	H		
5	H	S	H	H					H	S	H		

H: Highly Supportive **S: Supportive**

Table 2: COURSE OUTCOME ATTAINMENT

ATTAINMENT SCALE:

Pass percent of 85% and above= 3
Pass percent between 75% - 85%= 2
Pass percent between 75%- 65%= 1
Pass percent of less than 65%= 0



co	mid exam 1		mid exam 2		group discussion		assignment		viva		Attendence			External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	co wise internal average	pass%	Attainment level	co wise external average	co wise total average
CO1	93.1	3.0			100.0	3.0	100.0	3.0	100.0	3.0	55.2	0.0	2.4	58.6	0.0	0.0	1.0
CO2	93.1	3.0			100.0	3.0			100.0	3.0	55.2	0.0	2.3	58.6	0.0	0.0	0.9
CO3	93.1	3.0	100.0	3.0	100.0	3.0			100.0	3.0	55.2	0.0	2.4	58.6	0.0	0.0	1.0
CO4			100.0	3.0	100.0	3.0			100.0	3.0	55.2	0.0	2.3	58.6	0.0	0.0	0.9
CO5			100.0	3.0	100.0	3.0			100.0	3.0	55.2	0.0	2.3	58.6	0.0	0.0	0.9

AVERAGE	AVERAGE
0	0.924

RESULT ANALYSIS: (Only write a comment on the total CO attainment for the course and areas of improvement, how less it is from 3, which exam are they losing marks in, how can we attain 3)

The total CO attainment of the course is satisfactory. Performance in the mid semester exam needs to improve to improve overall course outcome attainment level.

Table 3: PROGRAMME OUTCOME MAPPING

Instruction:

1. Copy the completed table 1.

2. Retain only the POs and the Highly supportive (H) points. [Delete the PSO columns and the 'S' points]

3. Write the respective CO-wise total average (column K in table 2) wherever each CO is mapped as (H) under each PO.]

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1		H 0.96	H 0.96	H 0.96				
CO2	H 0.9	H 0.9	H 0.9					
CO3	H 0.96	H 0.96		H 0.96				
CO4	H 0.9	H 0.9		H 0.9				
CO5	H 0.9		H 0.9	H 0.9				
AVERAGE OF COS FOR POS	0.915	0.93	0.92	0.93				
AVERAGE OF POS	0.915	0.9225	0.906667	0.9225				
AVERAGE	0.916666667							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: NETWORK SECURITY

COURSE CODE: MCA21303A

CREDITS: 3

DEPARTMENT: M.C.A

PROGRAMME OUTCOMES Or POS(MCA):

PROGRAM OBJECTIVES (POs)

- **PO1: Engineering knowledge**: Apply the knowledge of mathematics, computer science, various programming languages, databases and operating system to develop a software system.
- **PO2: Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems to reach substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO3: Design/development of solutions**: Design solutions for complex engineering problems and System components or processes that meet the specified needs of public health and safety.
- **PO4: Continuous learning**: Recognize the needs and improves the ability to engage in independent and life-long learning as trends

changes in technology.

PROGRAMME SPECIFIC OUTCOME:

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO1**: To consolidate foundation of mathematics, computer science and problem solving methodology for effective implementation in the area of software development. To inculcate advance knowledge about various sub-domains of computer science and applications.

- **PSO2**: To prepare graduates to achieve peer-recognition, as an individual and in a team, through demonstration of good analytical, design and implementation skills.

- **PSO3**: To improve the ability to test and analyze the qualities of various subsystems and to integrate them together to evolve a larger and better computing system, that includes the concept of mathematics, computer engineering and related disciplines to meet the user objective .

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Explain the fundamentals of network security	II (UNDERSTAND)
CO2	Elaborate the concepts secret and public key cryptography	VI (CREATE)
CO3	Elucidate the hash functions digital signatures	II (UNDERSTAND)
CO4	Describe the digital signatures and smart cards	VI (CREATE)
CO5	Explain the applications of network security	II (UNDERSTAND)

Table 1: CO, PO, PSO MAPPING

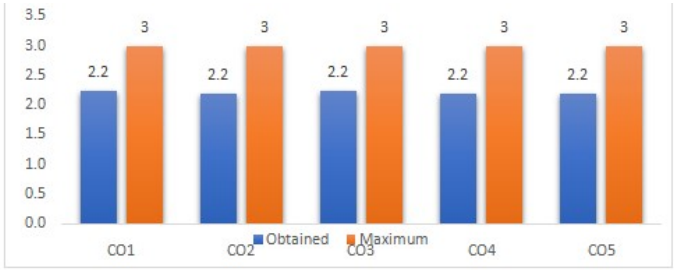
Course outcomes	Programme Outcomes								Program Specific Outcomes				
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**P08**	**PSO1**	**PSO2**	**PSO3**		
1	H	H	S	H					H	S	S		
2	H	H	S	S					S	S	H		
3	S	H	S	S					H	S	S		
4	H	H	S	S					S	H	S		
5	S	S	H	S					S	S	H		

H: Highly Supportive **S: Supportive**

Table 2: COURSE OUTCOME ATTAINMENT

ATTAINMENT SCALE:

Pass percent of 85% and above= 3
Pass percent between 75% - 85%= 2
Pass percent between 75%- 65%= 1
Pass percent of less than 65%= 0



co	mid exam 1		mid exam 2		group discussion		assignment		viva		Attendence			External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	co wise internal average	pass%	Attainment level	co wise external average	co wise total average
CO1	100.0	3.0			100.0	3.0	100.0	3.0	95.0	3.0	75.0	1.0	2.6	85.0	2.0	2.0	2.2
CO2	100.0	3.0			100.0	3.0			95.0	3.0	75.0	1.0	2.5	85.0	2.0	2.0	2.2
CO3	100.0	3.0	95.0	3.0	100.0	3.0			95.0	3.0	75.0	1.0	2.6	85.0	2.0	2.0	2.2
CO4			95.0	3.0	100.0	3.0			95.0	3.0	75.0	1.0	2.5	85.0	2.0	2.0	2.2
CO5			95.0	3.0	100.0	3.0			95.0	3.0	75.0	1.0	2.5	85.0	2.0	2.0	2.2

AVERAGE	AVERAGE
2	2.216

RESULT ANALYSIS: (Only write a comment on the total CO attainment for the course and areas of improvement, how less it is from 3, which exam are they losing marks in, how can we attain 3)

The total CO attainment of the course is satisfactory. Performance in the mid semester exam needs to improve to improve overall course outcome attainment level.

Table 3: PROGRAMME OUTCOME MAPPING

Instruction:

1. Copy the completed table 1.

2. Retain only the POs and the Highly supportive (H) points. [Delete the PSO columns and the 'S' points]

3. Write the respective CO-wise total average (column K in table 2) wherever each CO is mapped as (H) under each PO.]

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	H 2.24	H 2.24		H 2.24				
CO2	H 2.2	H 2.2						
CO3		H 2.24						
CO4	H 2.2	H 2.2						
CO5			H 2.2					
AVERAGE OF COS FOR POS	2.213333333	2.22	2.2	2.24				
AVERAGE OF POS	2.204444	2.215	2.2	2.24				
AVERAGE	2.214861111							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: ANDROID APPLICATION DEVELOPMENT

COURSE CODE: MCA23303C

CREDITS: 3

DEPARTMENT: M.C.A

PROGRAMME OUTCOMES Or POS(MCA):

PROGRAM OBJECTIVES (POs)

- **PO1: Engineering knowledge**: Apply the knowledge of mathematics, computer science, various programming languages, databases and operating system to develop a software system.
- **PO2: Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems to reach substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO3: Design/development of solutions**: Design solutions for complex engineering problems and System components or processes that meet the specified needs of public health and safety.
- **PO4: Continuous learning**: Recognize the needs and improves the ability to engage in independent and life-long learning as trends

changes in technology.

PROGRAMME SPECIFIC OUTCOME:

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO1**: To consolidate foundation of mathematics, computer science and problem solving methodology for effective implementation in the area of software development. To inculcate advance knowledge about various sub-domains of computer science and applications.

- **PSO2**: To prepare graduates to achieve peer-recognition, as an individual and in a team, through demonstration of good analytical, design and implementation skills.

- **PSO3**: To improve the ability to test and analyze the qualities of various subsystems and to integrate them together to evolve a larger and better computing system, that includes the concept of mathematics, computer engineering and related disciplines to meet the user objective .

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Compare different mobile application models/architectures and patterns	II (UNDERSTAND)
CO2	Apply a mobile development framework to the development of a mobile application.	III (APPLY)
CO3	Explain components and structure of a mobile development framework.	II (UNDERSTAND)
CO4	Develop advanced Java programming competency.	VI (CREATE)

Table 1: CO, PO, PSO MAPPING

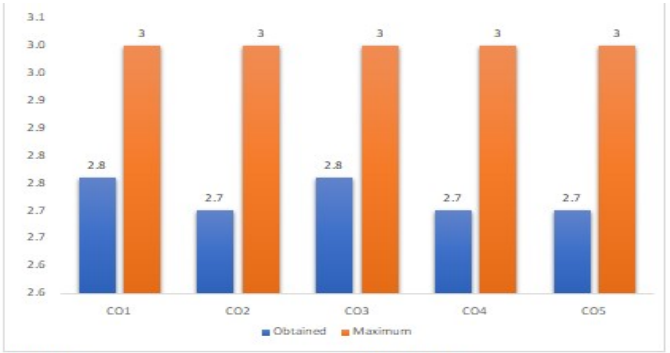
Course outcomes	Programme Outcomes								Program Specific Outcomes				
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**P08**	**PSO1**	**PSO2**	**PSO3**		
1	S	H	S	H					H	S	S		
2	H	H	S	H					S	H	H		
3	S	H	S	H					H	S	S		
4	S	H	H	S					S	H	H		

H: Highly Supportive **S: Supportive**

Table 2: COURSE OUTCOME ATTAINMENT

ATTAINMENT SCALE:

Pass percent of 85% and above= 3
Pass percent between 75% - 85%= 2
Pass percent between 75%- 65%= 1
Pass percent of less than 65%= 0



co	mid exam 1		mid exam 2		group discussion		assignment		viva		Attendence			External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	co wise internal average	pass%	Attainment level	co wise external average	co wise total average
CO1	94.6	3.0			100.0	3.0	100.0	3.0	100.0	3.0	56.8	0.0	2.4	94.6	3.0	3.0	2.8
CO2	94.6	3.0			100.0	3.0			100.0	3.0	56.8	0.0	2.3	94.6	3.0	3.0	2.7
CO3	94.6	3.0	94.6	3.0	100.0	3.0			100.0	3.0	56.8	0.0	2.4	94.6	3.0	3.0	2.8
CO4			94.6	3.0	100.0	3.0			100.0	3.0	56.8	0.0	2.3	94.6	3.0	3.0	2.7
CO5			94.6	3.0	100.0	3.0			100.0	3.0	56.8	0.0	2.3	94.6	3.0	3.0	2.7

AVERAGE	AVERAGE
3	2.724

RESULT ANALYSIS: (Only write a comment on the total CO attainment for the course and areas of improvement, how less it is from 3, which exam are they losing marks in, how can we attain 3)

The total CO attainment of the course is satisfactory. Performance in the mid semester exam needs to improve to improve overall course outcome attainment level.

Table 3: PROGRAMME OUTCOME MAPPING

Instruction:

1. Copy the completed table 1.

2. Retain only the POs and the Highly supportive (H) points. [Delete the PSO columns and the 'S' points]

3. Write the respective CO-wise total average (column K in table 2) wherever each CO is mapped as (H) under each PO.]

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1		H 2.76		H 2.76				
CO2	H 2.7	H 2.7		H 2.7				
CO3		H 2.76		H 2.76				
CO4		H 2.7	H 2.7					
CO5								
AVERAGE OF COS FOR POS	2.7	2.73	2.7	2.74				
AVERAGE OF POS	2.7	2.7225	2.7	2.733333				
AVERAGE	2.713958333							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: OPERATIONS RESEARCH

COURSE CODE: MCA21304

CREDITS: 4

DEPARTMENT: M.C.A

PROGRAMME OUTCOMES Or POS(MCA):

PROGRAM OBJECTIVES (POs)

- **PO1: Engineering knowledge**: Apply the knowledge of mathematics, computer science, various programming languages, databases and operating system to develop a software system.
- **PO2: Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems to reach substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO3: Design/development of solutions**: Design solutions for complex engineering problems and System components or processes that meet the specified needs of public health and safety.

- **PO4: Continuous learning**: Recognize the needs and improves the ability to engage in independent and life-long learning as trends changes in technology.

PROGRAMME SPECIFIC OUTCOME:

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO1**: To consolidate foundation of mathematics, computer science and problem solving methodology for effective implementation in the area of software development. To inculcate advance knowledge about various sub-domains of computer science and applications.

- **PSO2**: To prepare graduates to achieve peer-recognition, as an individual and in a team, through demonstration of good analytical, design and implementation skills.

- **PSO3**: To improve the ability to test and analyze the qualities of various subsystems and to integrate them together to evolve a larger and better computing system, that includes the concept of mathematics, computer engineering and related disciplines to meet the user objective .

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Identifying the methods to solve LPP.	III (APPLY)
CO2	Applying OR to transportation problems.	III (APPLY)
CO3	Applying OR to Assignment problems and IPP.	III (APPLY)
CO4	Creating the network diagrams for Project management problems.	VI (CREATING)
CO5	Analysing the game theory problems	IV (ANALYZE)

Table 1: CO, PO, PSO MAPPING

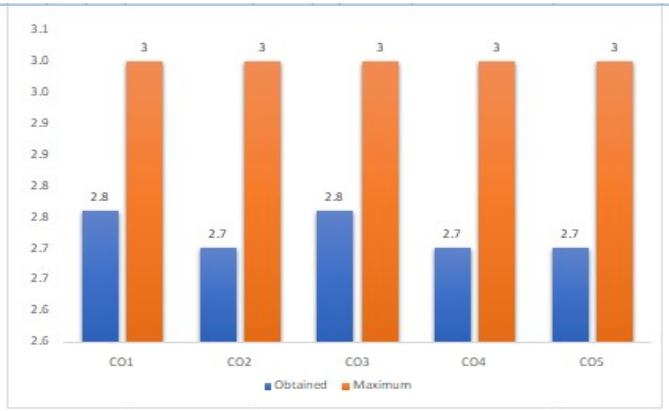
Course outcomes	Programme Outcomes								Program Specific outcomes				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	P08	PSO1	PSO2	PSO3		
1	H	S	H	S					H	H	S		
2	H	S	H	S					H	H	S		
3	H	S	H	S					H	H	S		
4	S	H	H	H					H	S	H		
5	S	H	H	H					H	H	H		

H: Highly Supportive **S: Supportive**

Table 2: COURSE OUTCOME ATTAINMENT

ATTAINMENT SCALE:

Pass percent of 85% and above= 3
Pass percent between 75% - 85%= 2
Pass percent between 75%- 65%= 1
Pass percent of less than 65%= 0



co	mid exam 1		mid exam 2		group discussion		assignment		viva		Attendence			External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	co wise internal average	pass%	Attainment level	co wise external average	co wise total average
CO1	91.2	3.0			100.0	3.0	100.0	3.0	100.0	3.0	64.9	0.0	2.4	87.7	3.0	3.0	2.8
CO2	91.2	3.0			100.0	3.0			100.0	3.0	64.9	0.0	2.3	87.7	3.0	3.0	2.7
CO3	91.2	3.0	93.0	3.0	100.0	3.0			100.0	3.0	64.9	0.0	2.4	87.7	3.0	3.0	2.8
CO4			93.0	3.0	100.0	3.0			100.0	3.0	64.9	0.0	2.3	87.7	3.0	3.0	2.7
CO5			93.0	3.0	100.0	3.0			100.0	3.0	64.9	0.0	2.3	87.7	3.0	3.0	2.7

AVERAGE	AVERAGE
3	2.724

RESULT ANALYSIS: (Only write a comment on the total CO attainment for the course and areas of improvement, how less it is from 3, which exam are they losing marks in, how can we attain 3)

The total CO attainment of the course is satisfactory. Performance in the mid semester exam needs to improve to improve overall course outcome attainment level.

Table 3: PROGRAMME OUTCOME MAPPING

Instruction:

1. Copy the completed table 1.

2. Retain only the POs and the Highly supportive (H) points. [Delete the PSO columns and the 'S' points]

3. Write the respective CO-wise total average (column K in table 2) wherever each CO is mapped as (H) under each PO.]

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	H 2.76		H 2.76					
CO2	H 2.7		H 2.7					
CO3	H 2.76		H 2.76					
CO4		H 2.7	H 2.7	H 2.7				
CO5		H 2.7	H 2.7	H 2.7				
AVERAGE OF COS FOR POS	2.74	2.7	2.724	2.7				
AVERAGE OF POS	2.733333	2.7	2.7168	2.7				
AVERAGE	2.712533333							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: SOFTWARE ENGINEERING

COURSE CODE: MCA21305

CREDITS: 3

DEPARTMENT: M.C.A

PROGRAMME OUTCOMES Or POS(MCA):

PROGRAM OBJECTIVES (POs)

- **PO1: Engineering knowledge**: Apply the knowledge of mathematics, computer science, various programming languages, databases and operating system to develop a software system.
- **PO2: Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems to reach substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO3: Design/development of solutions**: Design solutions for complex engineering problems and System components or processes that meet the specified needs of public health and safety.

- **PO4: Continuous learning**: Recognize the needs and improves the ability to engage in independent and life-long learning as trends changes in technology.

PROGRAMME SPECIFIC OUTCOME:

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO1**: To consolidate foundation of mathematics, computer science and problem solving methodology for effective implementation in the area of software development. To inculcate advance knowledge about various sub-domains of computer science and applications.

- **PSO2**: To prepare graduates to achieve peer-recognition, as an individual and in a team, through demonstration of good analytical, design and implementation skills.

- **PSO3**: To improve the ability to test and analyze the qualities of various subsystems and to integrate them together to evolve a larger and better computing system, that includes the concept of mathematics, computer engineering and related disciplines to meet the user objective .

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Explain Software Engineering and to know which model is suited according to the user specifications.	II (UNDERSTAND)
CO2	Explain about Software Requirement and Specifications (SRS) and to know the concepts of designing a project and what are the models used for designing.	VI (CREATING)
CO3	Understand the places or parts of the project where design is to be conducted and the types of designs and how to identify and overcome the risks in a software project.	III (APPLY)
CO4	Explain the importance of testing and to understand the importance of testing and understand various testing procedures and measurements used for testing the productivity of a software project.	VI (CREATING)
CO5	**Understand** the importance of maintenance, reengineering and software process improvement in a software project.	II (UNDERSTAND)

Table 1: CO, PO, PSO MAPPING

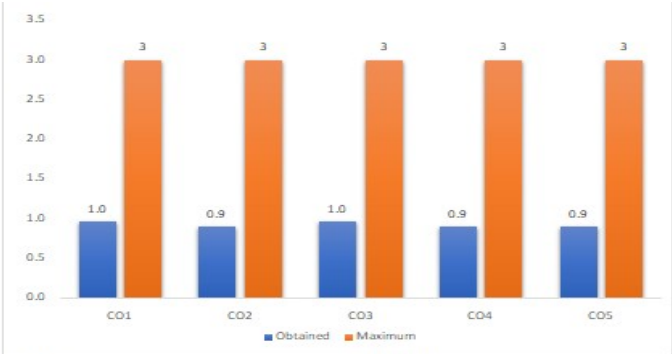
Course outcomes	Programme Outcomes								Program Specific outcomes				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	P08	PSO1	PSO2	PSO3		
1	H	S	S	H					S	H	S		
2	S	H	S	S					S	S	S		
3	H	S	H	S					H	S	S		
4	H	S	S	H					S	S	H		
5	H	S	S	H					S	S	H		

H: Highly Supportive **S: Supportive**

Table 2: COURSE OUTCOME ATTAINMENT

ATTAINMENT SCALE:

Pass percent of 85% and above= 3
Pass percent between 75% - 85%= 2
Pass percent between 75%- 65%= 1
Pass percent of less than 65%= 0



co	mid exam 1		mid exam 2		group discussion		assignment		viva		Attendence			External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	co wise internal average	pass%	Attainment level	co wise external average	co wise total average
CO1	94.7	3.0			100.0	3.0	100.0	3.0	100.0	3.0	49.1	0.0	2.4	47.4	0.0	0.0	1.0
CO2	94.7	3.0			100.0	3.0			100.0	3.0	49.1	0.0	2.3	47.4	0.0	0.0	0.9
CO3	94.7	3.0	100.0	3.0	100.0	3.0			100.0	3.0	49.1	0.0	2.4	47.4	0.0	0.0	1.0
CO4			100.0	3.0	100.0	3.0			100.0	3.0	49.1	0.0	2.3	47.4	0.0	0.0	0.9
CO5			100.0	3.0	100.0	3.0			100.0	3.0	49.1	0.0	2.3	47.4	0.0	0.0	0.9

AVERAGE	AVERAGE
0	0.924

RESULT ANALYSIS: (Only write a comment on the total CO attainment for the course and areas of improvement, how less it is from 3, which exam are they losing marks in, how can we attain 3)

The total CO attainment of the course is satisfactory. Performance in the mid semester exam needs to improve to improve overall course outcome attainment level.

Table 3: PROGRAMME OUTCOME MAPPING

Instruction:

1. Copy the completed table 1.

2. Retain only the POs and the Highly supportive (H) points. [Delete the PSO columns and the 'S' points]

3. Write the respective CO-wise total average (column K in table 2) wherever each CO is mapped as (H) under each PO.]

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	H 0.96			H 0.96				
CO2		H 0.9						
CO3	H 0.96		H 0.96					
CO4	H 0.9			H 0.9				
CO5	H 0.9			H 0.9				
AVERAGE OF COS FOR POS	0.93	0.9	0.96	0.92				
AVERAGE OF POS	0.9225	0.9	0.96	0.906667				
AVERAGE	0.922291667							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: INTERNET TECHNOLOGIES

COURSE CODE: MCA21306

CREDITS: 3

DEPARTMENT: M.C.A

PROGRAMME OUTCOMES Or POS(MCA):

PROGRAM OBJECTIVES (POs)

- **PO1: Engineering knowledge**: Apply the knowledge of mathematics, computer science, various programming languages, databases and operating system to develop a software system.
- **PO2: Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems to reach substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO3: Design/development of solutions**: Design solutions for complex engineering problems and System components or processes that meet the specified needs of public health and safety.
- **PO4: Continuous learning**: Recognize the needs and improves the ability to engage in independent and life-long learning as trends changes in technology.

PROGRAMME SPECIFIC OUTCOME:

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO1**: To consolidate foundation of mathematics, computer science and problem solving methodology for effective implementation in the area of software development. To inculcate advance knowledge about various sub-domains of computer science and applications.

- **PSO2**: To prepare graduates to achieve peer-recognition, as an individual and in a team, through demonstration of good analytical, design and implementation skills.

- **PSO3**: To improve the ability to test and analyze the qualities of various subsystems and to integrate them together to evolve a larger and better computing system, that includes the concept of mathematics, computer engineering and related disciplines to meet the user objective .

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	**Explain basics** of Java Script and OOPS concept.	(II)UNDERSTAND
CO2	**Creation** of Express with node JS	(VI)CREATE
CO3	**Create** Dynamic Web Applications using Angular.	(VI)CREATE
CO4	**Explain** Basics of Django Frame work.	(II)UNDERSTAND
CO5	**Create** trending web applications using Django	(VI)CREATE

Table 1: CO, PO, PSO MAPPING

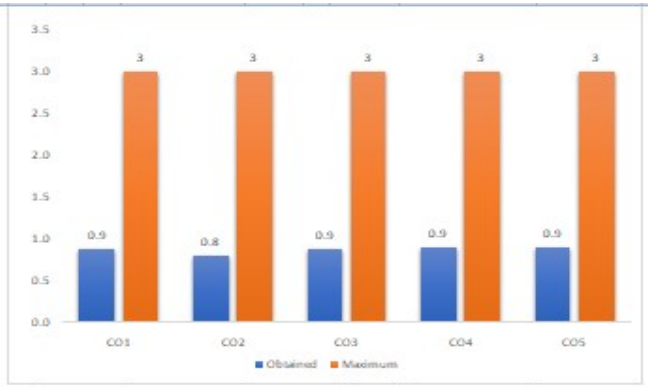
Course outcomes	Programme Outcomes								Program Specific outcomes				
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**P08**	**PSO1**	**PSO2**	**PSO3**		
1	H	S	H	S					H	H	S		
2	H	H	H	S					S	H	S		
3	H	H	S	H					S	H	S		
4	H	H	S	S					H	H	H		
5	H	H	H	S					H	H	H		

H: Highly Supportive **S: Supportive**

Table 2: COURSE OUTCOME ATTAINMENT

ATTAINMENT SCALE:

Pass percent of 85% and above= 3
Pass percent between 75% - 85%= 2
Pass percent between 75%- 65%= 1
Pass percent of less than 65%= 0



co	mid exam 1		mid exam 2		group discussion		assignment		viva		Attendence			External Exam			
	pass%	Attainment level	pass %	Attainment level	pass %	Attainment level	pass %	Attainment level	pass %	Attainment level	pass %	Attainment level	co wise internal	pass %	Attainment level	co wise external average	co wise total
CO1	84.2	2.0			98.2	3.0	100.0	3.0	100.0	3.0	64.9	0.0	2.2	56.1	0.0	0.0	0.9
CO2	84.2	2.0			98.2	3.0			100.0	3.0	64.9	0.0	2.0	56.1	0.0	0.0	0.8
CO3	84.2	2.0	98.2	3.0	98.2	3.0			100.0	3.0	64.9	0.0	2.2	56.1	0.0	0.0	0.9
CO4			98.2	3.0	98.2	3.0			100.0	3.0	64.9	0.0	2.3	56.1	0.0	0.0	0.9
CO5			98.2	3.0	98.2	3.0			100.0	3.0	64.9	0.0	2.3	56.1	0.0	0.0	0.9

AVERAGE	AVERAGE
0	0.872

RESULT ANALYSIS: (Only write a comment on the total CO attainment for the course and areas of improvement, how less it is from 3, which exam are they losing marks in, how can we attain 3)

The total CO attainment of the course is satisfactory. Performance in the mid semester exam needs to improve to improve overall course outcome attainment level.

Table 3: PROGRAMME OUTCOME MAPPING

Instruction:

1. Copy the completed table 1.

2. Retain only the POs and the Highly supportive (H) points. [Delete the PSO columns and the 'S' points]

3. Write the respective CO-wise total average (column K in table 2) wherever each CO is mapped as (H) under each PO.]

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	H 0.88		H 0.88					
CO2	H 0.8	H 0.8	H 0.8					
CO3	H 0.88	H 0.88		H 0.88				
CO4	H 0.9	H 0.9						
CO5	H 0.9	H 0.9	H 0.9					
AVERAGE OF COS FOR POS	0.872	0.87	0.86	0.88				
AVERAGE OF POS	0.8704	0.87	0.8533	0.88				
AVERAGE	0.868433333							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: DEEP LEARNING

COURSE CODE: MCA23307

CREDITS: 3

DEPARTMENT: M.C.A

PROGRAMME OUTCOMES Or POS(MCA):

PROGRAM OBJECTIVES (POs)

- **PO1: Engineering knowledge**: Apply the knowledge of mathematics, computer science, various programming languages, databases and operating system to develop a software system.
- **PO2: Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems to reach substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO3: Design/development of solutions**: Design solutions for complex engineering problems and System components or processes that meet the specified needs of public health and safety.

- **PO4: Continuous learning**: Recognize the needs and improves the ability to engage in independent and life-long learning as trends changes in technology.

PROGRAMME SPECIFIC OUTCOME:

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO1**: To consolidate foundation of mathematics, computer science and problem solving methodology for effective implementation in the area of software development. To inculcate advance knowledge about various sub-domains of computer science and applications.

- **PSO2**: To prepare graduates to achieve peer-recognition, as an individual and in a team, through demonstration of good analytical, design and implementation skills.

- **PSO3**: To improve the ability to test and analyze the qualities of various subsystems and to integrate them together to evolve a larger and better computing system, that includes the concept of mathematics, computer engineering and related disciplines to meet the user objective .

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Learn deep learning basics and optimization algorithms	(II)UNDERSTAND
CO2	Understand deep learning computation, CNNs and modern CNNs	(II)UNDERSTAND
CO3	Study recurrent neural networks and its modern versions	(II)UNDERSTAND
CO4	Learn computer vision	(III)APPLY
CO5	Comprehend GANs	(IV)ANALYZE

Table 1: CO, PO, PSO MAPPING

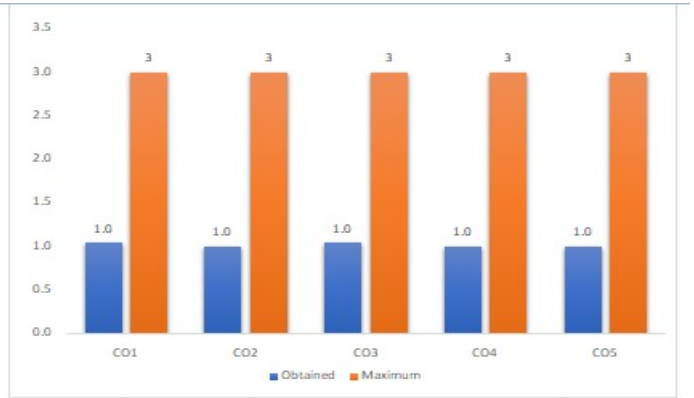
Course outcomes	Programme Outcomes								Program Specific outcomes				
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**P08**	**PSO1**	**PSO2**	**PSO3**		
1	S	H	S	S					H	S	S		
2	H	H	S	S					S	S	S		
3	S	S	S	S					S	S	S		
4	H	H	H	H					H	H	S		
5	S	S	H	S					H	S	S		

H: Highly Supportive **S: Supportive**

Table 2: COURSE OUTCOME ATTAINMENT

ATTAINMENT SCALE:

Pass percent of 85% and above= 3
Pass percent between 75% - 85%= 2
Pass percent between 75%- 65%= 1
Pass percent of less than 65%= 0



co	mid exam 1		mid exam 2		group discussion		assignment		viva		Attendence			External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	co wise internal average	pass%	Attainment level	co wise external average	co wise total average
CO1	89.5	3.0			100.0	3.0	100.0	3.0	93.0	3.0	73.7	1.0	2.6	50.9	0.0	0.0	1.0
CO2	89.5	3.0			100.0	3.0			93.0	3.0	73.7	1.0	2.5	50.9	0.0	0.0	1.0
CO3	89.5	3.0	94.7	3.0	100.0	3.0			93.0	3.0	73.7	1.0	2.6	50.9	0.0	0.0	1.0
CO4			94.7	3.0	100.0	3.0			93.0	3.0	73.7	1.0	2.5	50.9	0.0	0.0	1.0
CO5			94.7	3.0	100.0	3.0			93.0	3.0	73.7	1.0	2.5	50.9	0.0	0.0	1.0

AVERAGE	AVERAGE
0	1.016

RESULT ANALYSIS: (Only write a comment on the total CO attainment for the course and areas of improvement, how less it is from 3, which exam are they losing marks in, how can we attain 3)

The total CO attainment of the course is satisfactory. Performance in the mid semester exam needs to improve to improve overall course outcome attainment level.

Table 3: PROGRAMME OUTCOME MAPPING

Instruction:

1. Copy the completed table 1.

2. Retain only the POs and the Highly supportive (H) points. [Delete the PSO columns and the 'S' points]

3. Write the respective CO-wise total average (column K in table 2) wherever each CO is mapped as (H) under each PO.]

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1		H 1.04						
CO2	H 1	H 1						
CO3								
CO4	H 1	H 1	H 1	H 1				
CO5			H 1					
AVERAGE OF COS FOR POS	1	1.013333333	1	1				
AVERAGE OF POS	1	1.004444	1	1				
AVERAGE	1.001111111							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: SOFTWARE TESTING

COURSE CODE: MCA21401A

CREDITS: 3

DEPARTMENT: M.C.A

PROGRAMME OUTCOMES Or POS(MCA):

PROGRAM OBJECTIVES (POs)

- **PO1: Engineering knowledge**: Apply the knowledge of mathematics, computer science, various programming languages, databases and operating system to develop a software system.
- **PO2: Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems to reach substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO3: Design/development of solutions**: Design solutions for complex engineering problems and System components or processes that meet the specified needs of public health and safety.

- **PO4: Continuous learning**: Recognize the needs and improves the ability to engage in independent and life-long learning as trends changes in technology.

PROGRAMME SPECIFIC OUTCOME:

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO1**: To consolidate foundation of mathematics, computer science and problem solving methodology for effective implementation in the area of software development. To inculcate advance knowledge about various sub-domains of computer science and applications.

- **PSO2**: To prepare graduates to achieve peer-recognition, as an individual and in a team, through demonstration of good analytical, design and implementation skills.

- **PSO3**: To improve the ability to test and analyze the qualities of various subsystems and to integrate them together to evolve a larger and better computing system, that includes the concept of mathematics, computer engineering and related disciplines to meet the user objective .

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Express importance of testing in software development process, glass-box testing, black-box testing, and how to report and analyse bugs	II (UNDERSTAND)
CO2	Design different types of test case	VI (CREATING)
CO3	Organize how to build testing strategy, establishing software testing methodology and software testing techniques	III (APPLY)
CO4	Identify the definition of quality, metrics for software quality and inspection techniques	III (APPLY)
CO5	Identify the definition of quality, metrics for software quality and inspection techniques	III (APPLY)

Table 1: CO, PO, PSO MAPPING

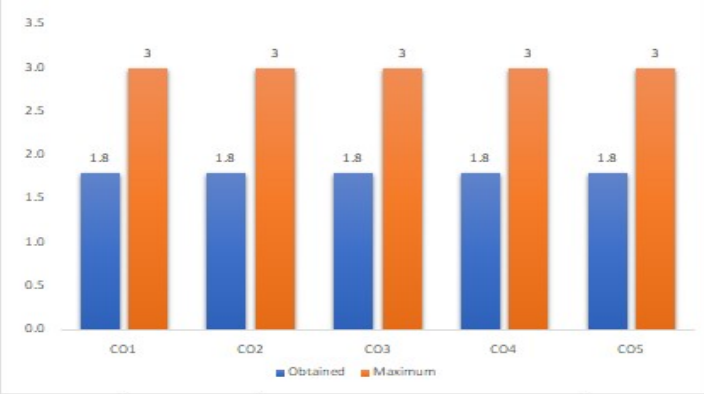
Course outcomes	Programme Outcomes								Program Specific outcomes				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	P08	PSO1	PSO2	PSO3		
1	H	S	S	H					H	S	S		
2	S	S	H	S					S	S	S		
3	H	H	S	S					S	S	H		
4	H	S	S	H					S	H	S		
5	H	S	S	H					S	H	S		

H: Highly Supportive **S: Supportive**

Table 2: COURSE OUTCOME ATTAINMENT

ATTAINMENT SCALE:

Pass percent of 85% and above= 3
Pass percent between 75% - 85%= 2
Pass percent between 75%- 65%= 1
Pass percent of less than 65%= 0



co	mid exam 1		mid exam 2		group discussion		assignment		viva		Attendence			External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	co wise internal average	pass%	Attainment level	co wise external average	co wise total average
CO1	95.0	3.0			100.0	3.0	100.0	3.0	100.0	3.0	95.0	3.0	3.0	70.0	1.0	1.0	1.8
CO2	95.0	3.0			100.0	3.0			100.0	3.0	95.0	3.0	3.0	70.0	1.0	1.0	1.8
CO3	95.0	3.0	100.0	3.0	100.0	3.0			100.0	3.0	95.0	3.0	3.0	70.0	1.0	1.0	1.8
CO4			100.0	3.0	100.0	3.0			100.0	3.0	95.0	3.0	3.0	70.0	1.0	1.0	1.8
CO5			100.0	3.0	100.0	3.0			100.0	3.0	95.0	3.0	3.0	70.0	1.0	1.0	1.8

AVERAGE	AVERAGE
1	1.8

RESULT ANALYSIS: (Only write a comment on the total CO attainment for the course and areas of improvement, how less it is from 3, which exam are they losing marks in, how can we attain 3)

The total CO attainment of the course is satisfactory. Performance in the mid semester exam needs to improve to improve overall course outcome attainment level.

Table 3: PROGRAMME OUTCOME MAPPING

Instruction:

1. Copy the completed table 1.

2. Retain only the POs and the Highly supportive (H) points. [Delete the PSO columns and the 'S' points]

3. Write the respective CO-wise total average (column K in table 2) wherever each CO is mapped as (H) under each PO.]

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	H 1.8			H 1.8				
CO2			H 1.8					
CO3	H 1.8	H 1.8						
CO4	H 1.8			H 1.8				
CO5	H 1.8			H 1.8				
AVERAGE OF COS FOR POS	1.8	1.8	1.8	1.8				
AVERAGE OF POS	1.8	1.8	1.8	1.8				
AVERAGE	1.8							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: CLOUD COMPUTING

COURSE CODE: MCA23401B

CREDITS: 3

DEPARTMENT: M.C.A

PROGRAMME OUTCOMES Or POS(MCA):

PROGRAM OBJECTIVES (POs)

- **PO1: Engineering knowledge**: Apply the knowledge of mathematics, computer science, various programming languages, databases and operating system to develop a software system.
- **PO2: Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems to reach substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO3: Design/development of solutions**: Design solutions for complex engineering problems and System components or processes that meet the specified needs of public health and safety.

- **PO4: Continuous learning**: Recognize the needs and improves the ability to engage in independent and life-long learning as trends changes in technology.

PROGRAMME SPECIFIC OUTCOME:

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO1**: To consolidate foundation of mathematics, computer science and problem solving methodology for effective implementation in the area of software development. To inculcate advance knowledge about various sub-domains of computer science and applications.

- **PSO2**: To prepare graduates to achieve peer-recognition, as an individual and in a team, through demonstration of good analytical, design and implementation skills.

- **PSO3**: To improve the ability to test and analyze the qualities of various subsystems and to integrate them together to evolve a larger and better computing system, that includes the concept of mathematics, computer engineering and related disciplines to meet the user objective .

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Illustrate the main concepts, features, challenges, and risks in cloud computing	II (UNDERSTAND)
CO2	Describe virtualization of clusters and Data centers, virtual clusters, and resource management.	I (REMEMBERING)
CO3	Identify the architectures over virtualized data centers.	III (APPLY)
CO4	Explain the core issues of cloud computing such as cloud security and trust management.	II (UNDERSTAND)
CO5	Compare various cloud programming and software environments.	IV (ANALYZE)

Table 1: CO, PO, PSO MAPPING

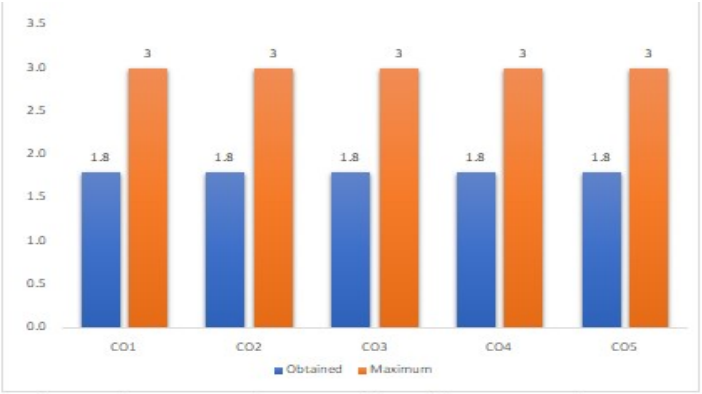
Course outcomes	Programme Outcomes								Program Specific outcomes				
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**P08**	**PSO1**	**PSO2**	**PSO3**		
1	**H**	**H**	**S**	**H**					**S**	**S**	**S**		
2	**H**	**H**	**S**	**H**					**S**	**S**	**S**		
3	**H**	**H**	**S**	**H**					**S**	**S**	**S**		
4	**H**	**H**	**H**	**H**					**S**	**H**	**H**		
5	**H**	**H**	**H**	**H**					**S**	**H**	**H**		

H: Highly Supportive **S: Supportive**

Table 2: COURSE OUTCOME ATTAINMENT

ATTAINMENT SCALE:

Pass percent of 85% and above= 3
Pass percent between 75% - 85%= 2
Pass percent between 75%- 65%= 1
Pass percent of less than 65%= 0



co	mid exam 1		mid exam 2		group discussion		assignment		viva		Attendence			External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	co wise internal average	pass%	Attainment level	co wise external average	co wise total average
CO1	100.0	3.0			100.0	3.0	100.0	3.0	100.0	3.0	88.5	3.0	3.0	73.1	1.0	1.0	1.8
CO2	100.0	3.0			100.0	3.0			100.0	3.0	88.5	3.0	3.0	73.1	1.0	1.0	1.8
CO3	100.0	3.0	100.0	3.0	100.0	3.0			100.0	3.0	88.5	3.0	3.0	73.1	1.0	1.0	1.8
CO4			100.0	3.0	100.0	3.0			100.0	3.0	88.5	3.0	3.0	73.1	1.0	1.0	1.8
CO5			100.0	3.0	100.0	3.0			100.0	3.0	88.5	3.0	3.0	73.1	1.0	1.0	1.8

AVERAGE	AVERAGE
1	1.8

RESULT ANALYSIS: (Only write a comment on the total CO attainment for the course and areas of improvement, how less it is from 3, which exam are they losing marks in, how can we attain 3)

The total CO attainment of the course is satisfactory. Performance in the mid semester exam needs to improve to improve overall course outcome attainment level.

Table 3: PROGRAMME OUTCOME MAPPING

Instruction:

1. Copy the completed table 1.

2. Retain only the POs and the Highly supportive (H) points. [Delete the PSO columns and the 'S' points]

3. Write the respective CO-wise total average (column K in table 2) wherever each CO is mapped as (H) under each PO.]

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	H 1.8	H 1.8		H 1.8				
CO2	H 1.8	H 1.8		H 1.8				
CO3	H 1.8	H 1.8		H 1.8				
CO4	H 1.8	H 1.8	H 1.8	H 1.8				
CO5	H 1.8	H 1.8	H 1.8	H 1.8				
AVERAGE OF COS FOR POS	1.8	1.8	1.8	1.8				
AVERAGE OF POS	1.8	1.8	1.8	1.8				
AVERAGE	1.8							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: CYBER SECURITY

COURSE CODE: MCA21401C

CREDITS: 3

DEPARTMENT: M.C.A

PROGRAMME OUTCOMES Or POS(MCA):

PROGRAM OBJECTIVES (POs)

- **PO1: Engineering knowledge**: Apply the knowledge of mathematics, computer science, various programming languages, databases and operating system to develop a software system.
- **PO2: Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems to reach substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO3: Design/development of solutions**: Design solutions for complex engineering problems and System components or processes that meet the specified needs of public health and safety.

- **PO4: Continuous learning**: Recognize the needs and improves the ability to engage in independent and life-long learning as trends changes in technology.

PROGRAMME SPECIFIC OUTCOME:

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO1**: To consolidate foundation of mathematics, computer science and problem solving methodology for effective implementation in the area of software development. To inculcate advance knowledge about various sub-domains of computer science and applications.

- **PSO2**: To prepare graduates to achieve peer-recognition, as an individual and in a team, through demonstration of good analytical, design and implementation skills.

- **PSO3**: To improve the ability to test and analyze the qualities of various subsystems and to integrate them together to evolve a larger and better computing system, that includes the concept of mathematics, computer engineering and related disciplines to meet the user objective .

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Ability to understand about cybercrimes, cyber offenses and attacks	II (UNDERSTAND)
CO2	Analyze and evaluate the cyber security needs of an organization	IV (ANALYZE)
CO3	Explain cyber laws and its implications	II (UNDERSTAND)
CO4	Understand the concepts of computer forensics	II (UNDERSTAND)
CO5	Understand cyber security concepts and social media marketing	II (UNDERSTAND)

Table 1: CO, PO, PSO MAPPING

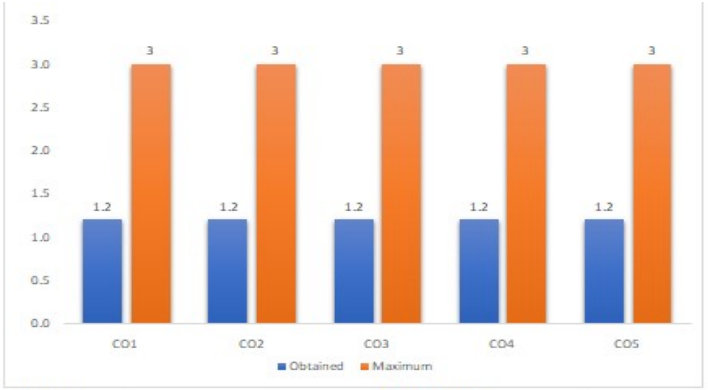
Course outcomes	Programme Outcomes								Program Specific Outcomes				
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**P08**	**PSO1**	**PSO2**	**PSO3**		
1	H	S	H	S					S	S	H		
2	S	H	H	H					H	S	H`		
3	H	S	H	S					S	S	H		
4	H	S	H	S					S	S	H		
5	H	S	H	S					S	S	H		

H: Highly Supportive **S: Supportive**

Table 2: COURSE OUTCOME ATTAINMENT

ATTAINMENT SCALE:

Pass percent of 85% and above= 3
Pass percent between 75% - 85%= 2
Pass percent between 75%- 65%= 1
Pass percent of less than 65%= 0



co	mid exam 1		mid exam 2		group discussion		assignment		viva		Attendence			External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	co wise internal average	pass%	Attainment level	co wise external average	co wise total average
CO1	100.0	3.0			100.0	3.0	100.0	3.0	100.0	3.0	100.0	3.0	3.0	63.6	0.0	0.0	1.2
CO2	100.0	3.0			100.0	3.0			100.0	3.0	100.0	3.0	3.0	63.6	0.0	0.0	1.2
CO3	100.0	3.0	90.9	3.0	100.0	3.0			100.0	3.0	100.0	3.0	3.0	63.6	0.0	0.0	1.2
CO4			90.9	3.0	100.0	3.0			100.0	3.0	100.0	3.0	3.0	63.6	0.0	0.0	1.2
CO5			90.9	3.0	100.0	3.0			100.0	3.0	100.0	3.0	3.0	63.6	0.0	0.0	1.2

AVERAGE	AVERAGE
0	1.2

RESULT ANALYSIS: (Only write a comment on the total CO attainment for the course and areas of improvement, how less it is from 3, which exam are they losing marks in, how can we attain 3)

The total CO attainment of the course is satisfactory. Performance in the mid semester exam needs to improve to improve overall course outcome attainment level.

Table 3: PROGRAMME OUTCOME MAPPING

Instruction:

1. Copy the completed table 1.

2. Retain only the POs and the Highly supportive (H) points. [Delete the PSO columns and the 'S' points]

3. Write the respective CO-wise total average (column K in table 2) wherever each CO is mapped as (H) under each PO.]

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	H 1.2		H 1.2					
CO2		H 1.2	H 1.2	H 1.2				
CO3	H 1.2		H 1.2					
CO4	H 1.2		H 1.2					
CO5	H 1.2		H 1.2					
AVERAGE OF COS FOR POS	1.2	1.2	1.2	1.2				
AVERAGE OF POS	1.2	1.2	1.2	1.2				
AVERAGE	1.2							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: NATURAL LANGUAGE PROCESSING

COURSE CODE: MCA23402A

CREDITS: 3

DEPARTMENT: M.C.A

PROGRAMME OUTCOMES Or POS(MCA):

PROGRAM OBJECTIVES (POs)

- **PO1: Engineering knowledge**: Apply the knowledge of mathematics, computer science, various programming languages, databases and operating system to develop a software system.
- **PO2: Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems to reach substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO3: Design/development of solutions**: Design solutions for complex engineering problems and System components or processes that meet the specified needs of public health and safety.
- **PO4: Continuous learning**: Recognize the needs and improves the ability to engage in independent and life-long learning as trends changes in technology.

PROGRAMME SPECIFIC OUTCOME:

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO1**: To consolidate foundation of mathematics, computer science and problem solving methodology for effective implementation in the area of software development. To inculcate advance knowledge about various sub-domains of computer science and applications.

- **PSO2**: To prepare graduates to achieve peer-recognition, as an individual and in a team, through demonstration of good analytical, design and implementation skills.

- **PSO3**: To improve the ability to test and analyze the qualities of various subsystems and to integrate them together to evolve a larger and better computing system, that includes the concept of mathematics, computer engineering and related disciplines to meet the user objective .

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Understand about Background of NLP, NLP applications and NLTK.	II(UNDERSTANDING)
CO2	Understand various approaches on parsing and syntax.	II(UNDERSTANDING)
CO3	Describe n-gram models, pos tagging, semantic analysis and discourse processing.	II(UNDERSTANDING)
CO4	Analyze various methodologies used in Machine Translation, know about natural language generations with translation systems	IV(ANALYZING)
CO5	Understand about Information Retrieval and Lexical resources	II(UNDERSTANDING)

Table 1: CO, PO, PSO MAPPING

Course outcomes	Programme Outcomes								Program Specific Outcomes				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	P08	PSO1	PSO2	PSO3		
1	S	S	S	S					S	S	S		
2	S	H	S	S					S	S	S		
3	S	S	S	S					S	S	S		
4	H	H	H	S					H	S	H		
5	S	S	S	S					S	S	S		

H: Highly Supportive **S: Supportive**

Table 2: COURSE OUTCOME ATTAINMENT

ATTAINMENT SCALE:

Pass percent of 85% and above= 3
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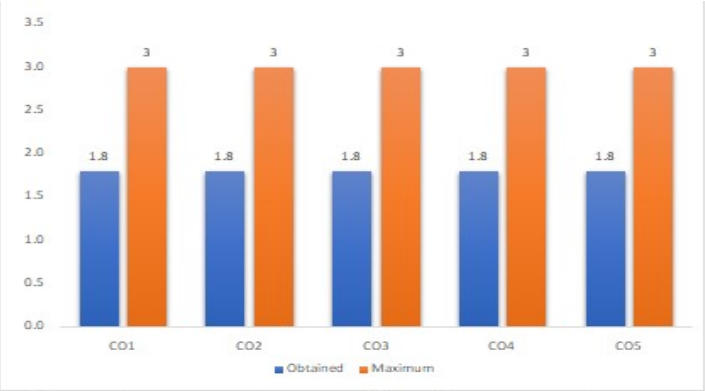

co	mid exam 1		mid exam 2		group discussion		assignment		viva		Attendence			External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	co wise internal average	pass%	Attainment level	co wise external average	co wise total average
CO1	100.0	3.0			100.0	3.0	100.0	3.0	100.0	3.0	93.3	3.0	3.0	73.3	1.0	1.0	1.8
CO2	100.0	3.0			100.0	3.0			100.0	3.0	93.3	3.0	3.0	73.3	1.0	1.0	1.8
CO3	100.0	3.0	100.0	3.0	100.0	3.0			100.0	3.0	93.3	3.0	3.0	73.3	1.0	1.0	1.8
CO4			100.0	3.0	100.0	3.0			100.0	3.0	93.3	3.0	3.0	73.3	1.0	1.0	1.8
CO5			100.0	3.0	100.0	3.0			100.0	3.0	93.3	3.0	3.0	73.3	1.0	1.0	1.8

AVERAGE	AVERAGE
1	1.8

RESULT ANALYSIS: (Only write a comment on the total CO attainment for the course and areas of improvement, how less it is from 3, which exam are they losing marks in, how can we attain 3)

The total CO attainment of the course is satisfactory. Performance in the mid semester exam needs to improve to improve overall course outcome attainment level.

Table 3: PROGRAMME OUTCOME MAPPING

Instruction:

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OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1								
CO2		H 1.8						
CO3								
CO4	H 1.8	H 1.8	H 1.8					
CO5								
AVERAGE OF COS FOR POS	1.8	1.8	1.8					
AVERAGE OF POS	1.8	1.8	1.8					
AVERAGE	1.8							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: BIG DATA ANALYTICS

COURSE CODE: MCA23402B

CREDITS: 3

DEPARTMENT: M.C.A

PROGRAMME OUTCOMES Or POS(MCA):

PROGRAM OBJECTIVES (POs)

- **PO1: Engineering knowledge**: Apply the knowledge of mathematics, computer science, various programming languages, databases and operating system to develop a software system.
- **PO2: Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems to reach substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
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PROGRAMME SPECIFIC OUTCOME:

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO1**: To consolidate foundation of mathematics, computer science and problem solving methodology for effective implementation in the area of software development. To inculcate advance knowledge about various sub-domains of computer science and applications.

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- **PSO3**: To improve the ability to test and analyze the qualities of various subsystems and to integrate them together to evolve a larger and better computing system, that includes the concept of mathematics, computer engineering and related disciplines to meet the user objective .

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	**Understand** Big Data and its analytics in the real world	(II) UNDERSTANDING
CO2	**Understand** the Hadoop Ecosystem and **Design** Algorithms to solve Data-Intensive Problems using the Map Reduce Paradigm	(VI)CREATE
CO3	**Design** algorithms to solve Data Intensive problems using the YARN Map Reduce paradigm.	(VI)CREATE
CO4	**Develop** skills in writing Hive queries and managing data with Hive.	(III)ANALYZING
CO5	Write complex MapReduce transformations using a simple scripting language called Pig Latin and **Explain and compare** different types of NoSQL Databases	(V)EVALUATING

Table 1: CO, PO, PSO MAPPING

Course outcomes	Programme Outcomes								Program Specific outcomes				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	P08	PSO1	PSO2	PSO3		
1	S	S	S	S					H	S	S		
2	S	S	S	H					H	S	S		
3	H	H	H	H					S	H	H		
4	H	H	H	H					S	H	H		
5	H	S	H	H					S	H	H		

H: Highly Supportive **S: Supportive**

Table 2: COURSE OUTCOME ATTAINMENT

ATTAINMENT SCALE:

Pass percent of 85% and above= 3
Pass percent between 75% - 85%= 2
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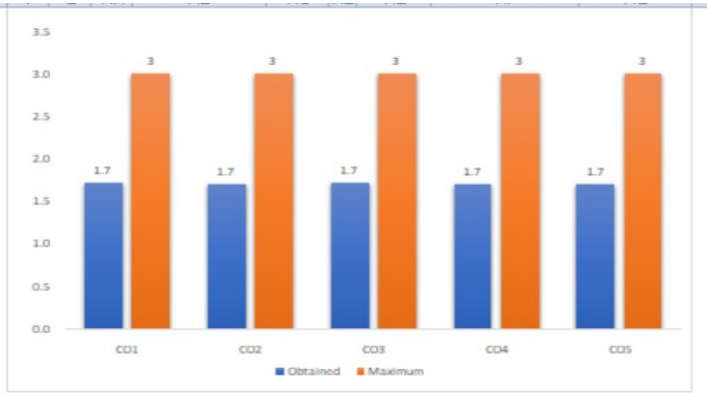

co	mid exam 1		mid exam 2		group discussion		assignment		viva		Attendence			External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	co wise internal average	pass%	Attainment level	co wise external average	co wise total average
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CO2	100.0	3.0			100.0	3.0			95.0	3.0	85.0	2.0	2.8	75.0	1.0	1.0	1.7
CO3	100.0	3.0	95.0	3.0	100.0	3.0			95.0	3.0	85.0	2.0	2.8	75.0	1.0	1.0	1.7
CO4			95.0	3.0	100.0	3.0			95.0	3.0	85.0	2.0	2.8	75.0	1.0	1.0	1.7
CO5			95.0	3.0	100.0	3.0			95.0	3.0	85.0	2.0	2.8	75.0	1.0	1.0	1.7

AVERAGE	AVERAGE
1	1.708

RESULT ANALYSIS: (Only write a comment on the total CO attainment for the course and areas of improvement, how less it is from 3, which exam are they losing marks in, how can we attain 3)

The total CO attainment of the course is satisfactory. Performance in the mid semester exam needs to improve to improve overall course outcome attainment level.

Table 3: PROGRAMME OUTCOME MAPPING

Instruction:

1. Copy the completed table 1.

2. Retain only the POs and the Highly supportive (H) points. [Delete the PSO columns and the 'S' points]

3. Write the respective CO-wise total average (column K in table 2) wherever each CO is mapped as (H) under each PO.]

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1								
CO2				H 1.7				
CO3	H 1.72	H 1.72	H 1.72	H 1.72				
CO4	H 1.7	H 1.7	H 1.7	H 1.7				
CO5	H 1.7		H 1.7	H 1.7				
AVERAGE OF COS FOR POS	1.706666667	1.71	1.706666667	1.705				
AVERAGE OF POS	1.706667	1.71	1.706667	1.705				
AVERAGE	1.707083333							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: SOCIAL MEDIA ANALYTICS

COURSE CODE: MCA23402C

CREDITS: 3

DEPARTMENT: M.C.A

PROGRAMME OUTCOMES Or POS(MCA):

PROGRAM OBJECTIVES (POs)

- **PO1: Engineering knowledge**: Apply the knowledge of mathematics, computer science, various programming languages, databases and operating system to develop a software system.
- **PO2: Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems to reach substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO3: Design/development of solutions**: Design solutions for complex engineering problems and System components or processes that meet the specified needs of public health and safety.

- **PO4: Continuous learning**: Recognize the needs and improves the ability to engage in independent and life-long learning as trends changes in technology.

PROGRAMME SPECIFIC OUTCOME:

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO1**: To consolidate foundation of mathematics, computer science and problem solving methodology for effective implementation in the area of software development. To inculcate advance knowledge about various sub-domains of computer science and applications.

- **PSO2**: To prepare graduates to achieve peer-recognition, as an individual and in a team, through demonstration of good analytical, design and implementation skills.

- **PSO3**: To improve the ability to test and analyze the qualities of various subsystems and to integrate them together to evolve a larger and better computing system, that includes the concept of mathematics, computer engineering and related disciplines to meet the user objective .

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Identify various platforms in social media.	I(REMEMBERING)
CO2	Understand processing of social media.	II(UNDERSTANDING)
CO3	Compare differences between twitter and other social media networks.	IV(ANALYZING)
CO4	Analyze Facebook information and write business cases.	IV(ANALYZING)
CO5	Differentiate social media networks Instagram (i.e., usage of Instagram and data processing techniques also they will get idea)	V(EVALUATING)

Table 1: CO, PO, PSO MAPPING

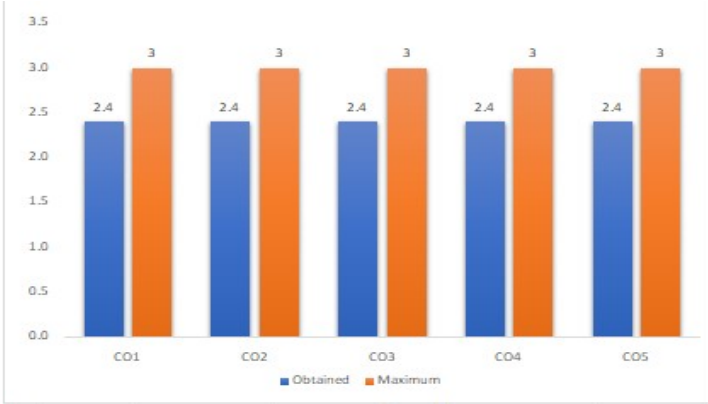
Course outcomes	Programme Outcomes								Program Specific outcomes				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	P08	PSO1	PSO2	PSO3		
1	S	S	S	S					S	S	S		
2	H	S	S	S					H	S	S		
3	S	H	S	S					S	S	S		
4	H	H	S	S					H	S	S		
5	H	S	S	S					H	S	S		

H: Highly Supportive **S: Supportive**

Table 2: COURSE OUTCOME ATTAINMENT

ATTAINMENT SCALE:

Pass percent of 85% and above= 3
Pass percent between 75% - 85%= 2
Pass percent between 75%- 65%= 1
Pass percent of less than 65%= 0



co	mid exam 1		mid exam 2		group discussion		assignment		viva		Attendence			External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	co wise internal average	pass%	Attainment level	co wise external average	co wise total average
CO1	100.0	3.0			100.0	3.0	100.0	3.0	100.0	3.0	90.9	3.0	3.0	77.3	2.0	2.0	2.4
CO2	100.0	3.0			100.0	3.0			100.0	3.0	90.9	3.0	3.0	77.3	2.0	2.0	2.4
CO3	100.0	3.0	95.5	3.0	100.0	3.0			100.0	3.0	90.9	3.0	3.0	77.3	2.0	2.0	2.4
CO4			95.5	3.0	100.0	3.0			100.0	3.0	90.9	3.0	3.0	77.3	2.0	2.0	2.4
CO5			95.5	3.0	100.0	3.0			100.0	3.0	90.9	3.0	3.0	77.3	2.0	2.0	2.4

AVERAGE	AVERAGE
2	2.4

RESULT ANALYSIS: (Only write a comment on the total CO attainment for the course and areas of improvement, how less it is from 3, which exam are they losing marks in, how can we attain 3)

The total CO attainment of the course is satisfactory. Performance in the mid semester exam needs to improve to improve overall course outcome attainment level.

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OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1								
CO2	H 2.4							
CO3		H 2.4						
CO4	H 2.4	H 2.4						
CO5	H 2.4							
AVERAGE OF COS FOR POS	2.4	2.4						
AVERAGE OF POS	2.4	2.4						
AVERAGE	2.4							