COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: GENERAL ENGLISH II

COURSE CODE: EN18201

CREDITS: 3

DEPARTMENT: B. Sc. MATHEMATICS, STATISTICS & COMPUTER SCIENCE

Programme Outcomes – (B. Sc.)

B. Sc.:

- **PO1. Scientific Knowledge**: Apply the knowledge of Science, Mathematics, Engineering& Technology fundamentals to solve the complex problems.

- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3.Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
- **PO6.Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOMES (DEPARTMENTAL):

Students will be able to:

PSO1. Demonstrate in-depth knowledge in the foundational areas of the mathematical sciences and Communicate mathematical ideas using numerical, graphical and symbolic representations.

PSO2. Recognize the importance and value of mathematical and statistical thinking, training, and approach to problem solving, on a diverse variety of disciplines.

PSO3. Use emerging technologies and computing concepts.

PSO4. Apply mathematical, computational and statistical tools to detect patterns and model performance.

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	**CO1:** To identify a sound understanding on the formation of words and to demonstrate the functional grammatical component in the sentence.	III (APPLY)
CO2	**CO2:** To paraphrase ideas and thoughts in a coherent, neat and organized manner in order to utilize the writing skills for sound writing propagandas.	IV(ANALYZE)
CO3	**CO3:** To create an understanding on Indian Literature, alongside to develop and chisel their communication skills	III (APPLY)
CO4	**CO4:** To recognize the moral element which underlies in the short story; an exposure to informal language.	VI(CREATE)
CO5	**CO5:** To develop listening and speaking skills through effective sentence constructions and efficient delivery	IV(ANALYZE)

Table 1: CO, PO, PSO MAPPING

Course	Programme Outcomes	Program Specific outcomes

outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	P08	PSO1	PSO2	PSO3	PSO4	
1	**H**		**H**	**H**			**S**	**H**		**H**		**H**	
2	**S**		**S**	**H**			**S**	**S**		**H**		**H**	
3	**H**		**H**	**H**	**S**		**H**	**S**		**H**		**H**	
4	**S**		**S**	**H**	**H**		**S**	**H**		**H**		**H**	
5	**H**		**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

	INTERNAL ASSESSMENT (40%)											EXTERNAL ASSESSMENT (60%)			
co	WEEKLY		MIDSEMESTER		PRE-FINAL		ASSIGNMENT		VIVA			EXTERNAL EXAMS			
	PASS %	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0 (A)	PASS%	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0 (B)	PASS%	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0 (C)	PASS %	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0	PASS%	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0 (E)	Co-Wise Internal Average (Avg of A,B,C,D,E) (F)	PASS %	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0	Co-Wise External Average	CO-WISE TOTAL AVERAGE (F)X 0.4+ (G) X 0.6

								(D)						**(G)**	**(K)**
C01	100	3	89.39	3	95	3	100	3	100	3	2.6	100	3	3	2.84
CO2	------	------	90.4	3	86.32	3	---		100	3	2.33	100	3	3	2.935
CO3	------	-----	86.25	3	87.3137	3	----		100	3	2.33	100	3	3	2.935
CO4	------	------	------	------	89.3137	3	----		100	3	2.5	100	3	3	2.8
CO5	------	------	------	------	87.3137	3	-----		100	3	2.5	100	3	3	2.8
TOTAL INTERNAL AVERAGE [Avg of all (F)]:														**Total External**	**Total CO attainment**

3.00		**Average (Avg of G):** **3**	**For Entire Course (Avg of K)** **3.00**

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.]

Course outcomes	Programme Outcomes							
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**P08**
1	**H (2.84)**		**H (2.84)**	**H (2.84)**				
2	**H (2.935)**		**H (2.935)**	**H (2.935)**				
3	**H (2.935)**		**H (2.935)**	**H (2.935)**			**H (2.935)**	
4	**H (2.8)**		**H (2.8)**	**H (2.8)**				
5	**H (2.8)**		**H (2.8)**	**H (2.8)**				
Column (a)	**Average of Cos for PO1** **2.7808**	**Average of Cos for PO2**	**Average of Cos for PO3** **2.7808**	**Average of Cos for PO4** **2.7808**	**Average of Cos for PO5**	**Average of Cos for PO6**	**Average of Cos for PO7** **2.935**	**Average of Cos for PO8**
Column (b)	**Average of PO1: [(Column a / 3) X** **Total CO attainment**	**Average of PO2: [(Column a)/ 3 X**	**Average of PO3: [(Column a)/ 3 X**	**Average of PO4: [(Column a)/ 3 X**	**Average of PO5: [(Column a)/ 3 X**	**Average of PO6: [(Column a)/ 3 X**	**Average of PO7: [(Column a)/ 3 X**	**Average of PO8: [(Column a)/ 3 X**

	For Entire Course **value in table 2** **2.5776**	**Total CO attainment For Entire Course** **value in table 2**	**Total CO attainment For Entire Course** **value in table 2** **2.5776**	**Total CO attainment For Entire Course** **value in table 2** **2.5776**	**Total CO attainment For Entire Course** **value in table 2**	**Total CO attainment For Entire Course** **value in table 2**	**Total CO attainment For Entire Course** **value in table 2** **2.5324**	**Total CO attainment For Entire Course** **value in table 2**
TOTAL PO ATTAINMENT:	**(Average of all values in Column (b):** **3.00**							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: INDIAN HERITAGE AND CULTURE (IHC)

COURSE CODE: IC19001

CREDITS: 2

DEPARTMENT: B. Sc. MATHEMATICS, STATISTICS & COMPUTER SCIENCE

Programme Outcomes – (B. Sc.)

B. Sc.:

- **PO1. Scientific Knowledge**: Apply the knowledge of Science, Mathematics, Engineering& Technology fundamentals to solve the complex problems.

- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3.Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
- **PO6.Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOMES (DEPARTMENTAL):

Students will be able to:

PSO1. Demonstrate in-depth knowledge in the foundational areas of the mathematical sciences and Communicate mathematical ideas using numerical, graphical and symbolic representations.

PSO2. Recognize the importance and value of mathematical and statistical thinking, training, and approach to problem solving, on a diverse variety of disciplines.

PSO3. Use emerging technologies and computing concepts.

PSO4. Apply mathematical, computational and statistical tools to detect patterns and model performance.

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	**CO1:** The student can understand better about the origin of ancient Indian culture and the contributions of great rulers from both north and south India for Indian culture in ancient days	III (APPLY)
CO2	**CO2:** Students will analyse how Persian culture entered India and how it influenced the Fine Arts of Indian society like Classical Music, Dance and Architecture.	IV(ANALYZE)
CO3	**CO3:** Student can be able to assess how the Indian orthodox society turn into modern and western society in the 19th century. It also edifies the students with spiritual doctrines of various Religions.	III (APPLY)
CO4	**CO4:** Students will evaluate various challenges face by the youth and the evil effects of terrorism on society .	VI(CREATE)
CO5	**CO5:** The topics in the unit create belongingness among the students by bringing awareness of the rights and duties to make the world a better place and it throw light on gender sensitization issues of women, Children and LGBT.	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	PSO4	
1	H		H	S			S	S		S		H	
2	H		H	H			S	S		H		H	
3	H		H	H	H		H	S		H		H	
4	S		H	H	S		S	S		H		S	
5	H		H	H	S		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

	INTERNAL ASSESSMENT (40%)											EXTERNAL ASSESSMENT (60%)			
co	WEEKLY		MIDSEMESTER		PRE-FINAL		ASSIGNMENT		VIVA			EXTERNAL EXAMS			
	PASS %	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0	PASS%	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0	PASS%	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0	PASS % (choose the unit/CO from which assignment was given)	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0	PASS%	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0	Co-Wise Internal Average (Avg of A,B,C,D,E)	PASS %	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0	Co-Wise External Average	CO-WISE TOTAL AVERAGE (F)X 0.4+ (G) X 0.6

		(A)		(B)		(C)		(D)		(E)	(F)			(G)	(K)
C01	94.52	3	86.62	3	85.3137	3	100	3	100	3	2.6	100	3	3	2.84
CO2	------	------	89.62	3	93.37	3	---		100	3	2.33	100	3	3	2.935
CO3	------	-----	90.62	3	89.62	3	----		100	3	2.33	100	3	3	2.935
CO4	------	------	------	------	94.3137	3	----		100	3	2.5	100	3	3	2.8
CO5	------	------	------	------	85.36	3	-----		100	3	2.5	100	3	3	2.8
TOTAL INTERNAL AVERAGE [Avg of all (F)]:														**Total External**	**Total CO attainment**

3		**Average (Avg of G):** **3**	**For Entire Course (Avg of K)** **2.7808**

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.]

Course outcomes	Programme Outcomes							
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**P08**
1	**H (2.84)**		**H (2.84)**	**H (2.84)**				
2	**H (2.935)**		**H (2.935)**	**H (2.935)**				
3	**H (2.935)**		**H (2.935)**	**H (2.935)**			**H (2.935)**	
4	**H (2.8)**		**H (2.8)**	**H (2.8)**				
5	**H (2.8)**		**H (2.8)**	**H (2.8)**				
Column (a)	**Average of Cos for PO1** **2.7808**	**Average of Cos for PO2**	**Average of Cos for PO3** **2.7808**	**Average of Cos for PO4** **2.7808**	**Average of Cos for PO5**	**Average of Cos for PO6**	**Average of Cos for PO7** **2.935**	**Average of Cos for PO8**
Column (b)	**Average of PO1: [(Column a / 3) X** **Total CO attainment**	**Average of PO2: [(Column a)/ 3 X**	**Average of PO3: [(Column a)/ 3 X**	**Average of PO4: [(Column a)/ 3 X**	**Average of PO5: [(Column a)/ 3 X**	**Average of PO6: [(Column a)/ 3 X**	**Average of PO7: [(Column a)/ 3 X**	**Average of PO8: [(Column a)/ 3 X**

	For Entire Course **value in table 2** **2.66**	**Total CO attainment For Entire Course** **value in table 2**	**Total CO attainment For Entire Course** **value in table 2** **2.776**	**Total CO attainment For Entire Course** **value in table 2** **2.776**	**Total CO attainment For Entire Course** **value in table 2**	**Total CO attainment For Entire Course** **value in table 2**	**Total CO attainment For Entire Course** **value in table 2** **2.623**	**Total CO attainment For Entire Course** **value in table 2**
TOTAL PO ATTAINMENT:	**(Average of all values in Column (b):** **3.00**							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: COMPUTER ARCHITECTURE

COURSE CODE: MS19201

CREDITS: 4

DEPARTMENT: B. Sc. MATHEMATICS, STATISTICS & COMPUTER SCIENCE

Programme Outcomes – (B. Sc.)

B. Sc.:

- **PO1. Scientific Knowledge**: Apply the knowledge of Science, Mathematics, Engineering& Technology fundamentals to solve the complex problems.

- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
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- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
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PROGRAMME SPECIFIC OUTCOMES (DEPARTMENTAL):

Students will be able to:

PSO1. Demonstrate in-depth knowledge in the foundational areas of the mathematical sciences and Communicate mathematical ideas using numerical, graphical and symbolic representations.

PSO2. Recognize the importance and value of mathematical and statistical thinking, training, and approach to problem solving, on a diverse variety of disciplines.

PSO3. Use emerging technologies and computing concepts.

PSO4. Apply mathematical, computational and statistical tools to detect patterns and model performance.

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	**CO1:** Demonstrate knowledge of register organization of a basic computer system	III (APPLY)
CO2	**CO2:** Understand the machine language of a basic computer system.	IV(ANALYZE)
CO3	**CO3:** Incorporate In-depth understanding of control unit organization and micro programmed control.	III (APPLY)
CO4	**CO4:** Apply various algorithms to perform arithmetic operations and propose suitable hardware for them.	VI(CREATE)
CO5	**CO5:** Analyse 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**	**PSO4**	

1	**H**		**H**	**H**			**H**	**H**		**H**		**H**	
2	**S**		**S**	**H**			**S**	**S**		**H**		**H**	
3	**H**		**H**	**H**	**S**		**H**	**S**		**H**		**H**	
4	**H**		**H**	**H**	**H**		**H**	**H**		**H**		**H**	
5	**H**		**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

	INTERNAL ASSESSMENT (40%)	EXTERNAL ASSESSMENT (60%)

co	WEEKLY		MIDSEMESTER		PRE-FINAL		ASSIGNMENT		VIVA			EXTERNAL EXAMS			
	PASS %	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(A)**	**PASS%**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(B)**	**PASS%**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(C)**	**PASS %** (choose the unit/CO from which assignment was given)	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0**	**PASS%**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(E)**	**Co-Wise Internal Average** **(Avg of A,B,C,D,E)** **(F)**	**PASS %**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0**	**Co-Wise External Average** **(G)**	**CO-WISE TOTAL AVERAGE** **(F)X 0.4+ (G) X 0.6**

								(D)							**(K)**
C01	100	3	84.32	2	75.32	2	100	3	100	3	2.6	98.08	3	3	2.84
CO2	------	------	82.32	2	86.32	3	---		100	3	2.33	98.08	3	3	2.935
CO3	------	-----	79.25	2	77.3137	2	----		100	3	2.33	98.08	3	3	2.935
CO4	------	------	------	------	83.3137	2	----		100	3	2.5	98.08	3	3	2.8
CO5	------	------	------	------	81.3137	2	-----		100	3	2.5	98.08	3	3	2.8
TOTAL INTERNAL AVERAGE [Avg of all (F)]:														**Total External**	**Total CO attainment**

3.00		**Average (Avg of G):** **3**	**For Entire Course (Avg of K)** **3.00**

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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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.]

Course outcomes	Programme Outcomes							
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**P08**
1	**H (2.84)**		**H (2.84)**	**H (2.84)**				
2	**H (2.935)**		**H (2.935)**	**H (2.935)**				
3	**H (2.935)**		**H (2.935)**	**H (2.935)**			**H (2.935)**	
4	**H (2.8)**		**H (2.8)**	**H (2.8)**				
5	**H (2.8)**		**H (2.8)**	**H (2.8)**				
Column (a)	**Average of Cos for PO1** **2.7808**	**Average of Cos for PO2**	**Average of Cos for PO3** **2.7808**	**Average of Cos for PO4** **2.7808**	**Average of Cos for PO5**	**Average of Cos for PO6**	**Average of Cos for PO7** **2.935**	**Average of Cos for PO8**
Column (b)	**Average of PO1: [(Column a / 3) X** **Total CO attainment**	**Average of PO2: [(Column a)/ 3 X**	**Average of PO3: [(Column a)/ 3 X**	**Average of PO4: [(Column a)/ 3 X**	**Average of PO5: [(Column a)/ 3 X**	**Average of PO6: [(Column a)/ 3 X**	**Average of PO7: [(Column a)/ 3 X**	**Average of PO8: [(Column a)/ 3 X**

	For Entire Course **value in table 2** **2.5776**	**Total CO attainment For Entire Course** **value in table 2**	**Total CO attainment For Entire Course** **value in table 2** **2.5776**	**Total CO attainment For Entire Course** **value in table 2** **2.5776**	**Total CO attainment For Entire Course** **value in table 2**	**Total CO attainment For Entire Course** **value in table 2**	**Total CO attainment For Entire Course** **value in table 2** **2.5324**	**Total CO attainment For Entire Course** **value in table 2**
TOTAL PO ATTAINMENT:	**(Average of all values in Column (b):** **3.00**							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: SOLID GEOMETRY

COURSE CODE: MS18202

CREDITS: 4

DEPARTMENT: B. Sc. MATHEMATICS, STATISTICS & COMPUTER SCIENCE

Programme Outcomes – (B. Sc.)

B. Sc.:

- **PO1. Scientific Knowledge**: Apply the knowledge of Science, Mathematics, Engineering& Technology fundamentals to solve the complex problems.

- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
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PROGRAMME SPECIFIC OUTCOMES (DEPARTMENTAL):

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PSO1. Demonstrate in-depth knowledge in the foundational areas of the mathematical sciences and Communicate mathematical ideas using numerical, graphical and symbolic representations.

PSO2. Recognize the importance and value of mathematical and statistical thinking, training, and approach to problem solving, on a diverse variety of disciplines.

PSO3. Use emerging technologies and computing concepts.

PSO4. Apply mathematical, computational and statistical tools to detect patterns and model performance.

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	**CO1: Use** key standards and conventions to communicate graphic ideas and information	III (APPLY)
CO2	**CO2: Demonstrate** knowledge and understanding of plane and solid geometry	IV(ANALYZE)
CO3	**CO3: Develop** factual knowledge including the mathematical notation and terminology in geometr points, lines, and angles; planar figures.	III (APPLY)
CO4	**CO4: Evaluate** the surface area of sphere - great circle and volume of sphere, cone.	VI(CREATE)
CO5	**CO5: Explain** the properties of a cylinder. Measure and determine the surface area and Volume of a cylinder.	IV(ANALYZE)

Table 1: CO, PO, PSO MAPPING

Course	Programme Outcomes	Program Specific outcomes

outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	P08	PSO1	PSO2	PSO3	PSO4	
1	**H**		**H**	**S**			**S**	**S**		**S**		**H**	
2	**H**		**H**	**H**			**H**	**S**		**H**		**H**	
3	**H**		**H**	**H**	**H**		**H**	**S**		**H**		**H**	
4	**H**		**H**	**H**	**S**		**H**	**S**		**H**		**S**	
5	**H**		**H**	**H**	**S**		**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

	INTERNAL ASSESSMENT (40%)											EXTERNAL ASSESSMENT (60%)			
co	WEEKLY		MIDSEMESTER		PRE-FINAL		ASSIGNMENT		VIVA			EXTERNAL EXAMS			
	PASS %	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0 (A)	PASS%	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0 (B)	PASS%	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0 (C)	PASS %	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0	PASS%	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0 (E)	Co-Wise Internal Average (Avg of A,B,C,D,E) (F)	PASS %	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0	Co-Wise External Average	CO-WISE TOTAL AVERAGE (F)X 0.4+ (G) X 0.6

								(D)						**(G)**	**(K)**
C01	98.23	3	83.62	2	84.31	2	100	3	100	3	2.6	94.23	3	3	2.84
CO2	------	------	89.62	3	83.37	2	---		100	3	2.33	94.23	3	3	2.935
CO3	------	-----	89.62	3	89.62	3	----		100	3	2.33	94.23	3	3	2.935
CO4	------	------	------	------	84.73	2	----		100	3	2.5	94.23	3	3	2.8
CO5	------	------	------	------	85.36	3	-----		100	3	2.5	94.23	3	3	2.8
TOTAL INTERNAL AVERAGE [Avg of all (F)]:														**Total External**	**Total CO attainment**

3		**Average (Avg of G):** **3**	**For Entire Course (Avg of K)** **2.7808**

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.]

Course outcomes	Programme Outcomes							
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**P08**
1	**H (2.84)**		**H (2.84)**	**H (2.84)**				
2	**H (2.935)**		**H (2.935)**	**H (2.935)**				
3	**H (2.935)**		**H (2.935)**	**H (2.935)**			**H (2.935)**	
4	**H (2.8)**		**H (2.8)**	**H (2.8)**				
5	**H (2.8)**		**H (2.8)**	**H (2.8)**				
Column (a)	**Average of Cos for PO1** **2.7808**	**Average of Cos for PO2**	**Average of Cos for PO3** **2.7808**	**Average of Cos for PO4** **2.7808**	**Average of Cos for PO5**	**Average of Cos for PO6**	**Average of Cos for PO7** **2.935**	**Average of Cos for PO8**
Column (b)	**Average of PO1: [(Column a / 3) X** **Total CO attainment**	**Average of PO2: [(Column a)/ 3 X**	**Average of PO3: [(Column a)/ 3 X**	**Average of PO4: [(Column a)/ 3 X**	**Average of PO5: [(Column a)/ 3 X**	**Average of PO6: [(Column a)/ 3 X**	**Average of PO7: [(Column a)/ 3 X**	**Average of PO8: [(Column a)/ 3 X**

	For Entire Course **value in table 2** **2.66**	**Total CO attainment For Entire Course** **value in table 2**	**Total CO attainment For Entire Course** **value in table 2** **2.776**	**Total CO attainment For Entire Course** **value in table 2** **2.776**	**Total CO attainment For Entire Course** **value in table 2**	**Total CO attainment For Entire Course** **value in table 2**	**Total CO attainment For Entire Course** **value in table 2** **2.623**	**Total CO attainment For Entire Course** **value in table 2**
TOTAL PO ATTAINMENT:	**(Average of all values in Column (b):** **3.00**							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: PROBABILITY DISTRIBUTIONS

COURSE CODE: BS19033

CREDITS: 4

DEPARTMENT: B. Sc. MATHEMATICS, STATISTICS & COMPUTER SCIENCE

Programme Outcomes – (B. Sc.)

B. Sc.:

- **PO1. Scientific Knowledge**: Apply the knowledge of Science, Mathematics, Engineering& Technology fundamentals to solve the complex problems.

- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3.Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
- **PO6.Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOMES (DEPARTMENTAL):

Students will be able to:

PSO1. Demonstrate in-depth knowledge in the foundational areas of the mathematical sciences and Communicate mathematical ideas using numerical, graphical and symbolic representations.

PSO2. Recognize the importance and value of mathematical and statistical thinking, training, and approach to problem solving, on a diverse variety of disciplines.

PSO3. Use emerging technologies and computing concepts.

PSO4. Apply mathematical, computational and statistical tools to detect patterns and model performance.

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	**CO1: Use** discrete and continuous probability distributions, including requirements, mean and variance, and making decision	III (APPLY)
CO2	**CO2: Identify** the characteristics of different discrete distributions.	IV(ANALYZE)
CO3	**CO3: Apply** the normal probability distribution including standard normal curve calculations of appropriate areas.	III (APPLY)
CO4	**CO4:** Choose exponential, beta and Gamma distributions to solve statistical problems.	VI(CREATE)
CO5	**CO5: Develop** different distributions to solve various statistical problems.	IV(ANALYZE)

Table 1: CO, PO, PSO MAPPING

Course	Programme Outcomes	Program Specific outcomes

outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	P08	PSO1	PSO2	PSO3	PSO4	
1	**H**		**S**	**H**			**H**	**H**		**H**		**H**	
2	**H**		**H**	**H**			**H**	**H**		**H**		**H**	
3	**H**		**S**	**H**	**S**		**H**	**S**		**H**		**H**	
4	**H**		**H**	**H**	**H**		**H**	**H**		**H**		**H**	
5	**H**		**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

	INTERNAL ASSESSMENT (40%)											EXTERNAL ASSESSMENT (60%)			
co	WEEKLY		MIDSEMESTER		PRE-FINAL		ASSIGNMENT		VIVA			EXTERNAL EXAMS			
	PASS %	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0 (A)	PASS%	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0 (B)	PASS%	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0 (C)	PASS %	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0	PASS%	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0 (E)	Co-Wise Internal Average (Avg of A,B,C,D,E) (F)	PASS %	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0	Co-Wise External Average	CO-WISE TOTAL AVERAGE (F)X 0.4+ (G) X 0.6

								(D)						**(G)**	**(K)**
C01	100	3	84.32	2	85.32	3	100	3	100	3	2.6	98.08	3	3	2.84
CO2	------	------	82.32	2	86.32	3	---		100	3	2.33	98.08	3	3	2.935
CO3	------	-----	79.25	2	79	2	----		100	3	2.33	98.08	3	3	2.935
CO4	------	------	------	------	81.3137	2	----		100	3	2.5	98.08	3	3	2.8
CO5	------	------	------	------	82.137	2	-----		100	3	2.5	98.08	3	3	2.8
TOTAL INTERNAL AVERAGE [Avg of all (F)]:														**Total External**	**Total CO attainment**

3.00		**Average (Avg of G):** **3**	**For Entire Course (Avg of K)** **3.00**

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.]

Course outcomes	Programme Outcomes							
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**P08**
1	**H (2.84)**		**H (2.84)**	**H (2.84)**				
2	**H (2.935)**		**H (2.935)**	**H (2.935)**				
3	**H (2.935)**		**H (2.935)**	**H (2.935)**			**H (2.935)**	
4	**H (2.8)**		**H (2.8)**	**H (2.8)**				
5	**H (2.8)**		**H (2.8)**	**H (2.8)**				
Column (a)	**Average of Cos for PO1** **2.7808**	**Average of Cos for PO2**	**Average of Cos for PO3** **2.7808**	**Average of Cos for PO4** **2.7808**	**Average of Cos for PO5**	**Average of Cos for PO6**	**Average of Cos for PO7** **2.935**	**Average of Cos for PO8**
Column (b)	**Average of PO1: [(Column a / 3) X** **Total CO attainment**	**Average of PO2: [(Column a)/ 3 X**	**Average of PO3: [(Column a)/ 3 X**	**Average of PO4: [(Column a)/ 3 X**	**Average of PO5: [(Column a)/ 3 X**	**Average of PO6: [(Column a)/ 3 X**	**Average of PO7: [(Column a)/ 3 X**	**Average of PO8: [(Column a)/ 3 X**

	For Entire Course **value in table 2** **2.5776**	**Total CO attainment For Entire Course** **value in table 2**	**Total CO attainment For Entire Course** **value in table 2** **2.5776**	**Total CO attainment For Entire Course** **value in table 2** **2.5776**	**Total CO attainment For Entire Course** **value in table 2**	**Total CO attainment For Entire Course** **value in table 2**	**Total CO attainment For Entire Course** **value in table 2** **2.5324**	**Total CO attainment For Entire Course** **value in table 2**
TOTAL PO ATTAINMENT:	**(Average of all values in Column (b):** **3.00**							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: C++ WITH DATA STRUCTURES

COURSE CODE: BS19202

CREDITS: 4

DEPARTMENT: B. Sc. MATHEMATICS, STATISTICS & COMPUTER SCIENCE

Programme Outcomes – (B. Sc.)

B. Sc.:

- **PO1. Scientific Knowledge**: Apply the knowledge of Science, Mathematics, Engineering& Technology fundamentals to solve the complex problems.

- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3.Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
- **PO6.Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOMES (DEPARTMENTAL):

Students will be able to:

PSO1. Demonstrate in-depth knowledge in the foundational areas of the mathematical sciences and Communicate mathematical ideas using numerical, graphical and symbolic representations.

PSO2. Recognize the importance and value of mathematical and statistical thinking, training, and approach to problem solving, on a diverse variety of disciplines.

PSO3. Use emerging technologies and computing concepts.

PSO4. Apply mathematical, computational and statistical tools to detect patterns and model performance.

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	**CO1: Differentiate** between object-oriented programming and procedure-oriented programming.	III (APPLY)
CO2	**CO2: Develop** programs using object oriented programming features.	IV(ANALYZE)
CO3	**CO3: Implement** searching, sorting and various linear data structures and determine the time complexity.	III (APPLY)
CO4	**CO4: Understand** the non-linear data structures like trees, graphs	VI(CREATE)
CO5	**CO5: Choose** appropriate data structures to represent data items in real world 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	PSO4	

1	**H**		**S**	**H**			**S**	**H**		**H**		**H**	
2	**H**		**H**	**H**			**H**	**H**		**H**		**H**	
3	**H**		**S**	**H**	**S**		**H**	**H**		**H**		**H**	
4	**H**		**H**	**H**	**H**		**S**	**H**		**H**		**H**	
5	**H**		**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

	INTERNAL ASSESSMENT (40%)	**EXTERNAL ASSESSMENT (60%)**

co	WEEKLY		MIDSEMESTER		PRE-FINAL		ASSIGNMENT		VIVA			EXTERNAL EXAMS			
	PASS %	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(A)**	**PASS%**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(B)**	**PASS%**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(C)**	**PASS %** (choose the unit/CO from which assignment was given)	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0**	**PASS%**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(E)**	**Co-Wise Internal Average** **(Avg of A,B,C,D,E)** **(F)**	**PASS %**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0**	**Co-Wise External Average** **(G)**	**CO-WISE TOTAL AVERAGE** **(F)X 0.4+ (G) X 0.6**

								(D)							**(K)**
C01	98.36	3	84.36	2	85.32	3	100	3	100	3	2.6	99.08	3	3	2.84
CO2	------	------	84.46	2	86.32	3	---		100	3	2.33	99.08	3	3	2.935
CO3	------	-----	85.25	3	79.66	2	----		100	3	2.33	99.08	3	3	2.935
CO4	------	------	------	------	83.73	2	----		100	3	2.5	98.08	3	3	2.8
CO5	------	------	------	------	81.37	2	-----		100	3	2.5	99.08	3	3	2.8
TOTAL INTERNAL AVERAGE [Avg of all (F)]:														**Total External**	**Total CO attainment**

3.00		**Average (Avg of G):** **3**	**For Entire Course (Avg of K)** **3.00**

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.]

Course outcomes	Programme Outcomes							
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**P08**
1	**H (2.84)**		**H (2.84)**	**H (2.84)**				
2	**H (2.935)**		**H (2.935)**	**H (2.935)**				
3	**H (2.935)**		**H (2.935)**	**H (2.935)**			**H (2.935)**	
4	**H (2.8)**		**H (2.8)**	**H (2.8)**				
5	**H (2.8)**		**H (2.8)**	**H (2.8)**				
Column (a)	**Average of Cos for PO1** **2.7808**	**Average of Cos for PO2**	**Average of Cos for PO3** **2.7808**	**Average of Cos for PO4** **2.7808**	**Average of Cos for PO5**	**Average of Cos for PO6**	**Average of Cos for PO7** **2.935**	**Average of Cos for PO8**
Column (b)	**Average of PO1: [(Column a / 3) X** **Total CO attainment**	**Average of PO2: [(Column a)/ 3 X**	**Average of PO3: [(Column a)/ 3 X**	**Average of PO4: [(Column a)/ 3 X**	**Average of PO5: [(Column a)/ 3 X**	**Average of PO6: [(Column a)/ 3 X**	**Average of PO7: [(Column a)/ 3 X**	**Average of PO8: [(Column a)/ 3 X**

	For Entire Course **value in table 2** **2.5776**	**Total CO attainment For Entire Course** **value in table 2**	**Total CO attainment For Entire Course** **value in table 2** **2.5776**	**Total CO attainment For Entire Course** **value in table 2** **2.5776**	**Total CO attainment For Entire Course** **value in table 2**	**Total CO attainment For Entire Course** **value in table 2**	**Total CO attainment For Entire Course** **value in table 2** **2.5324**	**Total CO attainment For Entire Course** **value in table 2**
TOTAL PO ATTAINMENT:	**(Average of all values in Column (b):** **3.00**							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: SYSTEMS ANALYSIS AND DESIGN (SAD)

COURSE CODE: MS18401

CREDITS: 4

DEPARTMENT: B. Sc. MATHEMATICS, STATISTICS & COMPUTER SCIENCE

Programme Outcomes – (B. Sc.)

B. Sc.:

- **PO1. Scientific Knowledge**: Apply the knowledge of Science, Mathematics, Engineering& Technology fundamentals to solve the complex problems.

- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3.Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
- **PO6.Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOMES (DEPARTMENTAL):

Students will be able to:

PSO1. Demonstrate in-depth knowledge in the foundational areas of the mathematical sciences and Communicate mathematical ideas using numerical, graphical and symbolic representations.

PSO2. Recognize the importance and value of mathematical and statistical thinking, training, and approach to problem solving, on a diverse variety of disciplines.

PSO3. Use emerging technologies and computing concepts.

PSO4. Apply mathematical, computational and statistical tools to detect patterns and model performance.

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	**CO1: Understand** the system development environment	III (APPLY)
CO2	**CO2: Apply** the structuring system requirements	IV(ANALYZE)
CO3	**CO3: Explain** design objectives and transform analysis	III (APPLY)
CO4	**CO4: Identify** Object oriented system design and development	VI(CREATE)
CO5	**CO5: Construct** UML diagrams	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**	**PSO4**	

1	**H**		**H**	**S**			**S**	**S**		**S**		**H**	
2	**H**		**H**	**H**			**H**	**S**		**H**		**H**	
3	**H**		**H**	**H**	**H**		**H**	**S**		**H**		**H**	
4	**H**		**H**	**H**	**S**		**H**	**S**		**H**		**S**	
5	**H**		**H**	**H**	**S**		**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

	INTERNAL ASSESSMENT (40%)	**EXTERNAL ASSESSMENT (60%)**

co	WEEKLY		MIDSEMESTER		PRE-FINAL		ASSIGNMENT		VIVA			EXTERNAL EXAMS			
	PASS %	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(A)**	**PASS%**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(B)**	**PASS%**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(C)**	**PASS %** (choose the unit/CO from which assignment was given)	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0**	**PASS%**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(E)**	**Co-Wise Internal Average** **(Avg of A,B,C,D,E)** **(F)**	**PASS %**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0**	**Co-Wise External Average** **(G)**	**CO-WISE TOTAL AVERAGE** **(F)X 0.4+ (G) X 0.6**

								(D)							**(K)**
C01	98.23	3	83.62	2	84.31	2	100	3	100	3	2.6	95.83	3	3	2.84
CO2	------	------	89.62	3	83.37	2	---		100	3	2.33	95.89	3	3	2.935
CO3	------	-----	89.62	3	89.62	3	----		100	3	2.33	96.10	3	3	2.935
CO4	------	------	------	------	84.73	2	----		100	3	2.5	96.83	3	3	2.8
CO5	------	------	------	------	85.36	3	-----		100	3	2.5	95.83	3	3	2.8
TOTAL INTERNAL AVERAGE [Avg of all (F)]:														**Total External**	**Total CO attainment**

3		**Average (Avg of G):** **3**	**For Entire Course (Avg of K)** **2.7808**

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.]

Course outcomes	Programme Outcomes							
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**P08**
1	**H (2.84)**		**H (2.84)**	**H (2.84)**				
2	**H (2.935)**		**H (2.935)**	**H (2.935)**				
3	**H (2.935)**		**H (2.935)**	**H (2.935)**			**H (2.935)**	
4	**H (2.8)**		**H (2.8)**	**H (2.8)**				
5	**H (2.8)**		**H (2.8)**	**H (2.8)**				
Column (a)	**Average of Cos for PO1** **2.7808**	**Average of Cos for PO2**	**Average of Cos for PO3** **2.7808**	**Average of Cos for PO4** **2.7808**	**Average of Cos for PO5**	**Average of Cos for PO6**	**Average of Cos for PO7** **2.935**	**Average of Cos for PO8**
Column (b)	**Average of PO1: [(Column a / 3) X** **Total CO attainment**	**Average of PO2: [(Column a)/ 3 X**	**Average of PO3: [(Column a)/ 3 X**	**Average of PO4: [(Column a)/ 3 X**	**Average of PO5: [(Column a)/ 3 X**	**Average of PO6: [(Column a)/ 3 X**	**Average of PO7: [(Column a)/ 3 X**	**Average of PO8: [(Column a)/ 3 X**

	For Entire Course **value in table 2** **2.66**	**Total CO attainment For Entire Course** **value in table 2**	**Total CO attainment For Entire Course** **value in table 2** **2.776**	**Total CO attainment For Entire Course** **value in table 2** **2.776**	**Total CO attainment For Entire Course** **value in table 2**	**Total CO attainment For Entire Course** **value in table 2**	**Total CO attainment For Entire Course** **value in table 2** **2.623**	**Total CO attainment For Entire Course** **value in table 2**
TOTAL PO ATTAINMENT:	**(Average of all values in Column (b):** **3.00**							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: OPERATIONS RESEARCH

COURSE CODE: MS18402

CREDITS: 4

DEPARTMENT: B. Sc. MATHEMATICS, STATISTICS & COMPUTER SCIENCE

Programme Outcomes – (B. Sc.)

B. Sc.:

- **PO1. Scientific Knowledge**: Apply the knowledge of Science, Mathematics, Engineering& Technology fundamentals to solve the complex problems.

- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3.Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
- **PO6.Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOMES (DEPARTMENTAL):

Students will be able to:

PSO1. Demonstrate in-depth knowledge in the foundational areas of the mathematical sciences and Communicate mathematical ideas using numerical, graphical and symbolic representations.

PSO2. Recognize the importance and value of mathematical and statistical thinking, training, and approach to problem solving, on a diverse variety of disciplines.

PSO3. Use emerging technologies and computing concepts.

PSO4. Apply mathematical, computational and statistical tools to detect patterns and model performance.

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	**CO1: Identify** the various techniques of operations research and to translate a real – world problem, given in words, into a mathematical formulation	III (APPLY)
CO2	**CO2: Construct** the simplex table and to plan the optimum results.	IV(ANALYZE)
CO3	**CO3: Use** the program for optimizing the cost involved in transportation problems.	III (APPLY)
CO4	**CO4: Develop** and solve transformation models and assignment models.	VI(CREATE)
CO5	**CO5: Design** the sequence of jobs and to make up the total process time.	IV(ANALYZE)

Table 1: CO, PO, PSO MAPPING

Course	Programme Outcomes	Program Specific outcomes

outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	P08	PSO1	PSO2	PSO3	PSO4	
1	**H**		**H**	**S**			**S**	**S**		**S**		**H**	
2	**H**		**H**	**H**			**H**	**S**		**H**		**H**	
3	**H**		**H**	**H**	**H**		**H**	**S**		**H**		**H**	
4	**H**		**H**	**H**	**S**		**H**	**S**		**H**		**S**	
5	**H**		**H**	**H**	**S**		**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

	INTERNAL ASSESSMENT (40%)											EXTERNAL ASSESSMENT (60%)			
co	WEEKLY		MIDSEMESTER		PRE-FINAL		ASSIGNMENT		VIVA			EXTERNAL EXAMS			
	PASS %	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0 (A)	PASS%	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0 (B)	PASS%	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0 (C)	PASS %	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0	PASS%	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0 (E)	Co-Wise Internal Average (Avg of A,B,C,D,E) (F)	PASS %	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0	Co-Wise External Average	CO-WISE TOTAL AVERAGE (F)X 0.4+ (G) X 0.6

								(D)						**(G)**	**(K)**
C01	98.23	3	83.62	2	84.31	2	100	3	100	3	2.6	95.92	3	3	2.84
CO2	------	------	89.62	3	83.37	2	---		100	3	2.33	95.92	3	3	2.935
CO3	------	-----	89.62	3	89.62	3	----		100	3	2.33	95.92	3	3	2.935
CO4	------	------	------	------	84.73	2	----		100	3	2.5	95.92	3	3	2.8
CO5	------	------	------	------	85.36	3	-----		100	3	2.5	95.92	3	3	2.8
TOTAL INTERNAL AVERAGE [Avg of all (F)]:														**Total External**	**Total CO attainment**

3		**Average (Avg of G):** **3**	**For Entire Course (Avg of K)** **2.7808**

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.]

Course outcomes	Programme Outcomes							
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**P08**
1	**H (2.84)**		**H (2.84)**	**H (2.84)**				
2	**H (2.935)**		**H (2.935)**	**H (2.935)**				
3	**H (2.935)**		**H (2.935)**	**H (2.935)**			**H (2.935)**	
4	**H (2.8)**		**H (2.8)**	**H (2.8)**				
5	**H (2.8)**		**H (2.8)**	**H (2.8)**				
Column (a)	**Average of Cos for PO1** **2.7808**	**Average of Cos for PO2**	**Average of Cos for PO3** **2.7808**	**Average of Cos for PO4** **2.7808**	**Average of Cos for PO5**	**Average of Cos for PO6**	**Average of Cos for PO7** **2.935**	**Average of Cos for PO8**
Column (b)	**Average of PO1: [(Column a / 3) X** **Total CO attainment**	**Average of PO2: [(Column a)/ 3 X**	**Average of PO3: [(Column a)/ 3 X**	**Average of PO4: [(Column a)/ 3 X**	**Average of PO5: [(Column a)/ 3 X**	**Average of PO6: [(Column a)/ 3 X**	**Average of PO7: [(Column a)/ 3 X**	**Average of PO8: [(Column a)/ 3 X**

	For Entire Course **value in table 2** **2.66**	**Total CO attainment For Entire Course** **value in table 2**	**Total CO attainment For Entire Course** **value in table 2** **2.776**	**Total CO attainment For Entire Course** **value in table 2** **2.776**	**Total CO attainment For Entire Course** **value in table 2**	**Total CO attainment For Entire Course** **value in table 2**	**Total CO attainment For Entire Course** **value in table 2** **2.623**	**Total CO attainment For Entire Course** **value in table 2**
TOTAL PO ATTAINMENT:	**(Average of all values in Column (b):** **3.00**							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: REAL ANALYSIS

COURSE CODE: MS18403

CREDITS: 4

DEPARTMENT: B. Sc. MATHEMATICS, STATISTICS & COMPUTER SCIENCE

Programme Outcomes – (B. Sc.)

B. Sc.:

- **PO1. Scientific Knowledge**: Apply the knowledge of Science, Mathematics, Engineering& Technology fundamentals to solve the complex problems.

- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3.Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
- **PO6.Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOMES (DEPARTMENTAL):

Students will be able to:

PSO1. Demonstrate in-depth knowledge in the foundational areas of the mathematical sciences and Communicate mathematical ideas using numerical, graphical and symbolic representations.

PSO2. Recognize the importance and value of mathematical and statistical thinking, training, and approach to problem solving, on a diverse variety of disciplines.

PSO3. Use emerging technologies and computing concepts.

PSO4. Apply mathematical, computational and statistical tools to detect patterns and model performance.

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	**CO1: Categorize** the real line as a complete, ordered field.	III (APPLY)
CO2	**CO2: Use** the definitions of convergence as they apply to sequences, series, and functions.	IV(ANALYZE)
CO3	**CO3: Identify** the continuity, differentiability, and inerrability of functions defined on subsets of the real line.	III (APPLY)
CO4	**CO4: Apply** the Mean Value Theorem and the Fundamental Theorem of Calculus to problems in the context of real analysis.	VI(CREATE)
CO5	**CO5: Explain** the Riemann integrability and the Riemann-Stieltjes integrability of a bounded function and prove a selection of theorems concerning integration.	IV(ANALYZE)

Table 1: CO, PO, PSO MAPPING

Course	Programme Outcomes	Program Specific outcomes

outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	P08	PSO1	PSO2	PSO3	PSO4	
1	**H**		**H**	**S**			**S**	**S**		**S**		**H**	
2	**H**		**H**	**H**			**H**	**S**		**H**		**H**	
3	**H**		**H**	**H**	**H**		**H**	**S**		**H**		**H**	
4	**H**		**H**	**H**	**S**		**H**	**S**		**H**		**S**	
5	**H**		**H**	**H**	**S**		**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

	INTERNAL ASSESSMENT (40%)											EXTERNAL ASSESSMENT (60%)			
co	WEEKLY		MIDSEMESTER		PRE-FINAL		ASSIGNMENT		VIVA			EXTERNAL EXAMS			
	PASS %	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0 (A)	PASS%	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0 (B)	PASS%	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0 (C)	PASS %	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0	PASS%	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0 (E)	Co-Wise Internal Average (Avg of A,B,C,D,E) (F)	PASS %	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0	Co-Wise External Average	CO-WISE TOTAL AVERAGE (F)X 0.4+ (G) X 0.6

								(D)						**(G)**	**(K)**
C01	98.23	3	83.62	2	84.31	2	100	3	100	3	2.6	97.96	3	3	2.84
CO2	------	------	89.62	3	83.37	2	---		100	3	2.33	97.96	3	3	2.935
CO3	------	-----	89.62	3	89.62	3	----		100	3	2.33	97.96	3	3	2.935
CO4	------	------	------	------	84.73	2	----		100	3	2.5	97.96	3	3	2.8
CO5	------	------	------	------	85.36	3	-----		100	3	2.5	97.96	3	3	2.8
TOTAL INTERNAL AVERAGE [Avg of all (F)]:														**Total External**	**Total CO attainment**

3		**Average (Avg of G):** **3**	**For Entire Course (Avg of K)** **2.7808**

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.]

Course outcomes	Programme Outcomes							
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**P08**
1	**H (2.84)**		**H (2.84)**	**H (2.84)**				
2	**H (2.935)**		**H (2.935)**	**H (2.935)**				
3	**H (2.935)**		**H (2.935)**	**H (2.935)**			**H (2.935)**	
4	**H (2.8)**		**H (2.8)**	**H (2.8)**				
5	**H (2.8)**		**H (2.8)**	**H (2.8)**				
Column (a)	**Average of Cos for PO1** **2.7808**	**Average of Cos for PO2**	**Average of Cos for PO3** **2.7808**	**Average of Cos for PO4** **2.7808**	**Average of Cos for PO5**	**Average of Cos for PO6**	**Average of Cos for PO7** **2.935**	**Average of Cos for PO8**
Column (b)	**Average of PO1: [(Column a / 3) X** **Total CO attainment**	**Average of PO2: [(Column a)/ 3 X**	**Average of PO3: [(Column a)/ 3 X**	**Average of PO4: [(Column a)/ 3 X**	**Average of PO5: [(Column a)/ 3 X**	**Average of PO6: [(Column a)/ 3 X**	**Average of PO7: [(Column a)/ 3 X**	**Average of PO8: [(Column a)/ 3 X**

	For Entire Course **value in table 2** **2.66**	**Total CO attainment For Entire Course** **value in table 2**	**Total CO attainment For Entire Course** **value in table 2** **2.776**	**Total CO attainment For Entire Course** **value in table 2** **2.776**	**Total CO attainment For Entire Course** **value in table 2**	**Total CO attainment For Entire Course** **value in table 2**	**Total CO attainment For Entire Course** **value in table 2** **2.623**	**Total CO attainment For Entire Course** **value in table 2**
TOTAL PO ATTAINMENT:	**(Average of all values in Column (b):** **3.00**							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: STATISTICAL INFERENCE II

COURSE CODE: BS18040

CREDITS: 4

DEPARTMENT: B. Sc. MATHEMATICS, STATISTICS & COMPUTER SCIENCE

Programme Outcomes – (B. Sc.)

B. Sc.:

- **PO1. Scientific Knowledge**: Apply the knowledge of Science, Mathematics, Engineering& Technology fundamentals to solve the complex problems.

- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3.Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
- **PO6.Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOMES (DEPARTMENTAL):

Students will be able to:

PSO1. Demonstrate in-depth knowledge in the foundational areas of the mathematical sciences and Communicate mathematical ideas using numerical, graphical and symbolic representations.

PSO2. Recognize the importance and value of mathematical and statistical thinking, training, and approach to problem solving, on a diverse variety of disciplines.

PSO3. Use emerging technologies and computing concepts.

PSO4. Apply mathematical, computational and statistical tools to detect patterns and model performance.

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	**CO1: Develop** the distributional results needed for statistical inference.	III (APPLY)
CO2	**CO2: Analyze** hypotheses tests of means, proportions and variances using both one-and two-sample data sets	IV(ANALYZE)
CO3	**CO3: Explain** Chi-Squared test for independence of attributes and goodness of fit.	III (APPLY)
CO4	**CO4: Differentiate** between the tests statistics to be used for dependent and independent samples.	VI(CREATE)
CO5	**CO5: Design** the test statistic to be used when the nature of the distribution is unknown	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**	**PSO4**	

1	**H**		**H**	**S**			**S**	**S**		**S**		**H**	
2	**H**		**H**	**H**			**H**	**S**		**H**		**H**	
3	**H**		**H**	**H**	**H**		**H**	**S**		**H**		**H**	
4	**H**		**H**	**H**	**S**		**H**	**S**		**H**		**S**	
5	**H**		**H**	**H**	**S**		**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

	INTERNAL ASSESSMENT (40%)	**EXTERNAL ASSESSMENT (60%)**

co	WEEKLY		MIDSEMESTER		PRE-FINAL		ASSIGNMENT		VIVA			EXTERNAL EXAMS			
	PASS %	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(A)**	**PASS%**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(B)**	**PASS%**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(C)**	**PASS %** (choose the unit/CO from which assignment was given)	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0**	**PASS%**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(E)**	**Co-Wise Internal Average** **(Avg of A,B,C,D,E)** **(F)**	**PASS %**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0**	**Co-Wise External Average** **(G)**	**CO-WISE TOTAL AVERAGE** **(F)X 0.4+ (G) X 0.6**

								(D)							**(K)**
C01	98.23	3	83.62	2	84.31	2	100	3	100	3	2.6	91.84	3	3	2.84
CO2	------	------	89.62	3	83.37	2	---		100	3	2.33	91.84	3	3	2.935
CO3	------	-----	89.62	3	89.62	3	----		100	3	2.33	91.84	3	3	2.935
CO4	------	------	------	------	84.73	2	----		100	3	2.5	91.84	3	3	2.8
CO5	------	------	------	------	85.36	3	-----		100	3	2.5	91.84	3	3	2.8

TOTAL INTERNAL AVERAGE [Avg of all (F)]: **3**		**Total External Average (Avg of G):** **3**	**Total CO attainment For Entire Course (Avg of K)** **2.7808**

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.]

Course outcomes	Programme Outcomes							
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**P08**
1	**H (2.84)**		**H (2.84)**	**H (2.84)**				
2	**H (2.935)**		**H (2.935)**	**H (2.935)**				
3	**H (2.935)**		**H (2.935)**	**H (2.935)**			**H (2.935)**	
4	**H (2.8)**		**H (2.8)**	**H (2.8)**				
5	**H (2.8)**		**H (2.8)**	**H (2.8)**				
Column (a)	**Average of Cos for PO1 2.7808**	**Average of Cos for PO2**	**Average of Cos for PO3 2.7808**	**Average of Cos for PO4 2.7808**	**Average of Cos for PO5**	**Average of Cos for PO6**	**Average of Cos for PO7 2.935**	**Average of Cos for PO8**

Column (b)	**Average of PO1: [(Column a / 3) X** **Total CO attainment For Entire Course** **value in table 2** **2.66**	**Average of PO2: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2**	**Average of PO3: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2** **2.776**	**Average of PO4: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2** **2.776**	**Average of PO5: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2**	**Average of PO6: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2**	**Average of PO7: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2** **2.623**	**Average of PO8: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2**
TOTAL PO ATTAINMENT:	**(Average of all values in Column (b):** **3.00**							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: DATABASE MANAGEMENT SYSTEM

COURSE CODE: MS18404

CREDITS: 4

DEPARTMENT: B. Sc. MATHEMATICS, STATISTICS & COMPUTER SCIENCE

Programme Outcomes – (B. Sc.)

B. Sc.:

- **PO1. Scientific Knowledge**: Apply the knowledge of Science, Mathematics, Engineering& Technology fundamentals to solve the complex problems.

- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3.Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
- **PO6.Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOMES (DEPARTMENTAL):

Students will be able to:

PSO1. Demonstrate in-depth knowledge in the foundational areas of the mathematical sciences and Communicate mathematical ideas using numerical, graphical and symbolic representations.

PSO2. Recognize the importance and value of mathematical and statistical thinking, training, and approach to problem solving, on a diverse variety of disciplines.

PSO3. Use emerging technologies and computing concepts.

PSO4. Apply mathematical, computational and statistical tools to detect patterns and model performance.

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	**CO1:** Describe Entity Relationship and Enhanced ER model	III (APPLY)
CO2	**CO2:** Understand the relational model, reduction to relation schema, relational algebra and normalization	IV(ANALYZE)
CO3	**CO3:** Identify SQL- the standard language of relational databases and PL/SQL programming.	III (APPLY)
CO4	**CO4:** Explain the storage and file structure, storage access, indexing and hashing techniques of the database.	VI(CREATE)
CO5	**CO5:** Understand the concept of Transactions, recovery system and concurrency control.	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**	**PSO4**	

1	**H**		**H**	**S**			**S**	**S**		**S**		**H**	
2	**H**		**H**	**H**			**H**	**S**		**H**		**H**	
3	**H**		**H**	**H**	**H**		**H**	**S**		**H**		**H**	
4	**H**		**H**	**H**	**S**		**H**	**S**		**H**		**S**	
5	**H**		**H**	**H**	**S**		**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

	INTERNAL ASSESSMENT (40%)	**EXTERNAL ASSESSMENT (60%)**

co	WEEKLY		MIDSEMESTER		PRE-FINAL		ASSIGNMENT		VIVA			EXTERNAL EXAMS			
	PASS %	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(A)**	**PASS%**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(B)**	**PASS%**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(C)**	**PASS %** (choose the unit/CO from which assignment was given)	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0**	**PASS%**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(E)**	**Co-Wise Internal Average** **(Avg of A,B,C,D,E)** **(F)**	**PASS %**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0**	**Co-Wise External Average** **(G)**	**CO-WISE TOTAL AVERAGE** **(F)X 0.4+ (G) X 0.6**

								(D)							**(K)**
C01	98.23	3	83.62	2	84.31	2	100	3	100	3	2.6	91.49	3	3	2.84
CO2	------	------	89.62	3	83.37	2	---		100	3	2.33	91.49	3	3	2.935
CO3	------	-----	89.62	3	89.62	3	----		100	3	2.33	91.49	3	3	2.935
CO4	------	------	------	------	84.73	2	----		100	3	2.5	91.49	3	3	2.8
CO5	------	------	------	------	85.36	3	-----		100	3	2.5	91.49	3	3	2.8

TOTAL INTERNAL AVERAGE [Avg of all (F)]: **3**		**Total External Average (Avg of G):** **3**	**Total CO attainment For Entire Course (Avg of K)** **2.7808**

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.]

Course outcomes	Programme Outcomes							
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**P08**
1	**H (2.84)**		**H (2.84)**	**H (2.84)**				
2	**H (2.935)**		**H (2.935)**	**H (2.935)**				
3	**H (2.935)**		**H (2.935)**	**H (2.935)**			**H (2.935)**	
4	**H (2.8)**		**H (2.8)**	**H (2.8)**				
5	**H (2.8)**		**H (2.8)**	**H (2.8)**				
Column (a)	**Average of Cos for PO1 2.7808**	**Average of Cos for PO2**	**Average of Cos for PO3 2.7808**	**Average of Cos for PO4 2.7808**	**Average of Cos for PO5**	**Average of Cos for PO6**	**Average of Cos for PO7 2.935**	**Average of Cos for PO8**

Column (b)	**Average of PO1: [(Column a / 3) X** **Total CO attainment For Entire Course** **value in table 2** **2.66**	**Average of PO2: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2**	**Average of PO3: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2** **2.776**	**Average of PO4: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2** **2.776**	**Average of PO5: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2**	**Average of PO6: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2**	**Average of PO7: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2** **2.623**	**Average of PO8: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2**
TOTAL PO ATTAINMENT:	**(Average of all values in Column (b):** **3.00**							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: FUNCTIONS OF A COMPLEX VARIABLE

COURSE CODE: MS18601A

CREDITS: 4

DEPARTMENT: B. Sc. MATHEMATICS, STATISTICS & COMPUTER SCIENCE

Programme Outcomes – (B. Sc.)

B. Sc.:

- **PO1. Scientific Knowledge**: Apply the knowledge of Science, Mathematics, Engineering& Technology fundamentals to solve the complex problems.

- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3.Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
- **PO6.Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOMES (DEPARTMENTAL):

Students will be able to:

PSO1. Demonstrate in-depth knowledge in the foundational areas of the mathematical sciences and Communicate mathematical ideas using numerical, graphical and symbolic representations.

PSO2. Recognize the importance and value of mathematical and statistical thinking, training, and approach to problem solving, on a diverse variety of disciplines.

PSO3. Use emerging technologies and computing concepts.

PSO4. Apply mathematical, computational and statistical tools to detect patterns and model performance.

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	**CO1: Represent** complex numbers algebraically and geometrically, define and analyze limits and continuity for complex functions as well as consequences of continuity.	III (APPLY)
CO2	**CO2: Apply** the concept and consequences of analyticity and the Cauchy-Riemann equations and of results on harmonic and entire functions including the fundamental theorem of algebra	IV(ANALYZE)
CO3	**CO3: Analyze** sequences and series of analytic functions and types of convergence.	III (APPLY)
CO4	**CO4: Solve** complex contour integrals directly and by the fundamental theorem, apply the Cauchy integral theorem in its various versions, and the Cauchy integral formula.	VI(CREATE)
CO5	**CO5: Classify** singularities and poles, find residues and evaluate complex integrals using the residue theorem. Represent functions as Taylor, power and Laurent series.	IV(ANALYZE)

Table 1: CO, PO, PSO MAPPING

Course	Programme Outcomes	Program Specific outcomes

outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	P08	PSO1	PSO2	PSO3	PSO4	
1	**H**		**H**	**S**			**S**	**S**		**S**		**H**	
2	**H**		**H**	**H**			**H**	**S**		**H**		**H**	
3	**H**		**H**	**H**	**H**		**H**	**S**		**H**		**H**	
4	**H**		**H**	**H**	**S**		**H**	**S**		**H**		**S**	
5	**H**		**H**	**H**	**S**		**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

	INTERNAL ASSESSMENT (40%)											EXTERNAL ASSESSMENT (60%)			
co	WEEKLY		MIDSEMESTER		PRE-FINAL		ASSIGNMENT		VIVA			EXTERNAL EXAMS			
	PASS %	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0 (A)	PASS%	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0 (B)	PASS%	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0 (C)	PASS %	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0	PASS%	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0 (E)	Co-Wise Internal Average (Avg of A,B,C,D,E) (F)	PASS %	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0	Co-Wise External Average	CO-WISE TOTAL AVERAGE (F)X 0.4+ (G) X 0.6

								(D)						**(G)**	**(K)**
C01	98.23	3	86.62	23	94.31	3	100	3	100	3	2.6	100	3	3	2.84
CO2	------	------	89.62	3	86.37	3	---		100	3	2.33	100	3	3	2.935
CO3	------	-----	89.62	3	89.62	3	----		100	3	2.33	100	3	3	2.935
CO4	------	------	------	------	84.73	2	----		100	3	2.5	100	3	3	2.8
CO5	------	------	------	------	85.36	3	-----		100	3	2.5	100	3	3	2.8

TOTAL INTERNAL AVERAGE [Avg of all (F)]: **3**		**Total External Average (Avg of G):** **3**	**Total CO attainment For Entire Course (Avg of K)** **2.7808**

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.]

Course outcomes	Programme Outcomes							
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**P08**
1	**H (2.84)**		**H (2.84)**	**H (2.84)**				
2	**H (2.935)**		**H (2.935)**	**H (2.935)**				
3	**H (2.935)**		**H (2.935)**	**H (2.935)**			**H (2.935)**	
4	**H (2.8)**		**H (2.8)**	**H (2.8)**				
5	**H (2.8)**		**H (2.8)**	**H (2.8)**				
Column (a)	**Average of Cos for PO1 2.7808**	**Average of Cos for PO2**	**Average of Cos for PO3 2.7808**	**Average of Cos for PO4 2.7808**	**Average of Cos for PO5**	**Average of Cos for PO6**	**Average of Cos for PO7 2.935**	**Average of Cos for PO8**

Column (b)	**Average of PO1: [(Column a / 3) X** **Total CO attainment For Entire Course** **value in table 2** **2.66**	**Average of PO2: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2**	**Average of PO3: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2** **2.776**	**Average of PO4: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2** **2.776**	**Average of PO5: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2**	**Average of PO6: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2**	**Average of PO7: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2** **2.623**	**Average of PO8: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2**
TOTAL PO ATTAINMENT:	**(Average of all values in Column (b):** **3.00**							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: LAPLACE TRANSFORMS AND FOURIER SERIES

COURSE CODE: MS18601B

CREDITS: 4

DEPARTMENT: B. Sc. MATHEMATICS, STATISTICS & COMPUTER SCIENCE

Programme Outcomes – (B. Sc.)

B. Sc.:

- **PO1. Scientific Knowledge**: Apply the knowledge of Science, Mathematics, Engineering& Technology fundamentals to solve the complex problems.

- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3.Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
- **PO6.Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOMES (DEPARTMENTAL):

Students will be able to:

PSO1. Demonstrate in-depth knowledge in the foundational areas of the mathematical sciences and Communicate mathematical ideas using numerical, graphical and symbolic representations.

PSO2. Recognize the importance and value of mathematical and statistical thinking, training, and approach to problem solving, on a diverse variety of disciplines.

PSO3. Use emerging technologies and computing concepts.

PSO4. Apply mathematical, computational and statistical tools to detect patterns and model performance.

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	**CO1: Solve** the Laplace transform of standard functions from the definitions. **Solve** the Laplace transform of standard functions from the definitions. .	III (APPLY)
CO2	**CO2: Use** the appropriate shift theorems in finding Laplace and inverse Laplace transforms.	IV(ANALYZE)
CO3	**CO3: Combine** the necessary Laplace transform techniques to solve second-order ordinary differential equations.	III (APPLY)
CO4	**CO4: Analyse** the Fourier transform of elementary functions from the definition.	VI(CREATE)
CO5	**CO5: Develop** real and complex forms of the Fourier series for standard periodic waveforms and convert from real-form Fourier series to complex-form and vice-versa.	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**	**PSO4**	

1	**H**		**H**	**S**			**S**	**S**		**S**		**H**	
2	**H**		**H**	**H**			**H**	**S**		**H**		**H**	
3	**H**		**H**	**H**	**H**		**H**	**S**		**H**		**H**	
4	**H**		**H**	**H**	**S**		**H**	**S**		**H**		**S**	
5	**H**		**H**	**H**	**S**		**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

	INTERNAL ASSESSMENT (40%)	**EXTERNAL ASSESSMENT (60%)**

co	WEEKLY		MIDSEMESTER		PRE-FINAL		ASSIGNMENT		VIVA			EXTERNAL EXAMS			
	PASS %	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(A)**	**PASS%**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(B)**	**PASS%**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(C)**	**PASS %** (choose the unit/CO from which assignment was given)	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0**	**PASS%**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(E)**	**Co-Wise Internal Average** **(Avg of A,B,C,D,E)** **(F)**	**PASS %**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0**	**Co-Wise External Average** **(G)**	**CO-WISE TOTAL AVERAGE** **(F)X 0.4+ (G) X 0.6**

								(D)							**(K)**
C01	98.23	3	86.62	23	94.31	3	100	3	100	3	2.6	100	3	3	2.84
CO2	------	------	89.62	3	86.37	3	---		100	3	2.33	100	3	3	2.935
CO3	------	-----	89.62	3	89.62	3	----		100	3	2.33	100	3	3	2.935
CO4	------	------	------	------	84.73	2	----		100	3	2.5	100	3	3	2.8
CO5	------	------	------	------	85.36	3	-----		100	3	2.5	100	3	3	2.8

TOTAL INTERNAL AVERAGE [Avg of all (F)]: **3**		**Total External Average (Avg of G):** **3**	**Total CO attainment For Entire Course (Avg of K)** **2.7808**

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.]

Course outcomes	Programme Outcomes							
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**P08**
1	**H (2.84)**		**H (2.84)**	**H (2.84)**				
2	**H (2.935)**		**H (2.935)**	**H (2.935)**				
3	**H (2.935)**		**H (2.935)**	**H (2.935)**			**H (2.935)**	
4	**H (2.8)**		**H (2.8)**	**H (2.8)**				
5	**H (2.8)**		**H (2.8)**	**H (2.8)**				
Column (a)	**Average of Cos for PO1 2.7808**	**Average of Cos for PO2**	**Average of Cos for PO3 2.7808**	**Average of Cos for PO4 2.7808**	**Average of Cos for PO5**	**Average of Cos for PO6**	**Average of Cos for PO7 2.935**	**Average of Cos for PO8**

Column (b)	**Average of PO1: [(Column a / 3) X** **Total CO attainment For Entire Course** **value in table 2** **2.66**	**Average of PO2: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2**	**Average of PO3: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2** **2.776**	**Average of PO4: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2** **2.776**	**Average of PO5: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2**	**Average of PO6: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2**	**Average of PO7: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2** **2.623**	**Average of PO8: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2**
TOTAL PO ATTAINMENT:	**(Average of all values in Column (b):** **3.00**							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: APPLIED STATISTICS – II

COURSE CODE: MS18602

CREDITS: 4

DEPARTMENT: B. Sc. MATHEMATICS, STATISTICS & COMPUTER SCIENCE

Programme Outcomes – (B. Sc.)

B. Sc.:

- **PO1. Scientific Knowledge**: Apply the knowledge of Science, Mathematics, Engineering& Technology fundamentals to solve the complex problems.

- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3.Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
- **PO6.Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOMES (DEPARTMENTAL):

Students will be able to:

PSO1. Demonstrate in-depth knowledge in the foundational areas of the mathematical sciences and Communicate mathematical ideas using numerical, graphical and symbolic representations.

PSO2. Recognize the importance and value of mathematical and statistical thinking, training, and approach to problem solving, on a diverse variety of disciplines.

PSO3. Use emerging technologies and computing concepts.

PSO4. Apply mathematical, computational and statistical tools to detect patterns and model performance.

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	**CO1: Analyze** the concepts of quality control, chance and assignable causes of variation, control charts for variables and attribute.	III (APPLY)
CO2	**CO2: Classify tolerance** limits, specification limits and process capability limits..	IV(ANALYZE)
CO3	**CO3: Select** the appropriate index numbers and calculate an indices from given data.	III (APPLY)
CO4	**CO4: Construct** the cost of living index numbers and wholesale price index numbers	VI(CREATE)
CO5	**CO5: Develop** the knowledge on vital statistics, and calculate fertility rates from given data.	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**	**PSO4**	

1	**H**		**H**	**S**			**S**	**S**		**S**		**H**	
2	**H**		**H**	**H**			**H**	**S**		**H**		**H**	
3	**H**		**H**	**H**	**H**		**H**	**S**		**H**		**H**	
4	**H**		**H**	**H**	**S**		**H**	**S**		**H**		**S**	
5	**H**		**H**	**H**	**S**		**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

	INTERNAL ASSESSMENT (40%)	**EXTERNAL ASSESSMENT (60%)**

co	WEEKLY		MIDSEMESTER		PRE-FINAL		ASSIGNMENT		VIVA			EXTERNAL EXAMS			
	PASS %	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(A)**	**PASS%**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(B)**	**PASS%**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(C)**	**PASS %** (choose the unit/CO from which assignment was given)	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0**	**PASS%**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(E)**	**Co-Wise Internal Average** **(Avg of A,B,C,D,E)** **(F)**	**PASS %**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0**	**Co-Wise External Average** **(G)**	**CO-WISE TOTAL AVERAGE** **(F)X 0.4+ (G) X 0.6**

								(D)							**(K)**
C01	98.23	3	86.62	23	94.31	3	100	3	100	3	2.6	100	3	3	2.84
CO2	------	------	89.62	3	86.37	3	---		100	3	2.33	100	3	3	2.935
CO3	------	-----	89.62	3	89.62	3	----		100	3	2.33	100	3	3	2.935
CO4	------	------	------	------	84.73	2	----		100	3	2.5	100	3	3	2.8
CO5	------	------	------	------	85.36	3	-----		100	3	2.5	100	3	3	2.8

TOTAL INTERNAL AVERAGE [Avg of all (F)]: **3**		**Total External Average (Avg of G):** **3**	**Total CO attainment For Entire Course (Avg of K)** **2.7808**

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.]

Course outcomes	Programme Outcomes							
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**P08**
1	**H (2.84)**		**H (2.84)**	**H (2.84)**				
2	**H (2.935)**		**H (2.935)**	**H (2.935)**				
3	**H (2.935)**		**H (2.935)**	**H (2.935)**			**H (2.935)**	
4	**H (2.8)**		**H (2.8)**	**H (2.8)**				
5	**H (2.8)**		**H (2.8)**	**H (2.8)**				
Column (a)	**Average of Cos for PO1 2.7808**	**Average of Cos for PO2**	**Average of Cos for PO3 2.7808**	**Average of Cos for PO4 2.7808**	**Average of Cos for PO5**	**Average of Cos for PO6**	**Average of Cos for PO7 2.935**	**Average of Cos for PO8**

Column (b)	**Average of PO1: [(Column a / 3) X** **Total CO attainment For Entire Course** **value in table 2** **2.66**	**Average of PO2: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2**	**Average of PO3: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2** **2.776**	**Average of PO4: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2** **2.776**	**Average of PO5: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2**	**Average of PO6: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2**	**Average of PO7: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2** **2.623**	**Average of PO8: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2**
TOTAL PO ATTAINMENT:	**(Average of all values in Column (b):** **3.00**							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: OPERATING SYSTEMS

COURSE CODE: MS18603

CREDITS: 4

DEPARTMENT: B. Sc. MATHEMATICS, STATISTICS & COMPUTER SCIENCE

Programme Outcomes – (B. Sc.)

B. Sc.:

- **PO1. Scientific Knowledge**: Apply the knowledge of Science, Mathematics, Engineering& Technology fundamentals to solve the complex problems.

- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3.Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
- **PO6.Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOMES (DEPARTMENTAL):

Students will be able to:

PSO1. Demonstrate in-depth knowledge in the foundational areas of the mathematical sciences and Communicate mathematical ideas using numerical, graphical and symbolic representations.

PSO2. Recognize the importance and value of mathematical and statistical thinking, training, and approach to problem solving, on a diverse variety of disciplines.

PSO3. Use emerging technologies and computing concepts.

PSO4. Apply mathematical, computational and statistical tools to detect patterns and model performance.

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	**CO1:** Identify the main components of an OS & their functions.	III (APPLY)
CO2	**CO2:** Analyze various issues in Inter Process Communication (IPC) and the role of OS in IPC.	IV(ANALYZE)
CO3	**CO3:** Explain Process synchronization, Deadlocks-deadlock characterization, methods for handling deadlocks.	III (APPLY)
CO4	**CO4:** Compare the concepts and implementation Memory management policies and virtual memory	VI(CREATE)
CO5	**CO5:** Understand the working of an OS as a resource manager, file system manager, process manager, memory manager and I/O manager and methods used to implement the different parts of OS	IV(ANALYZE)

Table 1: CO, PO, PSO MAPPING

Course	Programme Outcomes	Program Specific outcomes

outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	P08	PSO1	PSO2	PSO3	PSO4	
1	**H**		**H**	**S**			**S**	**S**		**S**		**H**	
2	**H**		**H**	**H**			**H**	**S**		**H**		**H**	
3	**H**		**H**	**H**	**H**		**H**	**S**		**H**		**H**	
4	**H**		**H**	**H**	**S**		**H**	**S**		**H**		**S**	
5	**H**		**H**	**H**	**S**		**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

	INTERNAL ASSESSMENT (40%)											EXTERNAL ASSESSMENT (60%)			
co	WEEKLY		MIDSEMESTER		PRE-FINAL		ASSIGNMENT		VIVA			EXTERNAL EXAMS			
	PASS %	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0 (A)	PASS%	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0 (B)	PASS%	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0 (C)	PASS %	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0	PASS%	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0 (E)	Co-Wise Internal Average (Avg of A,B,C,D,E) (F)	PASS %	ATTAINMENT LEVEL >85%=3 85-75%=2 75-65%=1 <65%=0	Co-Wise External Average	CO-WISE TOTAL AVERAGE (F)X 0.4+ (G) X 0.6

								(D)						**(G)**	**(K)**
C01	98.23	3	86.62	23	94.31	3	100	3	100	3	2.6	100	3	3	2.84
CO2	------	------	89.62	3	86.37	3	---		100	3	2.33	100	3	3	2.935
CO3	------	-----	89.62	3	89.62	3	----		100	3	2.33	100	3	3	2.935
CO4	------	------	------	------	84.73	2	----		100	3	2.5	100	3	3	2.8
CO5	------	------	------	------	85.36	3	-----		100	3	2.5	100	3	3	2.8

TOTAL INTERNAL AVERAGE [Avg of all (F)]: **3**		**Total External Average (Avg of G):** **3**	**Total CO attainment For Entire Course (Avg of K)** **2.7808**

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.]

Course outcomes	Programme Outcomes							
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**P08**
1	**H (2.84)**		**H (2.84)**	**H (2.84)**				
2	**H (2.935)**		**H (2.935)**	**H (2.935)**				
3	**H (2.935)**		**H (2.935)**	**H (2.935)**			**H (2.935)**	
4	**H (2.8)**		**H (2.8)**	**H (2.8)**				
5	**H (2.8)**		**H (2.8)**	**H (2.8)**				
Column (a)	**Average of Cos for PO1 2.7808**	**Average of Cos for PO2**	**Average of Cos for PO3 2.7808**	**Average of Cos for PO4 2.7808**	**Average of Cos for PO5**	**Average of Cos for PO6**	**Average of Cos for PO7 2.935**	**Average of Cos for PO8**

Column (b)	**Average of PO1: [(Column a / 3) X** **Total CO attainment For Entire Course** **value in table 2** **2.66**	**Average of PO2: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2**	**Average of PO3: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2** **2.776**	**Average of PO4: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2** **2.776**	**Average of PO5: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2**	**Average of PO6: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2**	**Average of PO7: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2** **2.623**	**Average of PO8: [(Column a)/ 3 X** **Total CO attainment For Entire Course** **value in table 2**
TOTAL PO ATTAINMENT:	**(Average of all values in Column (b):** **3.00**							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: SOFTWARE ENGINEERING

COURSE CODE: BS18044B

CREDITS: 4

DEPARTMENT: B. Sc. MATHEMATICS, STATISTICS & COMPUTER SCIENCE

Programme Outcomes – (B. Sc.)

B. Sc.:

- **PO1. Scientific Knowledge**: Apply the knowledge of Science, Mathematics, Engineering& Technology fundamentals to solve the complex problems.

- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
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PSO3. Use emerging technologies and computing concepts.

PSO4. Apply mathematical, computational and statistical tools to detect patterns and model performance.

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	**CO1:** Explain engineering through various process models	III (APPLY)
CO2	**CO2:** Identify analyze Requirements, Object Oriented and various modeling's	IV(ANALYZE)
CO3	**CO3:** Categorize design and architecture.	III (APPLY)
CO4	**CO4:** Classify Components, golden rules and design evaluation.	VI(CREATE)
CO5	**CO5:** Understand testing techniques to evaluate quality metrics.	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**	**PSO4**	

1	**H**		**H**	**S**			**S**	**S**		**S**		**H**	
2	**H**		**H**	**H**			**H**	**S**		**H**		**H**	
3	**H**		**H**	**H**	**H**		**H**	**S**		**H**		**H**	
4	**H**		**H**	**H**	**S**		**H**	**S**		**H**		**S**	
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	PASS %	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(A)**	**PASS%**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(B)**	**PASS%**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(C)**	**PASS %** (choose the unit/CO from which assignment was given)	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0**	**PASS%**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0** **(E)**	**Co-Wise Internal Average** **(Avg of A,B,C,D,E)** **(F)**	**PASS %**	**ATTAINMENT LEVEL** **>85%=3** **85-75%=2** **75-65%=1** **<65%=0**	**Co-Wise External Average** **(G)**	**CO-WISE TOTAL AVERAGE** **(F)X 0.4+ (G) X 0.6**

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2	**H (2.935)**		**H (2.935)**	**H (2.935)**				
3	**H (2.935)**		**H (2.935)**	**H (2.935)**			**H (2.935)**	
4	**H (2.8)**		**H (2.8)**	**H (2.8)**				
5	**H (2.8)**		**H (2.8)**	**H (2.8)**				
Column (a)	**Average of Cos for PO1 2.7808**	**Average of Cos for PO2**	**Average of Cos for PO3 2.7808**	**Average of Cos for PO4 2.7808**	**Average of Cos for PO5**	**Average of Cos for PO6**	**Average of Cos for PO7 2.935**	**Average of Cos for PO8**

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TOTAL PO ATTAINMENT:	**(Average of all values in Column (b):** **3.00**							