OBE DESIGN

ALL COURSES-2023-24

1. Course- Programme outcome Matrix:

The Programme Outcomes are developed through the curriculum (curricular/co-curricular, extra-curricular activities). The programme outcomes are attained through the course implementation. As an educator, one must know, to which POs is his/her course contributing to; so that one can design the learning experiences, select teaching method and design the tools for assessment. Hence, establishing the Course-PO matrix is an essential step in the OBE. The course-programme outcomes matrix indicates the correlation between the courses and programme outcomes. The CO-PO matrix is the map of list of courses contributing to the development of respective POs. The CO-PO Matrix is provided in the table for each programme.

2. Course Outcomes (for all courses):

The course outcomes are the statement that describes the knowledge & abilities developed in the student by the end of course (subject) teaching. The focus is on development of abilities rather than mere content. There can be 5 to 7 course outcomes of any course. These are to be written in the specific terms and not in general. The list of Course Outcomes is the part of Annexure-C attached herewith.

3. Set Target levels for Attainment of Course Outcomes:

The course outcome attainment is assessed in order to track the graduates' performance w.r.t target level of performance. The CO-PO attainment is the tool used for continuous improvement in the graduates' abilities through appropriate learning & teaching strategies. In order to assess students' performance with respect to abilities (at the end of course teaching/by the end of program) the course outcome attainment are measured/calculated. In order to calculate the program outcome attainment, the course outcome attainment is calculated. Prior to that, the course-program outcome mapping is done.

4. Set Target level for Attainment of Program Outcomes:

The program outcome (PO) attainment is assessed in order to track the graduates' performance w.r.t target level of performance. The CO-PO attainment is the tool used for continuous improvement in the graduates' abilities through appropriate learning & teaching strategies. In order to assess students' performance with respect to abilities (at the end of course teaching/by the end of program) the course outcome (CO) attainment and program outcome attainment is measured/calculated. The program outcome attainment is governed by curricular, co-curricular and extra-curricular activities including the stakeholders' participation. The direct method and indirect method is adopted to calculate the PO attainment. The direct method implies the attainment by course outcomes contributing to respective program outcomes. And indirect method is the satisfaction/feed-back survey of stakeholders. In order to calculate the program outcome attainment, the course outcome attainment is calculated. Prior to that, the course-program outcome mapping is done.

The set target level is the set benchmark to ensure the continuous improvements in the learners/ graduates' performance.

5. Course Outcome Attainment Levels:

a. CO attainment is defined/set at five levels;

b. The CO attainment is based on end term examination assessment and internal assessment;

c. The Co attainment is defined at five levels in ascending order

The following are the defined CO attainment level for **BSc (Mathematics)**

e.g. For end term and internal examination;

i. **Level-1**: 40% to 49.99% students scored more than class average
ii. **Level-2**: 50% to 59.99% students score more than class average;
iii. **Level-3:** 60% to 69.99% students score more than class average;
iv. **Level-4**: 70% to 79.99% students score more than class average;
v. **Level 5**: 80% to 89.99% students score more than class average.

d. The target level is set (e.g. Level-2). It indicates that, the current target is level-2; 50% students score more than class average. The CO attainment is measured and the results are obtained. Based on the results of attainment, the corrective measures/remedial action are taken.

e. CO Attainment= 75% (Attainment level in end term examination) + 25% (Attainment level in internal examination).

For academic year 22-23 (Semester I only)

CO Attainment= 60% (Attainment level in end term examination) + 40% (Attainment level in internal examination).

f. One example on calculation of CO attainment for **BSc (Mathematics)** is provided under point No.7 in the below paragraph.

6. Program attainment Level:

a. PO attainment is defined at five levels in ascending order;

b. The PO attainment is based on the average attainment level of corresponding courses (Direct Method) and feed-back survey (Indirect method);

c. The PO attainment levels are defined / set as stated below

i. Level-1: Greater than 0.5 and less than 1.0 (0.5>1)- Poor
ii. Level-2: 1.0>1.5-Average
iii. Level-3: 1.5>2.0-Good
iv. Level-4: 2.0>2.5-Very Good
v. Level-5: 2.5>3.0 –Excellent

d. The PO attainment target level is set/defined (say, Level-4). It implies that, the department is aiming at minimum level-4 (very good) in the performance of abilities by the graduates. Based upon the results of attainment, the remedial measures are taken;

e. PO Attainment= 80% (Average attainment level by direct method) + 20% (Average attainment level by indirect method)

f. One example on calculation of PO attainment for Master of Commerce is provided under point No. 8 in the below paragraph

Table 1.0:PO & CO Mapping Table- BSc (Mathematics)
Academic Year 2023-24

Semester	Course Code	Course Name	CO PO Mapping								
			PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**
I	**BUSMT101**	Calculus-I	*	*	*	*	*	*	*	*	*
	BUSMT102	Algebra-I	*	*	*	*	*	*	*	*	*
II	**BUSMT201**	Calculus-II	*	*	*	*	*	*	*	*	*
	BUSMT202	Linear Algebra-I	*	*	*	*	*	*	*	*	*
III	**BUSMT301**	Calculus-III	*	*	*	*	*	*	*	*	*
	BUSMT302	Linear Algebra-II	*	*	*	*	*	*	*	*	*
	BUSMT303	Discrete Mathematics	*	*	*	*	*	*	*	*	*
IV	**BUSMT401**	Calculus-IV	*	*	*	*	*	*	*	*	*
	BUSMT402	Linear Algebra-III	*	*	*	*	*	*	*	*	*
	BUSMT403	Ordinary Differential Equation	*	*	*	*	*	*	*	*	*
V	**BUSMT501**	Multivariable Calculus	*	*	*	*	*	*	*	*	*
	BUSMT502	Algebra-II	*	*	*	*	*	*	*	*	*
	BUSMT503	Topology of Metric Spaces	*	*	*	*	*	*	*	*	*
	BUSMT5A4	Numerical Analysis I	*	*	*	*	*	*	*	*	*
VI	**BUSMT601**	Basic Complex Analysis	*	*	*	*	*	*	*	*	*
	BUSMT602	Algebra-III	*	*	*	*	*	*	*	*	*
	BUSMT603	Topology of Metric Spaces and Real Analysis	*	*	*	*	*	*	*	*	*
	BUSMT6A4	Numerical Analysis II	*	*	*	*	*	*	*	*	*

The Results of CO Attainment:

The Results of CO attainment are provided in Annexure-B

FOR EXAMPLE: COURSE CODE/TITLE: SEM I/ BUCBIEMFS101 / Environment and Management of Financial Services

e.g. For end term and internal examination;

i. **Level-1**: 40% to 49.99% students scored more than class average
ii. **Level-2**: 50% to 59.99% students score more than class average;
iii. **Level-3:** 60% to 69.99% students score more than class average;
iv. **Level-4**: 70% to 79.99% students score more than class average;
v. **Level 5**: 80% to 89.99% students score more than class average.

Average Marks in External examination: 40.010 = i.e. 40.00

% Students score more than 40 is 312/599 i.e. 52.09% i.e. Levl-2

Average Marks in Internal examination= 17.087= i.e. 17.00

% Students score more than 17 is 432/599= 72.12%, i.e. Level-4

A (CO) BUCBIEMFS101 **= 60% (2) +40%(4) = 1.2 + 1.6 = 2.8**

Hence, the attainment level is Level-2 and the set target level is Level-2 and therefore the CO is fully attained. Following table provides details of Course Outcome (CO) attainment levels.

Table No. 1.1: CO Attainment Level - BSc (Mathematics)
Academic Year 2022-23

SEM	SUB	CODE	CO Attainment value	Attainment Target Level	Fully Attained/ Not Attained	Remedial Measures
I	BUSMT101	Calculus-I	2.09	2	Fully Attained	NA
	BUSMT102	Algebra-I	1.02	2	Not Fully Attained	Remedial Coaching
II	BUSMT201	Calculus-II	2.04	2	Fully Attained	NA
	BUSMT202	Linear Algebra-I	1.09	2	Not Fully Attained	Remedial Coaching
III	BUSMT301	Calculus-III	2.16	2	Fully Attained	NA
	BUSMT302	Linear Algebra-II	1.64	2	Not Fully Attained	Remedial Coaching
	BUSMT303	Discrete Mathematics	1.36	2	Not Fully Attained	Remedial Coaching
IV	BUSMT401	Calculus-IV	2.11	2	Fully Attained	NA
	BUSMT402	Linear Algebra-III	1.22	2	Not Fully Attained	Remedial Coaching
	BUSMT403	Ordinary Differential Equation	1.02	2	Not Fully Attained	Remedial Coaching
V	BUSMT501	Multivariable Calculus	2.26	2	Fully Attained	NA
	BUSMT502	Algebra-II	1.44	2	Not Fully Attained	Remedial Coaching

	BUSMT503	Topology of Metric Spaces	2	2	Fully Attained	NA
	BUSMT5A4	Numerical Analysis I	2	2	Fully Attained	NA
	BUSMT5P5	EI	2	2	Fully Attained	NA
VI	BUSMT601	Basic Complex Analysis	0.8	2	Not Fully Attained	Remedial Coaching
	BUSMT602	Algebra-III	1.8	2	Not Fully Attained	Remedial Coaching
	BUSMT603	Topology of Metric Spaces and Real Analysis	1	2	Not Fully Attained	Remedial Coaching
	BUSMT6A4	Numerical Analysis II	1.6	2	Not Fully Attained	Remedial Coaching
	BUSMT6P5	EI	1.8	2	Not Fully Attained	Remedial Coaching
Average			1.62	2	Not Fully Attained	Remedial Coaching

NA: Not applicable as target level is fully attained.

Table No. 1.2: Results of CO-PO attainment
Bachelor of Science (Mathematics)

Semester	Course Code	Course Name	CO PO Mapping								
			PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9
I	**BUSMT101**	Calculus-I	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09
	BUSMT102	Algebra-I	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
II	**BUSMT201**	Calculus-II	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04
	BUSMT202	Linear Algebra-I	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
III	**BUSMT301**	Calculus-III	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16
	BUSMT302	Linear Algebra-II	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64
	BUSMT303	Discrete Mathematics	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36
IV	**BUSMT401**	Calculus-IV	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11
	BUSMT402	Linear Algebra-III	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22
	BUSMT403	Ordinary Differential Equation	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
V	**BUSMT501**	Multivariable Calculus	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26
	BUSMT502	Algebra-II	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44
	BUSMT503	Topology of Metric Spaces	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42
	BUSMT5A4	Numerical Analysis I	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42
	BUSMT5P5	EI	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62
VI	**BUSMT601**	Basic Complex Analysis	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98

	BUSMT602	Algebra-III	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78
	BUSMT603	Topology of Metric Spaces and Real Analysis	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58
	BUSMT6A4	Numerical Analysis II	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53
	BUSMT6P5	EI	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02
		Average	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64