MIT First Grade College

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Manual for CO-PO Mapping and Attainment

Index

1	Terminology
2	Course Outcomes
3	Mapping CO and PO
4	PO Attainment Process

Terminologies:

Program:

The **Program** is nothing but the branch of Engineering/ Management a candidate opts as a choice of professional one chooses to be.

Course:

Course is nothing but the subjects that are taught to the students during the curriculum year.

Stakeholders:

Stakeholders include **Regulators** (UGC, AICTE, etc), **Management**, **Students**, **Faculty**, **Industry**, and **Society**.

Program Outcome (PO):

Program outcomes describe what students are expected to know and would be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire as they progress through the program. Program Outcome **should ensure** that the **profile of the graduates meets the requirement of stakeholders** such as those that **have influence in career** of graduates.

Course Outcome (CO):

Statements indicating what a student can do after the successful completion of a course. Every Course leads to some Course Outcomes. The CO statements are defined by considering the course content covered in each module of a course. For every course there may be 5 or 6 COs. The keywords used to define COs are based on Bloom's Taxonomy.

OBE:

The **Outcome Based Education** (OBE) demands that the **Program** be designed to instill the required level of

professional attributes at the completion of the program in the candidate in the form of **Program Outcome(PO)**. **Program Educational Objectives (PEOs): Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.**

CO

The **course outcome (CO's)** of **each subject** must **contribute to several of the defined Program Outcome (PO's)** and in doing so the graduate will be educated with the **attributes** that are required by the stakeholders.

Course outcomes are **action statements** that are written by using verbs.

Such as:

1. **Apply** laws of physics (eg. Hook's law, etc.,) to compute different types of response (stress and deformation) in the given materials. (PO 1)
2. **Analyze** structural elements for different force systems to compute design parameters (BM and SF) (PO2)
3. **Design** compression elements using engineering principles to resist any given loads. (PO3)
4. **Conduct** experiments to validate physical behavior of materials/components.
5. **Prepare** laboratory reports on interpretation of experimental results (P10)

A **minimum of 5 CO's** must be written for each course and **one of the CO must compulsorily** be communicating **real life application** of that particular course.

HOW TO WRITE THE CO'S?

Step 1: Check for the availability of COs mentioned in the syllabus. If available, the same could be suitably adopted in writing the actual CO's for your respective courses. If the VTU defined CO's are not satisfying the compliance with PO's then the CO's may be modified

Step 2: The CO's must be written using Action based words. Each subject could have a minimum of 5 CO's and one of which must compulsorily be communicating **real life application** of that particular course.

Step 3: The initial draft of the written CO's must be approved by the Advisory Committee.

Step 4: The Criterion#2 coordinator must create a list of subjects with their unique codes and the same must consolidated for each semester and enlisted.

How a CO must NOT be Written

A CO must be written in such a way that they should be measured and **not like the below.**

CO1: Understand the knowledge of basic quantum mechanics, to set up one-dimensional Schrodinger's wave equations and its application to few physical problems.

CO2: Understand the fundamental aspects of crystallography, able to recognize various planes in a crystal and have knowledge of structure determination using x-rays.

CO3: Understand the role of free electrons in determining the properties of metals, the concept of Fermi energy, and the domain formation in ferromagnetic materials.

CO4: Understand the basic laser physics, working of lasers, holography and principle of propagation of light in optical fibers.

CO5: Understand the theory of free, damped and forced vibrations of a particle and also the concept of resonance and its applications in ESR & NMR.

CO Format

COURSE OUTCOME

Subject:-Data Structures and File Processing Subject code : BC2DS

CO's	DESCRIPTION OF THE OUTCOMES	BT LEVEL
BC2DS.1	Describe different types of data structures, their operations, implementations and applications.	L2
BC2DS.2	Compare various searching and sorting techniques.	L4
BC2DS.3	Summarize various characteristics of storage devices.	L2
BC2DS.4	Describe basic file system organization.	L2
BC2DS.5	Explain the concepts of memory management.	L2

Step 5: The respective faculty must plan the **Delivery/ Instructional Methodologies and** Assessment **Methodologies by choosing from the mentioned methodologies** for their respective subjects and get the approval of the Criterion#2 Coordinator and the HOD.

Delivery/ Instructional Methodologies:

1. Chalk and Talk

2. Assignment

3. Web Resources

4. ICT

5. Student Seminars

6. Add on Courses

Assessment Methodologies Direct:

1. Assignment

2. Seminar

3. Test/Preparatory

4. University Examination

5. Lab Practices

6. Viva

7. Project

8. Certification

9. Add on Course

10. Others

Step 6: The respective faculty must prepare the question papers for internal assessment and map individual questions with various CO's. The format for preparing the question papers is as follows.

CO's	Q. NO		Q Description	Marks Allotted
	1	a		
		b		
	2	a		
		b		
	3	a		
		b		
	4	a		
		b		

Note: Each of the question must only Map to any one of the COs. In case a choice is to be given between two questions, make sure both of them are mapped to the same COs.

Step 7: The respective faculty must prepare the scheme of evaluation for each of the IA QP's. The format for the same is as follows.

CO	Q. NO		Q Description	Marks Allotted
	1	a		
			Ans)	
		b		
			Ans)	

	2	a		
			Ans)	
		b		
			Ans)	
	3	a		
			Ans)	
		b		
			Ans)	

CO – PO Mapping

All the courses together must cover all the PO's. For a course we map the CO to PO through the CO-PO matrix with a measure of correlation. The various correlation levels are:

- **"1"** – Slight (Low) Correlation
- **"2"** – Moderate (Medium) Correlation
- **"3"** – Substantial (High) Correlation
- **"-"** indicates there is no correlation.

CO-PO Mapping Format

CO No	Program Outcomes									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
18BC2DS.1	3	2	2	-	-	-	-	-	-	-
18BC2DS.2	-	2	-	-	-	-	-	-	-	-
18BC2DS.3	2	-	-	-	-	-	-	-	-	-
18BC2DS.4	2	-	-	-	-	-	-	-	-	-
18BC2DS.5	2	-	-	-	-	-	-	-	-	-
CO Average	2.25	2	2							

Note: CO Average is calculated as total of the COs / No. of cells filled in that particular PO column

Note: **The faculty must justify the assigned level of relevance in brief to the advisory committee.**

CO-PO Approval Format for each subject

Date: --/--/--

COURSE OUTCOME

Subject:-Data Structures and File Processing Subject code : 18BC2DS

CO's	DESCRIPTION OF THE OUTCOMES	BT LEVEL
18BC2DS.1	Describe different types of data structures, their operations, implementations and applications.	L2
18BC2DS.2	Compare various searching and sorting techniques.	L4
18BC2DS.3	Summarize various characteristics of storage devices.	L2
18BC2DS.4	Describe basic file system organization.	L2
18BC2DS.5	Explain the concepts of memory management.	L2

CO No	Program Outcomes									
	1	2	3	4	5	6	7	8	9	10
18BC2DS.1	3	2	2	-	-	-	-	-	-	-
18BC2DS.2	-	2	-	-	-	-	-	-	-	-
18BC2DS.3	2	-	-	-	-	-	-	-	-	-
18BC2DS.4	2	-	-	-	-	-	-	-	-	-
18BC2DS.5	2	-	-	-	-	-	-	-	-	-
CO Average	2.25	2	2							

Delivery/ Instructional Methodologies:

Assessment Methodologies Direct:

Faculty	**HOD**	**IQAC Co-ordinator**	**Principal**

Program level CO-PO matrix for all the courses including first year courses will be done by the program coordinator and a sample is given.

SEM	Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10

AVG											

PO Attainment

Step 1: The respective faculty in consultation with the Criterion#2 Coordinator must define the **Attainment Level** and prepare the **CO Attainment Plan** for the respective course. The procedure for selection of the Attainment level as prescribed by NBA is as follows.

According to NBA-SAR guidelines, the optional **attainment level of Course Outcomes** are as follows.

Attainment Level 1: 60% of the students score more than 60% marks
Attainment Level 2: 70% of the students score more than 60% marks
Attainment Level 3: 80% of the students score more than 60% marks

The Attainment Level information and the plan of achieving that attainment level must be documented in the course file as per the format mentioned below.

Course/ Subject Name	
Course / Subject Code	
Session of Course	Feb 2018 – May 2018
L:T:P (Lecture: Tutorial: Practical)	3:0:2
Semester	
Credits	
Batch	
Faculty	

Mapping of the CO's with Each test and other assessment methods.

CO's	IA1	IA2	IA3	Quiz/ Assignment 1	Quiz/ Assignment2	Quiz/ Assignment3	Lab/Practical
	Q. Nos	Q. Nos	Q. Nos	Yes	No	Yes	
	Q. Nos	Q. Nos	Q. Nos	Yes	Yes	No	
	Q. Nos	Q. Nos	Q. Nos	No			

Step 2: Upon completion of an IA and its valuation, the marks of each of the candidate must be entered by the faculty in test book behind the cover page. The format for the same is as mentioned below.

INTERNAL ASSESSMENT SUMMARY																			
Student Name:		**USN:**						**Semester:**			**Section:**								
CO Code		**Description of the COs**																	
BC2DS.1																			
BC2DS.2																			
BC2DS.3																			
BC2DS.4																			
BC2DS.5																			
Question NOs		1a	1b	1c	2a	2b	2c	3a	3b	3c	4a	4b	4c	**Assignments**					
Max Marks																			
Cos Mapped to		BC2DS.1	BC2DS.4	BC2DS.3															**Total**
IA1	**Date**																		
IA2	**Date**																		

Step 3: After the completion of each IA, the Course Coordinator of the respective subject must consolidate the IA for each section and tabulate the same in the following formats.

This below mentioned format is preferably to be done in Excel sheet

Sub Code:		IA1																		IA2	IA3	SEE
Question NOs		1a	1b	1c	2a	2b	2c	3a	3b	3c	4a	4b	4c	Assignments					Total			
Max Marks																						
Cos Mapped to		BC2DS.1	BC2DS.4	BC2DS.3																		
Name	RegNo																					

The Consolidated Marks of each IA must then be mapped to the CO's and the level of attainment for each CO must be calculated as follows.

Sub Code:		IA1																		IA2	IA3	SEE
Question NOs		1a	1b	1c	2a	2b	2c	3a	3b	3c	4a	4b	4c	Assignments					Total			
Max Marks																						
Cos Mapped to		BC2DS.1	BC2DS.4	BC2DS.3																		
Name	USN	Set Target >60%																				
Yogesh	05ME127	Y	N	Y	-	Y	N	NA	N	Y	Y	Y	N									
Kishan	07ME016	N	Y	N	-	N	Y	N	Y	N	N	N	Y									
Chethan	07ME123	NA	Y	Y	-	Y	Y	N	Y	Y	Y	Y	N									
Ramesh	10ME021	NA	Y	Y	-	Y	Y	N	Y	Y	Y	Y	N									
CO Attainment in %		**50**	**75**	**75**	NA			0			75			50								

Average attainment per CO = CO attainment in every Assessment/No. of instances of assessing that CO.

For Example: from the above table:

Average CO1=CO1 (IA1+IA2+IA3+etc)/No. of instances of assessing CO1

Overall CO attainment = [Avg (CO1+CO2+CO3+CO4+CO5+etc)]/ No. of COs.

Note: **Y** represents that the candidate has **secured more than the set target**

N represents that the candidate has **not secured the set target**

NA represents the candidate has **not attendedthat question**

- represents that the Question is **not applicable to that particular IA**

Co Attainment = No. of Y's/ No. of Candidates Attended that IA

CO Attainment for a Subject: BC2DS							
COs	IA1	IA2	IA3	A1	A2	A3	Individual CO Avg
BC2DS.1	43.75						
BC2DS.2							
BC2DS.3							
BC2DS.4							
BC2DS.5							
Overall CO Attainment							

Then, the course coordinator must calculate overall CO for both IA's and SEE as follows.

Case1: Overall CO attainment = 50% of CO level in SEE + 50% of CO level in IA

= 0.5*1+0.5*2

=1.5

= [50% of CO level in SEE*the overall CO attainment level in SEE] + [50% of CO level in IA's *the overall CO attainment level in IA's]

Step 4: The Course coordinator must then provide the Overall CO attainment of the respective course to the Criterion Coordinator#3.

The Criterion Coordinator#3 must then calculate the PO attainment Level as follows for each of the PO's.

Example:

PO ATTAINMENT TABLE												
Semester: v												
CO AVG	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
BC5ST (PNMX subject)	**1.08**	**0.74**										
BC5CS												

PO 1 Attainment **= (2.7*1.2)/3**

=1.08

PO2 Attainment **= (1.85*1.2)/3**

=0.74

PO3 Attainment **= (2.8*1.2)/3**

=1.12

And So on

Step 5: The Criterion Coordinator #3 must consolidate the PO attainment values for each semester as follows.

Semester: V													
Subjects	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**			**CO Avg**
10ME51 (PNMX subject)													
10ME 52													
10ME 53													
10ME 54													
10ME 55													
10ME 56													
Direct PO Attainment Avg													
Indirect PO Attainment Avg													
Overall PO attainment													
Target Set													

Overall PO attainment = The Average of (Direct PO attainment + Indirect Po Attainment)

Target Set = The value for corresponding PO from table **apcq. (By the Advisory Committee)**

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