G.S. Mandal's

MAHARASHTRA INSTITUTE OF TECHNOLOGY

Chh. Sambhajinagar

(An Autonomous Institute)

Department of Electrical Engineering

Instructional System Design

Class: **T.Y.B.Tech(Autonomous)**

Course: **EED301 Control System Engineering**

Step 1: Write Course Outcomes using Revised Bloom's Taxonomy

Structure of a CO statement

- CO1: Able to **Determine** the mathematical modelling of physical systems and evaluate their transfer function of using block diagram and /or signal-flow graph techniques (Remember)
- CO2: Able to **Interpret** different physical and mechanical systems in terms of electrical system to construct equivalent electrical models for analysis. system (Understand)
- CO3: Able to **Employ** the time-domain response of first and second order systems for various standard test signals and investigate their stability using time-domain techniques ions (Apply)
- CO4: Able to **Analyze** the system response and stability in time domain (Analyse)
- CO5: Able to **Formulate** different types of analysis in frequency domain to explain the nature of stability of the system (Analyse)
- CO6: Able to **Design** different types of controllers and compensator to ascertain the required dynamic response from the system (Create)

Step 2: Locate COs in Revised Bloom-Vincenti Taxonomy Table

For example,

CO1: Define the terminologies used in solid state devices (Remember)

- Action: Define (Remember)
- Knowledge: terminologies used (Factual)
- Condition: of HEV

- Criterion: None

CO	Action	Knowledge	Condition	Criteria
1	**Categorize**	Remembering(F)	None	None
2	**Characterize**	Understanding(C)	None	None
3	**Interpret**	Apply (C,F,P)	None	None
4	**Employ**	Analysing (F,C & P , C&S)	using simplification methods	optimize a HEV
5	**Formulate**	Analyse (F,C,P,M, C&S)	None	for given specifications
6	**Design**	Create (F, C ,P ,M, C&S)	None	for a given application/problem statement

Locating Sample CO in Revised Bloom-Vincenti Taxonomy Table

Cognitive Processes	**Knowledge Categories**							
	Factual	Conceptual	Procedural	Meta-cognitive	Fundamental Design Principles	Criteria & Specifications	Practical Constraints	Design instrumentalities
Remember	CO1							
Understand		CO2						
Apply	CO3	CO3	CO3					
Analyze	CO4	CO4	CO4	-		CO4		
	CO5	CO5	CO5	CO5		CO5		
Evaluate								
Create	CO6	CO6	CO6	CO6		CO6		

Step 3: Tag course outcomes with Program Outcomes (POs,) Program Specific Outcomes (PSOs,) Cognitive Level (CL), Knowledge Categories (KC), number of Class/ Laboratory/ Field sessions, and present it in the table format indicated with sample course.

Departmental PSO:

PSO 1: Inculcate the ability to utilize applied sciences, transform methods, discrete mathematics, applied differential equations and numerical methods in support of electrical and electronics engineering.

PSO 2: Demonstrate the ability to analyze, design & implement control and instrumentation systems with computer and power systems.

PSO 3: Student should be able to use computational techniques to design and analyze electrical systems.

Special Purpose Electrical Machines - Credits: 3:0:0

	Course Outcome	**POs/ PSOs**	**CL**	**KC**	**Class Sessions**	**Tutorial (Hrs.)**
CO1	Able to **Interpret** different physical and mechanical systems in terms of electrical system to construct equivalent electrical models for analysis. system (Understand	PO1, PSO1	R	F	08	00
CO2	Able to **Interpret** different physical and mechanical systems in terms of electrical system to construct equivalent electrical models for analysis. system (Understand	PO2,3 PSO1	U	C	06	00
CO3	Able to **Employ** the time-domain response of first and second order systems for various standard test signals and investigate their stability using time-domain techniques ions (Apply)	PO2,3,5 PSO3	AP	F,C, P	06	00

CO4	Able to **Analyze** the system response and stability in time domain (Analyse)	PO1,2,5 PSO3	An	F,C, P, C&S	06	00
CO5	Able to **Formulate** different types of analysis in frequency domain to explain the nature of stability of the system (Analyse)	PO2,4 PSO2,3	An	P,M FDP, C&S	06	00
CO6	Able to **Design** different types of controllers and compensator to ascertain the required dynamic response from the system (Create)	PO1, PSO1	C	P, M, C&S	04	00
Total Hours of instruction					**36**	**00**

Cognitive levels

R-Remember, U-Understand, AP- Apply, An-Analyse, E-Evaluate and C-Create.

Categories of Knowledge

General Categories

F- Factual, C- Conceptual, P- Procedural, M-Metacognitive

Categories specific to Engineering

FDP- Fundamental Design Principles, C&S-Criteria and Specifications, PS- Practical Constraints, DI- Design Instrumentalities

Step 4: Decide on Strength of CO-PO/PSO Mapping

- Example (Showing only non-zero mapping entries):

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 10	PSO1	PSO2	PSO3
CO1	2						2		
CO2		2	2				2		
CO3		2	2		2				2

CO4	2	2			2				
CO5		2		2				2	2
CO6	1								1
Average	2	2	2	2	2		2	2	2
Mapping Strength	2	2	2	2	2		2	2	2

Step 5: Identify the Assessment Items/Assessment Instruments, Delivery Technologies and Instruction types.

Cos	Assessment Items/Assessment Instruments		Delivery Technologies	Instruction types
CO1	MSE - I	ESE	Chalk & Board PPT Presentation Video Lecture	Teaching Plan
CO2	MSE-I	ESE	Chalk & Board PPT Presentation Video Lecture	Teaching Plan
CO3	MSE -II	ESE	Chalk & Board PPT Presentation Video Lecture	Teaching Plan
CO4	MSE-II	ESE	Chalk & Board PPT Presentation Video Lecture	Teaching Plan
CO5	MSE-CIE 1,2	ESE	Chalk & Board PPT Presentation	Teaching Plan

			Video Lecture	
CO6	Teacher Assessment	ESE	Chalk & Board PPT Presentation Video Lecture	Teaching Plan

Instructional System Design

Class: **T.Y.B.Tech(Autonomous)**

Course: **EED302 Microprocessor 8085**

Course Outcomes:

Step 1: Course Outcomes using Revised Bloom's Taxonomy

CO1: **Explain** the functionality of each architectural block of 8085 microprocessor

Action: Explain (Understand)

Knowledge: the functionality of each architectural block

Condition: of 8085 microprocessor and 8051 microcontroller

Criteria:

CO2: **Describe** the assembly language instructions of 8085 microprocessor

Action: Describe (Understand)

Knowledge: instructions

Condition: of 8085 microprocessor

Criteria: assembly language

CO3:**Develop** assembly language programs for 8085 microprocessor .

Action: Develop (Apply)

Knowledge: programs

Condition: of 8085 microprocessor and 8051 microcontroller

Criteria: assembly language

CO4:**Interface** semiconductor memory to 8085 microprocessor

Action: Interface (Apply)

Knowledge: memory

Condition: to 8085 microprocessor

Criteria: semiconductor memories

CO5: **Interface** various peripherals to 8085 microprocessor.

Action: Interface (Apply)

Knowledge: peripherals

Condition: to 8085 microprocessor

Criteria: assembly language

CO6: **Design** an 8085 microprocessor based system using ADC, DAC, Stepper motor, DC Motor & Relay using assembly language

Action: Design (Apply)

Knowledge: ADC, DAC, Stepper motor, DC Motor & Relay

Condition: 8085 microprocessor based system

Criteria: assembly language

CO1	**Explain** the functionality of each architectural block of 8085 microprocessor
CO2	**Describe** the assembly language instructions of 8085 microprocessor
CO3	**Develop** assembly language programs for 8085 microprocessor
CO4	**Interface** semiconductor memory to 8085 microprocessor
CO5	**Interface** various peripherals to 8085 microprocessor
CO6	**Design** an 8085 microprocessor based system using ADC, DAC, Stepper motor, DC Motor & Relay using assembly language

Step 2: Location of COs in Revised Bloom-Vincenti Taxonomy Table

Cognitive Processes	**Knowledge categories**							
	Factual	Conceptual	Procedural	Meta-cognitive	Fundamental Design Principles	Criteria & Specifications	Practical Constraints	Design instrumentalities
Remember		CO1						
Understand		CO2						
Apply			CO3, CO4,CO5, CO6					
Analyze								
Evaluate								
Create								

Step 3: Tagging of course outcomes with Program Outcomes (POs,) Program Specific Outcomes (PSOs,) Cognitive Level (CL), Knowledge Categories(KC),numberofClass/Laboratory/Field sessions, and present it in the table format indicated with sample course

	Course Outcome	**POs/ PSOs**	**CL**	**KC**	**Class Sessions**
CO1	**Explain** the functionality of each architectural block of 8085 microprocessor	PO1	U	FDP	06
CO2	**Describe** the assembly language instructions of 8085 microprocessor	PO1	U	FDP	06
CO3	**Develop** assembly language programs for 8085 microprocessor	PO2	AP	C&S, DI	06
CO4	**Interface** semiconductor memory to 8085 microprocessor	PO3	AP	C&S, DI	06
CO5	**Interface** various peripherals to 8085 microprocessor	PO3	AP	C&S, DI	06
CO6	**Design** an 8085 microprocessor based system using ADC, DAC, Stepper motor, DC Motor & Relay using assembly language	PO3	AP	C&S, DI	06
					36

Cognitive levels

R-Remember, U-Understand, Ap- Apply, An-Analyse, E-Evaluate and C-Create.

Categories of Knowledge

General Categories

F- Factual, C- Conceptual, P- Procedural, M-Metacognitive

Categories specific to Engineering

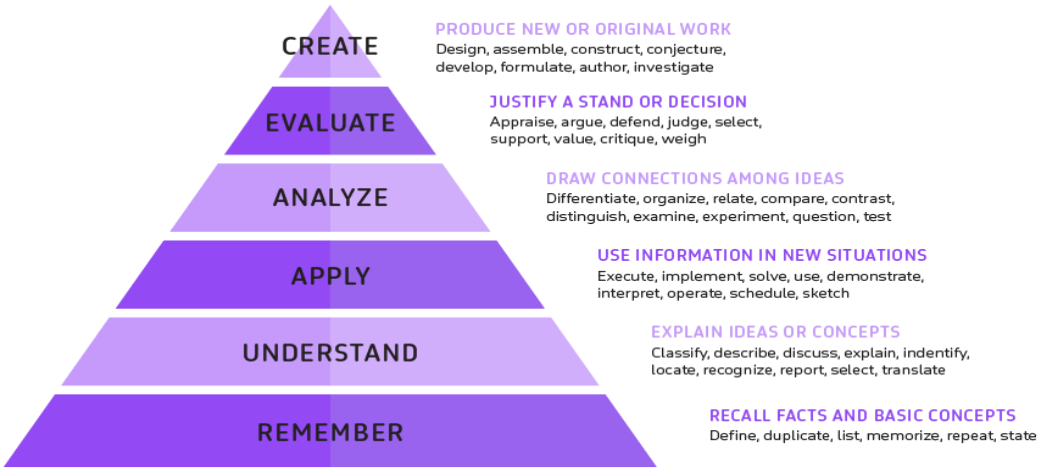
FDP- Fundamental DesignPrinciples, C&S-Criteria andSpecifications, PS-practical Constraints, DI- Design Instrumentalities

Step 4: Strength of CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3												3		
CO2	3												3		
CO3		3											2	2	
CO4			2											2	2
CO5			2											2	2
CO6			2											2	2
Avg	3	3	2										2.66	2	2

Step 5: Identification of the Assessment Items/Assessment Instruments, Delivery Technologies and Instruction types.

Cos	Assessment Items/Assessment Instruments		Delivery Technologies	Instruction types
CO1	MSE-I	ESD	Chalk & Board, PPT Presentation	Teaching Plan
CO2	TA	ESD	Chalk & Board, PPT Presentation	Teaching Plan
CO3	MSE-II	ESD	Chalk & Board, PPT Presentation	Teaching Plan
CO4	MSE-II	ESD	Chalk & Board, PPT Presentation	Teaching Plan
CO5	CIE 1	PR Exam	Chalk & Board, PPT Presentation	Teaching Plan
CO6	CIE 2	PR Exam	Chalk & Board, PPT Presentation	Teaching Plan



INSTRUCTIONAL SYSTEM DESIGN

Class: T.Y.B.Tech(Autonomous)

Course: EED303 Power Electronics

Step 1: Write Course Outcomes using Revised Bloom's Taxonomy

Course outcomes

CO1	Demonstrate the behavior of different switching devices (SCR, MOSFET, IGBT, GTO and TRIAC.) for construction, working, VI characteristics and switching characteristics. (Understand)
CO2	Demonstrate the operation of single phase controlled and uncontrolled rectifiers and analyze its characteristics and performance parameters with R and RL load (Analyze)
CO3	Demonstrate the operation of Three phase controlled and uncontrolled rectifiers and analyze its characteristics and performance parameters with R and RL load (Analyze)
CO4	Describe basic operation of chopper with control methods (Understand)
CO5	Demonstrate the operation of single phase inverter with different types and three phase inverter with different operating mode.. (Analyze)
CO6	Illustrate the functioning of AC voltage controllers and cycloconverters(Analyze)

step 2: Locate COs in Revised Bloom-Vincenti Taxonomy Table

Cognitive Processes	**Knowledge Categories**							
	Factual	Conceptual	Procedural	Meta-cognitive	Fundamental Design Principles	Criteria & Specifications	Practical Constraints	Design instrumentalities
Remember	CO1							
Understand								
Apply	CO4		CO2					
Analyze	CO6	CO5	CO3					
Evaluate								
Create								

Step 3: Tag course outcomes with Program Outcomes (POs,) Program Specific Outcomes (PSOs,) Cognitive Level (CL), Knowledge Categories (KC), number of Class/ Laboratory/ Field sessions, and present it in the table format indicated with sample course

	Course Outcome	POs/ PSOs	CL	KC	Class Sessions	Practical session
CO1	Demonstrate the behavior of different switching devices (SCR, MOSFET, IGBT, GTO and TRIAC.) for construction, working, VI characteristics and switching characteristics. (Understand)	PO1, PO2,PO9,PO12,PSO1	R	F	7	2
CO2	Demonstrate the operation of single phase controlled and uncontrolled rectifiers and analyze its characteristics and performance parameters with R and RL load (Analyze)	PO1, PO2,PO3,PO4,PO12,PSO2	AP	PR	8	2
CO3	Demonstrate the operation of Three phase controlled and uncontrolled rectifiers and analyze its characteristics and performance parameters with R and RL load (Analyze)	PO1, PO2,PO3,PO4,PO12,PSO2	AZ	PR	6	1
CO4	Describe basic operation of chopper with control methods (Understand)	PO2,PO3,PO12,PSO2	AP	F	5	2
CO5	Demonstrate the operation of single phase inverter with different types and three phase inverter with different operating mode.. (Analyze)	PO2,PO4,PO5PO12,PSO2	AZ	C	7	1
CO6	Illustrate the functioning of AC voltage controllers and cycloconverters(Analyze)	PO1,PO12,PSO2	AZ	F	5	1
Total Hours of instruction					**36**	**9**

Cognitive levels

R-Remember, U-Understand, Ap- Apply, An-Analyse, E-Evaluate and C-Create.

Categories of Knowledge

General Categories

F- Factual, C- Conceptual, P- Procedural, M-Metacognitive

Categories specific to Engineering

FDP- Fundamental Design Principles, C&S-Criteria and Specifications, PS- Practical Constraints, DI-Design Instrumentalities

Step 4: Decide on Strength of CO-PO/PSO Mapping

- Example (Showing only non-zero mapping entries):

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO9**	**PO12**	**PSO1**	**PSO2**
Power Electronics								
CO1:Demonstrate the behavior of different switching devices (SCR, MOSFET, IGBT, GTO and TRIAC.) for construction, working, VI characteristics and switching characteristics. (Understand)	3	2			1	1	1	
CO2:Demonstrate the operation of single phase controlled and uncontrolled rectifiers and analyze its characteristics and performance parameters with R and RL load (Analyze)	1	3	3	2		1		1
CO3:Demonstrate the operation of Three phase controlled and uncontrolled rectifiers and analyze its characteristics and performance parameters with R and RL load (Analyze)	1	3	3	2		1		1
CO4:Describe basic operation of chopper with control methods (Understand)		3	2			1		1
CO5:Demonstrate the operation of single phase inverter with different types and three phase inverter with different operating mode.. (Analyze)		3		2	1	1		1
CO6:Illustrate the functioning of AC voltage controllers and cycloconverters(Analyze)	3					1		1

Average	2	2.4	2.6	2	1	1	1	1

Course Coordinator: R.P.Dahad

INSTRUCTIONAL SYSTEMS DESIGN

Name of the Course: EED304 Power Systems-I

Class: TY

Step 1: Write Course Outcomes using Revised Bloom's Taxonomy

1. **Describe** layout and operation of thermal and hydro power plant.
2. **Calculate** the transmission line constants of solid & composite conductors using the concept of GMD
3. **Classify** types of conductors and insulators also compare them based on the design specification & illustrate the effects caused by voltage & current
4. **Calculate** the sending end and receiving end parameters of different (short, medium & long) types of transmission lines.
5. **Discuss** the classification, requirements, design considerations, and calculation methods for AC and DC distribution systems.

CO1: Describe layout and operation of thermal and hydroelectric power plant & Evaluate plant economics.

- Action: Describe, Evaluate
- Knowledge: layout and operation of thermal and hydroelectric power plant
- Condition: NA
- Criteria: NA

CO2: Calculate the transmission line constants of solid & composite conductors using the concept of GMD.

- Action: Calculate
- Knowledge: the transmission line constants of solid & composite conductors
- Condition: using the concept of GMD.
- Criteria: NA

CO3: Classify types of conductors and insulators also compare them based on the design specification & illustrate the effects caused by voltage & current.

- Action: Classify, Illustrate
- Knowledge: types of conductors and insulators, the effects caused by voltage & current
- Condition: based on the design specification

- Criteria: N/A

CO4: Calculate the sending end and receiving end parameters of different (short, medium & long) types of transmission lines.

- Action: Calculate
- Knowledge: the sending end and receiving end parameters of different types of transmission lines
- Condition: N/A
- Criteria: N/A

CO5: Discuss the classification, requirements, design considerations and calculation methods for AC and DC distribution systems

- Action: Discuss
- Knowledge: the classification, requirements, design considerations and calculation methods for AC and DC distribution systems
- Condition: N/A
- Criteria: N/A

Step 2: Locate COs in Revised Bloom-Vincenti Taxonomy Table

Cognitive Processes	**Knowledge Categories**							
	Factual	Conceptual	Procedural	Meta-cognitive	Fundamental Design Principles	Criteria & Specifications	Practical Constraints	Design instrumentalities
Remember	CO5	CO5						
Understand	CO1 CO3	CO1 CO2 CO3						

Apply	CO4	CO4						
Analyze								
Evaluate								
Create								

Step 3: Tag course outcomes with Program Outcomes (POs,) Program Specific Outcomes (PSOs,) Cognitive Level (CL), Knowledge Categories (KC), number of Class/ Laboratory/ Field sessions, and present it in the table format indicated with sample course

	Course Outcome	**POs/ PSOs**	**CL**	**KC**	**Class Sessions**	**Tutorial (Hrs.)**
CO1	**Describe** layout and operation of thermal and hydroelectric power plant & **Evaluate** plant economics.	PO1, PO2 PSO1	U	F, C	08	03
CO2	**Calculate** the transmission line constants of solid & composite conductors using the concept of GMD	PO1, PO2 PSO1	U	C	08	02
CO3	**Classify** types of conductors and insulators also compare them based on the design specification & illustrate the effects caused by voltage & current	PO1, PO2, PSO1	U	F, C	08	03
CO4	**Calculate** the sending end and receiving end parameters of different (short, medium & long) types of transmission lines.	PO1, PSO2	Ap	F,C	06	02
CO5	**Discuss** the classification, requirements, design considerations,	PO1, PSO1	R	F,C	06	02

	and calculation methods for AC and DC distribution systems					
Total Hours of instruction					**36**	12

Cognitive levels

R-Remember, U-Understand, Ap- Apply, An-Analyse, E-Evaluate and C-Create.

Categories of Knowledge

General Categories

F- Factual, C- Conceptual, P- Procedural, M-Metacognitive

Categories specific to Engineering

FDP- Fundamental Design Principles, C&S-Criteria and Specifications, PS- Practi=cal Constraints, DI- Design Instrumentalities

Step 4: Decide on Strength of CO-PO/PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2
CO1	3	2				2	
CO2	**3**	2				2	
CO3	**3**	2				2	
CO4	3						1
CO5	3					2	
Average	**3**	**2**				2	1
Mapping Strength							

Step 5: Identify the Assessment Items/Assessment Instruments, Delivery Technologies and Instruction types.

Cos	Assessment Items/Assessment Instruments		Delivery Technologies	Instruction types
CO1	CT-1, MCQ Test-1and Assignment-1	ESE	Chalk & Board PPT Presentation Video Lecture	Teaching Plan
CO2	CT-1, MCQ Test-1 and Assignment-1	ESE	Chalk & Board PPT Presentation Video Lecture	Teaching Plan
CO3	CT-2, MCQ Test-2 and Assignment-2	ESE	Chalk & Board PPT Presentation Video Lecture	Teaching Plan
CO4	CT-2, MCQ Test-2 and Assignment-2	ESE	Chalk & Board PPT Presentation Video Lecture	Teaching Plan
CO5	MCQ Test-3	ESE	Chalk & Board PPT Presentation Video Lecture	Teaching Plan

S.A.Sabnis
Course Coordinator

Dr.S.M.Badave
HEED