Lovely Professional University, Punjab

Course Code	Course Title	Lectures	Tutorials	Practicals	Credits	
ECE305	CONTROL SYSTEMS	3	0	0	3	
Course Weightage	ATT: 5 CA: 25 MTT: 20 ETT: 50					

Course Focus	EMPLOYABILITY,SKILL DEVELOPMENT

Course Outcomes :Through this course students should be able to

CO1 :: Describe the mathematical model for a given physical systems.

CO2 :: Identify physical systems and classification of open and close loop control systems.

CO3 :: Examine the system performance in time and frequency domain.

CO4 :: Analyze system behaviour in state space domain

CO5 :: Assess the performance of LTI systems to different inputs

CO6 :: Design basic controllers to meet out desired performance

	TextBooks (T)		
Sr No	**Title**	**Author**	**Publisher Name**
T-1	CONTROL SYSTEMS PRINCIPLES AND DESIGN	M GOPAL	MCGRAW HILL EDUCATION

	Reference Books (R)		
Sr No	**Title**	**Author**	**Publisher Name**
R-1	LINEAR CONTROL SYSTEMS	B S MANKE	KHANNA PUBLISHERS
R-2	CONTROL SYSTEMS ENGINEERING	I J NAGRATH AND GOPAL	NEW AGE INTERNATIONAL
R-3	AUTOMATIC CONTROL SYSTEMS	OGATA K	PRENTICE HALL
R-4	MODERN CONTROL SYSTEMS	RICHARD C DORF, ROBERT H BOSHOP	PEARSON

Other Reading (OR)	
Sr No	**Journals articles as Compulsary reading (specific articles, complete reference)**
OR-1	https://faculty.washington.edu/seattle/physics227/reading/reading-3b.pdf ,

Relevant Websites (RW)		
Sr No	**(Web address) (only if relevant to the course)**	**Salient Features**
RW-1	http://lpsa.swarthmore.edu/Bode/BodeHow.html	bode plot
RW-2	http://newton.ex.ac.uk/teaching/CDHW/Feedback/	PID controller
RW-3	http://www.electrical4u.com/nyquist-plot/	Nyquist plot
RW-4	https://www.electrical4u.com/control-system-closed-loop-open-loop-control-system/	open loop and closed loop

Audio Visual Aids (AV)		
Sr No	**(AV aids) (only if relevant to the course)**	**Salient Features**
AV-1	https://onlinecourses.nptel.ac.in/noc22_de09/preview	swyam nptel

LTP week distribution: (LTP Weeks)	
Weeks before MTE	7
Weeks After MTE	7
Spill Over (Lecture)	7

Detailed Plan For Lectures

Week Number	Lecture Number	Broad Topic(Sub Topic)	Chapters/Sections of Text/reference books	Other Readings, Relevant Websites, Audio Visual Aids, software and Virtual Labs	Lecture Description	Learning Outcomes	Pedagogical Tool Demonstration/ Case Study / Images / animation / ppt etc. Planned	Live Examples
Week 1	Lecture 1	Introduction to Control Systems(Introduction to linear control system)	T-1 R-2	RW-4 AV-1	Zero lecture and Introduction to linear control system,Open loop and Closed loop systems	In zero lecture an introduction shall be given to the student about the course.Student will learn about basics of the subject and its significance	Discussion on reallife examples. Use of animations and videos of industrial control examples	Automobile steering control system, Water level float regulator
		Introduction to Control Systems(Open loop and Closed loop systems)	T-1 R-2	RW-4 AV-1	Zero lecture and Introduction to linear control system,Open loop and Closed loop systems	In zero lecture an introduction shall be given to the student about the course.Student will learn about basics of the subject and its significance	Discussion on reallife examples. Use of animations and videos of industrial control examples	Automobile steering control system, Water level float regulator

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Week 1	Lecture 2	Introduction to Control Systems(Introduction to linear control system)	T-1 R-2	RW-4 AV-1	Zero lecture and Introduction to linear control system,Open loop and Closed loop systems	In zero lecture an introduction shall be given to the student about the course.Student will learn about basics of the subject and its significance	Discussion on reallife examples. Use of animations and videos of industrial control examples	Automobile steering control system, Water level float regulator
		Introduction to Control Systems(Open loop and Closed loop systems)	T-1 R-2	RW-4 AV-1	Zero lecture and Introduction to linear control system,Open loop and Closed loop systems	In zero lecture an introduction shall be given to the student about the course.Student will learn about basics of the subject and its significance	Discussion on reallife examples. Use of animations and videos of industrial control examples	Automobile steering control system, Water level float regulator
	Lecture 3	Introduction to Control Systems(Transfer functions)	T-1 R-3 R-4	AV-1	Modelling of electrical systems, simple mechanical systems including both translational and rotational systems and analogy between electrical and mechanical systems	Students will be able to understand modelling of electrical and mechanical systems	Lecturing, Discussion, problem solving, questioning	Suspension, brakes, stabilization and Driving of gears, motors or moving objects
		Introduction to Control Systems(Industrial Control Examples)	T-1 R-3 R-4	AV-1	Modelling of electrical systems, simple mechanical systems including both translational and rotational systems and analogy between electrical and mechanical systems	Students will be able to understand modelling of electrical and mechanical systems	Lecturing, Discussion, problem solving, questioning	Suspension, brakes, stabilization and Driving of gears, motors or moving objects
		Introduction to Control Systems(Transfer Function of Electrical Systems)	T-1 R-3 R-4	AV-1	Modelling of electrical systems, simple mechanical systems including both translational and rotational systems and analogy between electrical and mechanical systems	Students will be able to understand modelling of electrical and mechanical systems	Lecturing, Discussion, problem solving, questioning	Suspension, brakes, stabilization and Driving of gears, motors or moving objects

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Week 2	Lecture 4	Introduction to Control Systems(Transfer functions)	T-1 R-3 R-4	AV-1	Modelling of electrical systems, simple mechanical systems including both translational and rotational systems and analogy between electrical and mechanical systems	Students will be able to understand modelling of electrical and mechanical systems	Lecturing, Discussion, problem solving, questioning	Suspension, brakes, stabilization and Driving of gears, motors or moving objects
		Introduction to Control Systems(Industrial Control Examples)	T-1 R-3 R-4	AV-1	Modelling of electrical systems, simple mechanical systems including both translational and rotational systems and analogy between electrical and mechanical systems	Students will be able to understand modelling of electrical and mechanical systems	Lecturing, Discussion, problem solving, questioning	Suspension, brakes, stabilization and Driving of gears, motors or moving objects
		Introduction to Control Systems(Transfer Function of Electrical Systems)	T-1 R-3 R-4	AV-1	Modelling of electrical systems, simple mechanical systems including both translational and rotational systems and analogy between electrical and mechanical systems	Students will be able to understand modelling of electrical and mechanical systems	Lecturing, Discussion, problem solving, questioning	Suspension, brakes, stabilization and Driving of gears, motors or moving objects
	Lecture 5	Introduction to Control Systems(Mechanical Systems)		AV-1	Concept of Thermal and pneumatic systems	Students will learn about various types of systems	Lecturing, Discussion using images and examples	Automobile brakes, dentist drills
		Introduction to Control Systems(Electrical Analogous Systems)		AV-1	Concept of Thermal and pneumatic systems	Students will learn about various types of systems	Lecturing, Discussion using images and examples	Automobile brakes, dentist drills
	Lecture 6				Test 1			
Week 3	Lecture 7	Modelling and Representations of Control Systems(Concept of Poles and Zeros)	T-1 R-2	OR-1	Concept of poles and zeros and effect of feedback	student will learn about feedback and poles and zeros	discussion, numerical problems	
		Modelling and Representations of Control Systems(Effect of feedback)	T-1 R-2	OR-1	Concept of poles and zeros and effect of feedback	student will learn about feedback and poles and zeros	discussion, numerical problems	
	Lecture 8	Modelling and Representations of Control Systems(Concept of Poles and Zeros)	T-1 R-2	OR-1	Concept of poles and zeros and effect of feedback	student will learn about feedback and poles and zeros	discussion, numerical problems	

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Week 3	Lecture 8	Modelling and Representations of Control Systems(Effect of feedback)	T-1 R-2	OR-1	Concept of poles and zeros and effect of feedback	student will learn about feedback and poles and zeros	discussion, numerical problems	
	Lecture 9	Modelling and Representations of Control Systems(Block diagram representation and reduction techniques)	T-1 R-4	AV-1	Block diagram representation and reduction techniques	using BDR to simplify the systems	numerical solving	
Week 4	Lecture 10	Modelling and Representations of Control Systems(Block diagram representation and reduction techniques)	T-1 R-4	AV-1	Block diagram representation and reduction techniques	using BDR to simplify the systems	numerical solving	
	Lecture 11				Test 2			
	Lecture 12	Modelling and Representations of Control Systems(Signal flow graphs)	T-1 R-2		Signal flow graph and masons formula	using SFG to simplify the systems	numerical sloving	
		Modelling and Representations of Control Systems(Mason Gain Formula)	T-1 R-2		Signal flow graph and masons formula	using SFG to simplify the systems	numerical sloving	
Week 5	Lecture 13	Modelling and Representations of Control Systems(Signal flow graphs)	T-1 R-2		Signal flow graph and masons formula	using SFG to simplify the systems	numerical sloving	
		Modelling and Representations of Control Systems(Mason Gain Formula)	T-1 R-2		Signal flow graph and masons formula	using SFG to simplify the systems	numerical sloving	
	Lecture 14	Time Domain analysis and Stability(Standard input signals)	T-1 R-1 R-4	RW-4 AV-1	Time response of first and second order systems	student will learn about time domain analsysis	numerical solving, case studies	air conditioner control system, robotics arm
		Time Domain analysis and Stability(Time Response of first order system)	T-1 R-1 R-4	RW-4 AV-1	Time response of first and second order systems	student will learn about time domain analsysis	numerical solving, case studies	air conditioner control system, robotics arm
		Time Domain analysis and Stability(Time response of second order system subjected to unit step input)	T-1 R-1 R-4	RW-4 AV-1	Time response of first and second order systems	student will learn about time domain analsysis	numerical solving, case studies	air conditioner control system, robotics arm
		Time Domain analysis and Stability(Time -Domain specifications)	T-1 R-1 R-4	RW-4 AV-1	Time response of first and second order systems	student will learn about time domain analsysis	numerical solving, case studies	air conditioner control system, robotics arm

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Week 5	Lecture 15	Time Domain analysis and Stability(Standard input signals)	T-1 R-1 R-4	RW-4 AV-1	Time response of first and second order systems	student will learn about time domain analsysis	numerical solving, case studies	air conditioner control system, robotics arm
		Time Domain analysis and Stability(Time Response of first order system)	T-1 R-1 R-4	RW-4 AV-1	Time response of first and second order systems	student will learn about time domain analsysis	numerical solving, case studies	air conditioner control system, robotics arm
		Time Domain analysis and Stability(Time response of second order system subjected to unit step input)	T-1 R-1 R-4	RW-4 AV-1	Time response of first and second order systems	student will learn about time domain analsysis	numerical solving, case studies	air conditioner control system, robotics arm
		Time Domain analysis and Stability(Time -Domain specifications)	T-1 R-1 R-4	RW-4 AV-1	Time response of first and second order systems	student will learn about time domain analsysis	numerical solving, case studies	air conditioner control system, robotics arm
Week 6	Lecture 16	Time Domain analysis and Stability(Standard input signals)	T-1 R-1 R-4	RW-4 AV-1	Time response of first and second order systems	student will learn about time domain analsysis	numerical solving, case studies	air conditioner control system, robotics arm
		Time Domain analysis and Stability(Time Response of first order system)	T-1 R-1 R-4	RW-4 AV-1	Time response of first and second order systems	student will learn about time domain analsysis	numerical solving, case studies	air conditioner control system, robotics arm
		Time Domain analysis and Stability(Time response of second order system subjected to unit step input)	T-1 R-1 R-4	RW-4 AV-1	Time response of first and second order systems	student will learn about time domain analsysis	numerical solving, case studies	air conditioner control system, robotics arm
		Time Domain analysis and Stability(Time -Domain specifications)	T-1 R-1 R-4	RW-4 AV-1	Time response of first and second order systems	student will learn about time domain analsysis	numerical solving, case studies	air conditioner control system, robotics arm
	Lecture 17	Time Domain analysis and Stability(Steady state error)	T-1 R-1 R-2 R-3 R-4		Time Domain analysis and Stability	Time -Domain specifications	numerical solving, case studies	Automobile steering control system
		Time Domain analysis and Stability(Static error coefficients)	T-1 R-1 R-2 R-3 R-4		Time Domain analysis and Stability	Time -Domain specifications	numerical solving, case studies	Automobile steering control system

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Week 6	Lecture 17	Time Domain analysis and Stability(Concept of stability)	T-1 R-1 R-2 R-3 R-4		Time Domain analysis and Stability	Time -Domain specifications	numerical solving, case studies	Automobile steering control system
	Lecture 18				Test 3			
Week 7	Lecture 19	Time Domain analysis and Stability(Absolute and Relative Stability)	T-1		Absolute and Relative Stability, Routh-Hurwitz criterion	Routh-Hurwitz criterion	Use of animations and videos of industrial control examples	Automobile control system
		Time Domain analysis and Stability(Routh-Hurwitz criterion)	T-1		Absolute and Relative Stability, Routh-Hurwitz criterion	Routh-Hurwitz criterion	Use of animations and videos of industrial control examples	Automobile control system
		SPILL OVER						
Week 7	Lecture 20				Spill Over			
	Lecture 21				Spill Over			
		MID-TERM						
Week 8	Lecture 22	Frequency response analysis (Relationship between time and frequency response)	T-1 R-4	RW-3	Root locus technique	student will be able to make root locus plot and anakyse the stability	numerical solving, discussion	MATLAB control toolbox
		Frequency response analysis (Stability in frequency domain)	T-1 R-4	RW-3	Root locus technique	student will be able to make root locus plot and anakyse the stability	numerical solving, discussion	MATLAB control toolbox
		Frequency response analysis (Root Locus Technique)	T-1 R-4	RW-3	Root locus technique	student will be able to make root locus plot and anakyse the stability	numerical solving, discussion	MATLAB control toolbox
	Lecture 23	Frequency response analysis (Relationship between time and frequency response)	T-1 R-4	RW-3	Root locus technique	student will be able to make root locus plot and anakyse the stability	numerical solving, discussion	MATLAB control toolbox
		Frequency response analysis (Stability in frequency domain)	T-1 R-4	RW-3	Root locus technique	student will be able to make root locus plot and anakyse the stability	numerical solving, discussion	MATLAB control toolbox
		Frequency response analysis (Root Locus Technique)	T-1 R-4	RW-3	Root locus technique	student will be able to make root locus plot and anakyse the stability	numerical solving, discussion	MATLAB control toolbox

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Week 8	Lecture 24	Frequency response analysis (Relationship between time and frequency response)	T-1 R-4	RW-3	Root locus technique	student will be able to make root locus plot and anakyse the stability	numerical solving, discussion	MATLAB control toolbox
		Frequency response analysis (Stability in frequency domain)	T-1 R-4	RW-3	Root locus technique	student will be able to make root locus plot and anakyse the stability	numerical solving, discussion	MATLAB control toolbox
		Frequency response analysis (Root Locus Technique)	T-1 R-4	RW-3	Root locus technique	student will be able to make root locus plot and anakyse the stability	numerical solving, discussion	MATLAB control toolbox
Week 9	Lecture 25	Frequency response analysis (Nyquist plot and nyquist stability criterion)	T-1		Polar and nyquist plot	will be able to analyse the stability and system performance in frequency domain	numerical solving, case studies	
		Frequency response analysis (Polar Plot)	T-1		Polar and nyquist plot	will be able to analyse the stability and system performance in frequency domain	numerical solving, case studies	
	Lecture 26	Frequency response analysis (Nyquist plot and nyquist stability criterion)	T-1		Polar and nyquist plot	will be able to analyse the stability and system performance in frequency domain	numerical solving, case studies	
		Frequency response analysis (Polar Plot)	T-1		Polar and nyquist plot	will be able to analyse the stability and system performance in frequency domain	numerical solving, case studies	
	Lecture 27	Frequency response analysis (Nyquist plot and nyquist stability criterion)	T-1		Polar and nyquist plot	will be able to analyse the stability and system performance in frequency domain	numerical solving, case studies	
		Frequency response analysis (Polar Plot)	T-1		Polar and nyquist plot	will be able to analyse the stability and system performance in frequency domain	numerical solving, case studies	
Week 10	Lecture 28				Test 4			

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Week 10	Lecture 29	Design of Compensators (Bode Plot and stability determination)	T-1 R-2 R-3	RW-1 AV-1	Concept of stability using bode plot	Student will be able to understand how to draw bode plot and determine stability from it using semi-log paper	Lecturing, discussion using problem solving, PPT	
	Lecture 30	Design of Compensators (Bode Plot and stability determination)	T-1 R-2 R-3	RW-1 AV-1	Concept of stability using bode plot	Student will be able to understand how to draw bode plot and determine stability from it using semi-log paper	Lecturing, discussion using problem solving, PPT	
Week 11	Lecture 31	Design of Compensators (Bode Plot and stability determination)	T-1 R-2 R-3	RW-1 AV-1	Concept of stability using bode plot	Student will be able to understand how to draw bode plot and determine stability from it using semi-log paper	Lecturing, discussion using problem solving, PPT	
	Lecture 32	Design of Compensators (Lag-lead compensation)	T-1 R-2	RW-1 AV-1	Concept of lag, lead and lag-lead compensators and their design	Students will understand the need for compensation and types of compensators and their design	Lecturing, discussion using problem solving, PPT	
		Design of Compensators (Lead compensation)	T-1 R-2	RW-1 AV-1	Concept of lag, lead and lag-lead compensators and their design	Students will understand the need for compensation and types of compensators and their design	Lecturing, discussion using problem solving, PPT	
		Design of Compensators (Lag compensation)	T-1 R-2	RW-1 AV-1	Concept of lag, lead and lag-lead compensators and their design	Students will understand the need for compensation and types of compensators and their design	Lecturing, discussion using problem solving, PPT	
		Design of Compensators (Design of Compensators using Bode plot)	T-1 R-2	RW-1 RW-2 AV-1	Concept of lag, lead and lag-lead compensators and their design	Students will understand the need for compensation and types of compensators and their design	Lecturing, discussion using problem solving, PPT	

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Week 11	Lecture 32	Design of Compensators (PID control)	T-1 R-2	RW-1 RW-2 AV-1	Concept of lag, lead and lag-lead compensators and their design	Students will understand the need for compensation and types of compensators and their design	Lecturing, discussion using problem solving, PPT	
	Lecture 33	Design of Compensators (Lag-lead compensation)	T-1 R-2	RW-1 AV-1	Concept of lag, lead and lag-lead compensators and their design	Students will understand the need for compensation and types of compensators and their design	Lecturing, discussion using problem solving, PPT	
		Design of Compensators (Lead compensation)	T-1 R-2	RW-1 AV-1	Concept of lag, lead and lag-lead compensators and their design	Students will understand the need for compensation and types of compensators and their design	Lecturing, discussion using problem solving, PPT	
		Design of Compensators (Lag compensation)	T-1 R-2	RW-1 AV-1	Concept of lag, lead and lag-lead compensators and their design	Students will understand the need for compensation and types of compensators and their design	Lecturing, discussion using problem solving, PPT	
		Design of Compensators (Design of Compensators using Bode plot)	T-1 R-2	RW-1 RW-2 AV-1	Concept of lag, lead and lag-lead compensators and their design	Students will understand the need for compensation and types of compensators and their design	Lecturing, discussion using problem solving, PPT	
		Design of Compensators (PID control)	T-1 R-2	RW-1 RW-2 AV-1	Concept of lag, lead and lag-lead compensators and their design	Students will understand the need for compensation and types of compensators and their design	Lecturing, discussion using problem solving, PPT	
Week 12	Lecture 34				Test 5			
	Lecture 35	State Space Analysis (Transfer Function Decomposition)	T-1 R-2	RW-1 AV-1	Disadvantages of transfer function and state space technique approach for SISO systems	Students will understand the concept of state space analysis	Lecturing, discussion, PPT	

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Week 12	Lecture 36	State Space Analysis(State space analysis to transfer functions)	T-1 R-2	RW-1 AV-1	Disadvantages of transfer function and state space technique approach for SISO systems	Students will understand the concept of state space analysis	Lecturing, discussion, PPT	
		State Space Analysis (Transfer Function Decomposition)	T-1 R-2	RW-1 AV-1	Disadvantages of transfer function and state space technique approach for SISO systems	Students will understand the concept of state space analysis	Lecturing, discussion, PPT	
Week 13	Lecture 37	State Space Analysis(State space analysis to transfer functions)	T-1 R-2	RW-1 AV-1	Disadvantages of transfer function and state space technique approach for SISO systems	Students will understand the concept of state space analysis	Lecturing, discussion, PPT	
		State Space Analysis (Transfer Function Decomposition)	T-1 R-2	RW-1 AV-1	Disadvantages of transfer function and state space technique approach for SISO systems	Students will understand the concept of state space analysis	Lecturing, discussion, PPT	
	Lecture 38	State Space Analysis (Controllability and Observability)	T-1 R-2	RW-1	Understand the formula and its application for systems	Know about controllability and observability	Lecturing, Discussion, Problem Solving, PPt	
	Lecture 39				Assignment - Short documentary			
Week 14	Lecture 40	State Space Analysis (Solutions of state equations using Laplace Inverse and Caley-Hamilton Theorem)	T-1 R-2	RW-1	Understand the formula and its application for systems	Know about controllability and observability	Lecturing, Discussion, Problem Solving, PPt	
		SPILL OVER						
Week 14	Lecture 41				Spill Over			
	Lecture 42				Spill Over			
Week 15	Lecture 43				Spill Over			
	Lecture 44				Spill Over			
	Lecture 45				Spill Over			

Scheme for CA:

CA Category of this Course Code is:C010405 (Total 6 tasks, 1 compulsory and out of remaining 4 best out of 5 to be considered)

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Component	Iscompulsory	Weightage (%)	Mapped CO(s)
Test 1	NO	20	CO1
Test 2	NO	20	CO1, CO2
Test 3	NO	20	CO3
Test 4	NO	20	CO5
Test 5	NO	20	CO4, CO6
Assignment - Short documentary	Yes	20	CO1, CO2, CO3, CO4, CO5, CO6

Details of Academic Task(s)

Academic Task	Objective	Detail of Academic Task	Nature of Academic Task (group/individuals)	Academic Task Mode	Marks	Allottment / submission Week
Assignment - Short documentary	To enable the student to simulate the concepts learned and apply to some application	MATLAB Based Assignment to enable the student to simulate the concepts learned and apply to some application.	Individual	Online	30	5 / 13
Test 1	To access the student understanding of concepts	Suprise MCQ based test from Unit1. Their will be 15 question of 2 marks each.	Individual	Offline	30	1 / 2
Test 2	To access the student understanding of concepts	Subjective test from Unit 1 and 2. Their will be 6 questions of 5 marks each.	Individual	Online	30	3 / 4
Test 3	To access the student understanding of concepts	Subjective test from Unit 3. Their will be 6 questions of 5 marks each.	Individual	Online	30	5 / 6
Test 4	To access the student understanding of concepts	Surprise MCQ based test from Unit 4. Their will be 15 questions of 2 marks each.	Individual	Online	30	9 / 10
Test 5	To access the student understanding of concepts	Subjective test from Unit 5 and 6. Their will be 6 questions of 5 marks each.	Individual	Online	30	11 / 12

MOOCs/ Certification etc. mapped with the Academic Task(s)

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Academic Task	Name Of Certification/Online Course/Test/Competition mapped	Type	Offered By Organisation
Assignment - Short documentary	INDUSTRIAL AUTOMATION AND CONTROL	MOOCs	IIIT KHARAGPUR
Assignment - Short documentary	NPTEL	MOOCs	IISC BANGALORE
Test 1	INDUSTRIAL AUTOMATION AND CONTROL	MOOCs	IIIT KHARAGPUR
Test 1	NPTEL	MOOCs	IISC BANGALORE
Test 2	INDUSTRIAL AUTOMATION AND CONTROL	MOOCs	IIIT KHARAGPUR
Test 2	NPTEL	MOOCs	IISC BANGALORE
Test 3	INDUSTRIAL AUTOMATION AND CONTROL	MOOCs	IIIT KHARAGPUR
Test 3	NPTEL	MOOCs	IISC BANGALORE
Test 4	INDUSTRIAL AUTOMATION AND CONTROL	MOOCs	IIIT KHARAGPUR
Test 4	NPTEL	MOOCs	IISC BANGALORE
Test 5	INDUSTRIAL AUTOMATION AND CONTROL	MOOCs	IIIT KHARAGPUR
Test 5	NPTEL	MOOCs	IISC BANGALORE

Where MOOCs/ Certification etc. are mapped with Academic Tasks:
1. Students have choice to appear for Academic Task or MOOCs etc.
2. The student may appear for both, In this case best obtained marks will be considered.