NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

DEPARTMENT OF INSTUMENTATION AND CONTROL ENGINEERING

COURSE PLAN – PART I			
Name of the programme and specialization	**B.Tech / INSTRUMENTATION AND CONTROL ENGINEERING**		
Course Title	**ADVANCED PROCESS CONTROL**		
Course Code	**ICHO14**	**No. of Credits**	**03**
Course Code of Pre-requisite subject(s)	**-----**		
Session	**July 2019**	**Section (if, applicable)**	**A&B**
Name of Faculty	**Dr. N. Sivakumaran**	**Department**	**Instrumentation and Control Engineering**
Official Email	**nsk@nitt.edu**	**Telephone No.**	**0431-2503362**
Course Type (please tick appropriately)	☐ **Core course** ☐ **Elective course** ☑ **Honours**		

Syllabus (approved in BoS)

COURSE OBJECTIVES

1. To expose students to the advanced control methods used in industries and research
2. To teach various system identification and parameter estimation techniques.
3. To prepare the student to take up such challenges in his profession

MAPPING OF COs with POs

Course Outcomes	Programme Outcomes (PO) (Enter Numbers only)
1. Design an appropriate advanced controller for specific problems in chemical industry	3
2. Suggest a controller and tune its parameters.	4
3. design of controllers for interacting multivariable systems	2

COURSE PLAN – PART II

COURSE OVERVIEW

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	Ist – 5th Week	Review of single input single output(SISO) control, model based control, Multivariable control strategies, internal model control preliminaries and Model predictive control, Model forms for model predictive control	Black/ white board
2	6th - 8th Week	Parametric and non-parametric models, state space and transfer function representations, and their inter relationships	Black/white board Power point presentation
3	End of 8th week	***Assessment –1*** : written exam (20% Weightage)	Course Outcome – 1
4	9th to 11th week	Control relevant process identification, choice of input signals and model forms, parameter estimation using batch and recursive least squares, model validations using correlation concepts	Black/white board Power point presentation
5	End of 11th week	***Assessment -2 :*** written exam (20% Weightage)	Course outcome – 2
6	12th to 13th week	Identification of Non parametric representations, model predictive control, analysis of dynamic matrix control(DMC)	Black/white board Power point presentation
7	14th to 15th week	Generalized predictive control (GPC) schemes, controller tuning and robustness issues, extensions to constrained and multivariable cases.	Power point presentation. White board with pen
8	End of 15th week	***Assessment -5 :*** written exam (40% Weightage)	Course outcome-1,2,3
COURSE ASSESSMENT METHODS (shall range from 4 to 6)			

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	First Assessment (written exam)	End of 8th week	One hour	20%
2	Assignment on relevant process identification Seminar on specialized topic related to advanced control strategies	End of 10thweek	--	10%
3	Second Assessment (written exam)	End of 11thweek	One hour	20%
CPA	Compensation Assessment* (Written Exam)	End of 12thweek		20%
4	DMC/GPC based assignment or Seminar on specialized topic related to predictive control schemes	End of 14thweek	--	10%
5	Final assessment (Written Exam)	End of 15thweek	Two hour	40%

***mandatory; refer to guidelines on page 4**

COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)

1. Indirect feedback through questionnaire.
2. Direct feedback from the students.
3. Feedback from the students during the class committee meetings.

COURSE POLICY (including compensation assessment to be specified)

The course is laboratory in nature. It is conducted in ICE Department and Seimens Centre of excellence, NIT Trichy. Hence no compensation exam will be at the end. Every laboratory class is considered as for the student evaluation. Hence, if the student absents for genuine reason, compensation lab class will be conducted whenever necessary.

Retest / Re-examination:

If the student got less than 35% of marks with satisfactory attendance requirement (Refer Attendance policy), he/she has to undergone retest / supplementary examination.

Retest / Supplementary examination will be conducted as per the institute norms.

Passing Criteria / Awarding Grades:

35% is the minimum passing criteria for this subject. If the student got less than 35% even after reexamination and absent for reexamination, he/ she should undergo formative assessment. Other grades are awarded based on relative grades as per institute norms.

ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)

- At least 75% attendance in each course is mandatory.
- A maximum of 10% shall be allowed under On Duty (OD) category.
- Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.

ACADEMIC DISHONESTY & PLAGIARISM

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.
- The above policy against academic dishonesty shall be applicable for all the programmes.

ADDITIONAL INFORMATION, IF ANY

1. Students can meet any time depends on their mutual availability.
2. The course faculty will be available in ICE department ground floor inside process control lab in his cabin. For further information and doubts contact to the mail nsk@nitt.edu
3. Minor doubts will be clarified during the class hours.

FOR APPROVAL

Course Faculty 13/8/19 **CC- Chairperson** 13/8/19 **HOD** 13/8/19

Guidelines

a) The number of assessments for any theory course shall range from 4 to 6.

b) Every theory course shall have a final assessment on the entire syllabus with at least 30% weightage.

c) One compensation assessment for absentees in assessments (other than final assessment) is mandatory. Only genuine cases of absence shall be considered.

d) The passing minimum shall be as per the regulations.

B.Tech. Admitted in				P.G.
2018	2017	2016	2015	
35% or (Class average/2) whichever is greater.		(Peak/3) or (Class Average/2) whichever is lower		40%

e) Attendance policy and the policy on academic dishonesty & plagiarism by students are uniform for all the courses.

f) Absolute grading policy shall be incorporated if the number of students per course is less than 10.

g) Necessary care shall be taken to ensure that the course plan is reasonable and is objective.