DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN – PART I			
Name of the programme and specialization	B.Tech., Electrical and Electronics Engineering		
Course Title	DESIGN WITH PIC MICROCONTROLLERS		
Course Code	EEPE19	No. of Credits	3
Course Code of Pre-requisite subject(s)	EEPC15		
Session	July 2018	Section (if, applicable)	Both A / B
Name of Faculty	Dr. Shelas Sathyan	Department	Electrical and Electronics Engineering
Email	shelassathyan@ nitt.edu	Telephone No.	9561450634
Name of Course Coordinator(s) (if, applicable)			
E-mail		Telephone No.	
Course Type	☐ Core course	☑ Elective course	

Syllabus (approved in BoS)

Introduction to PIC microcontrollers - PIC 16F876 microcontroller – device overview-pin diagrams memory organisation.

Special Function Registers - I/O ports - Timers – Capture/Compare/PWM modules (CCP) – Analogto- digital converter module - selection – reset – interrupts - watchdog timer.

Instruction set - instruction description – PIC16F876 assembly language programming – simple programs.

Introduction to MPLABIDE and PICSTART plus – Device Programming using MPLAB and PICSTARTplus.

Assembly language programming for – Zero crossing detectors - square wave generation – pulse generation for typical applications - ADC program – hardware demonstration.

Essential Reding:
1. PIC16F87X datasheet, 28/40- pin 8 bit CMOS Flash Microcontrollers, Microchip Technology Inc, 2001.
2. Myke Predko, 'Programming and Customizing the PIC Microcontroller', Tata McGraw-Hill

Publications, 1st Edition, 2007.
4. John B. Peatman, 'Design with PIC Microcontrollers', Pearson Education Publications, 1st Edition,2008.
5. MPLABIDE Quick Start Guide Microchip Technology Inc., 2007.
6. M. D. Singh and K. B. Khanchandani, 'Power Electronics', Tata McGraw Hill Publishing Company Limited, 2nd Edition, 2006

COURSE OBJECTIVES

To understand the internal structure and operation of PIC16F876 microcontroller, assembly language programming with MPLAB and PICSTART plus and design methodology for software and hardware applications

COURSE OUTCOMES (CO)

Course Outcomes	Aligned Programme Outcomes (PO)
Upon completion of this course, students will	

PO	CO_1	CO_2	CO_3	CO_4
1	H	H	H	H
2	H	H	H	H
3	L	M	L	M
4	L	L	M	M
5	L	L	L	L
6	H	H	H	H
7	L	L	M	M
8	H	H	H	H
9	H	H	H	H
10	L	L	L	M
11	L	M	M	M
12	L	H	H	H
13	L	H	H	H
14	L	L	H	H

1. Understand the architecture of PIC 16F876 microcontroller and its instruction set
2. Be able to develop assembly language program.
3. Be able to develop the program using MPLAB and download it to the microcontroller chip using suitable developer
4. Be able to design and generate pulses for typical applications

COURSE PLAN – PART II
COURSE OVERVIEW

Understanding the PIC microcontroller architecture and assembly language programming of PIC microcontroller

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week/Contact Hours	Topic	Mode of Delivery

1	Week 1 16-18 July 2018 (3 hour)	Introduction to course, Introduction to PIC microcontrollers - PIC 16F876 microcontroller	Chalk & Talk
2	Week 2 23 –27 July 2018 (1 hours)	Device overview-pin diagrams memory organization	Chalk & Talk PPT
3	Week 3 30 July –03 August 2018 (3 hours)	Special Function Registers - I/O ports - Timers	Chalk & Talk PPT
6	Week 5 16August 2018	*Assessment – I (Quiz)*	Chalk & Talk PPT
7	Week 6 20 – 24 August 2018 (2 hours)	Analog to-digital converter module - selection – reset – interrupts - watchdog timer	Chalk & Talk PPT
8	Week7 27 – 31 August 2018 (2 hours)	instruction set - instruction description	Chalk & Talk PPT
9	Week7 30 August 2018	*First cycle test*	
10	Week8 4– 7 September 2018 (2 hours)	PIC16F876 assembly language programming – simple programs	Chalk & Talk PPT
11	Week9 10– 14 September 2018 (1 hours)	PIC16F876 assembly language programming – simple programs	Chalk & Talk PPT
12	Week10 17– 21September 2018 (3 hours)	Introduction to MPLABIDE and PICSTART plus	Chalk & Talk PPT
13	Week11 24– 28 September 2018 (3 hours)	Device Programming using MPLAB and PICSTART plus.	Chalk & Talk PPT
14	Week12 1– 05 October 2018 (3 hours)	Device Programming using MPLAB and PICSTART plus.	Chalk & Talk PPT
15	Week13 8– 12 October 2018 (2 hours)	Assembly language programming	Chalk & Talk PPT

16	Week13 10 October 2018	**Second cycle test**	
17	Week14 15 -19 October 2018 (3 hours)	Assembly language programming Zero crossing detectors - square wave generation –pulse generation for typical applications	Chalk & Talk PPT
18	Week15 22 -26 October 2018 (3 hours)	Zero crossing detectors - square wave generation –pulse generation for typical applications	Chalk & Talk PPT
19	Week16 29 oct -1Nov 2018 (3 hours)	Zero crossing detectors - square wave generation –pulse generation for typical applications	Chalk & Talk PPT
20	Week16 29-31 October	**Mini Project**	
21	Week17 5-9 Nov 2018 (2 hours)	ADC program – hardware demonstration.	Chalk & Talk PPT
22	Week17 5-9 Nov 2018 (2 hours)	**Compensation assessment**	
23	Week18 12-22 Nov 2018 (3 hours)	**Final Assessment**	

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Quiz	16Aug 2018	20 minutes	10%
2	First cycle test	30 Aug 2018	40 minutes	15%
3	Second cycle test	10 Oct 2018	40 minutes	15%
4	Assignemnt	2 Nov 2018		10%
CPA	Compensation assessment	5 – 9 Nov 2018	1 hour	20%
5	MiniProject	29-31st October		20%
6	Final Assessment *	12 – 22 Nov 2018	2 hour	30%

*mandatory; refer to guidelines on page 4

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

1. Students feedback through class committee meetings
2. Feedback questionnaire from students – twice during the semester
3. Feedback from students on the course outcomes shall be obtained at the end of the course

COURSE POLICY (preferred mode of correspondence with students, compensation assessment policy to be specified)

MODE OF CORRESPONDENCE (email/ phone etc)

1. The faculty is available for consultation during the time intimated to the students then and there.
2. All correspondence will be sent to the webmail id of the students, if required.
3. The students will be communicated through the email id: shelassathyan@nitt.edu for any academic related issues (including sharing of study materials) with respect to this course.

COMPENSATION ASSESSMENT POLICY

1. Flexibility is given to the students to fix the date for each assessment convenient to majority of the students. Attending all the assessments (1, 2, 3, 4, 5,6) are mandatory for every student.
2. If any student fails to attend the assessment 2 or 3 or both due to genuine reason like medical emergency, the student may be permitted to appear the compensation assessment (CPA) on submission of appropriate documents as proof.

3. The compensation assessment (CPA) is on first four units and in any case, CPA is not considered as an improvement test.

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.

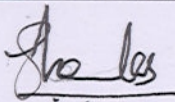➢ The departmental disciplinary committee including the course faculty member, PAC

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.
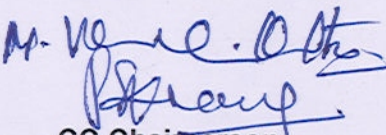
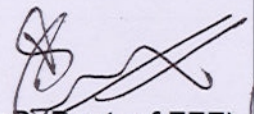The above policy against academic dishonesty shall be applicable for all the programmes.

ADDITIONAL INFORMATION

The minimum marks for passing this course and grading pattern will adhere to the regulations of the institute.

FOR APPROVAL

[Dr. Shelas Sathyan, AP/EEE] Course Faculty	CC Chairperson	HoD (Dept. of EEE)

Guidelines:

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

b) **Every 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. Details of compensation assessment to be specified by faculty.**

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

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.