NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE PLAN – PART I			
Name of the programme and specialization	**B.Tech- Electrical and Electronics Engineering**		
Course Title	**DESIGN WITH PIC MICRO-CONTROLLERS**		
Course Code	**EEPE19**	**No. of Credits**	**3**
Course Code of Pre-requisite subject(s)	**EEPC15**		
Session	**January 2021**	**Section**	**3rd and 4th year A and B**
Name of Faculty	**Dr. Sreenu Sreekumar**	**Department**	**EEE**
Official Email	**sreenu@nitt.edu**	**Telephone No.**	**8079033176**
Name of Course Coordinator(s) (if, applicable**)**			
Official E-mail		**Telephone No.**	
Course Type (please tick appropriately**)**	✓ **Elective course**		

Syllabus (approved in BoS)
Introduction to PIC microcontrollers - PIC 16F876 microcontroller – device overview-pin diagrams-memory organization
Special Function Registers - I/O ports - Timers – Capture/Compare/PWM modules (CCP) – Analog to 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 PICSTART plus
Assembly language programming for – Zero crossing detectors - square wave generation –pulse generation for typical applications - ADC program – hardware demonstration.
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.
MAPPING OF COs with Pos

Course Outcomes	Programme Outcomes (PO)			
Upon completion of this course, students will	PO	CO₁	CO₂	CO₃	CO₄

PO	CO$_1$	CO$_2$	CO$_3$	CO$_4$
1	L	M	H	H
2	H	H	H	H

Upon completion of this course, students will
- Understand the architecture of PIC 16F876 microcontroller and

3	L	L	M	L
4	M	M	M	M
5	L	H	H	H
6	L	M	L	M
7	M	H	L	L
8	H	H	L	H
9	H	M	H	H
10	H	H	H	H
11	L	M	H	H
12	L	H	L	L
13	L	H	H	L
14	M	H	M	H

its instruction set
- Be able to develop assembly language program
- Be able to develop the program using MPLAB and download it to the microcontroller chip using suitable developer
- Be able to design and generate pulses for typical applications

COURSE PLAN – PART II

COURSE OVERVIEW

PIC microcontrollers (Programmable Interface Controllers), are electronic circuits that can be programmed to carry out a vast range of tasks. They can be programmed to be timers or to control a production line and much more. They are found in most electronic devices such as alarm systems, computer control systems, phones, in fact almost any electronic device. The course aims to enable students to develop assembly language program, develop the program using MPLAB and download it to the microcontroller chip using suitable developer and design and generate pulses for typical applications.

COURSE TEACHING, LAB EXPERIMENTS AND LEARNING ACTIVITIES

S.No	Week/Contact Hours	Topic	Mode of Delivery
1.	Week 1 18-22 January 2021 (3 Contact hour)	Introduction to PIC microcontrollers- PIC 16F876 microcontroller – device overview	Online
2.	Week 2 25– 29 January 2021 (2 Contact hours)	Pin diagrams- memory organization	Online
3.	Week 3 01 - 05 February 2021 (3 Contact hours)	Special Function Registers	Online
4.	Week 4 08 - 12 February 2021 (3 Contact hour)	I/O ports - Timers	Online
5.	Week 5 15 - 19 February 2021 (3 Contact hours)	Capture/Compare/PWM modules (CCP)	Online
6.	Week 6 22 – 26 February 2021 (3 Contact hours)	Analog to digital converter module - selection – reset – interrupts - watchdog timer	Online
7.	Week 7 01– 05 March 2021 (3 Contact hours)		Online

8.	Week 8 08 - 12 March 2021 (3 Contact hour)	Instruction set - instruction description	Online
9.	Week 9 15 - 19 March 2021 (3 Contact hour)	PIC16F876 assembly language programming – simple programs	Online
10.	Week 10 22- 26 March 2021 (3 Contact hour)	Introduction to MPLABIDE and PICSTART plus	Online
11.	Week 11 30 March - 02 April 2021 (3 Contact hour)	Device Programming using MPLAB and PICSTART plus	Online
12.	Week 12 05 - 09 April 2021 (3 Contact hour)	Device Programming using MPLAB and PICSTART plus	Online
13.	Week 13 12 - 16 April 2021 (3 Contact hour)	Assembly language programming for – Zero crossing detectors	Online
14.	Week 14 19 - 23 April 2021 (3 Contact hour)	Assembly language programming for square wave generation	Online
15.	Week 15 26 - 30 April 2021 (3 Contact hour)	Assembly language programming for pulse generation for typical applications	Online
16.	Week 16 03 – 07 May 2021 (3 Contact hour)	Assembly language programming for ADC program	Online
17.	Week 18 10 - 13 May 2021 (3 Contact hour)	Hardware demonstration	
18.	Week 18 17 - 21 May 2021	Final assessment	

COURSE ASSESSMENT METHODS

S.No.	Mode of Assessment	Week	Duration	% Weightage
1	Class Test-1	Week 6 22 – 26 February 2021	60 minutes	15

2	Class Test-2	Week 10 22- 26 March 2021	60 minutes	15
3	Surprise test/ Assignments/Seminar/Home works/Other leraning activities	Continuous evaluation (Throughout the semester)		20
4	Mini Project	Continuous evaluation (Throughout the semester)		20
4	Compensation Assessment	Week 16 03 – 07 May 2021	60 minutes	15
5	Final Assessment	Week 18 17 - 21 May 2021	120 minutes	30

COURSE EXIT SURVEY

- Feedback from the students during class committee meetings
- Anonymous feedback through questionnaire (Mid of the semester & End of the semester)
- End semester feedback on course outcomes

COURSE POLICY (including compensation assessment to be specified)

1. Attending all the assessments mandatory for every student
2. One compensation assessment (CPA) will be conducted for those students who are being physically absent for the assessment 1 and/or 2, only for the valid reason.
3. At any case CPA will not be considered as an improvement test.
4. Absolute/Relative grading will be adopted for the course.

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

FOR APPROVAL

SREENU SREEKUMAR
18/01/2021

Dr. S. Kayalvizhi
21/01/21

Approved by HOD

Course Faculty _____   **CC- Chairperson** _____   **HOD** _____

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.