

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN – PART I

Course Title	Microprocessors and Microcontrollers		
Course Code	EEPC22	No. of Credits	3
Course Code of Pre-requisite subject(s)	EEPC15, EEPC10 and EEPC17		
Session	Jan. __2018__	Section (if, applicable)	A & B
Name of Faculty	DILEEP.K	Department	EEE
Email	dileep@nitt.edu	Mobile No.	9790636510
Name of Course Coordinator(s) (if, applicable)	----		
E-mail		Telephone No.	
Course Type	<input checked="" type="checkbox"/> Core course		<input type="checkbox"/> Elective course

Syllabus (approved in BoS)

8-Bit Microprocessor - 8085 architecture and memory interfacing (RAM & ROM), interfacing I/O devices - instruction set - addressing modes - assembly language programming – interrupts - timing diagram.

8051 Microcontroller - Intel 8051 architecture, memory organization, flags, stack, and special function registers, I/O, ports - connecting external memory, counters and timers, serial data I/O, Interrupts.

Microcontroller instructions - addressing modes, moving data, logical operations, arithmetic operations, jump and call instructions – subroutines - Interrupts and returns.

Microcontroller programming - Assembly Language Programming, timer and counter programming, connection to RS 232 and RS 485, Interrupt programming.

Peripherals and interfacing - Serial and parallel I/O (8251 and 8255), Programmable DMA controller, Programmable interrupt controller, ADC/DAC interfacing. Case Study:(i)Waveform generation (ii)speed control of DC motor(iii)Stepper motor control (iv)seven segment LED display (v)Firing Pulse generation (vi) Traffic Control Systems etc.

Text Books:

1. Ramesh S. Gaonkar, 'Microprocessor Architecture Programming and Applications with 8085', Penram Intl. Publishing, 6th Edition, 2013.
2. Kenneth Ayala, 'The 8051 Microcontroller', Cengage Learning Publications, 3rd Edition, 2007.
3. Muhammad Ali Mazidi, Janice Gillispie Mazidi, Rolin McKinlay 'The 8051 Microcontroller and Embedded Systems using Assembly and C', Prentice Hall Publications, 2nd Edition, 2008.

Reference Books:

1. Ray A. K., Bhurchandi K. M., 'Advanced Microprocessor and Peripherals', Tata McGraw-Hill Publications, 3rd Edition, 2013.
2. Sencer Yeralan, Helen Emery, 'Programming and interfacing the 8051 Microcontroller', Addison-Wesley Publications, 1st Edition, 2000.
3. Krishna Kant, 'Microprocessors and Microcontrollers, Architecture, Programming and System Design-8085, 8086, 8051, 8096', Prentice Hall India Ltd Publications, 1st Edition, 2010

COURSE OBJECTIVES

To gain knowledge on the architecture of 8085 microprocessors and 8051 micro controller, their programming and associated peripheral interface devices.

COURSE OUTCOMES (CO)	
Course Outcomes	Aligned Programme Outcomes (PO)
1. Have a clear understanding of the architecture and instruction set of 8085 and 8051.	PO2,PO6,PO8,PO9,P13, P14
2. Be able to interface peripherals and memories with 8085 and 8051	PO2,PO3,PO6,PO8,PO9,P13, P14
3. Be able to understand the application of 8085 and 8051 in waveform generators.	PO2,PO3,PO6,PO8,PO9,P13, P14

COURSE PLAN – PART II

COURSE OVERVIEW

This course offers an integrated treatment of both the hardware and software aspects of the 8085 microprocessor and 8051 microcontroller and also focuses on the basic concepts underlying programmable devices. Providing a sound pedagogy from basic concepts to applications it prepares users to apply concepts learned to a variety of situations they may encounter in their future jobs. This course covers the hardware aspects of the microcomputer as a system using a spiral approach in exploring and re-exploring topics from various perspectives; introduces programming step-by-step, beginning with 8085 and 8051 instructions; examines programming techniques, program development, and software development systems; and integrates hardware and software concepts in interfacing and designing microprocessor and microcontroller based products.

COURSE TEACHING AND LEARNING ACTIVITIES

S.No	Week/Contact Hours	Topic	Mode of Delivery
1.	Week 1 08-01-18 to 12-01-18 (3 contact hours)	<u>Unit-1:</u> Introduction to Microprocessor, 8-Bit Microprocessor, 8085 architecture and memory interfacing (RAM & ROM), addressing modes.	Lecture C&T/ PPT or any suitable mode
	Week 2 15-01-18 to 19-01-18 (3 contact hours)	Interfacing I/O devices, instruction set, interrupts, timing diagram.	
	Week 3 22-01-18 to 26-01-18 (2 contact hours)	Assembly language programming.	
	Week 4 29-01-18 to 02-02-18 (3 contact hours)	<u>Unit-2:</u> 8051 Microcontroller, Intel 8051 architecture and memory organization.	
	Week 5 05-02-18 to 09-02-18 (3 contact hours)	Flags, stack, and special function registers, I/O and ports.	
	Week 6 12-02-18 to 16-02-18 (2 contact hours)	Connecting external memory, counters and timers, serial data I/O and Interrupts.	
	(1 hour Assessment)	Assessment- 1	
7.	Week 7 19-02-18 to 23-02-18 (3 contact hours)	<u>Unit-3:</u> Microcontroller instructions, addressing modes and moving data, Logical operations and arithmetic operations.	Lecture C&T/ PPT or any suitable mode
	Week 8 26-02-18 to 02-02-18 (2 contact hours)	Microcontroller instructions: Jump and call instructions, subroutines, Interrupts and returns.	
9.	Week 9 05-03-18 to 09-03-18 (3 contact hours)	<u>Unit-4:</u> Microcontroller programming, Assembly Language Programming, timer and counter.	Lecture C&T/ PPT or any suitable mode

10.	Week 10 12-03-18 to 16-03-18 (3 contact hours)	Assembly Language Programming, connection to RS 232 and RS 485, Interrupt programming.	
11.	Week 11 19-03-18 to 23-03-18 (1 hour Assessment)	Assessment- 2	
	(2 contact hours)	<u>Unit-5:</u> Peripherals and interfacing, Serial and parallel I/O (8251 and 8255)	Lecture C&T/ PPT or any suitable mode
12.	Week 12 26-03-18 to 30-03-18 (2 contact hours)	Programmable DMA controller, Programmable interrupt controller, ADC/DAC interfacing.	
13.	Week 13 02-04-18 to 06-04-18 (3 contact hours)	Case Study:(i)Waveform generation (ii) Speed control of DC motor (iii)Stepper motor control	
14.	Week 14 09-04-18 to 13-04-18 (3 contact hours)	Case Study: (iv) Seven segment LED display (v) Firing Pulse generation (vi) Traffic Control Systems etc.	

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Assessment- 1 (Written Test)	6 th Week (12-2-18 to 16-2-18)	60 minutes	20
2	Assessment- 2 Written Test	11 th Week (19-3-18 to 23-3-18)	60 minutes	20
3	Assignment	--	--	10
4.	Compensation Assessment Written Test (First four units)	16-04-18 to 19-04-18	60 minutes	20
5	End semester exam	23-04-18 to 04-05-18	180 minutes	50

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 Course Outcomes at the end of the semester

COURSE POLICY (preferred mode of correspondence with students, policy on attendance, compensation assessment, academic honesty and plagiarism etc.)

1. All the students are expected to attend all the contact hours. Students should maintain 75% minimum physical attendance by the end of the semester to attend the End semester examination.
2. Any student who fails to maintain 75 % attendance needs to appear for the compensation test and score more than 50 % marks to be eligible for attending the end semester examination. Students not having 75 % minimum attendance at the end of the semester and also scores less than 50 % in the compensation test will have to REDO the course.
3. Attending all the assessments (1- 4) are mandatory for every student. Flexibility is given to the students to fix the date for each mode of evaluation convenient to majority of the students. If any student fails to attend the cycle tests due to genuine reason like medical emergency, the student may be permitted to appear the compensation test on submission of appropriate documents as proof. In any case, compensation test is not considered as an improvement test.
4. The minimum marks for passing this course and grading pattern will adhere to the regulations of the institute.

- In case of any student found guilty indulging in any mal practice, the student will be awarded no marks in that particular assessment. If found using mobile phones or any other gadgets for any mal-practice during the examination, the answer sheet of the student will not be evaluated and will be awarded ZERO marks.

ADDITIONAL INFORMATION

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

FOR APPROVAL

Course Faculty *Dileep* 10-1-18

CC-Chairperson *Arjun Reddy* 10/1/18
 HOD *Suresh* 11/1/18

S.No.	Mode of Assessment	Week/Date	Duration	Weightage
1	Assessment-1 (Written Test)	7 th Week (12-0-18) to 10 (14-2-18)	60 minutes	50
2	Assessment-2 (Written Test)	11 th Week (19-2-18) to 13 (23-2-18)	60 minutes	50
3	Assignment	-	-	10
4	Comparison Assessment (Written Test) (First last only)	12-04-18 to 10-04-18	30 minutes	50
5	End semester exam	22-04-18 to 04-05-18	120 minutes	50

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

- Students' feedback through class committee meetings
- Feedback questionnaire from students - once during the semester
- Feedback from students on Course Outcomes at the end of the semester

COURSE POLICY (preferred mode of correspondence with students, policy on attendance, composition, assessment, academic honesty and plagiarism etc.)

- All the students are expected to attend all the classes. Students should maintain 75% minimum physical attendance by the end of the semester to attend the End semester examination.
- Any student who fails to maintain 75% attendance needs to appear for the comparison test and score more than 50% marks to be eligible for attending the end semester examination. Students not having 75% minimum attendance at the end of the semester and also scores less than 50% in the comparison test will have to REDO the course.
- Attendance of the assessment (1-4) are mandatory for every student. Flexibility is given to the students in the case of exceptional circumstances to majority of the students. If any student fails to attend the cycle tests during regular hours, the student may be permitted to appear for the comparison test on submission of appropriate documents as proof. In any case, comparison test is not conducted as an invigilated test.
- Minimum marks for passing the course and grading pattern will adhere to the regulations of the