

**Department of Electronics and Communication Engineering**  
**NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI**

<b>Course Title</b>	<b>MICROPROCESSORS AND MICRO CONTROLLERS</b>		
<b>Course Code</b>	<b>ECPC18</b>	<b>No. of Credits</b>	<b>3</b>
<b>Department</b>	<b>ECE</b>	<b>Faculty</b>	<b>M.Anitha</b>
<b>Pre-requisites Course Code</b>	<b>ECPC14-Digital circuits and systems</b>		
<b>Course Coordinator(s) (if, applicable)</b>			
<b>Other Course Teacher(s)/Tutor(s) E-mail</b>	-	<b>E-mail/Telephone No.</b>	<u><a href="mailto:manitha@nitt.edu">manitha@nitt.edu</a></u> <b>0431-250 3334</b>
<b>Course Type</b>	<input checked="" type="checkbox"/> <b>Core course</b> <input type="checkbox"/> <b>Elective course</b>		
<b>COURSE OVERVIEW</b>			
<p>This course provides a brief introduction to embedded electronic systems, where they are used, and ways in which they can be implemented. Microcontrollers were originally developed from Microprocessors for use in embedded electronic control systems, as their name implies. They include a processor and most or all of the memory, clock, and other systems needed to support it. Everything is inside a single package.</p>			
<b>COURSE OBJECTIVE</b>			
<p>Student will get Knowledge in the basics of 16-bit Microprocessor, 8-bit and 16-bit Micro controllers and their architectures, internal organization. Student will be able to understand their functions, peripherals, and interfacing.</p>			
<b>COURSE OUTCOMES (CO)</b>			
<b>Course Outcomes</b>			<b>Aligned Programme Outcomes(PO)</b>
1. Student will be able to recall and apply the basic concept of digital fundamentals to Microprocessor based personal computer system.			PO1,PO5,PO8,PO9,PO11,PO12
2. To be able to illustrate how the different peripherals are interfaced with			PO1,PO2,PO3,PO4,

Microprocessor.	PO8,
3. Student will be able to distinguish and analyze the properties of Microprocessors & Microcontrollers.	PO8,PO4,PO5,PO9, PO11
4. To be able to understand a low power and reliability concept of mixed signal Microcontrollers.	PO1,PO5,PO8,PO9, PO11,PO12
5. Student will be able to analyze the data transfer information through serial & parallel ports and student will be able to train their practical knowledge through laboratory experiments	PO1,PO3,PO4,PO5,PO8 , PO9, PO11,PO12

#### COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week	Topic	Mode of Delivery
1.	First week of January (3 Contact Hours)	<ul style="list-style-type: none"> <li>Microprocessor based personal computer system.</li> <li>Software model of 8086.</li> </ul>	Chalk &Talk, PPT or any suitable mode
2.	Second week of January (3 Contact Hours)	<ul style="list-style-type: none"> <li>Segmented memory operation</li> <li>Instruction set and Addressing modes.</li> </ul>	
3.	Third week of January (3 Contact Hours)	<ul style="list-style-type: none"> <li>Assembly language programming.</li> <li>Interrupts.</li> <li>Programming with DOS and BIOS function calls.</li> </ul>	
4.	Fourth week of January (3 Contact Hours)	<ul style="list-style-type: none"> <li>Hardware detail of 8086.</li> <li>Bus timing and Minimum vs Maximum mode of operation.</li> </ul>	
		<b>ASSESSMENT-I</b>	<b>Quiz (or) Assignments</b>
5.	First week of February (3 Contact Hours)	<ul style="list-style-type: none"> <li>Memory interface.</li> <li>Parallel and serial data transfer methods.</li> <li>8255 PPI chip.</li> </ul>	Chalk &Talk, PPT or any suitable mode
6.	Second week of February (3 Contact Hours)	<ul style="list-style-type: none"> <li>8259 Interrupt controller and 8237 DMA controller.</li> </ul>	
7.		<b>ASSESSMENT -II</b>	<b>Written exam</b>

8.	Fourth week of February (3 Contact Hours)	<ul style="list-style-type: none"> <li>• Microcontroller : Von-Neumann Vs Harvard architecture. Programming model of 8051</li> </ul>	Chalk &Talk, PPT or any suitable mode
9.	First week of March (3 Contact Hours)	<ul style="list-style-type: none"> <li>• Instruction set of 8051 Microcontroller.</li> <li>• Addressing modes.</li> <li>• Programming and Timer operation.</li> </ul>	
10.	Second week of March (3 Contact Hours)	<ul style="list-style-type: none"> <li>• Mixed Signal Microcontroller: MSP430 series.</li> <li>• Block diagram.</li> <li>• Address space.</li> </ul>	
11.	<b>ASSESSMENT-III</b>		<b>Quiz (or) Assignments</b>
13.	Third week of March (3 Contact Hours)	<ul style="list-style-type: none"> <li>• Serial data transfer - UART, SPI and I2C.</li> </ul>	Chalk &Talk, PPT or any suitable mode
14.	<b>ASSESSMENT-IV</b>		<b>Written exam</b>
15.	First week of April (3 Contact Hours)	<ul style="list-style-type: none"> <li>• Interrupts.</li> <li>• I/O ports and port expansion.</li> </ul>	Chalk &Talk, PPT or any suitable mode
16.	Second week of April (3 Contact Hours)	<ul style="list-style-type: none"> <li>• DAC, ADC</li> <li>• LCD interfacing.</li> </ul>	
17.	Third week of April (3 Contact Hours)	<ul style="list-style-type: none"> <li>• DC motor</li> <li>• Stepper motor and LCD interfacing.</li> </ul>	
		<b>Compensation Assessment</b>	<b>Written exam</b>
18.	<b>Final Assessment</b>		<b>Descriptive type of exam</b>

**COURSE ASSESSMENT METHODS**

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1.	ASSESSMENT-I (either Quiz or Assignments )	Offline (not in contact hours)	-	5
2.	ASSESSMENT-II (Descriptive)	3 <sup>rd</sup> week of February'2017	60minutes	20
3.	ASSESSMENT-III (either Quiz or Assignments )	Offline (not in contact hours)	-	5
4.	ASSESSMENT-VI (Descriptive)	4 <sup>th</sup> week of March'2017	60minutes	20
5.	Compensation Assessment (CPA)	4 <sup>th</sup> week of April'2017	60 minutes	Refer course policy
6.	Final Assessment (Descriptive type of exam)	First week of May'2017	180 minutes	50

**ESSENTIAL READINGS :****Text Books:**

1. J.L.Antonakos, "An Introduction to the Intel Family of Microprocessors", Pearson, 1999.
2. M.A.Mazidi & J.C.Mazidi "Microcontroller and Embedded systems using Assembly & C. (2/e)", Pearson Education, 2007.
3. John H. Davies, "MSP430 Microcontroller Basics", Elsevier Ltd., 2008

**Reference Books:**

1. B.B. Brey, "The Intel Microprocessors, (7/e), Eastern Economy Edition", 2006.
2. K.J. Ayala, "The 8051 Microcontroller ", (3/e), Thomson Delmar Learning, 2004.
3. I. S. MacKenzie and R.C.W.Phan., " The 8051 Microcontroller. (4/e)", Pearson education, 2008.

**COURSE EXIT SURVEY**

1. Feedback from the students during class committee meeting.
2. Queries through questionnaire.
3. Course Attainment is calculated through Exams

**COURSE POLICY**

**Attendance:** Should maintain minimum of 75% attendance. Those who have attendance between 60% and 75%, need to appear for CPA(Compensation Assessment). Any student who have less than 60% attendance need to REDO the course

**Accordance:** All the correspondence including Schedule of class, assessment, course material and any other information will be done in class/ over phone/ in faculty room/ through their webmail.

**Assessment:** Attending all the assessments are mandatory. Those who are not able to attend any of the assessments due to valid reason, permitted to attend the CPA with 20% weightage .The student who permits for the CPA ,expected to Pass to get eligibility to appear for end semester exam.

Student who fails in CPA ,they will not permitted to write the End Semester examination. Finally, every student is expected to score (1/3)<sup>rd</sup> of the maximum mark of the class in the total assessment (1, 2, 3, 4, and 6) to pass the course. Otherwise the student will be declared fail and 'F' grade will be awarded. Further the student can take up only FORMATIVE ASSESSMENT.

**ADDITIONAL COURSE INFORMATION**

Queries and feedback may also be emailed to the Course Faculty directly at [manitha@nitt.edu](mailto:manitha@nitt.edu)  
Workshop may be arranged for this course from the Industry.

**FOR SENATE'S CONSIDERATION**

Course Faculty Mani 03/11/17 CC-Chairperson [Signature] 3/1/2017 HOD [Signature] 11/1/2017