Semester Plan

TCET/FRM/IP-02/10 **(Theory)** **Revision: A**

Semester: V **Course: ETRX**

Subject: EXC501: Microcontrollers and Applications **Class: TE ETRX**

Sr. No.	Prerequisite/ Bridge course:	Duration (Week /Hrs)	Modes of Learning	Recommended Sources
1	Prerequisite Course: EXC303: Digital Circuits and Design EXC402: Discrete Electronic Circuits EXC403: Microprocessor and Peripherals	3 hours	Self Learning/ Revision	**Textbooks:** 1. David A. Bell, "Electronic Devices and Circuits", Oxford, Fifth Edition. 2. 8086/8088 family: Design Programming and Interfacing: By John Uffenbeck

Class Room Teaching

Sr. No	Module No.	Lesson No.	Topics Planned (Technology to be used)	Teaching Aids Required	Planned /Completion Date	Resource Book Reference	Remarks
1	SOP	L1.1	SOP-Theory **Chapter 1:** 8051 Microcontroller Architecture- Introduction, Microcontroller Structure, Microprocessor vs.	Power point presentation, Chalk & Board	07-10-2017	Module – 1 Chapter - 1 M1.9.1 M1.9.2	
2	SOP	L1.2	SOP-OBE	Power point presentation, Chalk & Board	07-11-2017		
3	Module 1	L1.2	Features of 8051, Architecture of 8051 microprocessor	Power point presentation, Chalk & Board	07-12-2017	M1.9.3 M1.9.4	
4	Module 1	L1.3	Pin diagram of 8051	Power point presentation, Chalk & Board	13/7/2017	M1.9.5	
5	Module 1	L1.4	Memory and register organization	Power point presentation, Chalk & Board	14/7/2017	M1.9.6	
6	Module 1	L1.5	Stacks in the 8051, Advantages	Power point presentation, Chalk & Board	17/7/2017	M1.9.7 M1.9.8	
7	Module 2	L2.1	**Chapter 2**: 8051 Microcontroller Assembly Language Programming - Addressing Modes	Power point presentation, Chalk & Board	18/7/2017	Module – 2 Chapter - 2 M.2.9.1	
8	Module 2	L2.2	Instruction Set, Data movement/Data Transfer Instructions	Power point presentation, Chalk & Board	19/7/2017	M2.9.2	

9	Module 2	L2.3	Arithmetic instructions And Logic Instructions	Power point presentation, Chalk & Board	20/7/2017	M2.9.2	
10	Module 2	L2.4	Branch Instructions, Bit-oriented Instructions	Power point presentation, Chalk & Board	20/7/2017	M2.9.2	
11	Module 2	L2.5	8051 Programming examples	Power point presentation, Chalk & Board	21/7/2017	M2.9.3	
12	Module 2	L3.1	Timers/Counters Operation, Timers/Counters Modes of Operation	Power point presentation, Chalk & Board	24/7/2017	M2.9.4	
13	Module 2	L3.2	Timer/Counter Programming	Power point presentation, Chalk & Board	25/7/2017	M2.9.4	
14	Module 2	L3.3	Serial Communication, Serial Data Transmission Modes	Power point presentation, Chalk & Board	27/7/2017	M2.9.5	
15	Module 2	L3.4	Serial Port Programming	Power point presentation, Chalk & Board	27/7/2017	M2.9.5	
16	Module 2	L4.1	I/O Port Configuration	Power point presentation, Chalk & Board	31/7/2017	M2.9.6	
17	Module 2	L4.2	Input / Output Programming	Power point presentation, Chalk & Board	01-08-2017	M2.9.6	
18	Module 2	L4.3	Interrupts Structure, Power saving modes	Power point presentation, Chalk & Board	03-08-2017	M2.9.7, M2.9.8	
19	Module 3	L4.4	**Chapter 3**: 8051 Microcontroller Hardware and Software Applications- Interfacing External Memory	Power point presentation, Chalk & Board	03-08-2017	Module – 3, Chapter - 3 M3.9.1	
20	Module 3	L5.1	Memory Interfacing design example	Power point presentation, Chalk & Board	07-08-2017	M3.9.1	
21	Module 3	L5.2	Serial communication using RS232, Pulse Width Modulation	Power point presentation, Chalk & Board	08-08-2017	M3.9.2, M3.9.3	
22	Module 3	L5.3	DC Motor Interfacing	Power point presentation, Chalk & Board	10-08-2017	M3.9.4	
23	Module 3	L5.4	Stepper Motor Interfacing	Power point presentation, Chalk & Board	10-08-2017	M3.9.5	
24	Module 3	L6.1	Digital-to-Analog (DAC) converter interfacing	Power point presentation, Chalk & Board	14/8/2017	M3.9.6	

25	Module 3	L7.1	Analog-to-digital converter (ADC) interfacing	Power point presentation, Chalk & Board	24/8/2017	M3.9.7	
26	Module 3	L7.2	LCD Interfacing	Power point presentation, Chalk & Board	24/8/2017	M3.9.8	
27	Module 3	L8.1	Keyboard Interfacing	Power point presentation, Chalk & Board	31/8/2017	M3.9.9	
28	Module 3	L8.2	Relay Interfacing	Power point presentation, Chalk & Board	31/8/2017	M3.9.10	
29	Module 4	L9.1	Chapter 4: ARM7TDMI Architectural- Introduction, Features, Purpose & Advantages	Power point presentation, Chalk & Board	04-09-2017	M4.9.1 M4.9.2	
30	Module 4	L9.2	ARM Family Core Architecture	Power point presentation, Chalk & Board	05-09-2017	M4.9.3	
31	Module 4	L9.3	Programmer's Model Data types, register structure	Power point presentation, Chalk & Board	07-09-2017	M4.9.4	
32	Module 4	L9.4	PSR, processor modes, Processor operating states	Power point presentation, Chalk & Board	07-09-2017	M4.9.5, M4.9.6	
	Module 4	L10.1	Operating modes, Exceptions	Power point presentation, Chalk & Board	11-09-2017	M4.9.7 M4.9.8	
33	Module 4	L10.2	Interrupt Latencies	Power point presentation, Chalk & Board	12-09-2017	M4.9.9	
34	Module 4	L10.3	Memory formats, pipelined architecture	Power point presentation, Chalk & Board	14-09-2017	M4.9.10	
35	Module 4	L10.4	Pipelined architecture advantages	Power point presentation, Chalk & Board	14-09-2017	M4.9.11	
36	Module 5	L11.1	Chapter 5: ARM7TDMI-Assembly Language Programming- Memory Access & Addressing Modes	Power point presentation, Chalk & Board	18-09-2017	Module – 5 Chapter - 5 M5.9.1	
37	Module 5	L11.2	Memory Access & Addressing Modes continued	Power point presentation, Chalk & Board	19-09-2017	M5.9.1	
38	Module 5	L11.3	ARM Instruction set	Power point presentation, Chalk & Board	21-09-2017	M5.9.2	

39	Module 5	L11.4	Arithmetic and logical operation	Power point presentation, Chalk & Board	21-09-2017	M5.9.2.1 M5.9.2.2	
40	Module 5	L12.1	Condition evaluation and decision making based on flags	Power point presentation, Chalk & Board	25-09-2017	M5.9.2.3, M5.9.2.4	
41	Module 5	L12.2	Control transfers (Call, Jump, Return)	Power point presentation, Chalk & Board	26-09-2017	M5.9.2.5	
42	Module 5	L13.1	Format conversion between Hex, BCD,ASCII	Power point presentation, Chalk & Board	03-10-2017	M5.9.3	
43	Module 5	L13.2	Processor state changing (ARM THUMP	Power point presentation, Chalk & Board	05-10-2017	M5.9.4	
44	Module 5	L13.3	Exceptions	Power point presentation, Chalk & Board	05-10-2017	M5.9.5	
45	Module 5	L14.1	Interrupts and its handling	Power point presentation, Chalk & Board	12-10-2017	M5.9.6 M5.9.7	
46	Module 6	L14.2	Chapter 6: LPC2148 based C Program Applications: Applications for On-chip ADC, DAC	Power point presentation, Chalk & Board	12-10-2017	M6.9.1 M6.9.2	
47	Module 6	L15.1	Applications for parallel port, and serial port accessing	Power point presentation, Chalk & Board	16-10-2017	M6.9.3	
48	Modules 1,2,3	L9.5	Revision of Modules 1,2,3	Power point presentation, Chalk & Board	09-09-2017	Modules 1,2,3	
49	Modules 4,5,6	L15.2	Revision of Modules 4,5,6	Power point presentation, Chalk & Board	16/10/2017	Modules 4,5,6	
50	All		University Paper solving	Power point presentation, Chalk	16/10/2017	All	

Remark: Course:	Syllabus Coverage:	Practice Session: 2	**Content Beyond Syllabus:** miniproject implementation based on 8051 microcontroller
No. of (lectures planned)/(lecture taken): 50 /			
Advanced course: Embedded System Design, IoT based systems	20 Hours	Online videos : nptel.ac.in/courses/108102045/	**Web sources:** 1. NPTEL-https://onlinecourses.nptel.ac.in **Textbook reference:** 1. Embedded Systems by Lyla Das 2. Designing the Internet of Things

Digital Reference:

3.1 https://onlinecourses.nptel.ac.in/explorer

3.2 electronicsforu.com/microcontroller-projects-ideas

3.3 ARM Processor - nptel

3.4 https://www.arm.com

3.5 www.circuitstoday.com/8051-microcontroller

Name & Signature of Faculty	Signature of HOD	Signature of Principal/ Dean (Academic)
Date:	Date:	Date:

Note:

1. Plan date and completion date should be in compliance
2. Courses are required to be taught with emphasis on resource book, course file, text books, reference books, digital references etc.
3. Planning is to be done for 15 weeks where 1st week will be AOP, 2nd -13th for effective teaching and 14th -15th week for effective university examination oriented teaching, mock practice session and semester consolidation.
4. According to university syllabus where lecture of 4 hrs/per week is mentioned minimum 55 hrs and in case of 3 lectures per week minimum 45 lectures are to be engaged are required to be engaged during the semester and therefore accordingly semester planning for delivery of theory lectures shall be planned.
5. In order to improve score in NBA, faculty members are also required to focus course teaching beyond university prescribed syllabus and measuring the outcomes w.r.t learning course and programme objectives.
6. Text books and reference books are available in syllabus. Here only additional references w.r.t. non –digital/ digital sources can be written (if applicable)
7. Technology to be used in class room during lecture shall be written below the topic planned within the bracket.