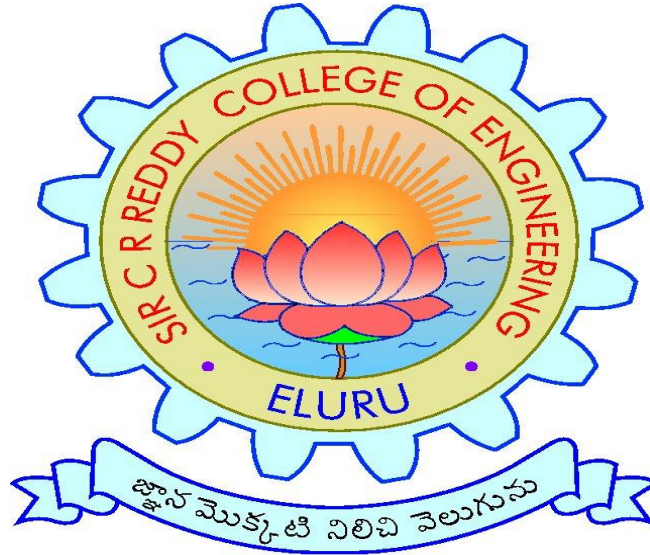


**SIR C.R.REDDY COLLEGE OF ENGINEERING, ELURU**  
**DEPARTMENT OF INFORMATION TECHNOLOGY**  
**COURSE HANDOUT**



**SUBJECT: FUNDAMENTALS OF MICROPROCESSORS AND  
MICROCONTROLLERS**

**CLASS: III/IV B.Tech., II SEMESTER, A.Y.2022-23**

**INSTRUCTOR: Smt. T.SATYA NAGAMANI**

### Course Handout Index

<b>S.No</b>	<b>Description</b>
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## **COLLEGE VISION**

To emerge as a premier institution in the field of technical education and research in the state and as a home for holistic development of the students and contribute to the advancement of society and the region.

## **COLLEGE MISSION**

To provide high quality technical education through a creative balance of academic and industry oriented learning; to create an inspiring environment of scholarship and research; to instill high levels of academic and professional discipline; and to establish standards that inculcate ethical and moral values that contribute to growth in career and development of society in general.

## **VISION OF THE DEPARTMENT**

To be a premier Department in the region in the field of Information Technology through academic excellence and research that enable graduates to meet the challenges of industry and society

## **MISSION OF THE DEPARTMENT**

- ❖ To Provide dynamic teaching-learning environment to make the students industry ready and advancement in career;
- ❖ To inculcate professional and leadership quality for better employability and entrepreneurship;
- ❖ To make high quality professional with moral and ethical values suitable for industry and society

## **PROGRAM EDUCATIONAL OBJECTIVES (PEOs)**

**PEO1:** Solve real world problems through effective professional skills in Information Technology industry and academic research.

**PEO2:** Analyze and develop applications in Information Technology domain and adapt to changing technology trends with continuous learning.

**PEO3:** Practice the profession in society with ethical and moral values.

## **PROGRAM OUTCOMES (POs)**

**PO1: Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**PO2: Problem Analysis:** Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using the first principles of mathematics, natural sciences, and engineering sciences.

**PO3: Design/Development of Solutions:** Design solutions for complex engineering problems and system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, society, and environmental considerations.

**PO4: Conduct Investigations of Complex Problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

**PO5: Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

**PO6: The Engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

**PO7: Environment and Sustainability:** Understand the impact of the professional engineering solutions in society and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**PO8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

**PO9: Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multi-disciplinary settings.

**PO10: Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11: Project Management and Finance:** Demonstrate knowledge and understanding of the

engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi-disciplinary environments.

**PO12: Life-long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

### **PROGRAM SPECIFIC OUTCOMES (PSOs)**

**PSO1:** Design and develop software in the area of relevance under realistic constraints.

**PSO2:** Adapt new and fast emerging technologies in the field of Information Technology.

### **JNTUK ACADEMIC CALENDAR**

Website: [www.jntuk.edu.in](http://www.jntuk.edu.in)  
Email: [dap@jntuk.edu.in](mailto:dap@jntuk.edu.in)



Phone: 0884-2300991

**Directorate of Academic Planning**  
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA  
KAKINADA-533003, Andhra Pradesh, INDIA  
(Established by AP Government Act No. 30 of 2008)

*Lr. No. DAP/AC/III Year /B. Tech/B. Pharmacy/2022*

*Date 14.09.2022*

**Dr. KVSG Murali Krishna,**  
*M.E., Ph.D.,*  
Director, Academic Planning  
JNTUK, Kakinada

To  
All the Principals of Affiliated Colleges,  
JNTUK, Kakinada.

#### **Academic Calendar for III Year - B. Tech/B. Pharmacy for the AY 2022-23 (2020-21 Admitted Batch)**


Description	From	To	Weeks
<b>I SEMESTER</b>			
Community Service Project	15.07.2022	30.07.2022	2W
I Unit of Instruction	01.08.2022	24.09.2022	8W
I Mid Examinations	26.09.2022	01.10.2022	1W
II Unit of Instructions	03.10.2022	26.11.2022	8W
II Mid Examinations	28.11.2022	03.12.2022	1W
Preparation & Practicals	05.12.2022	10.12.2022	1W
End Examinations	12.12.2022	25.12.2022	2W
Commencement of II Semester Class Work	02.01.2023		
<b>II SEMESTER</b>			
I Unit of Instructions	02.01.2023	25.02.2023	8W
I Mid Examinations	27.02.2023	04.03.2023	1W
II Unit of Instructions	06.03.2023	29.04.2023	8W
II Mid Examinations	01.05.2023	06.05.2023	1W
Preparation & Practicals	08.05.2023	13.05.2023	1W
End Examinations	15.05.2023	27.05.2023	2W

\* As per the APSCHE Guidelines Out of the Total 180 hours of Community Service Project leading to 4 Credits, two weeks will be offline and remaining project work can be done during the III-I semester weekends and holidays. The summer internship can be done in online cum offline during III-I and III-II semesters.

*KVSG*  
Director,  
Academics & Planning, JNTUK  
Director  
Academic Planning  
JNTUK Kakinada

Copy to the Secretary to the Hon'ble Vice Chancellor, JNTUK  
Copy to Rector, Registrar, JNTUK  
Copy to Director Academic Audit, JNTUK  
Copy to Director of Evaluation, JNTUK

## Department Academic Calendar

		Department of Information Technology IV/IV B.Tech Academic Calendar for 2022-23																																		
		S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M					
2022-23						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Jul 22						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Aug 22	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31					
Sep 22				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30			
Oct 22					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
Nov 22		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30					
Dec 22				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
Jan 23	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31					
Feb 23			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28						
Mar 23			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31			
Apr 23					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
May 23	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31					
Jun 23				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30			

<b>List of Holidays</b>	Oct 9: Maulud Nabi	Mar 22 : Ugadhi	Mid exams
July 10: Bakrid	Oct 24 : Diwali	Mar 30: Srirama navami	End Examinations
Aug 9: Moharum	Dec 25 : Christmas	Apr 5: Babu Jagjivan Ram Jayanti	Commencement of Class work
Aug 15: Independence day	Jan 14-16: sankranti	Apr 7: Good friday	Workshops
Aug 31: Ganesh Chaturdi	Jan 26: Republic Day	Apr 14: Ambedkar Jayanthi	Department fest/Elite
Oct 2: Gandhi jayanthi	Feb 18 : Sivaratri	Jun 29: Bakrid	
Oct 5: Vijayadasami	Mar 8 : holi		
			<b>HoD</b>
			<b>Department of IT</b>

## Course Description

This is a graduate course surveying the concepts of fundamentals of microprocessors and micro controllers. It covers topics of 8085 microprocessor, 8086 architecture and family and its programming constructs. It includes advanced topics like interfacing with 8086 with peripheral interfaces like 8255, 8251, 8237a and 8259 along with A/D & D/A converters.

This course also emphasis on advanced processors called microcontrollers in real time applications, their architecture, and programming concepts with 8051. It also gives practice with case study on simple programming exercises, keyboard interface, display interface and controlling applications like stepper motor control, automation systems.

## Course Objectives

Upon completion of this course, students will be able to do the following:

- Get aware of concepts of microprocessors, microcontrollers, architectures, their organization and programming concepts.
- Able to use microcontrollers in real time applications along with microprocessors.
- Get the knowledge of interfacing with various real time devices in various applications.
- Can compare the performance of microprocessors and microcontrollers in interface design of controller based systems.

### Course Outcomes

Students are able to

CO No's	Cos	Level
CO1	Will be able to understand various microprocessors, their architectures, families, assembly language programming concepts, interfacing with other peripheral interfacing chips.	L2
CO2	Will be able to understand various microcontrollers, memory organization, their architectures, families, programming concepts, interfacing, control algorithms.	L2
CO3	Will be able to demonstrate various programming techniques of microprocessors and microcontrollers and interface programming with peripherals.	L3
CO4	Will be able to Analyze the performance of microprocessors, microcontrollers, interfacing techniques in designing processor/controller based systems.	L4

S.No	Unit	Description	Teaching Aids	CO
1.	I	Introduction to 8085 microprocessor	BB	CO1
2.		Architecture of 8085	BB	CO1
3.		Memory organization	BB	CO1
4.		I/O ports	BB	CO1
5.		Interrupts of 8085	BB	CO1
6.		Pin diagram of 8086	BB	CO1
7.		Family of 8086	BB	CO1
8.		, internal architecture of 8086	BB	CO1
9.		Interrupts, 8086 timing	BB/PPT	CO1
10.		Minimum and maximum configuration modes	PPT	CO1
11.	II	Programming in 8086 steps	PPT	CO1

12.		Instruction set	BB	CO1
13.		Addressing modes, assembler directives	BB	CO1
14.		Program writing constructs	BB	CO1
15.		Simple programs with assembler	BB	CO1/CO3
16.		Assembly language development tools	BB	CO1/CO3
17.	III	8086 interfacing , semiconductor memories	BB	CO1/CO3
18.		Memory interfacing	BB	CO1/CO3
19.		8255 programmable peripheral interface	BB/PPT	CO1/CO3
20.		Interfacing switches and LEDS	BB	CO1/CO3
21.		Seven segment displays	BB/PPT	CO1/CO3
22.		Software and hardware interrupt applications	BB	CO1
23.		8251 USART architecture	BB/PPT	CO1
24.		8251 interfacing	BB	CO1/CO3
25.		8237a DMA controller,	BB/PPT	CO1/CO3
26.		A/D and D/A converters	BB	CO1/CO3
27.		stepper motor controllers	BB/PPT	CO1/CO3
28.		Need of 8259 programmable interrupt controller	BB/PPT	CO1/CO3/ CO4
29.	IV	8051 architecture, pinouts	BB	CO2
30.		Functional building blocks of 8051	BB	CO2
31.		Memory organization and I/O ports	BB/PPT	CO2
32.		Data transfer and timing diagram	BB	CO2
33.		Interrupts , manipulation	BB	CO2
34.		Control algorithms and I/O instructions	BB	CO2



35.		Comparison with 8085 programming	BB	CO3/CO4
36.	V	Key board and display interface programming	BB/PPT	CO3
37.		Control of servo motor application with microcontroller	PPT	CO3
38.		Control of stepper motor programming	PPT	CO3
39.		Application to automation systems	PPT	CO3
40.		Comparison of applications	BB	CO4
Total Classes			60	

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1										1		
CO2	3	1										1		
CO3	3	2	2	1								1	1	1
CO4	3	2	2	2								1	1	1

@

### Evaluation Pattern

S. No	Components	Internal	External	Total
1	Theory	30	70	100
2	Engineering Graphics/Design/Drawing	30	70	100
3	Practical	15	35	50
4	Mini Project/Internship/Industrial Training/ Skill Development programmes/Research Project	-	50	50
5	Project Work	60	140	200

<b>Marks Range Theory (Max – 100)</b>	<b>Marks Range Lab (Max – 50)</b>	<b>Level</b>	<b>Letter Grade</b>	<b>Grade Point</b>
≥ 90	≥ 45	Outstanding	A+	10
≥80 to <89	≥40 to <44	Excellent	A	9
≥70 to <79	≥35 to <39	Very Good	B	8
≥60 to <69	≥30 to <34	Good	C	7
≥50 to <59	≥25 to <29	Fair	D	6
≥40 to <49	≥20 to <24	Satisfactory	E	5
<40	<20	Fail	F	0
-		Absent	AB	0

<b>Day/Time</b>	<b>09.00- 09.50</b>	<b>09.50- 10.40</b>	<b>11.00- 11.50</b>	<b>11.50- 12.40</b>	<b>01.40- 02.30</b>	<b>02.30- 03.20</b>	<b>03.20- 04.10</b>	<b>04.10- 05.00</b>
<b>Mon</b>			FM&MC		FM&MC			
<b>Tue</b>						FM&MC		
<b>Wed</b>	FM&MC		FM&MC					
<b>Thu</b>	FM&MC		FM&MC			FM&MC		
<b>Fri</b>						FM&MC		
<b>Sat</b>	FM&MC							