J.B. INSTITUTE OF ENGINEERING & TECHNOLOGY

(AUTONOMOUS)

		ACADEMIC YEAR	2015-16

FACULTY DETAILS:

Name of the Faculty::   S.Divya
Designation: Assistant Professor
Department::   Information Technology

COURSE DETAILS

Name Of The Programme::   B.Tech   Batch::   2013
Designation::   Assistant Professor
Year: III B.Tech   Semester: II
Department::   IT
Title of The Subject   Embedded Systems   Subject Code   6756056
No of Students   44

	COURSE PLAN	2015-16
		Regulation: R12

FACULTY DETAILS:

Name of the Faculty::   S.Divya
Designation: Assistant Professor
Department::   Information Technology

1. TARGET

    a) Percentage Pass   100

    b) Percentage I class

2. COURSE PLAN

The topics of Units are covered by lectures, guest lectures, design exercises, solving numerical problems (if it consists of), demonstration of models, and by assignments, etc.)

3. METHOD OF EVALUATION

    3.1. ☐ Continuous Assessment Examinations (CAE 1, CAE 2)

    3.2. ☐ Assignments / Seminars

    3.3. ☐ Mini Projects

    3.4. ☐ Quiz

    3.5. ☐ Term End Examination

    3.6. ☐ Others

4. List out any new topic(s) or any innovation you would like to introduce in teaching the subject in this Semester.
Planning to use 89c51 SDK wine yard technologies.

Signature of HOD   Signature of Faculty
Date: Date:

FACULTY DETAILS:

Name of the Faculty::   S.Divya

Designation: Assistant Professor

Department::   Information Technology

Guidelines for Preparing the Course:

Course Description:

In today's world there are at least two orders of magnitude more embedded systems than PCs. Embedded systems are employed in consumer electronics such as cameras, DVD players and cable descramblers, in cars, airplanes, factories, offices and hospitals. Their large numbers and growing complexity call for a new approach to their design. In this new, experimental, course we will learn to program the processors embedded in electronic devices such as cell phones, digital clocks and cameras, and gameboys. At the end of this course, students will able to use electronic design automation tools.

Course Objectives:

1. Fundamentals of micro controllers, micro processors, Digital design
2. Hardware features of the 8051 microcontroller; Internal registers various operating modes of the UART, Types of interrupts.
3. Digital computer system organization and operation function and structure of CPU.

4. Instructions to increment and decrement the contents of registers and RAM, Do unsigned addition and subtraction, multiplication and division, BCD addition.
5. To Learn about Interfacing with keyboard, A/D & D/A conversions, serial data communication, LCD and LED display.
6. To Learn about Tasks, Semaphores, Message queues, pipes, Timer functions.
7. To Learn about Embedded development Software tools.
8. To Learn about ARM, SHARC, internet enabled systems.
9. At the end of semester, students will be able to design an embedded system based on micro-controller
10. To learn the method of designing a real time systems

Learning Outcomes:

Upon completion of this course, the student will be able to:

- Understand and design embedded systems and real-time systems
- For real-time systems:

◦ Identify the unique characteristics of real-time systems

◦ Explain the general structure of a real-time system

◦ Define the unique design problems and challenges of real-time systems

Apply real-time systems design techniques to various software programs.

- For embedded systems it will enable you to :

◦ Understand the basics of an embedded system

◦ Program an embedded system

◦ Design, implement and test an embedded system.

<table>
<tr><td colspan="2"></td><td>2015-16</td></tr>
<tr><td></td><td>**COURSE OBJECTIVES**</td><td></td></tr>
<tr><td colspan="2"></td><td>Regulation: R12</td></tr>
</table>

FACULTY DETAILS:

Name of the Faculty::   S.Divya
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Department::   Information Technology

On completion of this Subject / Course the student shall be able to:

S.No.	Objectives	Outcomes
1.	Fundamentals of micro controllers, micro processors, Digital design	The student shall be able to understand the basics of Embedded Systems know about microcontroller its design.
2.	Hardware features of the 8051 microcontroller; Internal registers various operating modes of the UART, Types of interrupts.	The student shall be able to know the Microcontroller configuration and its architecture like how many registers it consists of what its size.
3.	Digital computer system organization and operation function and structure of CPU.	The student shall be able to know the structure of CPU instruction, why assembly language is used, describe the assembly language process.
4.	Instructions to increment and decrement the contents of registers and RAM, Do unsigned addition and subtraction, multiplication and division, BCD addition.	The student will write the program in assembly language by knowing all kind of instruction for arithmetical operations performing signed and unsigned using inc & dec.
5.	To Learn about Interfacing with keyboard, A/D & D/A conversions, serial data communication, LCD and LED display.	The student will be able to interface keyboard with 8051 based microcontrollers, interface the microcontrollers system to A/D, D/A converters includes keyboard, LCD display
6.	To Learn about Tasks, Semaphores, Message queues, pipes, Timer functions.	Tasks must be able to communicate with one another to coordinate their activities or to using shared data and semaphores The typical RTOS has functions to create, to write to, and to read from mailboxes
7.	To Learn about Embedded development Software tools	Write a program on EDSim 51 simulators know their procedure.
8.	To Learn about ARM, SHARC, internet enabled systems.	The student will know different versions of ARM architecture are identified by number.
9.	At the end of semester, students will be able to design an embedded system based on micro-controller	The student will have an idea to design embedded system.
10.	To learn the method of designing a real time systems	The student can design real time ES.

Signature of Faculty
Date:

Note: For each of the OBJECTIVE indicate the appropriate OUTCOMES to be achieved.
Kindly refer Page 16, to know the illustrative verbs that can be used to state the objectives.

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FACULTY DETAILS:

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The expected outcomes of the Course / Subject are:

S.No.	General Categories of Outcomes	Specific Outcomes of the Course
A.	An ability to apply knowledge of mathematics, science, and engineering	
B.	An ability to design and conduct experiments, as well as to analyze and interpret data	
C.	An ability to design a system, component, or process to meet desired needs within realistic Constraints such as economic, environmental, social, political, ethical, health and safety, Manufacturability and sustainability	
D.	An ability to function on multi-disciplinary teams	
E.	An ability to identify, formulate, and solve engineering problems	
F.	An understanding of professional and ethical responsibility	
G.	An ability to communicate effectively	
H.	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
I.	A recognition of the need for, and an ability to engage in life-long learning	
J.	A knowledge of contemporary issues	
K.	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	

Objectives – Outcome Relationship Matrix (Indicate the relationships by ☒ mark)**.**

Objectives \ Outcomes	A	B	C	D	E	F	G	H	I	J	K
1.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
2.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
3.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
4.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
5.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
6.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
7.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
8.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
9.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
10.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

COURSE SCHEDULE

FACULTY DETAILS:

Name of the Faculty:: S.Divya
Designation: Assistant Professor
Department:: Information Technology

The Schedule for the whole Course / Subject is::

S. No.	Description	Duration (Date)		Total No. of Periods
		From	To	
1.	Introduction to embedded computing, Complex systems and microprocessor, The embedded systems design process, Formalism for system design, Design examples	14-12-15	21-12-15	9
2.	Introduction to 8051 architecture, 8051 microcontroller Hardware, Input/output ports and circuits, External memory, Counter and timers, Serial data input/output, Interrupts	22-12-15	12-01-16	12
3.	Basic assembly language programming concepts, The assembly language programming process, Programming tools and techniques, Programming the 8051, Data transfer and logical instructions	13-01-16	20-01-16	6
4.	Arithmetic operations, Decimal arithmetic, Jump and call instructions, Further details on interrupts	21-01-16	03-02-16	4
5.	Interfacing with keyboards, Displays, D/A and A/D conversions, Multiple interrupts, Serial data communication	04-02-16	18-02-16	7
6.	Introduction to real time operating systems, Task and tasks states, Tasks and data, Semaphores, Shared data, Message queues, Mailboxes and pipes, Timer functions, Events, Memory management, Interrupt routines in an RTOS Environment	22-02-16	26-02-16	7
7	Basic design using a real-Time operating system, Basic design using a real-Time operating system, Hard Real-time scheduling	02-03-16	16-03-16	11

	considerations, Saving memory and power, An example RTOS like uC-OS(open source), Embedded software development tools: Host and target machines, Linkers/Locators for embedded software, Getting embedded software into the target system, Debugging techniques, Testing on host machine, Using laboratory tools, An example system			
8	Introduction to advanced architectures, ARM and SHARC, Processor and memory organization and instruction level parallelism, Networked embedded system, Bus protocols, 12C bus and CAN bus, Internet-Enabled systems, Design example-elevator controller.	17-03-16	25-03-16	8

Total No. of Instructional periods available for the course: Hours / Periods

FACULTY DETAILS:

Name of the Faculty::   S.Divya
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The Schedule for the whole Course / Subject is::

Sl. No.	Date	No. of Periods	Topics / Sub - Topics	Objectives & Outcome Nos.	References (Text Book, Journal...) Page No___ to ___
1	14-12-15	1	Introduction to embedded computing	1	Computers as Components, Wayne Wolf, Elseveir**(TB1)**
2	15-12-15	1	Complex systems and microprocessor		
3	16-12-15	2	The embedded systems design process		
4	18-12-15	2	Formalism for system design		
5	21-12-15	3	Design examples		

Signature of Faculty
Date

Note: 1. ENSURE THAT ALL TOPICS SPECIFIED IN THE COURSE ARE MENTIONED.
2. ADDITIONAL TOPICS COVERED, IF ANY, MAY ALSO BE SPECIFIED **BOLDLY**.
3. MENTION THE CORRESPONDING COURSE OBJECTIVE AND OUT COME NUMBERS AGAINST EACH TOPIC.

FACULTY DETAILS:

Name of the Faculty:: S.Divya
Designation: Assistant Professor
Department:: Information Technology

The Schedule for the whole Course / Subject is::

Sl. No.	Date	No. of Periods	Topics / Sub - Topics	Objectives & Outcome Nos.	References (Text Book, Journal…) Page No___ to ___
1	22-12-15	2	Introduction to 8051 architecture	2	The 8051 Microcontroller, Third Edition, Kenneth J.Ayala, Thomson **TB2**
2	28-12-15	2	8051 microcontroller Hardware		
3	30-12-15	2	Input/output ports and circuits		
4	31-12-15	2	External memory		
5	07-01-16	1	Counter and timers		
6	9-01-16	1	Serial data input/output		
7	12-1-14	3	Interrupts		

Signature of Faculty
Date

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MENTION THE CORRESPONDING COURSE OBJECTIVE AND OUT COME NUMBERS AGAINST EACH TOPIC.

<table>
<tr><td colspan="2" rowspan="2"></td><td rowspan="2">SCHEDULE OF INSTRUCTIONS

UNIT - III</td><td>2015-16</td></tr>
<tr><td>Regulation: R12</td></tr>
</table>

FACULTY DETAILS:

Name of the Faculty::   S.Divya
Designation: Assistant Professor
Department::   Information Technology
The Schedule for the whole Course / Subject is::

Sl. No.	Date	No. of Periods	Topics / Sub - Topics	Objectives & Outcome Nos.	References (Text Book, Journal...) Page No___ to ___
1	13-1-16	1	Basic assembly language programming concepts	3	The 8051 Microcontroller, Third Edition, Kenneth J.Ayala, Thomson. **TB2**
2	18-1-16	1	The assembly language programming process		
3	19-1-16	2	Programming tools and techniques		
4	20-1-16	1	Programming the 8051		
		1	Data transfer and logical instructions		

Signature of Faculty
Date

Note: 1. ENSURE THAT ALL TOPICS SPECIFIED IN THE COURSE ARE MENTIONED.
     2.   ADDITIONAL TOPICS COVERED, IF ANY, MAY ALSO BE SPECIFIED **BOLDLY**.
MENTION THE CORRESPONDING COURSE OBJECTIVE AND OUT COME NUMBERS AGAINST EACH TOPIC.

FACULTY DETAILS:

Name of the Faculty:: S.Divya
Designation: Assistant Professor
Department:: Information Technology

The Schedule for the whole Course / Subject is::

Sl. No.	Date	No. of Periods	Topics / Sub - Topics	Objectives & Outcome Nos.	References (Text Book, Journal...) Page No___ to ___
1	21-1-16	1	Arithmetic operations	4	The 8051 Microcontroller, Third Edition, Kenneth J.Ayala, Thomson. **TB2**
2	22-1-16	1	Decimal arithmetic		
3	01-2-16	1	Jump and call instructions		
4	03-2-16	1	Further details on interrupts		

Signature of Faculty
Date

Note: 1. ENSURE THAT ALL TOPICS SPECIFIED IN THE COURSE ARE MENTIONED.
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MENTION THE CORRESPONDING COURSE OBJECTIVE AND OUT COME NUMBERS AGAINST EACH TOPIC.

FACULTY DETAILS:

Name of the Faculty:: S.Divya
Designation: Assistant Professor
Department:: Information Technology

The Schedule for the whole Course / Subject is::

Sl. No.	Date	No. of Periods	Topics / Sub - Topics	Objectives & Outcome Nos.	References (Text Book, Journal...) Page No___ to ___
1	04-2-15	1	Interfacing with keyboards	5	The 8051 Microcontroller, Third Edition, Kenneth J.Ayala, Thomson. **TB2**
2	05-02-15	1	Displays		
3	15-02-15	1	D/A and A/D conversions		
4	16-02-15	2	Multiple interrupts		
5	17-02-15	2	Serial data communication		

Signature of Faculty
Date

Note: 1. ENSURE THAT ALL TOPICS SPECIFIED IN THE COURSE ARE MENTIONED.
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MENTION THE CORRESPONDING COURSE OBJECTIVE AND OUT COME NUMBERS AGAINST EACH TOPIC.

FACULTY DETAILS:

Name of the Faculty:: S.Divya
Designation: Assistant Professor
Department:: Information Technology

The Schedule for the whole Course / Subject is::

Sl. No.	Date	No. of Periods	Topics / Sub - Topics	Objectives & Outcome Nos.	References (Text Book, Journal...) Page No___ to ___
1	22-2-16	1	Introduction to real time operating systems	6	An Embedded software primer, David E.Simon, Pearson Education **RB6**
		1	Task and tasks states		
			Tasks and data		
2	24-2-16	1	Semaphores		
			Shared data		
			Message queues		
3	25-2-16	1	Mailboxes and pipes		
			Timer functions		
			Events		
4	26-2-16	1	Memory management		
		2	Interrupt routines in an RTOS Environment		

Signature of Faculty
Date

Note: 1. ENSURE THAT ALL TOPICS SPECIFIED IN THE COURSE ARE MENTIONED.
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MENTION THE CORRESPONDING COURSE OBJECTIVE AND OUT COME NUMBERS AGAINST EACH TOPIC.

<table>
<tr><td colspan="2"></td><td>SCHEDULE OF INSTRUCTIONS

UNIT - VII</td><td>2015-16</td></tr>
<tr><td colspan="2"></td><td></td><td>Regulation: R12</td></tr>
</table>

FACULTY DETAILS:

Name of the Faculty::   S.Divya
Designation: Assistant Professor
Department::   Information Technology

The Schedule for the whole Course / Subject is::

Sl. No.	Date	No. of Periods	Topics / Sub - Topics	Objectives & Outcome Nos.	References (Text Book, Journal...) Page No___ to ___
1	2-03-16	1	Basic design using a real-Time operating system	7	An Embedded software primer, David E.Simon, Pearson Education **RB6**
2	03-03-16	1	Principles, semaphores and queues, Hard Real-time scheduling considerations		
3		1	Saving memory and power		
4			An example RTOS like uC-OS(open source)		
5	07-03-16	2	Embedded software development tools: Host and target machines		
6	10-03-16	1	Linkers/Locators for embedded software		
7	11-03-16	2	Getting embedded software into the target system		
8	15-03-16	1	Debugging techniques, Testing on host machine		
9	16-03-16	1	Using laboratory tools, An example system		

Signature of Faculty
Date

Note: 1. ENSURE THAT ALL TOPICS SPECIFIED IN THE COURSE ARE MENTIONED.
2. ADDITIONAL TOPICS COVERED, IF ANY, MAY ALSO BE SPECIFIED **BOLDLY**.
MENTION THE CORRESPONDING COURSE OBJECTIVE AND OUT COME NUMBERS AGAINST EACH TOPIC.

<table>
<tr><td colspan="2" rowspan="2">

SCHEDULE OF INSTRUCTIONS

UNIT - VIII

</td><td>2015-16</td></tr>
<tr><td>Regulation: R12</td></tr>
</table>

FACULTY DETAILS:

Name of the Faculty::   S.Divya
Designation: Assistant Professor
Department::   Information Technology
The Schedule for the whole Course / Subject is::

Sl. No.	Date	No. of Periods	Topics / Sub - Topics	Objectives & Outcome Nos.	References (Text Book, Journal...) Page No___ to ___
1	17-03-16	1	Introduction to advanced architectures	8,9, 10	Computers as Components, Wayne Wolf, Elseveir **TB1**
		1	ARM and SHARC		
2	21-03-16	2	Processor and memory organization and instruction level parallelism		
3	23-03-16	1	Networked embedded system		
		1	Bus protocols		
			12C bus and CAN bus		
	25-03-16	1	Internet-Enabled systems		
4		1	Design example-elevator controller.		

Signature of Faculty
Date

Note: 1. ENSURE THAT ALL TOPICS SPECIFIED IN THE COURSE ARE MENTIONED.
     2. ADDITIONAL TOPICS COVERED, IF ANY, MAY ALSO BE SPECIFIED **BOLDLY**.
MENTION THE CORRESPONDING COURSE OBJECTIVE AND OUT COME NUMBERS AGAINST EACH TOPIC.

	2015-16
COURSE COMPLETION STATUS	Regulation: R12

FACULTY DETAILS:

Name of the Faculty::   S.Divya
Subject::   Embedded Systems

Subject Code6756056

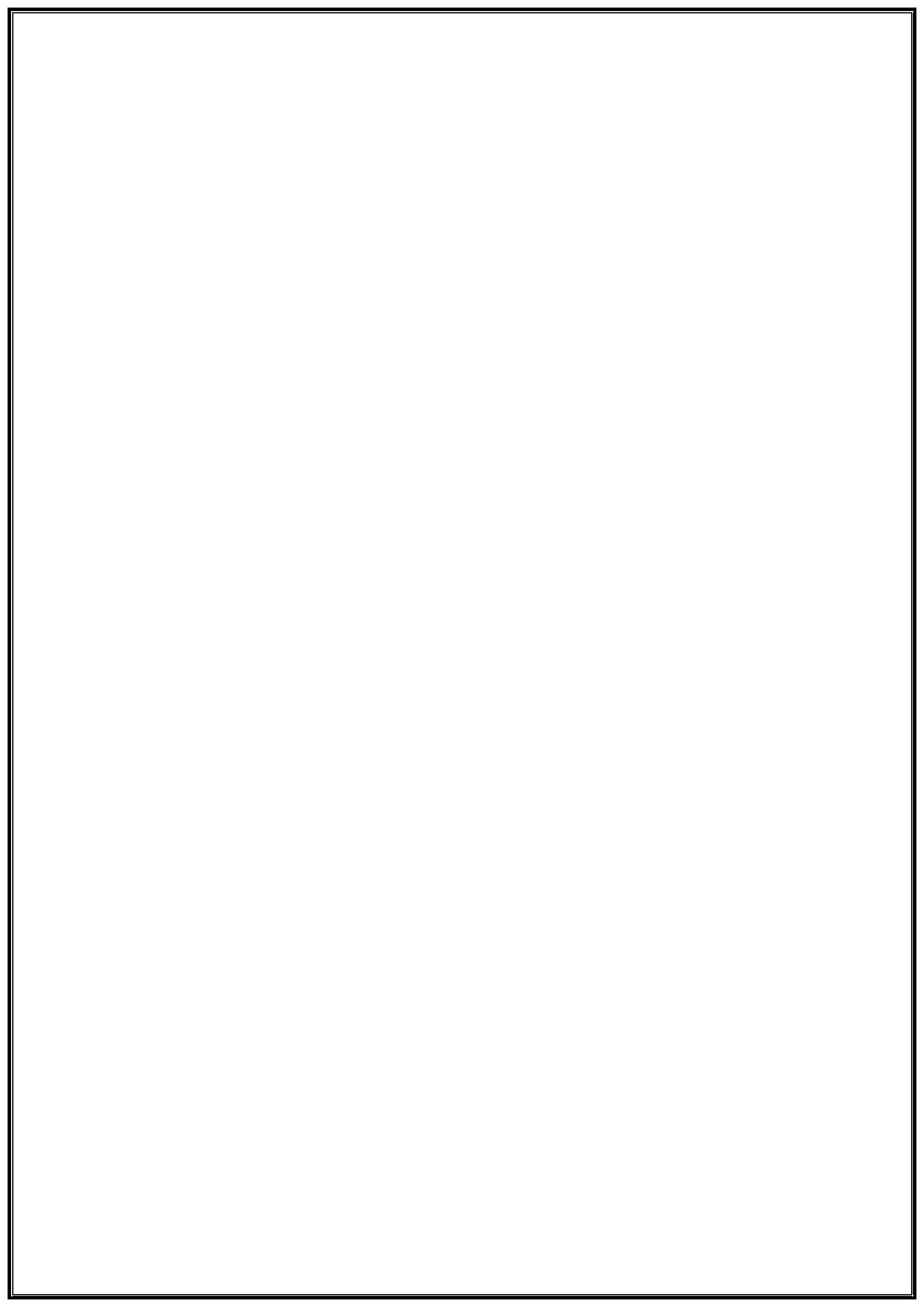Department::   Information Technology

Actual Date of Completion & Remarks, if any

Units	Remarks	Nos. of Objectives Achieved
Unit 1		
Unit 2		
Unit 3		
Unit 4		
Unit 5		
Unit 6		
Unit 7		
Unit 8		

Signature of Dean of School
Date:

Signature of Faculty
Date:

NOTE: AFTER THE COMPLETION OF EACH UNIT MENTION THE NUMBER OF OBJECTIVES ACHIEVED.
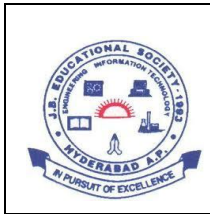
FACULTY DETAILS:

Name of the Faculty:: S.Divya
Designation: Assistant Professor
Department:: Information Technology
The Schedule for the whole Course / Subject is::

Date:

This Tutorial corresponds to Unit Nos.   Time:

Q1. Develop a requirement description and specification of a handheld robot controller.

Q2. Explain the characteristics of embedded computing applications

Q3. Describe the port configuration of 8051

Q4. Explain the mode0 and mode1 operation of timer0.

Q5. Discuss about assembly Language programming, assembler and flowchart with suitable examples.

Please write the Questions / Problems / Exercises which you would like to give to the students and also mention the objectives to which these questions / Problems are related.

Signature of Dean of School
Date:

Signature of Faculty
Date:

FACULTY DETAILS:

Name of the Faculty:: S.Divya
Designation: Assistant Professor
Department:: Information Technology
The Schedule for the whole Course / Subject is::

Date:

This Tutorial corresponds to Unit Nos.   Time:

Q1. Write a program that will do the task below.
    i)Exchange the contents of SP and PSW
    ii) Set timer 1 to A23Dh
    iii)Move the contents of B register to TMOD
    iv) Copy the contents of DPTR to registers R0 and R1

Q2. Write a program to add ten unsigned numbers from internal RAM location and store the result.

Q3. Write a program that will use the timer1 to interrupt the program after a delay of 2 m/sec. Write an interrupt service routine to find the average of five numbers.

Q4. Develop a program to interface a matrix keyboard to 8051. Draw the interface circuit.

Q5. Discuss briefly about semaphores and shared data problem.

Please write the Questions / Problems / Exercises which you would like to give to the students and also mention the

objectives to which these questions / Problems are related.

Signature of Dean of School   **Signature of Faculty**
Date: **Date:**

		2015-16
	TUTORIAL SHEETS - II	
		Regulation: R12

FACULTY DETAILS:

Name of the Faculty::   S.Divya
Designation: Assistant Professor
Department::   Information Technology

Date:

This Tutorial corresponds to Unit Nos.

Time:

Q1. Memory Management.

Q2. Discuss briefly about design of underground tank monitoring system

Q3. Explain about linker/Locator for embedded software.

Q4. Discuss about networks for embedded system.

Q5. Write a program to perform arithmetic calculations display result on LCD make necessary keyboard and LCD interfacing.

Please write the Questions / Problems / Exercises which you would like to give to the students and also mention the objectives to which these questions / Problems are related.

Signature of Dean of School
Date:

Signature of Faculty
Date:
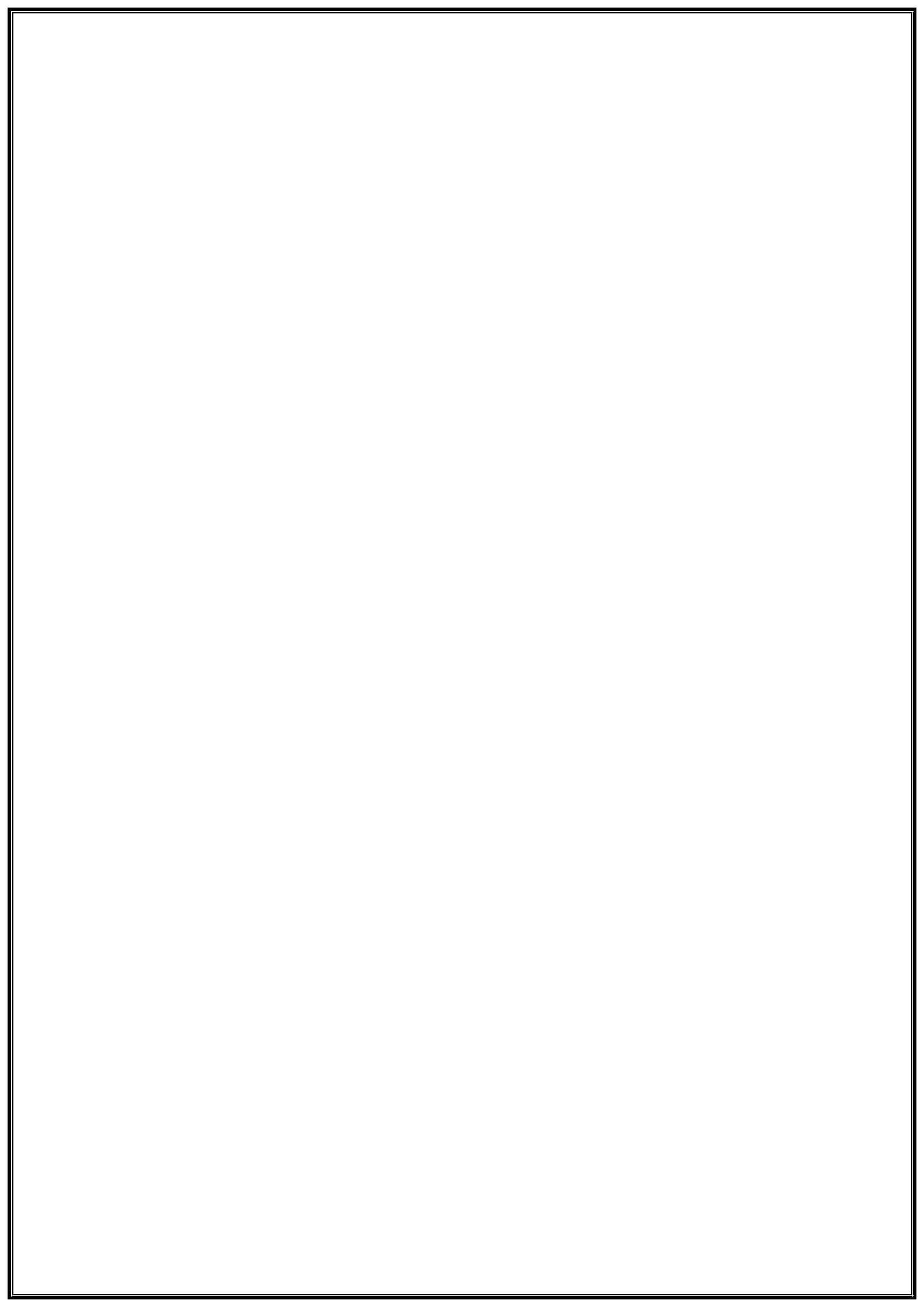
These verbs can also be used while framing questions for Continuous Assessment Examinations as well as for End – Semester (final) Examinations.

ILLUSTRATIVE VERBS FOR STATING **GENERAL OBJECTIVES**

Know Comprehend	Understand Apply	Analyze Design	Generate Evaluate

ILLUSTRATIVE VERBS FOR STATING **SPECIFIC OBJECTIVES:**

A. Cognitive Domain

1	2	3	4	5	6
Knowledge	**Comprehension Understanding**	**Application** of knowledge & comprehension	**Analysis** of whole w.r.t. its constituents	**Synthesis** combination of ideas/constituents	**Evaluation** judgement
Define	Convert	Change	Breakdown	Categorize	Appraise
Identify	Defend	Compute	Differentiate	Combine	Compare
Label	Describe (a	Demonstrate	Discriminate	Compile	Conclude
List	procedure)	Deduce	Distinguish	Compose	Contrast
Match	Distinguish	Manipulate	Separate	Create	Criticize
Reproduce	Estimate	Modify	Subdivide	Devise	Justify
Select	Explain why/how	Predict		Design	Interpret
State	Extend	Prepare		Generate	Support
	Generalize	Relate		Organize	
	Give examples	Show		Plan	
	Illustrate	Solve		Rearrange	
	Infer			Reconstruct	
	Summarize			Reorganize	
				Revise	

B. Affective Domain		**C. Psychomotor Domain (skill development)**				
Adhere	Resolve	Bend	Dissect	Insert	Perform	Straighten
Assist	Select	Calibrate	Draw	Keep	Prepare	Strengthen
Attend	Serve	Compress	Extend	Elongate	Remove	Time
Change	Share	Conduct	Feed	Limit	Replace	Transfer
Develop		Connect	File	Manipulate	Report	Type
Help		Convert	Grow	Move precisely	Reset	Weigh
Influence		Decrease	Handle	Operate	Run	
Initiate		Demonstrate	Increase	Paint	Set	

Name of the Faculty: S.Divya

Subject   Embedded Systems   Subject Code   6756056

Unit   I

INSTRUCTIONAL OBJECTIVES:

Session No	Topics to be covered	Time	Ref	Teaching Method
1	Introduction to embedded computing	50min	TB-1	Black Board
2	Complex systems and microprocessor			
3	The embedded systems design process			
4	Formalism for system design			
5	Design examples			

On completion of this lesson the student shall be able to(Outcomes)

1. To understand the design process

2. Use UML to describe designs at several levels of abstraction.

3. Characteristics of Embedded systems

4 To make selection of different family's of microcontroller.

	ASSIGNMENT Unit-I	2015-16
		Regulation: R12

Assignment / Questions

1. Develop a requirement description and specification of a handheld robot controller.
2. Explain the characteristics of embedded computing applications.

Signature of Faculty

Note: Mention for each question the relevant objectives and outcomes.

	LESSON PLAN Unit-II	2015-16
		Regulation: R12

Name of the Faculty: S.Divya

Subject   Embedded Systems   Subject Code   6756056

Unit   II

INSTRUCTIONAL OBJECTIVES:

Session No	Topics to be covered	Time	Ref	Teaching Method
1	Introduction to embedded computing	50min	**TB-2**	Black Board
2	Complex systems and microprocessor			
3	The embedded systems design process			
4	Formalism for system design			
5	Design examples			

On completion of this lesson the student shall be able to

1. Hardware features of the 8051 microcontroller

2. Internal registers various operating modes of the UART,

3. Types of interrupts.

4. Configuration of 8051 microcontroller.

	2015-16
	Regulation: R12

Assignment / Questions

1. Describe the port configuration of 8051.
2. Explain the mode0 and mode1 operation of timer0.

Signature of Faculty

Note: Mention for each question the relevant objectives and outcomes.

Name of the Faculty: S.Divya

Subject Embedded Systems

Subject Code 6756056

Unit III

INSTRUCTIONAL OBJECTIVES:

Session No	Topics to be covered	Time	Ref	Teaching Method
1	Basic assembly language programming concepts		**TB-2**	
2	The assembly language programming process			
3	Programming tools and techniques			
4	Programming the 8051			
5	Data transfer and logical instructions			

On completion of this lesson the student shall be able to(Outcomes)

1. Digital computer system organization and operation

2. Function and structure of CPU.

3. To write program in assembly language.

4. To know what type of tools are to be used.

Assignment / Questions

1. Discuss about assembly Language programming, assembler and flowchart with suitable examples.
2. Write a program that will do the task below.
   i)Exchange the contents of SP and PSW
   ii) Set timer 1 to A23Dh
   iii)Move the contents of B register to TMOD
   iv) Copy the contents of DPTR to registers R0 and R1

Signature of Faculty

Note: Mention for each question the relevant objectives and outcomes.

<table>
<tr><td rowspan="2"></td><td rowspan="2" align="center">LESSON PLAN
Unit-IV</td><td align="center">2015-16</td></tr>
<tr><td align="center">Regulation: R12</td></tr>
</table>

Name of the Faculty: S.Divya

Subject   Embedded Systems   Subject Code   6756056

Unit   IV

INSTRUCTIONAL OBJECTIVES:

Session No	Topics to be covered	Time	Ref	Teaching Method
1	Arithmetic operations		TB 2	
2	Decimal arithmetic			
3	Jump and call instructions			
4	Further details on interrupts			

On completion of this lesson the student shall be able to (Outcomes)

1. Instructions to increment and decrement the contents of registers and RAM

2. Do unsigned addition and subtraction, multiplication and division

3. BCD addition.

4. Jump and call instructions as three types of jumps are used while writing a program.

	ASSIGNMENT Unit-IV	2015-16
		Regulation: R12

Assignment / Questions

1. Write a program to add ten unsigned numbers from internal RAM location and store the result.
2. Write a program that will use the timer1 to interrupt the program after a delay of 2 m/sec. Write an interrupt service routine to find the average of five numbers.

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Note: Mention for each question the relevant objectives and outcomes.

Name of the Faculty: S.Divya

Subject   Embedded Systems   Subject Code   6756056

Unit   V

INSTRUCTIONAL OBJECTIVES:

Session No	Topics to be covered	Time	Ref	Teaching Method
1	Interfacing with keyboards		TB 2	
2	Displays			
3	D/A and A/D conversions			
4	Multiple interrupts			
5	Serial data communication			

On completion of this lesson the student shall be able to (Outcomes)

1. Learns about Interfacing with keyboard

2. A/D and D/A conversions

3. Serial data communication and problems with data reception.

4. LCD and LED display

	ASSIGNMENT **Unit-V**	2015-16
		Regulation: R12

Assignment / Questions

1. Develop a program to interface a matrix keyboard to 8051. Draw the interface circuit.
2. Write a program to display "Hello World " on LCD Display.
3. Describe in detail about A/D and D/A conversions with examples.

Signature of Faculty

Note: Mention for each question the relevant objectives and outcomes.

Name of the Faculty: S.Divya

Subject   Embedded Systems   Subject Code   6756056

Unit   VI

INSTRUCTIONAL OBJECTIVES:

Session No	Topics to be covered	Time	Ref	Teaching Method
1	Introduction to real time operating systems		**RB-6**	
2	Task and tasks states			
3	Tasks and data			
4	Semaphores			
5	Shared data			
6	Message queues			
7	Mailboxes and pipes			
8	Timer functions			
9	Events			
10	Memory management			
11	Interrupt routines in an RTOS Environment			

On completion of this lesson the student shall be able to (Outcomes)

1. Learns about Tasks

2. Semaphores, Message queues, pipes, Timer functions.

3. Tasks must be able to communicate with one another to coordinate their activities or to using shared data and semaphores

4. The typical RTOS has functions to create, to write to, and to read from mailboxes

	ASSIGNMENT **Unit-VI**	2015-16
		Regulation: R12

Assignment / Questions

1. Discuss briefly about semaphores and shared data problem.
2. Write notes on memory management.

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Note: Mention for each question the relevant objectives and outcomes.

	LESSON PLAN Unit-VII	2015-16
		Regulation: R12

Name of the Faculty: S.Divya

Subject   Embedded Systems   Subject Code   6756056

Unit   **VII**

INSTRUCTIONAL OBJECTIVES:

Session No	Topics to be covered	Time	Ref	Teaching Method
1	Basic design using a real-Time operating system		RB-6	
2	Principles, semaphores and queues			
3	Hard Real-time scheduling considerations			
4	Saving memory and power			
5	An example RTOS like uC-OS(open source)			
6	Embedded software development tools:			
7	Host and target machines			
8	Linkers/Locators for embedded software			
9	Getting embedded software into the target system			
10	Debugging techniques			
11	Testing on host machine			
12	Using laboratory tools			
13	An example system			

On completion of this lesson the student shall be able to

1. Learns about Embedded development Software tools.

2. To Write a program on EDSim 51 simulators know their procedure.

3. Getting embedded software into the target system

4. An example RTOS like uC-OS(open source)

Assignment / Questions

1. Discuss briefly about design of underground tank monitoring system.
2. Explain about linker/Locator for embedded software.

Signature of Faculty

Note: Mention for each question the relevant objectives and outcomes.

Name of the Faculty: S.Divya

Subject   Embedded Systems   Subject Code   6756056

Unit   VIII

INSTRUCTIONAL OBJECTIVES:

Session No	Topics to be covered	Time	Ref	Teaching Method
1	Introduction to advanced architectures		**TB1**	
2	ARM and SHARC			
3	Processor and memory organization and instruction level parallelism			
4	Networked embedded system			
5	Bus protocols			
6	12C bus and CAN bus			
7	Internet-Enabled systems			
8	Design example-elevator controller.			

On completion of this lesson the student shall be able to

1. Learns about ARM,SHARC

2. internet enabled systems.

3. The student will know different versions of ARM architecture are identified by number

4. Networked embedded system

	ASSIGNMENT Unit-VIII	2015-16
		Regulation: R12

Assignment / Questions

1. Discuss about networks for embedded system.

Signature of Faculty

Note: Mention for each question the relevant objectives and outcomes.