COURSE MODULES OF THE SUBECT TAUGHT FOR THE ACADEMIC YEAR 2025-26
EVEN SEMESTER

COURSE SYLLABI WITH COs

Academic Year:2025-26(Even Semester)

Department: Electronics and Communication Engineering

Course Code	Course Title	Core/Elective	Prerequisite	Contact Hours			Total hrs./sessions
				L	T	P	
BECL456A	Microcontrollers Lab	AEC/SDC	Computer Organization	0	0	2	

Objectives	**This course will enable students to:**
	Understand the basic programming of Microcontrollers.
	Develop the 8051 Microcontroller-based programs for various applications using Assembly Language & C Programming.
	Program 8051Microcontroller to control an external hardware using suitable I/O ports.

Topics Covered as per Syllabus

I. Assembly Language Programming

Data Transfer Programs:

1. Write an ALP to move a block of n bytes of data from source (20h) to destination (40h) using Internal-RAM.
2. Write an ALP to move a block of n bytes of data from source (2000h) to destination (2050h) using External RAM.
3. Write an ALP To exchange the source block starting with address 20h, (Internal RAM) containing N (05) bytes of data with destination block starting with address 40h (Internal RAM).
4. Write an ALP to exchange the source block starting with address 10h (Internal memory), containing N (06) bytes of data with destination block starting at location 00h (External memory).

Arithmetic & Logical Operation Programs:

5. Write an ALP to add the byte in the RAM at 34h and 35h, store the result in the register R5 (LSB) and R6 (MSB), using Indirect Addressing Mode.
6. Write an ALP to subtract the bytes in Internal RAM 34h &35h store the result in register R5 (LSB) & R6 (MSB).
7. Write an ALP to multiply two 8-bit numbers stored at 30h and 31h and store16- bit result in 32h and 33h of Internal RAM.
8. Write an ALP to perform division operation on 8-bit number by 8-bit number.
9. Write an ALP to separate positive and negative in a given array.

10. Write an ALP to separate even or odd elements in a given array.
11. Write an ALP to arrange the numbers in Ascending & Descending order.
12. Write an ALP to find Largest & Smallest number from a given array starting from 20h & store it in Internal Memory location 40h.

Counter Operation Programs:

13. Write an ALP for Decimal UP-Counter.
14. Write an ALP for Decimal DOWN-Counter.
15. Write an ALP for Hexadecimal UP-Counter.
16. Write an ALP for Hexadecimal DOWN-Counter.

II. C Programming

1. Write an 8051 C program to find the sum of first 10 Integer Numbers.
2. Write an 8051 C program to find Factorial of a given number.
3. Write an 8051 C program to find the Square of a number (1 to 10) using Look-Up Table.
4. Write an 8051 C program to count the number of Ones and Zeros in two consecutive memory locations.

III. Hardware Interfacing Programs

1. Write an 8051 C Program to rotate stepper motor in Clock & Anti-Clockwise direction.
2. Write an 8051 C program to Generate Sine & Square waveforms using DAC interface.

Suggested Learning Resources: The 8051 Microcontroller: Hardware, Software and Applications", V Udayashankara and M S Mallikarjuna Swamy, McGraw Hill Education,1st edition,2017.

Reference Books:

1. The 8051 Microcontroller by Kenneth Ayala
2. The 8051 Microcontroller and Embedded Systems by Muhammad Ali Mazidi

Course Outcomes	At the end of the course, the student will be able to: 1. Write a Assembly language / C programs in 8051 for solving simple problems that manipulate input data using different instructions. 2. Develop testing and experimental procedures on 8051 Microcontroller, analyse their operations under different cases. 3. Develop programs for 8051 Microcontroller to implement real world problems. 4. Develop microcontroller applications using external hardware interface.

Assessment Details (both CIE and SEE)

- ✓ The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%.
- ✓ The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation (CIE):

- CIE marks for the practical course are 50 Marks.
- The split-up of CIE marks for record/journal and test are in the ratio 60:40.
- Each experiment is to be evaluated for conduction with an observation sheet and record write-up.
- Rubrics for the evaluation of the journal/write up for hardware/ software experiments are designed by the faculty who is handling the laboratory session and are made known to students at the beginning of the practical session.
- Record should contain all the specified experiments in the syllabus and each experiment writeup will be evaluated for 10marks.
- Total marks scored by the students are scaled down to 30marks(60%ofmaximummarks).
- Weightage to be given for neatness and submission of record/write-upon time.
- Department shall conduct a test of 100marks after the completion of all the experiments listed in the syllabus.
- In a test, test writeup, Conduction of experiment, acceptable result, and procedural knowledge will carry a weightage of 60% and the rest 40% for viva-voce.
- The suitable rubrics can be designed to evaluate each student's performance and learning ability.
- The marks scored shall be scaled down to 20marks (40%ofthemaximummarks).
- The Sum of scaled-down marks scored in the report write-up/journal and marks of a test is the total CIE marks scored by the student.

Semester End Evaluation (SEE):

- SEE marks for the practical course are 50 Marks.
- SEE shall be conducted jointly by the two examiners of the same institute; examiners are appointed by the Head of the Institute.
- The examination schedule and names of examiners are informed to the university before the conduction of the examination. These practical examinations are to be conducted between the schedule mentioned in the academic calendar of the University.
- All laboratory experiments are to be included for practical examination.
- (Rubrics) Breakup of marks and the instructions printed on the cover page of the answer script to be strictly adhered to by the examiners OR based on the course requirement evaluation rubrics shall be decided jointly by examiners.
- Students can pick one question(experiment) from the questions lot prepared by the examiners jointly.
- Evaluation of test write-up/ conduction procedure and result/viva will be conducted jointly by examiners. General rubrics suggested for SEE are mentioned here, writeup-20%, Conduction procedure and result in -60%, Viva voce 20% of maximum marks. SEE for practical shall be evaluated for 100 marks and scored marks shall be scaled down to 50 marks (however, based on course type, rubrics shall be decided by the examiners).
- Change of experiment is allowed only once and 15% of Marks allotted to the procedure part are to be made zero. The minimum duration of SEE is 02 hours

The Correlation of Course Outcomes (CO's) and Program Outcomes (PO's)

Subject Code:	BECL456A	Title:	Microcontrollers Lab										
List of Course Outcomes	Program Outcomes												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO-1	3	2	1	-	3	-	-	2	-	-	1	2	2
CO-2	3	3	2	3	3	-	-	2	-	-	1	2	2
CO-3	3	3	3	2	3	-	-	2	-	-	2	3	2
CO-4	3	2	3	2	3	-	-	2	-	-	2	3	2

PSO1: To have the capability to understand and adopt the technological advancements with the usage of modern tool to analyze and design embedded system or processes for variety of applications.

PSO2: To work effectively in a group as an independent visionary, team member and leader having the ability to understand the requirement and develop feasible solutions to emerge as potential core or electronic engineer

Note: 3-Strong Contribution 2-Average Contribution 1-Weak Contribution

Signature of the Faculty **HOD**