Year: 2021-22
Semester: VI

1. **Name of the Faculty: Devendra Rawat** **Course Code: CSEG 3018**
2. **Course : Microprocessor & Embedded Systems** **L:4**
3. **Program : B. Tech CSE VI Sem** **T:0**
4. **Target : Level 3** **P:1**
   C:4

COURSE PLAN

Target	50% (marks)
Level-1	40% (population)
Level-2	50% (population)
Level-3	60% (population)

1. Method of Evaluation

UG
Quizzes/Tests, Assignments (30%)
Mid Examination (20%)
End examination (50%)

2. Passing Criteria

Scale	**UG**
Out of 10point scale	SGPA – "5.0" in each semester CGPA – "5.0" Min. Individual Course Grade – "C" Course Grade Point – "4.0"

*may be keep as per Program (UG/PG)

3. Pedagogy

- **Presentation,**
- **Class Test**
- **Quiz**
- **Assignments/ Tutorials**
- **Digital and analog presentations**
- **Concept diary (needs to be maintained by students-short and concise notes which include course concepts that he/she has understood.)**
- **YouTube videos as a startup**

4. Topics introduced for the first time in the program through this course

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5. **References:**

Text Books	Web resources	Journals	Reference books
1. Microprocessor Architecture, Programming. Book by Ramesh Gaonkar 2. Microprocessors and interfacing, Book by Douglas Hall 3. Mano, Morris. "Digital circuits and systems." Prentice-Hal. 4. Salivahanan, Arivazhagan S. Digital Circuits And Design. 5. Mazidi, Muhammad Ali, Janice Gillispie Mazidi, and Rolin D. McKinlay. The 8051 microcontroller and embedded systems. Pearson/Prentice Hall, 2006.	https://nptel.ac.in/courses/108/105/108105102/ https://nptel.ac.in/courses/108/102/108102169/ https://nptel.ac.in/courses/106/105/106105193/		1. The Intel Microprocessors–Architecture, Book by Barry B. Brey 2. Digital Logic and Microprocessor Design with VHDL 3. Digital Electronics, Principles, Devices and Applications, Anil K. Maini, John Wiley and Sons. 4. Microprocessor 8085 And Its Interfacing Book by Sunil Mathur 5. Fundamentals of Microprocessor and Microcomputers - B. Ram

Signature of HOD/Dean **Signature of Faculty**

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GUIDELINES TO STUDY THE SUBJECT

Instructions to Students:

1. Go through the 'Syllabus' in the Black Board section of the web-site(https://learn.upes.ac.in) in order to find out the Reading List.
2. Get your schedule and try to pace your studies as close to the timeline as possible.
3. Get your on-line lecture notes (Content, videos) at Lecture Notes section. These are our lecture notes. Make sure you use them during this course.
4. Check your blackboard regularly
5. Go through study material
6. Check mails and announcements on blackboard
7. Keep updated with the posts, assignments and examinations which shall be conducted on the blackboard
8. Be regular, so that you do not suffer in any way
9. C**ell Phones and other Electronic Communication Devices:** Cell phones and other electronic communication devices (such as Blackberries/Laptops) are not permitted in classes during Tests or the Mid/Final Examination. Such devices MUST be turned off in the class room.
10. **E-Mail and online learning tool:** Each student in the class should have an e-mail id and a pass word to access the LMS system regularly. Regularly, important information – Date of conducting class tests, guest lectures, via online learning tool. The best way to arrange meetings with us or ask specific questions is by email and prior appointment. All the assignments preferably should be uploaded on online learning tool. Various research papers/reference material will be mailed/uploaded on online learning platform time to time.
11. **Attendance:** Students are required to have minimum attendance of 75% in each subject. Students with less than said percentage shall NOT be allowed to appear in the end semester examination.

This much should be enough to get you organized and on your way to having a great semester! If you need us for anything, send your feedback through e-mail to your concerned faculty. Please use an appropriate subject line to indicate your message details.

There will no doubt be many more activities in the coming weeks. So, to keep up to date with all the latest developments, please keep visiting this website regularly.

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RELATED OUTCOMES

1. The expected outcomes of the Program are:

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, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, 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 societal and environmental contexts, demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics:** Apply ethical principles and commit to professional ethics, responsibilities, and norms of the engineering practice.
PO9	**Individual and Teamwork**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society, 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 multidisciplinary 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

2. The expected outcomes of the Specific Program are: (upto3)

PSO1	Perform system and application programming using computer system concepts, concepts of Data Structures, algorithm development, problem solving and optimizing techniques.

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PSO2	Apply software development and project management methodologies using concepts of front-end and back-end development and emerging technologies and platforms.
PSO3	Apply computing knowledge to assess, design and propose cyber security solutions and perform forensic procedures on digital systems and cyber world using tools and technologies in the area of cyber security and cyber forensics.

3. **The expected outcomes of the Course are: (minimum 3 and maximum 6)**

CO 1	Understand the functional modules of general purpose, single purpose, custom purpose processor, and hardware & software specifications.
CO 2	Design the embedded system using microcontrollers such as 8051 MCS, and develop the code using assembly language programming.
CO 3	Develop the embedded 'C' code for different applications and interfacing units of the microcontroller.
CO 4	Analyze and develop for different case studies, specifications and sampled control-embedded applications.
CO 5	Perform inter task communication and real time scheduling for real time embedded system design and development

4. **Co-Relationship Matrix**
Indicate the relationships by1- Slight (low) 2- Moderate (Medium) 3-Substantial (high)

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12	PSO 1	PSO2	PSO3
CO1	3	2	3	3	3	2	2	1	2	2	3	3	1	1	1
CO2	3	3	3	3	3	2	2	1	2	3	3	3	1	2	2
CO3	3	3	3	3	2	2	2	1	2	3	3	3	3	3	3
CO4	3	3	1	3	3	1	1	1	2	3	3	3	3	2	3
CO5	3	3	2	3	1	2	3	1	2	3	3	3	3	2	3
Average	3	3	3	3	3	2	2	1	2	3	3	3	3	3	3

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5. **Course outcomes assessment plan:**

components / Course Outcomes	Assignment	Test/Quiz	Mid Semester	End Semester	Any other
CO 1		✓	✓	✓	☐
CO 2	✓	✓	✓	✓	☐
CO3		✓		✓	☐
CO 4	✓	✓		✓	☐

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OVERVIEW OF COURSE DELIVERY/BROAD PLAN OF COURSE COVERAGE

Course Activities:

S. No.	Description	Planned			Actual			Remarks
		From	To	No. of Ses	From	TO	No. of Ses	
1.	**UNIT I: Review of Fundamentals** Number System: Binary and Hexadecimal; Combinational Circuits: Adder, Subtractor, Encoder-Decoder; Sequential Circuits: Flip-Flops, Register and Counters; Von Neumann Architecture, Computer Types, Functional Units, Memory System RAM, ROM, Cache, VM, etc.), Design of Basic Computer.							
2.	UNIT II: Microprocessor Vs Microcontroller Block diagram, Registers, Internal Bus Organization, Control signals, Input Output Subsystem, Serial communication and DMA features. Memory Subsystem, Interfacing of ADC, sensors, keyboard and DAC using microcontrollers; 8085							

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	Architecture and Pin Diagram							
3.	**UNIT III: Designing ALU and CU** Machine Instructions, Opcode, Registers, CPU organization, Instruction formats, Timing and control, Instruction cycle, Addressing modes, Program Control, Instruction Cycle: Fetch Decode and Execute, Control Transfer, Control memory, Micro programmed vs. Hardwired control unit							
4.	**UNIT IV: MSC 51 Family** Study of micro controller (MCS-51family- 8051) - Architecture, instruction set, addressing modes and programming, Registers, Flags, Counter and Timers, Comparison of various families of 8-bit micro controllers. Interfacing of ADC, sensors, keyboard and DAC using microcontrollers.							
5.	**UNIT V: Embedded System and Program Development Tools** Introduction to Embedded Systems, Embedded System: Categories, Requirements and Design Challenges, embedded computing, Applications Areas, Recent trends in embedded systems, Development process & Design, Formalisms for System Design: Integration and testing, Packaging Configuration, Development							

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	tools, Linker, Loader, Compiler, Libraries. Design Tools: Kiel, Arduino. Design Case Examples							

Total No. of Instructional periods available for the course: 48 Sessions

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