OFFICIAL COURSE OUTLINE INFORMATION

Students are advised to keep course outlines in personal files for future use.

Shaded headings are subject to change at the discretion of the department and the material will vary - see course syllabus available from instructor.

<table>
<thead>
<tr>
<th>FACULTY/DEPARTMENT</th>
<th>PHYS 362</th>
<th>PHYS 462</th>
</tr>
</thead>
<tbody>
<tr>
<td>COURSE NAME/NUMBER</td>
<td>Digital Electronics and Computer Interfacing</td>
<td></td>
</tr>
<tr>
<td>FORMER COURSE NUMBER</td>
<td></td>
<td>UCFV CREDITS</td>
</tr>
<tr>
<td>UCFV CREDITS</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

CALENDAR DESCRIPTION:

This course emphasizes elementary digital electronics and interfaces. Topics include gates and Boolean algebra, Karnaugh maps, flip flops, registers, counters and memories, digital components, microprocessor functions and architecture, instruction sets, D/A and A/D converters, and waveshaping. PHYS 372, the laboratory portion of this course, must be taken concurrently. This course is designed to provide practical experience with the basic digital logic chips and how digital circuits can be interfaced with microprocessors.

Note: Students with credit for PHYS 462 cannot take this course for further credit.

PREREQUISITES: PHYS 222

SYNONYMOUS COURSE(S)

(a) Replaces: PHYS 462
(Replaces course #)

(b) Cannot take: n/a for further credit.

TOTAL HOURS PER TERM: 75

STRUCTURE OF HOURS:

Lectures: 75 Hrs
Seminar: Hrs
Laboratory: Hrs
Field Experience: Hrs
Student Directed Learning: Hrs
Other (Specify): Hrs

MAXIMUM ENROLMENT: 24

EXPECTED FREQUENCY OF COURSE OFFERINGS:

Once every 2 or 3 years

WILL TRANSFER CREDIT BE REQUESTED? (lower-level courses only)

☑ Yes ☐ No

WILL TRANSFER CREDIT BE REQUESTED? (upper-level requested by department)

☐ Yes ☐ No

TRANSFER CREDIT EXISTS IN BCCAT TRANSFER GUIDE:

☑ Yes ☐ No

AUTHORIZATION SIGNATURES:

Course Designer(s): George McGuire; revised P. Mulhern
Chairperson: Gillian Mimmack (Curriculum Committee)

Department Head: Norm Taylor
Dean: September 1, 2009

UPAC Approval in Principle Date: May 22, 2009
UPAC Final Approval Date: October 2, 2009
LEARNING OBJECTIVES / GOALS / OUTCOMES / LEARNING OUTCOMES:

This course is designed to provide students with:
1. the theory needed to understand the purpose and how digital devices function;
2. an understanding and an appreciation of how a digital computer functions;
3. the ability to design, construct and test simple digital logic circuits;
4. an ability to program the common microprocessors;
5. how information can be transferred to and from computers.

METHODS:

This course will be presented using lectures, demonstrations, experiments, and computer simulations. Computer simulations will be used to design and to check the digital logic circuits. The laboratory portion of the course will provide the actual experience and the practice needed to confirm the digital logic theory studied in the lecture portion of the course. This unique combination of classroom theory, computer simulation, and practical experience should provide the students with the necessary knowledge and experience to design circuits to perform specific tasks. Students after successfully completing this course will have a good understanding of basic digital electronics, microprocessors, computer architecture, computer interfacing, and computers can be used to model and test circuits.

PRIOR LEARNING ASSESSMENT RECOGNITION (PLAR):

Credit can be awarded for this course through PLAR (Please check:)  ☒ Yes  ☐ No

METHODS OF OBTAINING PLAR:

Please see the Physics PLAR policy on the department's webpage

TEXTBOOKS, REFERENCES, MATERIALS:

[Textbook selection varies by instructor. An example of texts for this course might be:]

        Borgart, Introduction to Digital Circuits (1992)

REFERENCES:

STUDENT EVALUATION:

[An example of student evaluation for this course might be:]

Assignments         25%
Mid-term                25%
Final                      50%

COURSE CONTENT:

[Course content varies by instructor. An example of course content might be:]

(Chapters refer to Bogart)

Introduction: Digital vs. Analog; Elements of Design
Chap 3: Logic Gates
Chap 4: Boolean Algebra
Chap 4: Karnaugh Maps; Chap 5: Practical Considerations
Chap 6: Pulse and Digital Circuits
Physics of semiconductors; Analog – diodes
Analog – transistors and op-amps
Chap 7: Waveshaping and Waveform Analysis
Appendix 1: Spice
Chap 7: Comparators and Schmitt Triggers; Sensors  
Chap 8: Multivibrators and 555 Clock  
Chap 9: Basics of Internal Gate Structure  
Chap 10: Logic Families  
Chap 11: RS and D Flip-Flops  
Chap 11: JK Flip-Flops and applications: bus structure  
Chap 12: Registers; Chap 15 Multiplexers  
Chap 13: Encoders and Decoders  
Chap 2: Binary and Hexadecimal  
Chap 14: Counters – Asynchronous  
Chap 14: Counters – Synchronous  
Midterm: Chapters 3 – 11  
Chap 15: Adders  
Chap 12: Registers: Logical Comparators  
Computers: Turing machine, Von Neumann cycle, architecture  
Virtual Machines: Bus Architecture  
Chap 16: Memories  
Chap 17: D/A  
Chap 17: A/D and other interfacing  
Game Port; Software interrupts  
RS – 232 Interface  
IEEE – 488 Interface  
PLA and 8253/8255 chips  
Mechanical Interfaces; Stepper Motors