COURSE INFORMATION

DEPARTMENT: Natural Sciences

DATE: May 1994

Physics 472

Laboratory: Digital Electronics

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NAME & NUMBER OF COURSE

DESCRIPTIVE TITLE

UCFV CREDIT

CATALOGUE DESCRIPTION: Physics 472 is the laboratory portion of the digital electronics course, Physics 462. The experiments done in this course are designed to provide the students with the practical experience using, testing, and designing digital logic circuits. The experiments are closely related to the material covered in the classroom. The unifying philosophy of this course is to show how digital logic circuits can be interfaced with many of the common microprocessors.

COURSE PREREQUISITES: Physics 332

COURSE COREQUISITES: Physics 462

HOURS PER TERM

FOR EACH STUDENT

Lecture hrs

Laboratory 60 hrs

Student Directed Learning hrs

Seminar hrs

Other - specify:

Field Experience hrs

TOTAL hrs

60 HRS

TRANSFER

TRANSFER STATUS (Equivalent, Unassigned, Other Details)

UBC credits

SFU credits

UVIC units

Other

George McGuire

J.D. TUNSTALL Ph.D.

COURSE DESIGNER

DEAN OF ACADEMIC STUDIES
Physics 472

NAME & NUMBER OF COURSE

<table>
<thead>
<tr>
<th>COURSES FOR WHICH THIS IS A PREREQUISITE:</th>
<th>RELATED COURSES</th>
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<tr>
<td>None</td>
<td>Physics 472 (lab)</td>
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TEXTBOOKS, REFERENCES, MATERIALS (List reading resources elsewhere)


REFERENCES:


OBJECTIVES:

The experiments in this course are designed to provide students with:
1. the practical experience in using the basic digital gates;
2. digital design experience and how these circuits perform binary mathematics;
3. practical experience in using IC chips
4. the ability interface digital circuits with common microprocessors.

METHODS:

The experiments used in this course will be closely tied to the material covered in the lectures and to the assigned computer simulations. The laboratory is meant to be an integral part of the classroom portion of the course—it should not to be thought of as a separate part of the course. The experiments are needed to provide the practical experience with the logic circuits studied in the classroom. The unique combination of classroom theory, computer simulation, and practical experience should provide the students with the necessary knowledge and the experience to design and test digital electronic circuits. Experiments on computer interfacing will be assigned. Students after successfully completing this course will have a good understanding of digital electronics, microprocessors, computer architecture, and computer interfacing.

STUDENT EVALUATION PROCEDURE:

| Experiments                  | 25% |
| Project                     | 25% |
| Computer Simulations        | 15% |
| Final Exam (Physics 362)    | 35% |
COURSE CONTENT

EXPERIMENTS

Period 1. Experiment 2 and Experiment 3: Inverter, logic gates, and basic gates

Period 2. Experiment 4: Decoders and Multiplexers

Period 3. Experiment 5, Experiment 6: Adders and Complex Adders

Period 4. Experiment 7: Flip Flops

Period 5. Experiment 8 and Experiment 9: Four Bit register and Counters

Period 6. Experiment 11: A/D and D/A Converters

Period 7. Experiment 12 and Experiment 13: A/D and D/A computer interfaces

Period 8. Experiment 14 and Experiment 15: Random Access Memory

Period 9. Experiment 16 and Experiment 17: Program counters and Output Register

Period 10. Experiment 18 and Experiment 19: Ring Counter

Period 12. Experiment 22, and Experiment 23: ALU, Accumulator

Period 13. Experiment 24 and Experiment 25: Memory

Period 14. Experiment 25: System Interconnections

Period 15. Experiment 26: Assembler programming the 8080 microprocessor