TECHNOLOGICAL INSTITUTE OF THE PHILIPPINES

COURSE SYLLABUS

COURSE CODE **COURSE NAME**	CPE 132 ARCHITECTURE OF EMBEDDED SYSTEMS
CREDITS **CONTACT HOURS**	3 units (2 units lecture, 1 unit laboratory) 2 hours lecture, 3 hours laboratory
INSTRUCTOR	Engr. Ronnie M. Dysangco
TEXTBOOK	Wilmshurst , Tim (2010). *Designing Embedded System with PIC Microcontroller: Principle and Application*. Boston : Elsevier.
Other Supplemental Materials	Hamacher, Carl (2012). *Computer Organization and Embedded Systems. Sixth Edition.* New York, New York: McGraw-Hill Bohmer, Mario (2012). *Beginning Android ADK with Arduino: Learn how to use the Android Open Accessory Development Kit to Create Amazing Gadgets with Arduino*. New York, USA: Apress. Douglass, B. (2011). *Design Patterns for Embedded Systems in C: an embedded software engineering toolkit.* Amsterdam: Elsevier. Noergaard, Tommy (2011). *Demystifying Embedded Systems Middleware.* Oxford: Elsevier Zurawski, R. (2010). *Embedded Systems Handbook: Embedded Systems Design and Verification.* Boca Raton: Taylor and Francis. Johnson, Gary W. & Jennings, Richard. (2006). *Labview Graphical Programming*. New York, NY: McGraw-Hill.
SPECIFIC COURSE INFORMATION	
a. Course Description	
This course provides an introduction to embedded system design. It presents the two aspects of embedded systems as both hardware and software in a unified view. The first part is an overview to embedded systems, design challenges, technologies and development and implementation tools. The second part explores the various hardware implementation technologies; custom single-processor, general-purpose processor and memory and peripheral devices interfacing. Finally, the third part covers IC and Designed Technology.	
b. Prerequisites **Co-requisites**	None CPE 004 Logic Circuit and Switching Theory CPE131 Principles of Embedded Systems
c. Course Classification (Required/elective/ selected elective)	Required
SPECIFIC GOALS FOR THE COURSE	

a. Course Objective

After completing this course, the student must be able to:

1. Design embedded systems using different design methodologies and technologies.
2. Use development tools such as hardware system compilers and embedded system software development tools.
3. Apply design tradeoffs in developing embedded solutions to a given problem or situation.

b. Course Outcomes

By the end of the course, the students will be able to:

1. Explain the embedded system fundamental principles and concepts.
2. Derive an idea on different application of embedded system technology.
3. Determine the possible solution on transforming complex problem through technology evolution.
4. Evaluate the effect of embedded system principle and its application.

c. Student Outcomes Addressed by the Course

NONE

COURSE TOPICS

Prelim Period (Weeks 1–7)

I. Introduction; TIP Vision and Mission**;** TIP Graduate Attributes/ Institutional Intended Learning Outcomes; Program Objectives/ Program Intended Learning Outcomes; Course Objectives/ Course Intended Learning Outcomes; Course Policies

II. Embedded System Overview; Overview; Design Challenge; Processor Technology; IC Technology; Design Technology; Trade-offs

III. Processor Hardware; Custom Single Processor; General Purpose Processor

IV. Development Environment; Design Flow; Design Tools

Midterm Period (Weeks 8–13)

V. System Memory and Peripheral Interfacing; Communication Basics; Wired and wireless Protocol Concepts

VI. Design Technology; EDA Tools

Final Period (Weeks 14–17)

VII. PID Control Basics

VIII. Typical Controller Features, Options, and Capabilities

IX. A/D and D/A Conversion