

School of CSE - Details Needed for Course Revision Proposal

Course Title: *Microprocessors and Interfacing*

Proposer: *Sri Parameswaran*

Rationale

Why is the revision being proposed?

The revision is being proposed to modify the existing Microprocessors and Embedded Systems (COMP3221) course so that the revised course will serve as the compulsory course for the following programs:

Computer science;

Software Engineering; and

Computer Engineering.

What are the academic objectives?

As the application of computing systems becomes ubiquitous, the gap between software and hardware systems is becoming smaller. It is indispensable for all students in the school of CSE, to understand the principles of overall computing systems. Questions such as how a computing system is formed with hardware and software components; how they work together to perform functions; how each side design affects the other side, should be clear to all computing students. This course deals with such questions and provides students with a good insight for efficient and quality system design.

Students should be able to:

demonstrate understanding of Von Neumann and Harvard architectural models and their implementations in microprocessors and microcontrollers;

develop and debug programs at the assembly level using software development tools for applications including timing and data (both analog and digital) input/output;

develop high-level language programs for compilation into assembly-level code using software development tools;

demonstrate understanding of the relation between assembly language and high-level languages, including the concepts of memory stack, subroutine linkage, and program control structures;

demonstrate understanding of interrupt concepts including priority management and be able to develop and debug interrupt driven input/output;

demonstrate understanding of parallel and serial interfaces and be able to design software to use them;

demonstrate understanding of the concepts of data acquisition including analog-to-digital and digital-to-analog conversion.

Which programs/stage(s) does it serve? What proportion of students do you expect to come from which program? (It is legitimate not to have a full answer to that, but if you do have one, we'd like to know).

The course will serve as a compulsory for all CSE students.

Why can the same objectives not be achieved with the current course?

This would require an additional compulsory subject for CS and SE students.

The exiting Microprocessors and Embedded Systems course is not compulsory for SE and CS students.

How does the proposed course relate to other courses?

This course has the same relationship as per the current COMP3221, which will be replaced by MPI.

What overlap is there?

As per current COMP3221.

If there is any overlap, why is this justified/not a problem?

Stakeholders and Consultation

Who are the potential stakeholders, who was consulted about the

proposal (inside the School as well as outside), what was the result of that consultation?

HoS, TC chair, Program Director SE, Academic Director EE, and a number of student and staff consultations. There was general agreement.

Enrolment Impacts

Likely enrolment (with justification), and impact on enrolments of other courses.

Enrolment is likely to increase to 200 or so.

Justification of Prerequisites (or lack thereof)

COMP1A, COMP1B

Delivery and Assessment

Anything noteworthy about delivery mode, assessment (with justification).

As per COMP3221. Some introductory material may be used.

Handbook Entry

As per COMP3221

Textbooks/References

As per COMP3221

Syllabus

Indicative syllabus / overview of contents (at a level of detail well beyond that of the handbook entry)

Instruction Set Architecture (ISA), Floating point number representation, computer arithmetic, assembly and machine language Programming, Machine language fundamentals; addressing modes; instruction repertoire, Assembly language programming methodology, Interrupts and I/O interfacing (hardware and software), Serial communication, Timers, Analog Input and output, Converting Analog signals to Digital Signals (Data acquisition), Taking input from a variety of sensors and driving actuators, Buses and memory system, Low level device drivers.

Effect on School Resources:

1. Who is proposed to teach the proposed new course, and what impact would this have on their planned/current allocation?

TBD

2. What sort of tutorial component is proposed, if any?

As per COMP3221

3. What is the likely impact on lab utilisation (this relates to assignment and project work as well as scheduled labs)?

Increased utilization – about the 2001 levels.

3. Any other resource needs? E.g. special print/disk quota, access to servers, access to special machines, special labs.

Likely to increase the number of boards needed.