

# The Development and Deployment of Embedded Software Curricula in Taiwan

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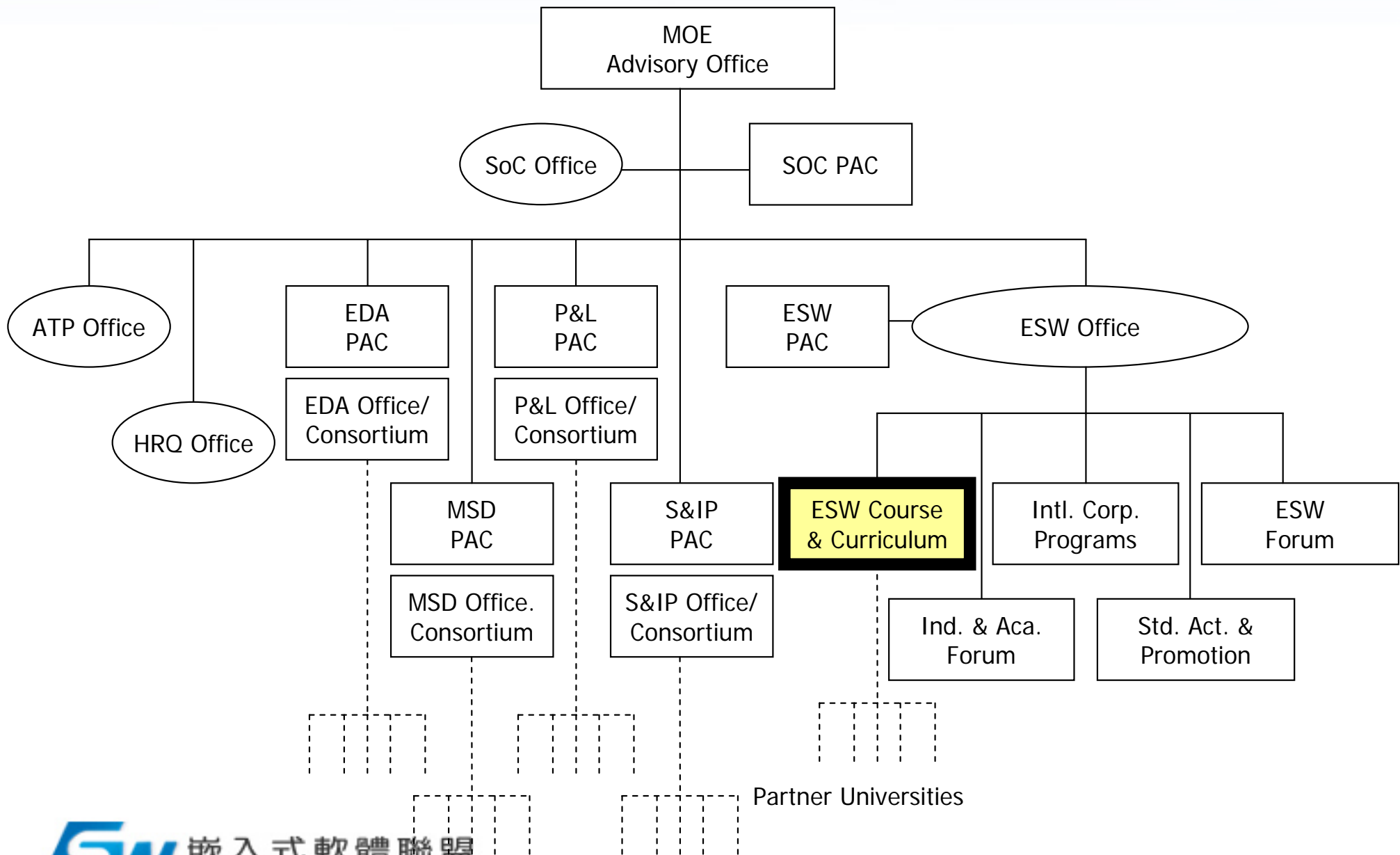
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# Outline

- ❖ Introduction
- ❖ Our strategies
- ❖ Embedded software curricula
- ❖ Results and experiences
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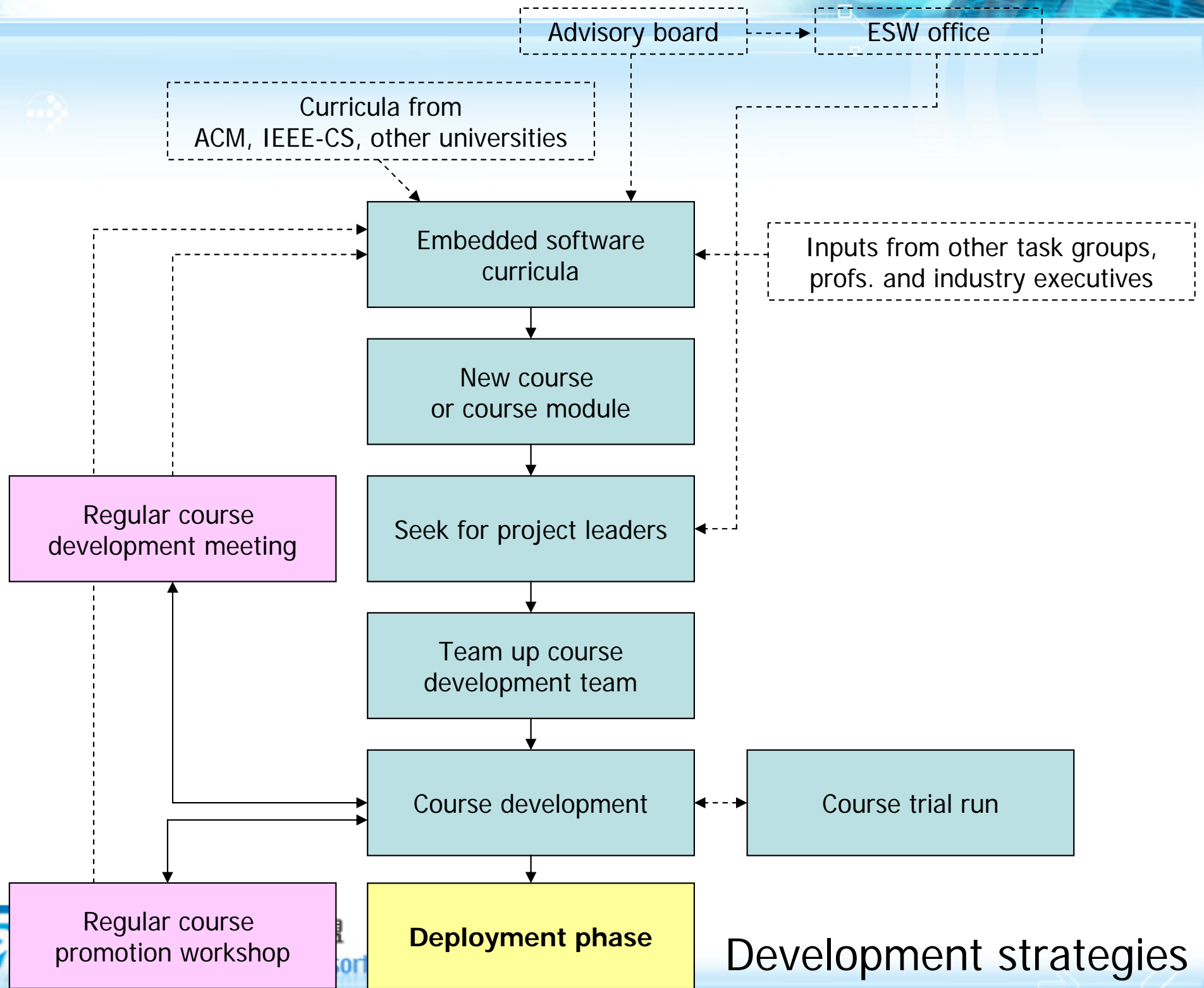
# MOE/VLSI Program/ESW Consortium

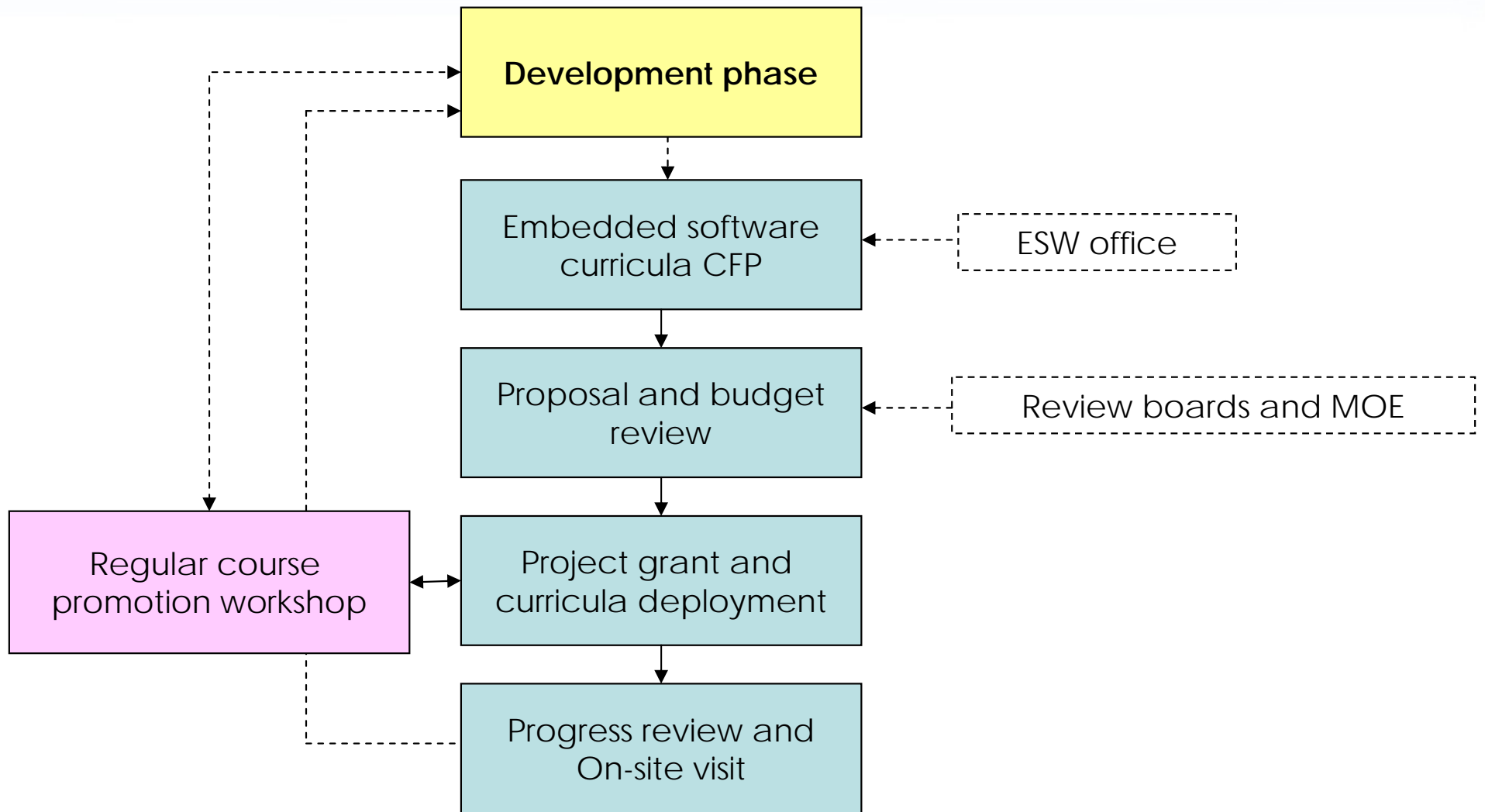


Partner Universities

# ESW Consortium/ESW Curriculum

- ❖ ESW curriculum task group
  - Develop reference ESW curricula for universities
  - Develop or enhance courseware including Labs for ESW courses
  - Promote ESW curricula for CS/EE depts.





# Embedded software curricula

## ❖ Universities

- train students with research, design and development abilities

## ❖ Technical universities

- offer trainings to students with technical skills and implementation abilities

Fundamental

Embedded Hardware/SoC

Embedded System Software

Embedded Application Software

Digital Logic Design

System Software

Programming Language

Electronic and Electric Circuit

Introduction to DSP

intermediate

Computer Organization

Introduction to OS

Embedded Software Programming

Advanced System Software

Microprocessor Lab.

Embedded Tool chians

DSP Labs

HDL & FPGA

Advanced OS

Advanced

Embedded System Design

SOC Design

Implementation of Embedded OS

Embedded Middleware

Existing Courses

HW/SW Co-Design

Embedded Real Time Systems

ESW for Networked SoCs

Newly Developed

Embedded Processor

Embedded Compiler Design

Special Projects for Embedded Mobile Systems

Not Yet Developed

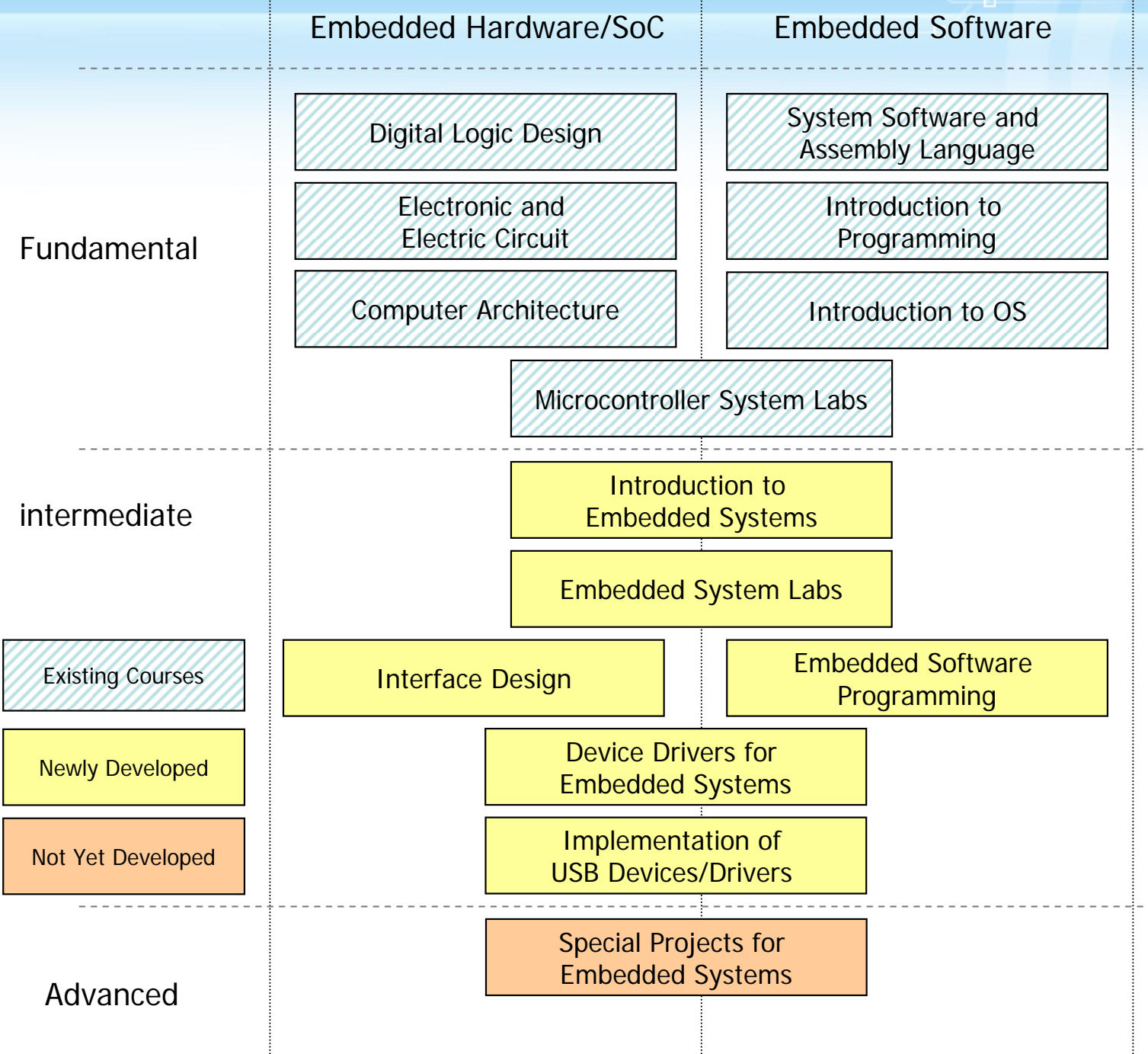
SOC Labs

I/O and Device Drivers

Special Projects for Embedded Sensors

Special Projects for Embedded Multimedia Systems





# Results and experiences

- ❖ 12 course development projects since 2004
  - 8 courses for universities
  - 4 courses for technical universities
- ❖ 12 projects
  - about total USD 600,000 for the course development
  - total USD 150,000 per year for maintenance
- ❖ 43 professors from more than 20 universities involve the course development
  - 18 professors are from EE and related departments
  - 25 professors are from the CS department

# Results and experiences (Cont.)

- ❖ Five curricula promotion workshops
  - more than 400 attendees including professors, students, and engineers from industries
- ❖ Received 24 proposals and approved 11 proposals in 2005
  - total USD 600,000 is funded for the first year. It is expected to have some amount of budget for the second year

# Results and experiences (Cont.)

- ❖ ESW education infrastructures have been established in the 11 universities
  - > 30 new courses or courses with enhancements are lectured in the 11 universities in the first year
  - > 1000 students enrolled these courses under the ESW curricula deployment program
- ❖ ESW consortium announced the call for proposal for technical universities in 2006

# Results and experiences (Cont.)

## ❖ Challenges and issues

- the common education platform
  - to develop different sets of hands-on labs over various platforms
  - require all hands-on labs to be developed over one or two common hardware platforms
- the development of hands-on labs
  - TA notes, reference source codes or reports, and knowledge and experiences learned from the labs are extremely important

## ❖ Establish a database for hands-on labs

- Lab road map
- >100 labs
- peer review

# Conclusions and future work

- ❖ The paper presented the strategies to develop and deploy ESW curricula in Taiwan
- ❖ The reference ESW curricula were proposed for universities and technical universities
- ❖ New courses and hands-on labs were developed to support the curricula
- ❖ The deployment program encourages universities to establish ESW curricula and the ESW education laboratory

# Conclusions and future work

- ❖ Our future working items are
  - a common teaching platform
  - construct a complete Lab database
  - develop more advanced courses



嵌入式軟體聯盟  
Embedded Software Consortium

Thank you !