Course title

Interconnection, packaging and heterogeneous integration of micro- and nanosystems

Code
PAC9010

ECTS credits	10
Faculty	Faculty of Technology and Maritime S
Location	Høgskolen i Vestfold
Teaching Language	English

Participants
Ph.D. students at HiVe and collaborating institutions

Prerequisite knowledge
Completed relevant Master programme

Aim and Objectives
Upon completion of this course the student should be able to:

- explain different techniques for assembly, interconnection and packaging
- explain techniques for integration of nanostructures into microsystems
- explain the rationale for selection of materials and processes for packaging
- explain reliability implications of packaging
- understand different packaging challenges for different applications
- calculate thermal impact for packaged systems
- choose a proper packaging strategy for a case system

Outline Syllabus

- The role of packaging in microlectronics and microsystems
- Single- and multichip packaging
- Flip chip assembly
- 3D chip stacking and heterogeneous integration
- Wafer-level packaging
- Packaging of special components: MEMS, RF, optoelectronic and biomedical components
- Reliability of packaging
- Thermal management
- Functional materials/ nanomaterials
- Top-down vs. bottom-up nanotechnology
- Integration of nanostructures in Microsystems

Work Methods/Teaching
Lectures. Laboratory work. Project work based on literature review

Assessment /Method(s)
Written examination, 5 hours (60%). Project work report (40%). The written examination may be replaced by an oral examination (when there are few students in the course).

Compulsory work
Laboratory work and project work based on literature review

Reading list
TEXT BOOKS:
Selected scientific articles and review papers.

Rao Tummala: “Fundamentals of Microsystems Packaging”, McGraw-Hill
Hand-outs.

SUPPORTING LITERATURE:
Charles Harper: “Electronic Packaging and Interconnection Handbook”, McGraw-Hill, 2005
Ken Gileo: “MEMS/MOEM Packaging, Designs, Materials, Processes”, McGraw-Hill, 2005
Richard k. Ulrich & William D. Brown: "Advanced Electronic Packaging", Wiley, 2006.

Coordinator (Professional responsible)

Asc. Prof. Knut Aasmundtveit