Computing (formerly Software Systems) Framework
Professor Keith Phalp
Associate Dean: Head of Computing and Informatics

School of Design, Engineering & Computing
Bournemouth University
Overview

- Some issues in Computing/IT degree level provision.
- Computing at Bournemouth (rationale and ethos)
- The Computing Framework and contents
  - Current courses, ethos and structure
  - Year One & Year Two
  - Placement
  - Final year units
  - Projects
  - The student experience
- Careers open to our graduates.
- Reflections on our rationale and experiences (why we have taken these approaches).
Issues in Computing/IT degree level provision

- Breadth and diversity of the subject area.
  - Computing means different things to different people.
  - Different experiences of prospective applicants
  - Much mis-information (and disagreement) about employment prospects. Our observations.
- Computer science degrees versus more professionally oriented degrees.
- Business IT degrees – how these vary.
- Why students choose to study on Computing/IT degrees.
Breadth and diversity of the subject area.

- Computers today penetrate every aspect of our lives
  - Databases and other software used in businesses and organisations
  - The internet and the World Wide Web
  - Embedded programmes that control our mobile phones, washing machines and car engines.
- Implies the need for Computing/IT professionals to **specialise**.
- But it is difficult for a school or college leaver, when choosing a university Computing/IT course, to know in which area(s) to specialise.
• “Traditional” Computer Science degrees
  • Theoretical
  • Draw on mathematical disciplines
  • Suit a particular type of student.

• More professionally oriented computing/IT degrees
  • Focus more on the practical application of computing/IT
  • Aim to prepare students for employment in the industry
  • Suit a broader range of students.

• Happy medium – rigour with practical experience.
Variation in Business IT degrees

- Many universities offer degrees with this or similar titles.
- Great variation in the proportion of business studies to technical studies on such courses.
- Provision on a spectrum of relative proportions
  - At one end, 70-80% business and 20-30% technical.
  - At the opposite end (us!), 20-30% business and 70-80% technical.
- It is important for students to know about this, as not all students can, or wish to, cope with the technical demands of the more technical courses.
Why students choose computing/IT degree courses

• They have a deep interest in, and fascination for, computers and what can be done with this technology.
  • The “geeks” (how we love them!)
• They understand that there are always good jobs for graduates in computing/IT disciplines.
• They, or their parents, believe that they need a degree of some sort for a successful future career
  • They quite enjoy using computers – to surf the net, play computer games, use social networking sites, etc. So why not choose a computing/IT degree?
• Industrially relevant education, underpinned by research and enterprise, on accredited courses *all in framework* with excellent employability prospects

• We have always had a focus on the professions.
• For example, we were among the first to have courses focussed on Software Engineering & Business IT (as opposed to Computer Science).
• Our current frameworks and courses still address professional practice, and reflect the breadth of the Computing industry with their specialisations, whilst being informed by our *research and enterprise activity*.
• We continue to review and refresh our provision to ensure its currency and value.
Some BU Research Themes

- **Things that matter to the profession**
  - Requirements Engineering
  - *Process modelling*
  - *Alignment of Business and IT*
  - Software Systems and Modelling
    - Model Driven Development
    - Software Development Methods (recent KTP projects)
    - Systems of Systems (coming funded project)
    - Automotive Software Engineering (with Bosch)
  - Software Process and Quality
  - Web Systems and Web Development Methods
  - Complex Adaptive Systems (with STRC as part of INFER)
  - Artificial Intelligence, Natural Computing, Data Mining
  - Information Assurance, IT Security.
Some Recent Research

- **Development Methods for Rich Internet Applications (KTP)**
  - Methods to address the particular needs of these kinds of development projects, in terms of product capability and reliable development processes.

- **Reverse engineering whilst retaining tacit Process Knowledge (KTP)**
  - Aside from the architectural re-engineering challenge to extract and describe business rules & processes to inform specification of new software products.

- **Meta-model-based merging: to Support Distributed Model Based Software Development for automotive product lines (with Bosch)**
  - Our model merging uses a novel (meta model driven) approach to ensure that much of the meaning (from the modellers’ perspective) is preserved.

- **Visual Model Driven Programming (VIDE)**
  - A rich and accessible tool-set, allowing those who are not IT specialists to be involved in the description and specification of system behaviour, as part of an MDA process.

- **A naturally inspired guidance system for unmanned autonomous vehicles employed in a search role**
  - Method for improving the performance of autonomous vehicles operating in a search role. A number of journal outputs, one of which gained a best paper medal (presented by HRH the Duke of Edinburgh, to the authors, Banks, Vincent and Phalp) in 2010.
What is the Computing Framework?

- A set of 7 related computing/IT degree titles. (note change from prospectus)
- **Deferred choice of final degree title.**
- Common first year of study.
- Partial specialisation in Year 2.
- Industrial Placement (Year 3).
- Final year
  - Choice of degree title and taught units.
  - Individual project and dissertation.
Degree Titles in the Computing Framework

- IT-with-business degrees
  - BSc (Hons) Business Computing
  - BSc (Hons) Business Information Technology (aka “BIT”)
  - BSc (Hons) Information Technology Management

- Computing degrees
  - BSc (Hons) Computing
  - BSc (Hons) Software Engineering

- Forensic/Security degree
  - BSc (Hons) Forensic Computing & Security

- Networking degree
  - BSc (Hons) Network Systems Management
Framework ethos and focus

• A range of degree titles reflecting the breadth of the profession
  • Deferred choice of degree title allows informed choice, specialisation, and changes of direction, up to the final year.

• Industrially relevant education, underpinned by research and enterprise, on accredited courses with excellent employability prospects
  • Our courses have always had a practical and professional emphasis (as opposed to Computer Science)
  • Course content and teaching are informed by the research and industrial activities of our staff.

• Common first year, and common units in second year, ensure coverage of core topics, necessary for accreditation with professional bodies.
Year One - Units & Assessment

Six taught units, studied by all first year students:
- Computers & Networks
- Databases
- Programming
- Systems Analysis & Design
- Web & Media Development
- Business & Professional Issues

- Assessment for most units is 50:50 coursework:exam.
  - Coursework – individual and group work.
The First Year Experience

• For each unit, normally:
  • A one-hour lecture per week.
  • A one-hour seminar or lab session, in smaller groups (more for programming)
• Modern, well-equipped computer labs, open 24 hours a day, 7 days a week.
• First year tutors, for academic and pastoral care.
• Peer-Assisted Learning (PAL) scheme in operation.
• Integrating all the first year learning – Simulated Business Week
  • Practical group work on a development project.
Integrating the learning
Integrating the learning
<table>
<thead>
<tr>
<th>Units</th>
<th>Bus IT</th>
<th>Comp</th>
<th>Forensics</th>
<th>Network</th>
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<tbody>
<tr>
<td><strong>Business Context</strong></td>
<td>Core</td>
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<td><strong>Data Management</strong></td>
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<td><strong>Digital Forensics</strong></td>
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<td><strong>Ethical Hacking &amp; Counter-</strong></td>
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<td><strong>Games</strong></td>
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<td><strong>Integrating Team Projects</strong></td>
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<td><strong>Networks and Security</strong></td>
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<td><strong>Programming 2</strong></td>
<td>Option</td>
<td>Core</td>
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<td><strong>Systems Design</strong></td>
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<td><strong>Web Development e-business</strong></td>
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• **Very** important part of the course
  • Puts into practice what has been learned in the first two years
  • Provides valuable industrial experience
  • Gives a competitive edge in finding a job after graduation.

• Placements last a minimum of 40 weeks
  • **Paid** positions, with large or small companies, in UK or abroad.

• Our Placement Service helps students find and apply for suitable placements
  • Also provides supervision while on placement.
Typical placement and graduate employers

- Adido Solutions
- CISCO Systems
- County Councils (various)
- DEK Printing Machines
- Disney
- Estee Lauder
- Google UK
- House of Fraser
- IBM
- Intel
- Lockheed Martin UK
- J P Morgan

- Microsoft UK
- Micronav
- Ministry of Defence
- Nationwide Building Soc
- NHS
- Oracle Corporation
- Quinetic
- School / College IT Departments (various)
- Siemens
- Xerox
Final Year (Year 4)

- Students enter Year 4 having made their final choices of degree title and the final year taught units they wish to study.
  - These choices are inter-related, most titles mandating certain electives.
  - However, there are two generic degree titles (Computing and Business Information Technology) that allow a more eclectic choice of units.
- The final year is organised into two semesters:
  - Semester 1 (October to mid-January)
    Study 3 taught elective units, with exams in early January.
  - Semester 2 (late January to May)
    Work on individual project/dissertation.
Current Final Year Taught Units

- Advanced Data Management
- Advanced Development
- Advanced Networks
- Business Development and Enterprise
- Business Processes and Requirements
- Cyber Crime
- Digital Entertainment Systems
- Information Assurance
- Management in Computing
- Network Configuration Management
- Software Quality and Testing
- Software Systems Modelling
- Web Systems
• The individual project is a triple-weighted unit (60 credits)
• Project involves a combination of theoretical and original practical work, related to the chosen degree title
  • Students choose an area of development and research relevant to their interests and career aspirations
  • Project ideas may arise from placement experience, taught units or suggestions from members of staff.
• Deliverables (typical)
  • Dissertation and development documentation
  • System demonstration.
• Project Tutor and individual Project Supervisor.
Graduate jobs open to our graduates

• Programmer
  • Many different types of applications (e.g. web applications, mobile phones, games, embedded, etc)
  • Many different programming languages
• Database developer, database administrator, data manager.
• Software engineer or software developer
  • Systems analyst, requirements engineer, systems designer, software tester.
• Networking – network designer, network manager.
• IT support – computers, networks, users.
• IT project management – team leader, project manager.
• IT teacher or trainer
• IT sales consultant
### Our graduates 2-10 years on ...

<table>
<thead>
<tr>
<th>Android Developer</th>
<th>Software Engineer</th>
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<tbody>
<tr>
<td>Business Analyst</td>
<td>Senior Analyst Programmer</td>
</tr>
<tr>
<td>Development Manager</td>
<td>Senior Information Analyst</td>
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<tr>
<td>Enterprise Architect</td>
<td>Senior Oracle Developer</td>
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<tr>
<td>IT Manager</td>
<td>Software Project Manager</td>
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<tr>
<td>Lead Web Developer</td>
<td>Systems Analyst</td>
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<tr>
<td>Managing Director</td>
<td>Technical Consultant</td>
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<tr>
<td>Network Analyst &amp; Mobile Specialist</td>
<td>Technical Director</td>
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<tr>
<td>Network Engineer</td>
<td>Test Team Leader</td>
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<tr>
<td>Online Marketing Consultant</td>
<td>Usability Manager</td>
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<tr>
<td>Pre-sales Support Engineer</td>
<td>Web Development Manager</td>
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Contacts

Computing Framework Leader
Ruth Pitman: rpitman@bournemouth.ac.uk
01202 96 5624

Computing Courses Administrator
Louise Burman: lburman@bournemouth.ac.uk
01202 96 1510

Head of Computing and Informatics
Keith Phalp: kphalp@bournemouth.ac.uk OR kp@bmth.ac.uk
01202 96 5571