

# Continued Professional Development (CPD) Programme in Software Engineering”

A 2 year part-time programme of courses  
from the Joburg Centre for Software Engineering (JCSE)  
and Wits University’s School of Electrical & Information Engineering.

The JCSE has identified the need to grow the pool of highly skilled software engineers capable of filling senior positions in the ICT industry. These software engineering specialists require both a strong theoretical foundation, and an ability to apply this theory in practice.

In conjunction with Wits University’s School of Electrical & Information Engineering, the JCSE offers a programme of advanced courses in Software Engineering. This programme is open to ICT professionals aiming to fill positions in ICT management, software architecture and design, or leadership roles in software project teams. The JCSE’s Continued Professional Development (CPD) Programme may, subject to certain conditions, also be used to provide a stepping stone into the Software Engineering option of the Wits University Post Graduate Diploma in Electrical Engineering (PG Dip Electrical Engineering – Software Engineering).

The full CPD Programme in Software Engineering consists of 5 “core” courses. The “core” courses correspond to a set of equivalent Wits University postgraduate courses.

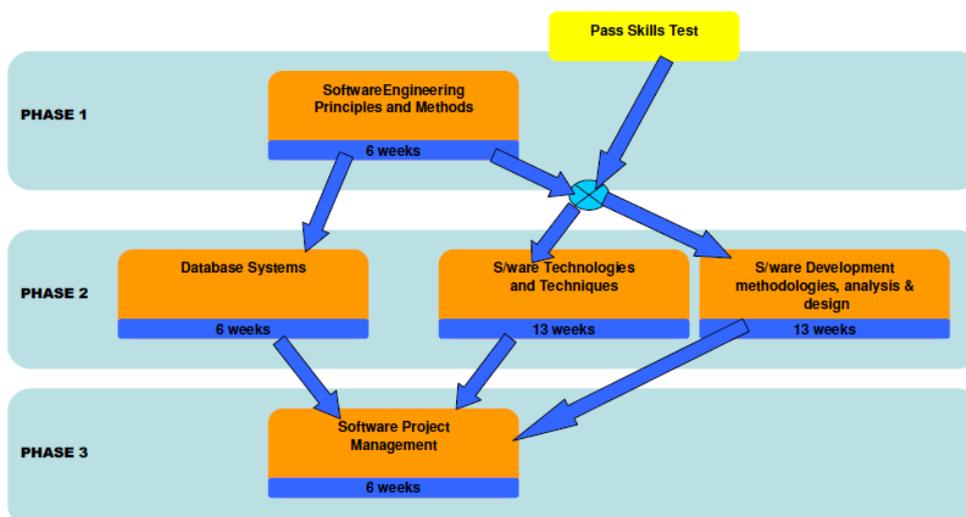
The CPD Programme in Software Engineering introduces students to key aspects of the software development lifecycle. By the end of the Programme students will understand and be able to apply key concepts and principles in software engineering (SE) and software project management (SPM). Courses aim to present an up-to-date and modern perspective, and are taught by experienced university lecturers and industry experts.

## AUDIENCE

The CPD Programme in Software Engineering is aimed at people with at least 5 years’ experience working in software development. Those attending the courses should have an interest in improving their theoretical skills to enable them to become software architects, designers, senior developers and project managers.

## COURSE STRUCTURE

The CPD Programme consists of 5 core courses in three different phases.



**Phase 1** is the entry course “Software Engineering Principles & Methods” and is required for all delegates. Before being accepted into the programme, each delegate will also be required to write a “Skills Test” (see details below). Delegates who **pass** this Skills Test can then complete all three of the **Phase 2** courses (“Software Development Methodologies, Analysis and Design”, “Software Technologies and Techniques”, “Database Systems”) and then may progress to the **Phase 3** course; “Software Project Management”. Delegates who **fail** the Skills Test may only complete the “Database Systems” course in **Phase 2** before progressing to **Phase 3**. *The Skills Test may be written again before the start of the next academic year.*

	Code	Course	Description
PHASE 1	CPD 7044	Software Engineering Principles & Methods	<ul style="list-style-type: none"> <li>· Software Development lifecycle</li> <li>· Objectives of software development – maintainability &amp; reuse</li> <li>· Requirements engineering</li> <li>· Overview of design</li> <li>· Software testing</li> <li>· Software quality</li> </ul>
PHASE 2	CPD 7045	Software Development Methodologies, Analysis and Design	<ul style="list-style-type: none"> <li>· Problem Frames and Use Cases</li> <li>· Object-Orientation</li> <li>· UML Notation</li> <li>· Analysis Patterns</li> <li>· Software Architecture</li> <li>· Domain-Driven Design</li> </ul>
	CPD 7046	Software Technologies and Techniques	<ul style="list-style-type: none"> <li>· Operating systems</li> <li>· Comparison of implementation languages and paradigms</li> <li>· Distributed systems</li> <li>· Tools and methods</li> </ul>
	CPD 7055	Database Systems	Information Systems and their data <ul style="list-style-type: none"> <li>· Database theory: relational databases; normalisation; SQL; object-oriented databases; data locking and transaction processing.</li> <li>· Database design</li> <li>· Practical issues; e.g. the principles of Knowledge Management</li> <li>· Spatial databases: location-based applications; Geographical Information Systems (GIS);</li> </ul>
PHASE 3	CPD 7047	Software Project Management	<ul style="list-style-type: none"> <li>· Feasibility analysis</li> <li>· Cost estimation</li> <li>· Resource allocation</li> <li>· Critical path analysis</li> <li>· Risk analysis</li> <li>· Project monitoring and control</li> <li>· Human issues</li> </ul>

The courses listed above are the “core” courses of the PG Dip in Electrical Engineering (Software Engineering)

## OBJECTIVES

Successful completion of the CPD Programme in Software Engineering Programme will enable participants to:

- Make decisions about how a software development project should best be organised, implemented and managed..
- Develop software and system designs using a disciplined process.
- Choose and use appropriate tools and methods in a systematic way.
- Apply principles, standards and best practices that are constantly being subjected to validation and improvement.
- Reuse designs and design artefacts.

## PREREQUISITES

There are no formal prerequisites for acceptance into the CPD Programme. However a Matric pass with University exemption (or equivalent) is **essential** for conversion from the CPD to the PG Dip in Electrical Engineering. In addition a University degree or Technikon Diploma in an appropriate discipline, combined with between 5 and 10 years of relevant work experience is recommended.

## THE “SKILLS TEST”

Two of the Phase 2 courses (“Software Development Methodologies, Analysis and Design” and “Software Technologies and Techniques”) are more “technical” in nature, drawing heavily on modern programming concepts such as Object-Oriented Design (OOD) and Object-Oriented Programming (OOP). Delegates attending these courses should have prior understanding of concepts such as classes, inheritance, polymorphism, etc. Such an understanding should be acquired through experience in the use of a modern OO language such as C++, C# or Java. The “Skills Test” is a written test (not a programming test) that explores the delegate’s understanding of OO concepts. Delegates who fail the test will be given advice on how to “brush up” on OO concepts and will be allowed to re-take the test before the start of the next academic year.

## COURSE WORK

The three courses “Software Engineering Principles & Methods”, ‘Database Systems” and “Software Project Management” are completed in 6 weeks. These courses require about 20 hours of effort per week, consisting of: a 3 hour lecture, 4 hours of structured group and project work, and 8-12 hours of self-learning and reading.

Two of the Phase 2 courses: “Software Development Methodologies, Analysis and Design” and “Software Technologies and Techniques”, are each presented in 12 lectures, over 13 weeks. The total amount of formal lecturing is about 30 hours. In addition delegates are required to devote about 17 hours per week to group and project work, self-learning and reading.

## COURSE MATERIALS

On the first day of the course, participants will receive

- a detailed course outline
- a study guide, including a reading list
- a copy of any prescribed text books

During the course participants will receive project and assignment hand-outs, together with additional study material.

Each course is supported by a website.

## CLASS SCHEDULE

Lectures are at Wits University in Room CM3, Chamber of Mines Building, West Campus off Enoch Sontonga Avenue (M18), Braamfontein, on Wednesdays or Thursdays from 4-7pm.

## CERTIFICATION

Successful completion of each course requires that participants attend and actively participate in classroom discussions and complete all assignments. Delegates successfully completing the course will receive an official Wits University Short Course Certificate of Attendance at the end of the course.

Delegates wishing to attain a formal Certificate of Competence from Wits University may elect to take an exam at the end of each course and must achieve over 50%.

Delegates electing to sit exams and achieving an average of 60% for 4 of the 5 core courses of the CPD programme may be invited to apply to register for the Wits University Post Graduate Diploma in Electrical Engineering (Software Engineering) The rules and procedures for admission to the PG Dip are defined by the University, and applicants will be required to meet specific requirements. Successful applicants will receive credits for the completed core CPD courses.

## COST

The cost of each course in 2018 is R13 000.00 or (for JCSE Partners) 13,000 points. Library fees are included in this fee.

## REGISTRATION

To request more information, please email: [info@jcse.org.za](mailto:info@jcse.org.za)

To register, please email: [Leah.Tladi@wits.ac.za](mailto:Leah.Tladi@wits.ac.za)

Registration for 2018 closes on **31 October 2017**. A maximum of 35 delegates will be accepted for each course.

## CPD Programme Course Schedule

### 2018 (Provisional)

Software Engineering Principles & Methods (6 Weeks)	24 Jan to 28 Feb (Exam 7 March)
Software Technologies and Techniques (12 weeks)	4 April to 20 June [Wednesdays]
Software Development Methodologies, Analysis and Design (12 weeks)	5 April to 21 June [Thursdays]
Database Systems (6 weeks)	25 July to 29 August (Exam 5 September)
Software Project Management (7 Weeks –excluding public & religious holidays)	19 September to 24 October (Exam 7 November)

*Note: Delegates may register for either “Software Technologies & Techniques” or “Software Development Methodologies, Analysis and Design” in any one year.*