Research Theory and Methodology\textsuperscript{a,b}

Anastássios Perdicoúlis
Assistant Professor, ECT, UTAD (http://www.tasso.utad.pt)
Senior Researcher, CITTA, FEUP (http://www.fe.up.pt/~tasso)
Visiting Researcher, Oxford Institute for Sustainable Development, OBU, UK

1 Description
The unit covers concepts, methods, and techniques for designing and implementing scientific work with rigorous procedure and content. Skill development is geared towards quality (e.g. research procedure, document structure, argumentation).

2 Teaching and assessment
\textbf{MODE} Interactive classes with students as researchers in training
\textbf{Assignment 1} Annotated bibliography on the subject of my thesis
\textbf{Assignment 2} The tasks of my research process and respective methods
\textbf{Criteria} Traceability, objectivity, precision, accuracy (Perdicoúlis, 2012)

3 Programme
\textbf{S01} Introduction
  I \textit{Presentation}: Syllabus; feedback
  II \textit{Cognitive base}: Data, information, comprehension, knowledge
  III \textit{Sources and formats}: Articles, books, reports, dissertations/theses, internet, people
  IV \textit{Techniques}: Searching for publications; bibliography management software
  V \textit{Techniques}: Consulting, annotating, citing, and referencing publications; class notes

\textbf{S02} Preparation
  I \textit{Perspective}: Science domains; subject matter; motivation; the ‘scientific question’
  II \textit{Methodology}: Approaching the subject matter; research typology: paradigms & protocols\textsuperscript{1}
  III \textit{Perspective}: Qualitative vs. quantitative approaches; suitability to subject matters
  IV \textit{Competence}: Argumentation — construction, communication, interpretation, verification
  V \textit{Competence}: Appropriate (‘scientific’) writing — structure, style, content, feedback

\textsuperscript{a} Teoria e Metodologia de Investigação — Software Engineering; TechAgro
\textsuperscript{b} Corresponds to the unit’s generic configuration — v. SIDE for current specifics
\textsuperscript{1} Special for IT: action research (Argyris, 1982), design thinking (Archer, 1965), design science research (Hevner \textit{et al.}, 2004)
S03 Work

I Perspective: Scientific revolutions; historic developments; awareness
II Competence: Research workflow; scientific reliability; scientific credibility
III Competence: Induction; explanation; formulation of a hypothesis
IV Competence: Hypothesis testing; experimentation; confidence
V Competence: Deduction; conclusions; decision; authority

S04 Refinement

I Perspective: Scientific method; engineering protocols
II Perspective: Evidence and data; direct or indirect acquisition
III Perspective: Beyond data and information: understanding and knowledge
IV Perspective: Personal experience; working in the ‘medium’: people; bibliography
V Perspective: Other fields; the same concepts in other contexts; parallelism

Reading list