WSDL Planning 2025/26

	Date	T (1h)	TP (2h)	Practical Work Milestone	By the end of the class, students should:
1	23/09/2025	Introduction to course goals: contents, bibliography, evaluation, project, planning. Introduction to Semantic Web and Linked Data.The Semantic Web Activity of W3C: Overview of technologies and standards.	No class		Understand the contents and learning goals of the unit. Understand the practical work and evaluation methodology. Understand the planning and milestines of the unit. Additionally: Explain what Linked Data is and how it relates to the Semantic Web vision. Recognize the W3C Semantic Web stack and the main standards (RDF, SPARQL, OWL, SHACL, SKOS, PROV, JSON-LD, etc.).
2	30/09/2025	Introduction to Linked Data.The Semantic Web Activity of W3C: Overview of technologies and standards (cont). Real-World Applications.	Group exercise. Practical work description and by-laws.		Explain what Linked Data is and how it relates to the Semantic Web vision. Recognize the W3C Semantic Web stack and the main standards (RDF, SPARQL, OWL, SHACL, SKOS, PROV, JSON-LD, etc.). Identify real-world applications across domains (science, industry, government, web). See the value and challenges of Linked Data in practice.
3	07/10/2025	RDF -The Resource Description Framework.	Practical sheet 1: Publishing data on the semantic web. Practical work discussion and selection.		Explain what RDF is and why it is the foundational model of the Semantic Web. Understand the triple structure (subject–predicate–object) and graph representation. Write simple RDF descriptions in different syntaxes (Turtle, RDF/XML, JSON-LD).
4	14/10/2025	RDF -The Resource Description Framework (cont.) Metadata with RDF; Metadata taxonomies with RDF Schema. Using semantic web and linked data approaches (cont)	Practical sheet 2: Resource Description Language Serialization. Practical work discussion and selection.		Distinguish between URIs, literals, and blank nodes. Explain how RDF is used to represent metadata (about web resources, datasets, publications, people…). Define and use RDFS constructs (rdfs:Class, rdfs:subClassOf, rdfs:Property, rdfs:subPropertyOf, rdfs:domain, rdfs:range, rdfs:label, rdfs:comment). Understand how RDF + RDFS provide shared vocabularies / taxonomies. Apply these concepts in semantic web and linked data contexts (e.g. dataset annotation, schema extension).
5	21/10/2025	Introduction to SPARQL.	Practical sheet 3: SPARQL. Practical work development.		Understand the role of SPARQL as the query language for RDF. Write basic SELECT queries over an RDF graph. Use triple patterns, variables, and prefixes. Apply filters, ordering, and simple aggregations. Distinguish between graph pattern matching and SQL querying. Run queries against public endpoints (e.g., DBpedia, Wikidata).
	28.10.2025	FEUP's Week			
6	4/11/2025	Practical Work Check Point I SPARQL queries. Using semantic web and linked data approaches.	Practical work development.	M1	Give students space to work on their practical assignment. Provide feedback and correction early so they don't go down the wrong path. Encourage peer-to-peer learning and exchange of approaches. Use SPARQL query forms beyond basic SELECT (ASK, CONSTRUCT, DESCRIBE). Apply advanced query patterns: OPTIONAL, UNION, FILTER, BIND, aggregates. Understand graph patterns in Linked Data contexts. Query public SPARQL endpoints (DBpedia, Wikidata, Europeana, etc.). See how SPARQL enables cross-dataset integration in the Semantic Web.
7	11/11/2025	Ontologies. Introduction to OWL language.	Practical sheet 4: Ontologies and reasoning. Practical work development.		Explain what an ontology is and how it differs from a taxonomy or schema. Understand why we need OWL on top of RDF/RDFS. Recognize the main constructs of OWL: classes, properties, restrictions, axioms. Write simple OWL axioms in Turtle/Manchester syntax. Understand the role of reasoners in deriving implicit knowledge.
9	18/11/2025	Practical Work Check Point II	Presentations of M2.	M2	Presentations by students
10	25/11/2025	OWL Properties.	Practical sheet 5: Pizza ontology. Practical work development.		Distinguish between object properties and datatype properties. Understand annotation properties and their role. Define property characteristics: functional, inverse functional, transitive, symmetric, reflexive, etc. Set domain and range restrictions for properties. Use Protégé to create classes, properties, and individuals, and apply these characteristics.
11	2/12/2025	Building ontologies. Real-world applications.	Practical sheet 6: Einstein puzzle. Practical work development.		Consolidate what they know about OWL classes and properties. Introduce logical restrictions and constraints in OWL. Show how a reasoner uses these constraints to derive facts.
12	9/12/2025	Concepts of neuro-symbolic AI.	Practical sheet 7: Neural -> Symbols -> Reasoning Practical work development.		Understand how neural methods can populate and extend ontologies (automatic instance creation, relation extraction). Use ontologies and rules to check, constrain, and explain neural outputs. Appreciate the strengths/limits of purely symbolic vs. purely neural approaches, and why hybridization matters.
	16/12/2025	Practical Work presentation.	Final presentations and discussion.	M3	Presentations by students. Feedback on unit.