



DISCIPLINE ACADEMIC SHEET
ACADEMIC YEAR 2025 – 2026

1. PROGRAMME DATA

1.1. Higher Education Institution	UNIVERSITY OF CRAIOVA
1.2. Faculty	Automation, Computers and Electronics
1.3. Department	Computers and Information Technology
1.4. Field of Study	Computers and Information Technology
1.5. Study level	L(License / Undergraduate)
1.6. Organizational form	IF
1.7. Study Program (name/code) /Qualification	Computers / L2060101010

2. DISCIPLINE DATA

2.1 Discipline Name	Information Retrieval						
2.2 Course Activities Holder	Prof. dr. ing. Liana Stanescu						
2.3. Practical Activities Holder							
2.4. Study Year	4	2.5. Semester	2	2.6. Evaluation type	E	2.7. Discipline regime	DOP

3. ESTIMATED TOTAL TIME (hours per semester of teaching activities)

3.1. Number of hours per week	4	in which: 3.2 course	3	3.3. sem./lab./pr.	1
3.4. Total hours of curriculum	40	in which: 3.5 course	30	3.6. sem./lab./pr.	10
3.7. Time distribution - hours/week					hours
Study after manual, course support, bibliography and notes					20
Additional documentation in library, on specialized electronic platforms and field					20
Training seminars / labs, homework, portfolios and essays					10
Tutorial					2
Examinations					5
Other activities.....					3
Total hours per individual activities					60
3.8. Total hours per semester					100
3.9. Number of credits					4

4. PRECONDITIONS (where appropriate)

4.1. of curriculum	Programming, programming techniques, data structures and algorithms, object-oriented programming
4.2. of competence	JAVA

5. CONDITIONS (where appropriate)

5.1. of the course	The course is taught with the help of the video projector. The board is used for some explanations and answers to
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	questions. The course support, the PowerPoint presentation and the electronic bibliography are provided.
5.2. of seminar/ laboratory/project	Lucene, ElasticSearch, Internet connection

6. COURSE OBJECTIVES – expected learning outcomes that are supported by completing and passing the course

Knowledge	The student/graduate: 1. Boolean retrieval and index structures – search models, the term vocabulary, postings lists, dictionaries, error-tolerant retrieval. 2. Index construction and compression – indexing stages, tokenization, stemming, compression techniques. 3. The vector space model – relevance scores, term weighting (TF-IDF), cosine similarity. 4. Complete search systems – combining scores and ranking factors. 5. Evaluation – performance measures (precision, recall, F1, MAP, nDCG). 6. Relevance feedback and query expansion – Rocchio methods, explicit/implicit feedback. 7. Probabilistic and machine learning methods – BM25 models, Naive Bayes, SVM, LSI. 8. Web search and crawling – search engine architecture, web indexing, PageRank, ethics and scalability.
Skills (Abilities)	The student/graduate selects and explains concepts specific to algorithm design, object-oriented programming, logic and functional programming. The student/graduate specifies requirements, analyzes, elaborates, develops and tests software systems in general-purpose (C etc.) and/or object-oriented (C++, Java etc.) programming languages, applying the elements specific to software engineering. The student/graduate designs, implements, develops and/or manages applications that include various types of databases. The student understands the main concepts underlying translation systems and source code compilation, and contributes to the development and improvement of tools specific to programming languages.
Responsibility and autonomy	The student/graduate behaves honorably, responsibly and ethically, in the spirit of the law, to ensure the reputation of the profession.

7. CONTENT

7.1. Course	The method of implementation	Teaching methods	Allocated time (hours)
1. Boolean retrieval, The term vocabulary and postings lists, Dictionaries and tolerant retrieval	face to face	Video projector, Classic	6
2. Index construction, index compression	face to face		3
3. Scoring, term weighting, the vector space model	face to face		3
4. Scores in a complete search system	face to face		3
5. Evaluation and results	face to face		3
6. Relevance feedback and query expansion	face to face		3
7. Probabilistic methods in information retrieval, Text classification & Naive Bayes, Support Vector	face to face		6

Machine, Latent semantic indexing			
8. Web search, Crawling	face to face		3
Bibliography:			
1. Christopher D. Manning, Prabhakar Raghavan and Hinrich Schütze, Introduction to Information Retrieval, Cambridge University Press. 2008. 2. Gerard Salton, Michael J. McGill, Introduction to modern information retrieval, McGraw-Hill, 1983. 3. https://www.cs.utexas.edu/~mooney/ir-course/ 4. Ricardo Baeza-Yates and Berthier Ribeiro-Neto. Modern Information Retrieval, 1999. 5. https://lucene.apache.org/core/2_9_4/gettingstarted.html 6. https://dzone.com/articles/apache-lucene-a-high-performance-and-full-featured 7. https://www.lucenetutorial.com/basic-concepts.html 8. https://www.elastic.co/guide/index.html			
1.			

7.2. Seminar/laboratory/project	The method of implementation	Teaching methods	Allocated time (hours)
1. Creating an application allowing queries with ranked results	face to face	Video projector, classic	2
1. Creating an application allowing phrase queries	face to face		2
2. Creating an application allowing wildcard queries	face to face		2
3. Creating an application allowing proximity queries	face to face		2
4. Creating an application allowing queries by attributes	face to face		2
Bibliography:			
1. https://lucene.apache.org/core/2_9_4/gettingstarted.html			
2. https://dzone.com/articles/apache-lucene-a-high-performance-and-full-featured			
3. https://www.lucenetutorial.com/basic-concepts.html 4. https://www.elastic.co/guide/index.html			

8. Correlating the content of the discipline with the expectations of representatives from the epistemic community, professional associations and representative employers in the field related to the program

The topics covered by the course were discussed with representative employers in the field related to the program: Operative, NetRom Software

9. EVALUATION

Activity Type	9.1. Evaluation criteria	9.2. Evaluation methods	9.3. Final mark weight
9.4. Course	- Knowledge of the basic elements of information retrieval and, in particular, of search engines (inverted indexes, boolean queries, document	Exam: written test. Exam requirements:	Nota va fi compusă din: $N = 0.6 * N1 + 0.4 * N2$

	preprocessing, dictionary structures, term weighting and score computation for document ranking); - knowledge of the methods by which retrieval can be improved by using techniques such as relevance feedback and query expansion; - knowledge of some forms of machine learning methods in information retrieval; - knowledge of the web search problem		
9.5. Seminar/laboratory/project	Pr: Using the Lucene or ElasticSearch library for indexing and search functions, as well as spell checking, and advanced analysis/tokenization capabilities	Presentation at the end of each laboratory of how the project work requirements were fulfilled	Studentul va intra la examenul final dacă a îndeplinit corect sarcinile fiecărei lucrări de proiect și obține $N2 \geq 5$
9.6. Minimum standard of performance			
The student is admitted to the final exam if they have adequately fulfilled the tasks of each laboratory and obtained a grade $N2 \geq 5$, and the minimum criterion for passing the exam is obtaining a final grade $N \geq 5$.			

Date of Completion	Signature of the Course Activities Holder,	Signature of the Practical Activities Holder,
23.08.2025	Prof. dr. ing. Liana Stanescu	As. Drd. Felix Petcusin

Date of Approval in the Department	Signature of the Department Director,
25.08.2025	Ș.l.dr.ing. Nicolae ENESCU

Date of Approval in the Faculty	Signature of the Dean,
	Prof.dr.ing. Dorin ŞENDRESCU