HMI

Human Machine Interaction

Final Presentation

Team 4

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LifeCycle of Search Engine

Life Cycle of Search Engine

1. **Database Establishment**
2. **System Components**
3. **Vectorization**
4. **Facets Implementation**

Database

- Sqlite
- Modified the Data
- Added specific file download location
- Selected fields for vectorization
- Directed fields to Searched Facets

System Components

- **Backend**
  - **Key Technologies**
    - **Flask (Python web framework)**
    - **SQLite (database)**
- **Frontend**
  - **Key Technologies**
    - **HTML, CSS, JavaScript**
  - **Function**
    - **Accepts user queries and displays search results**

Vectorization

- **Model**
  - **Sentence Transformers (all-MiniLM-L6-v2)**
- **Converting Text to Vectors**
- **Similarity Calculation**
- **Handling Misspellings**

NLP

Natural Language Processing Model

- Transforming natural queries into structured facets
- Using predefined keyword mappings to extract facets

Facets

- **instructor:**
- **title:**
- **term:**
- **content:**
- **learning:**
- **lang:**
- **credit:**
- **type:**

Facets by using operators

- **Wildcard (*)**
- **Exact match (“”)**
- **OR (|)**
- **AND (,)**

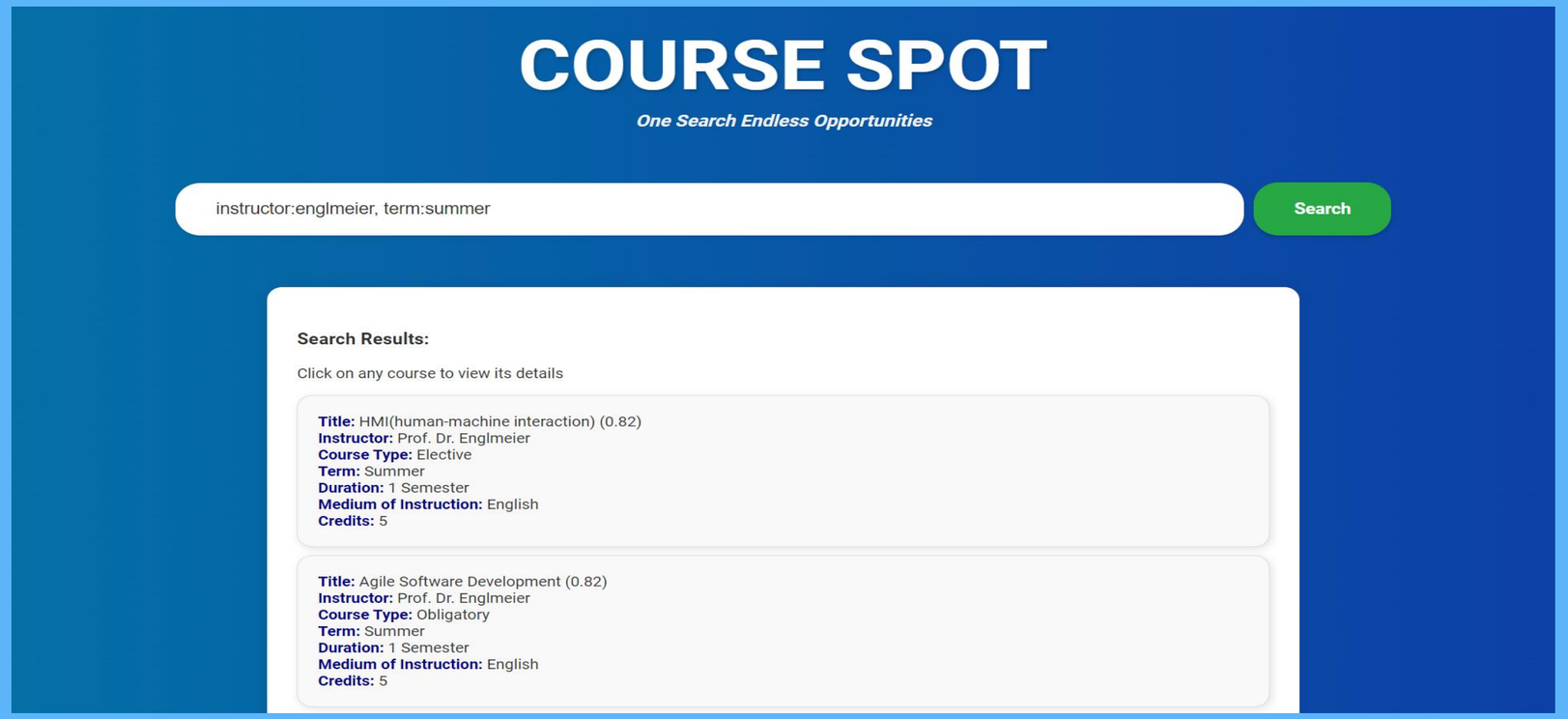
Explicit Query

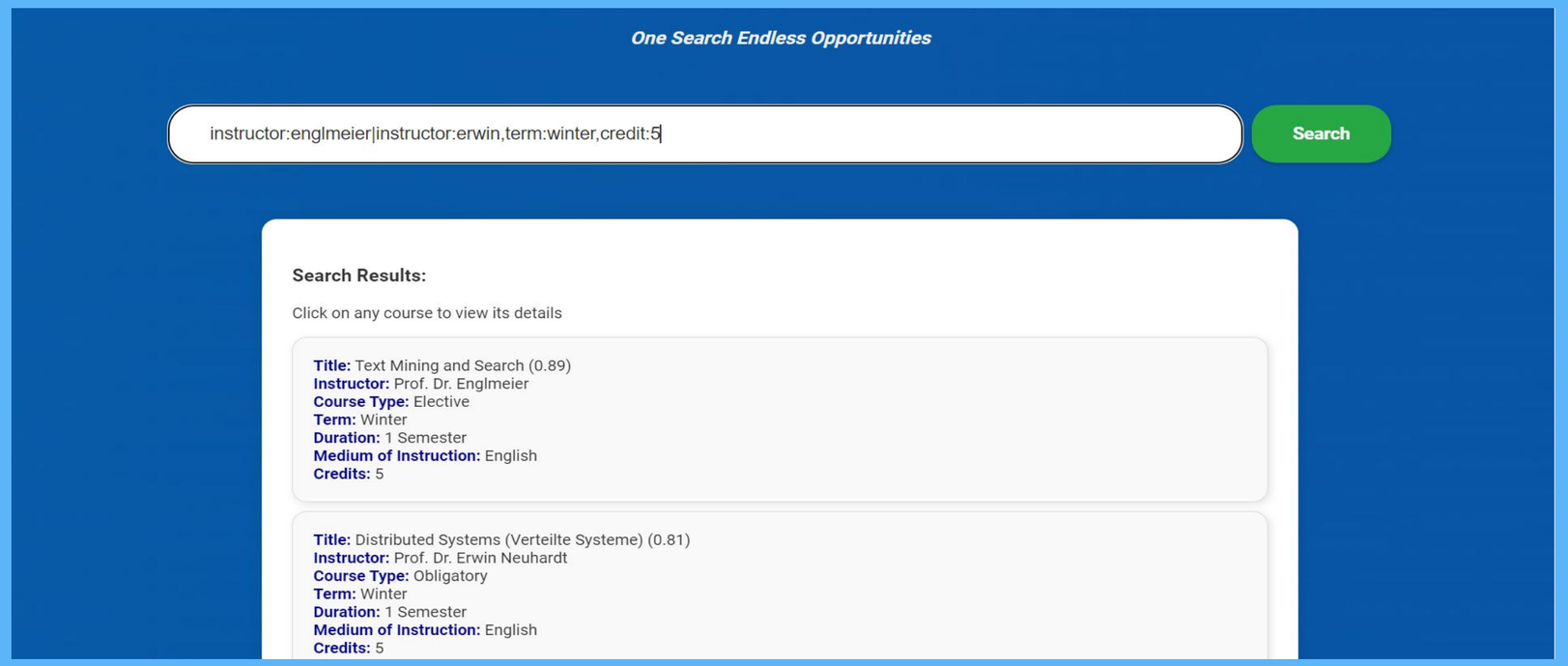
- instructor: englmeier
- type: elective
- term: summer
- title: compu*
- content: “sockets“

Explicit Query

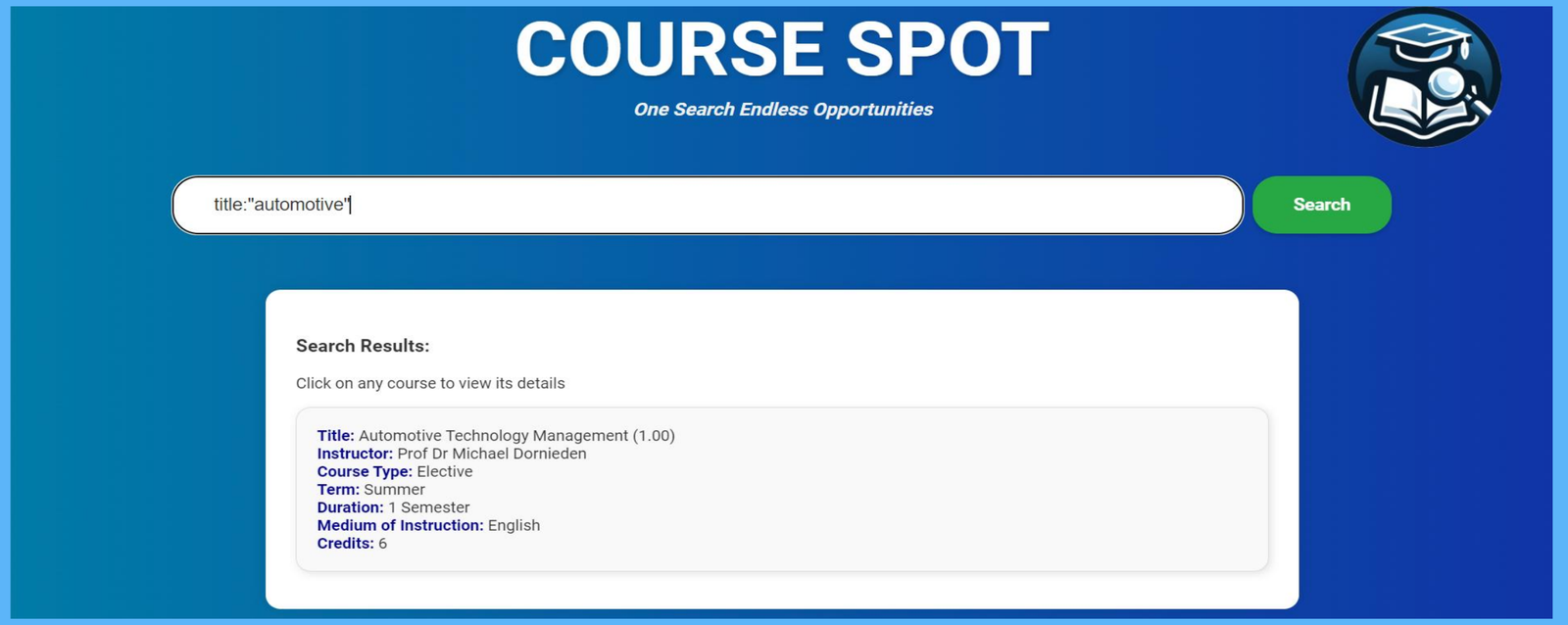
- instructor: hartmut | instructor: englmeier
- instructor: hartmut | instructor: englmeier, term: summer
- instructor: hartmut | instructor: englmeier , term: winter , credit: 5

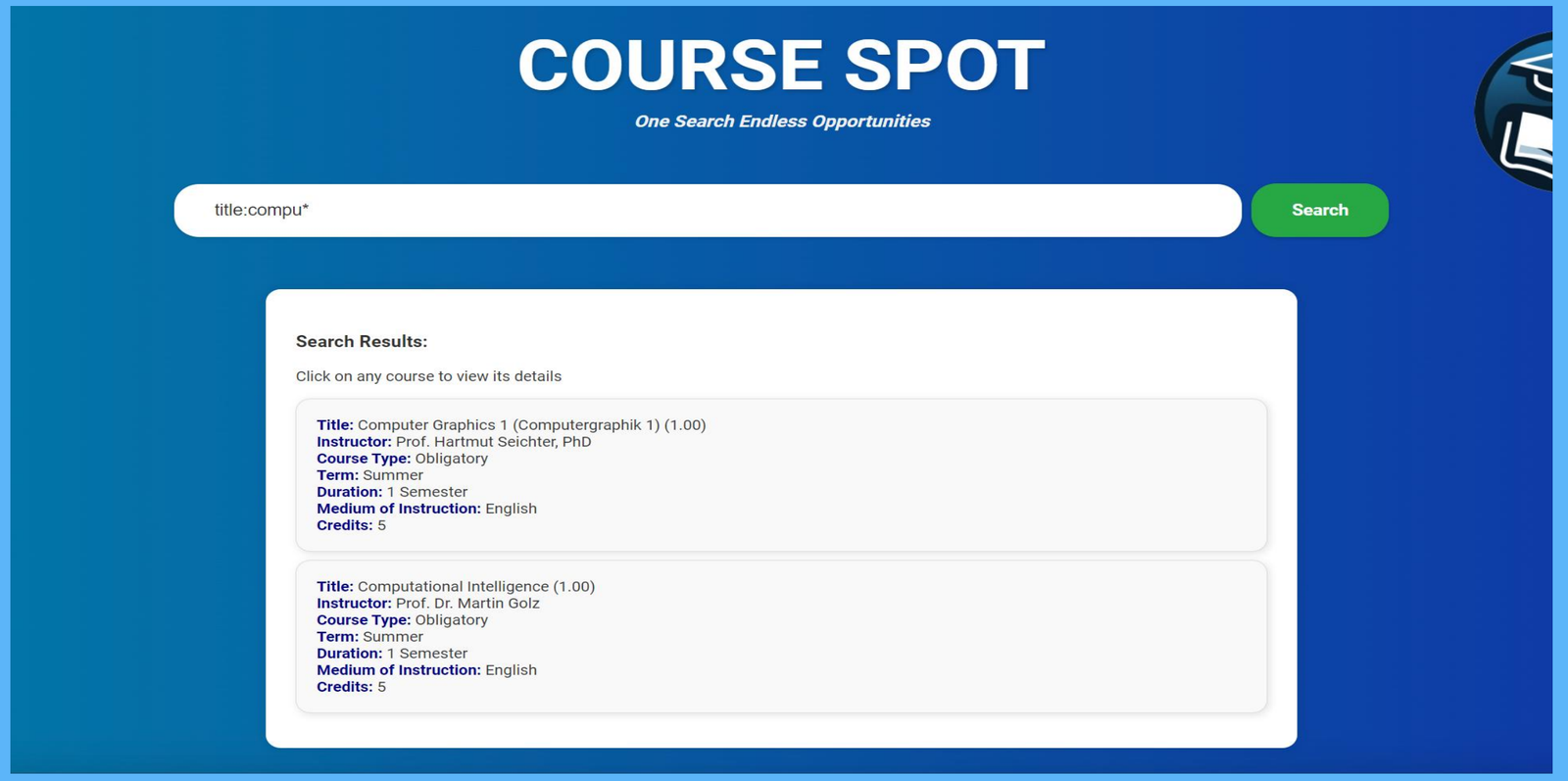
Explicit Query



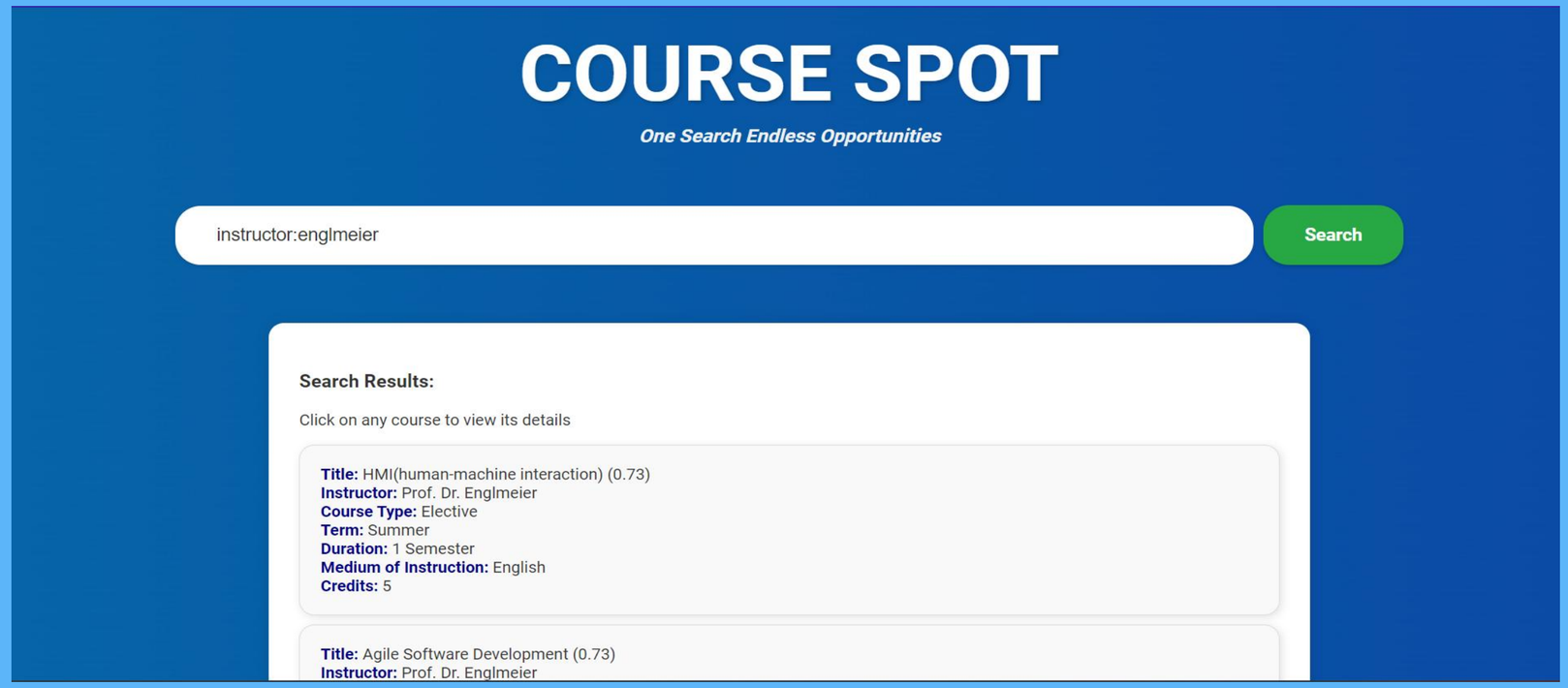


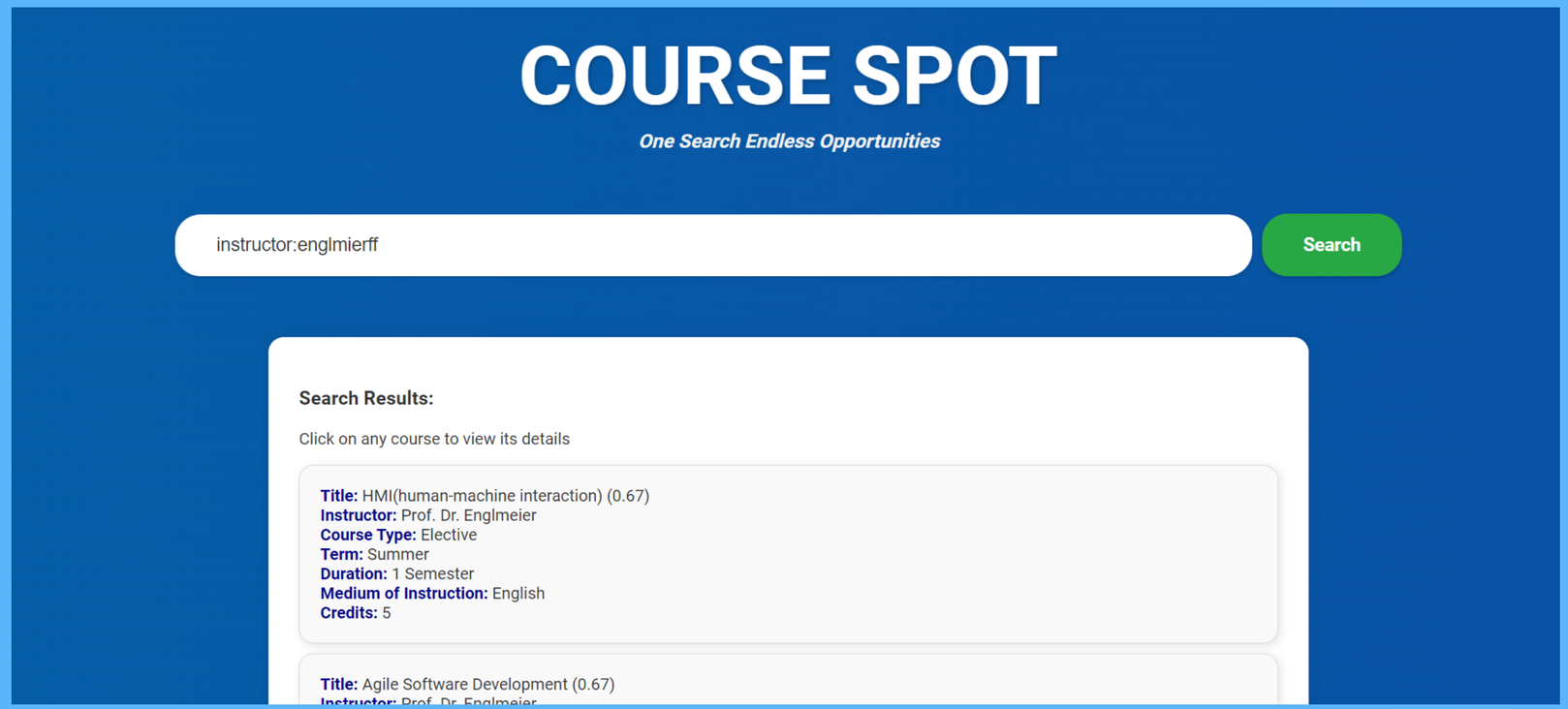
Explicit Query





Explicit Query

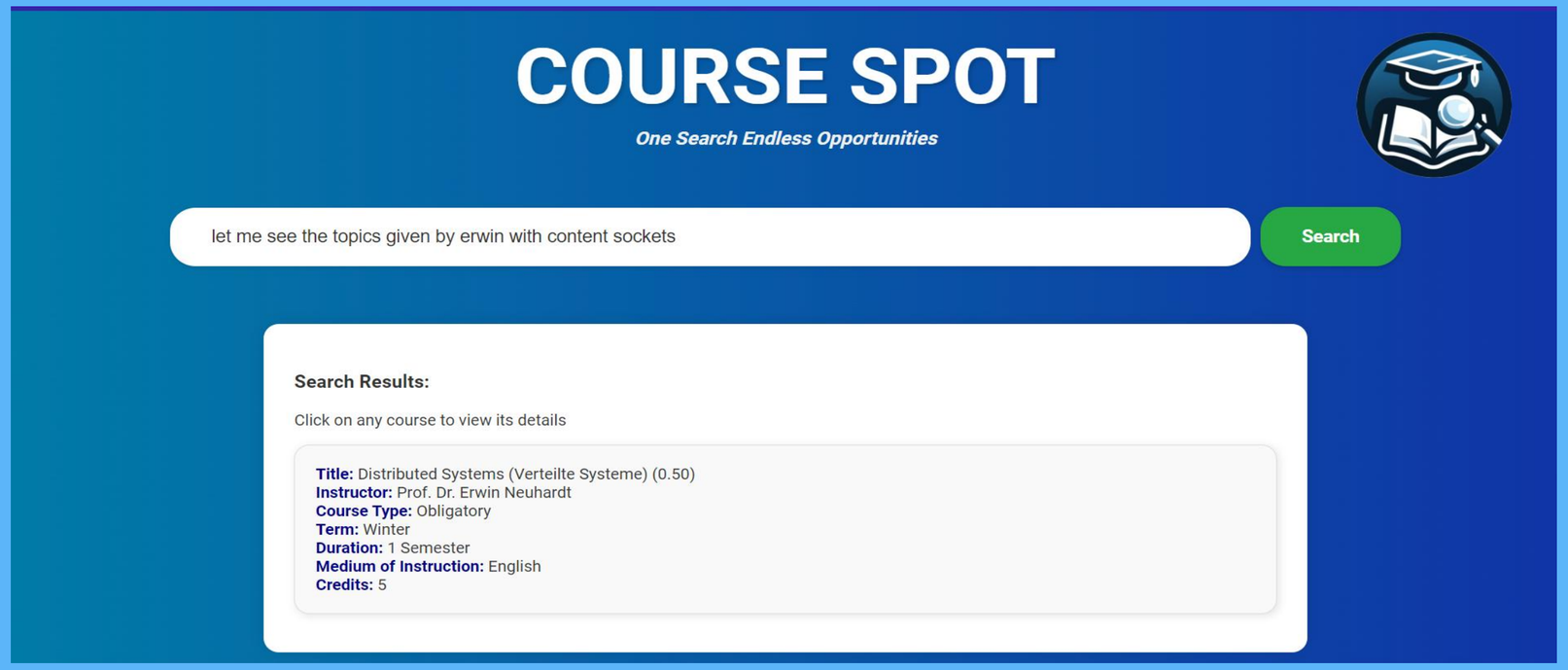


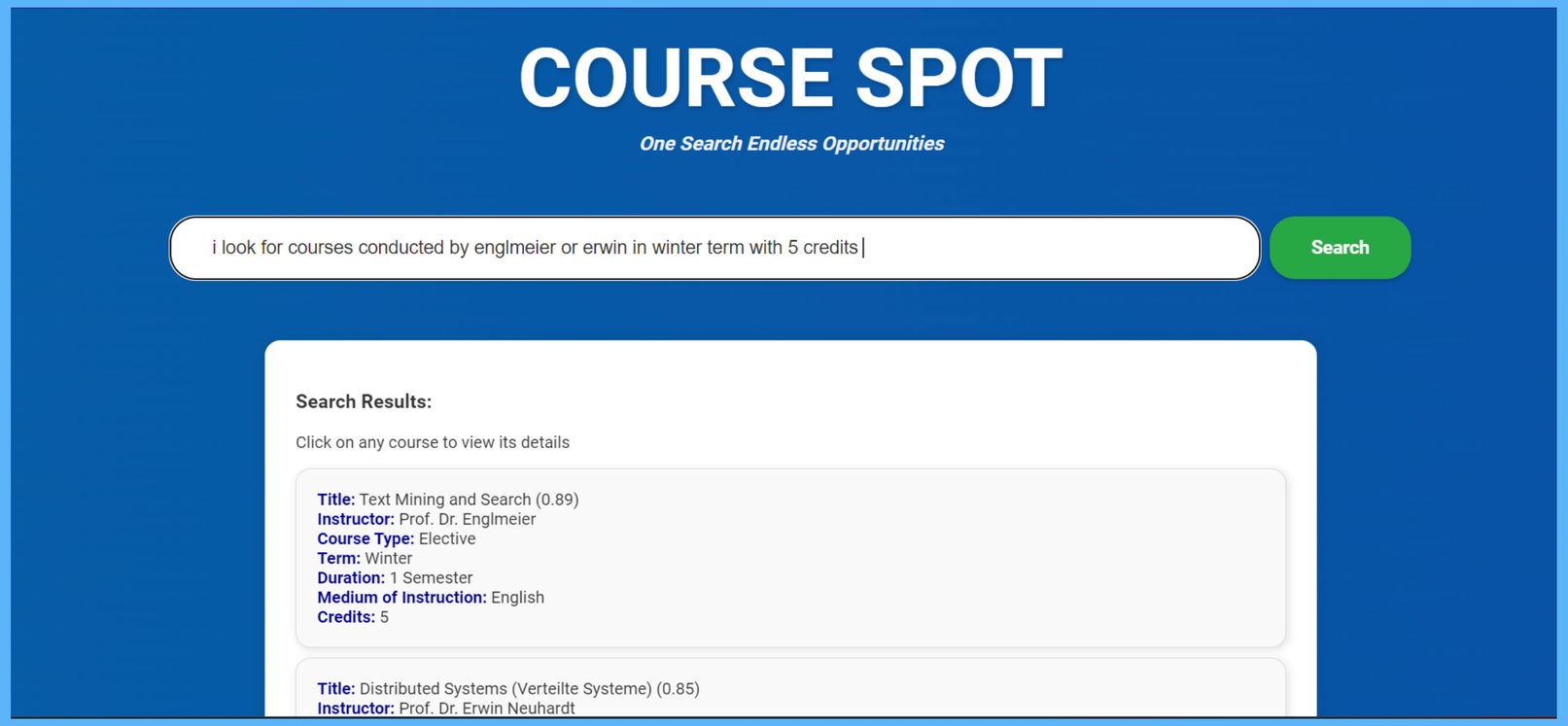


Implicit Query

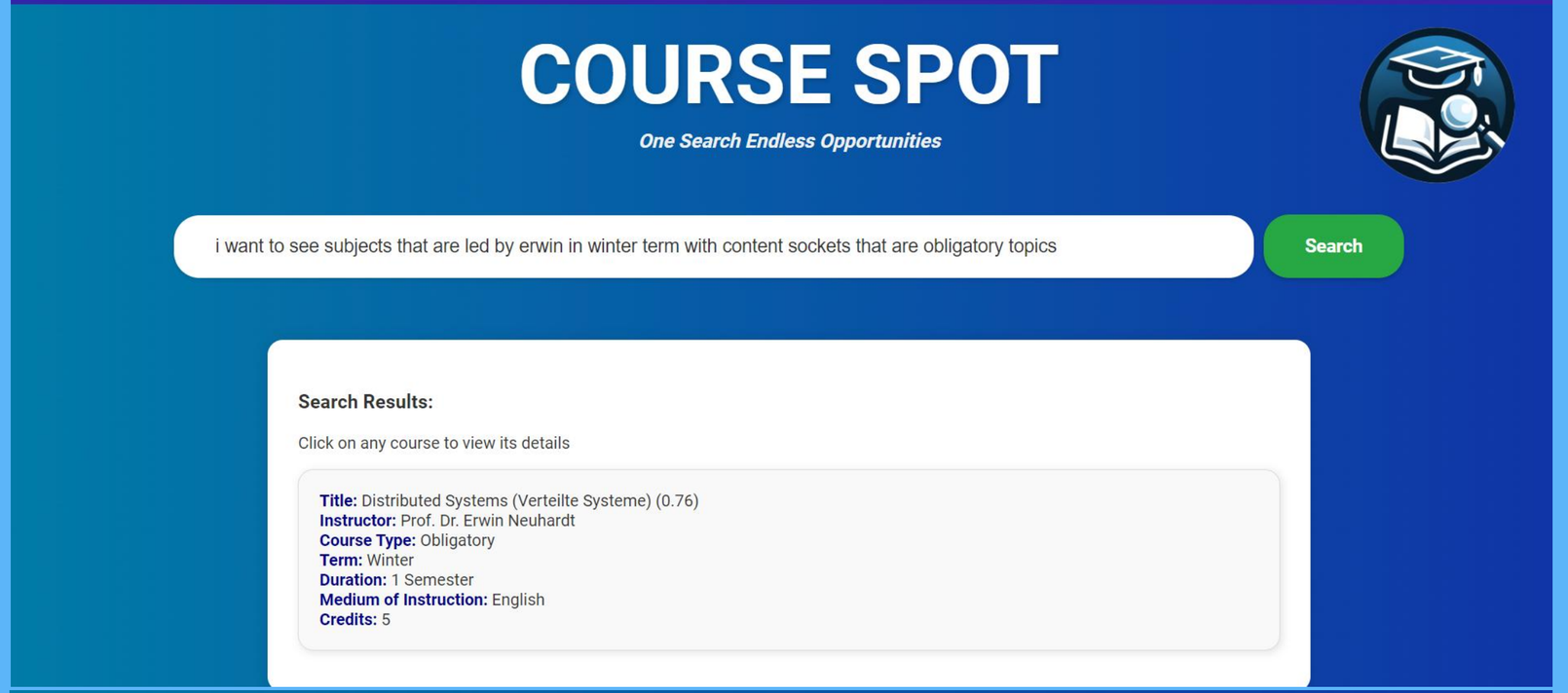
- I need courses taught by englmeier with 5 credits in summer term
- Show graphics related courses which is obligatory
- Looking for topics of the instructor erwin with content sockets

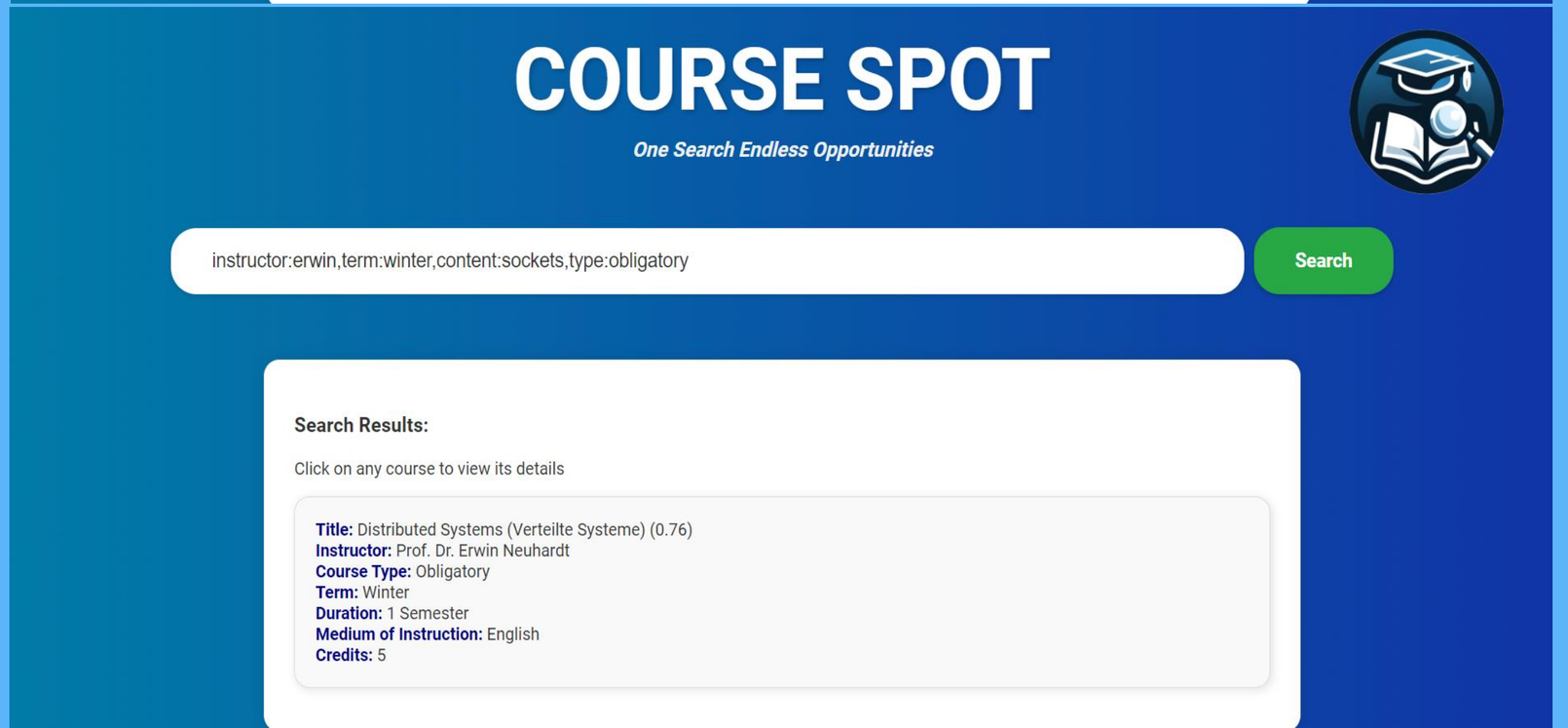
Implicit


COURSE SPOT
One Search Endless Opportunities
let me see the topics given by erwin with content sockets
Search
Search Results:
Click on any course to view its details
Title: Distributed Systems (Verteilte Systeme) (0.50)
Instructor: Prof. Dr. Erwin Neuhardt
Course Type: Obligatory
Term: Winter
Duration: 1 Semester
Medium of Instruction: English
Credits: 5

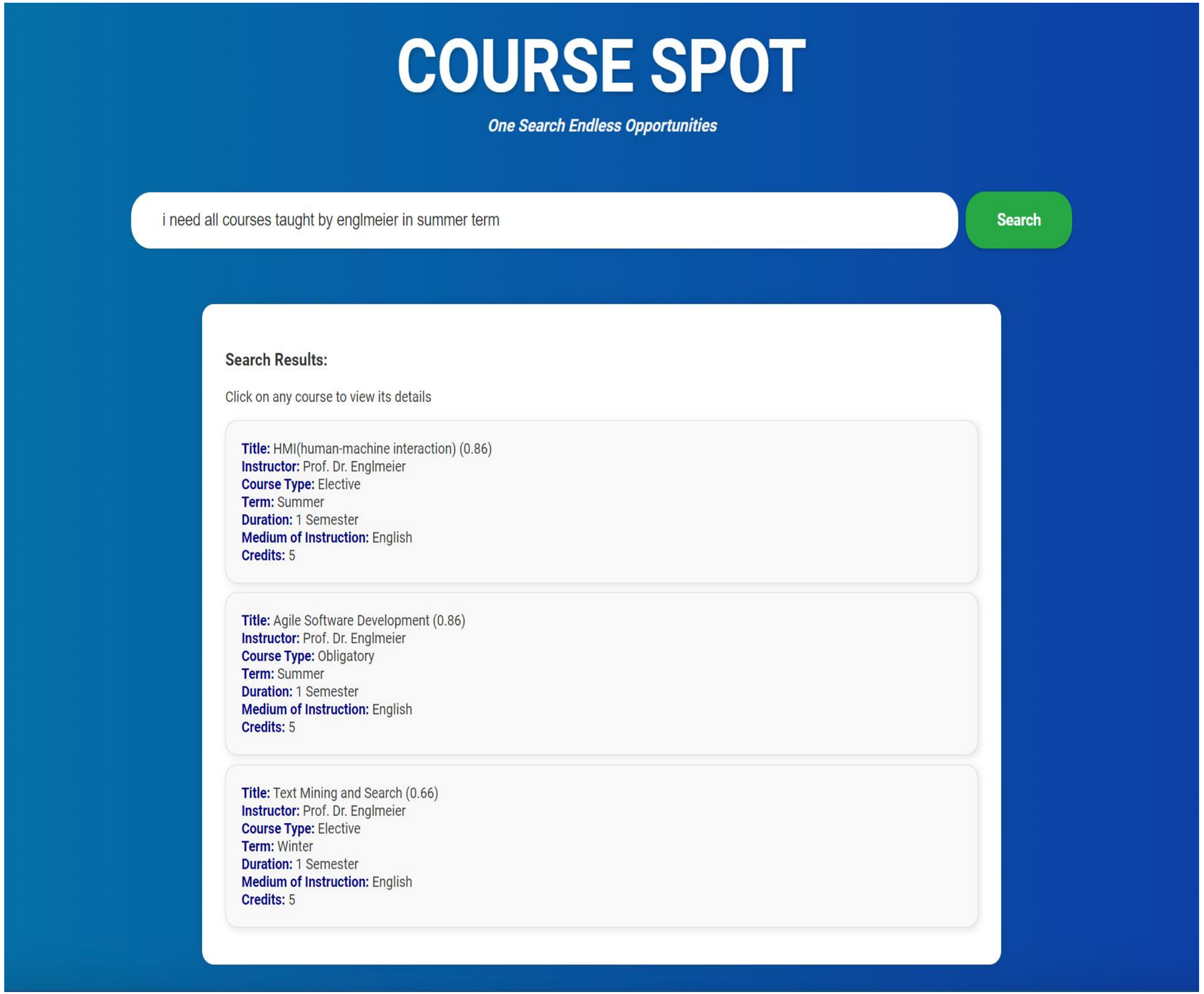

COURSE SPOT
One Search Endless Opportunities
i look for courses conducted by englmeier or erwin in winter term with 5 credits
Search
Search Results:
Click on any course to view its details
Title: Text Mining and Search (0.89)
Instructor: Prof. Dr. Englmeier
Course Type: Elective
Term: Winter
Duration: 1 Semester
Medium of Instruction: English
Credits: 5
Title: Distributed Systems (Verteilte Systeme) (0.85)
Instructor: Prof. Dr. Erwin Neuhardt

Implicit to Explicit





Flow of our web page



Flow of our web page

COURSE SPOT

One Search Endless Opportunities

i need all courses taught by englmeier in summer term

Search

Search Results:

Click on any course to view its details

Title: HMI(human-machine interaction) (0.86)
Instructor: Prof. Dr. Englmeier
Course Type: Elective
Term: Summer
Duration: 1 Semester
Medium of Instruction: English
Credits: 5

Title: Agile Software Development (0.86)
Instructor: Prof. Dr. Englmeier
Course Type: Obligatory
Term: Summer
Duration: 1 Semester
Medium of Instruction: English
Credits: 5

Title: Text Mining and Search (0.66)
Instructor: Prof. Dr. Englmeier
Course Type: Elective
Term: Winter
Duration: 1 Semester
Medium of Instruction: English
Credits: 5

Course Details

Translate to German

Title: HMI(human-machine interaction)

Instructor: Prof. Dr. Englmeier

Learning Objectives: Knowing/Perceiving: Students learn essentials in cognitive science as the basis of human-machine communication, which, in turn, provide the theoretical basis for the successful design of user interaction. They deal in particular with the user and task analysis. Applying: The theoretical knowledge guides the students in developing user stories that serve as blueprints for the user interaction. The course emphasizes the implementation of interaction in different environments using, for example, the description language for user interfaces in mobile applications (XAML etc.). It outlines in particular the role of natural language in interaction. Analyzing/Evaluating: Students develop in teams concrete user interfaces for different tasks. According to the task and user analysis they set up objectives, that are validated in the actual implementation. Synthesizing: The result of the course is manifested in a course-wide project that involves the development of an application with a high degree of user interaction. Application development is thereby broken down into smaller work packages. Each team (two or three students) assumes a work package, organizes its individual tasks, and contributes to the management of the overall project. The self-empowered organization of the project work also includes explorative learning.

Course Contents: 1.Basics • Essentials in Cognition • Basic Information Retrieval (IR) concepts • Regular Expressions • XML 2. User Analysis • How to Define Users and Tasks • Mental Models • Development of User Stories 3. Design, Implementation • GUI controls • XAML • GUI Development in Different Environments 4. Evaluation • Usability Principles • Methods

Teaching Methods: Lectures supported with multimedia courses offered by ACM. Workshops, team cooperation

Prerequisites: Solid practical programming skills

Readings: Carroll, J.M.: "Human-Computer Interaction in the New Millennium", ACM Press, New York, 2001. Cohn, M.: "User Stories Applied", Addison-Wesley, 2004. Online Courses of ACM addressing User Stories und User-Centred Design

Applicability: Master Applied Computer Science

Workload: Total 150 hours. Attendance: 60 hours, Self-Study: 45 hours, Exam

Credits: 5

Evaluation: Project work

Term: Summer

Duration: 1 Semester

Course Type: Elective

Medium of Instruction: English

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COURSE SPOT

One Search Endless Opportunities

i need all courses taught by englmeier in summer term

Search

Search Results:

Click on any course to view its details

Title: HMI(human-machine interaction) (0.86)
Instructor: Prof. Dr. Englmeier
Course Type: Elective
Term: Summer
Duration: 1 Semester
Medium of Instruction: English
Credits: 5

Title: Agile Software Development (0.86)
Instructor: Prof. Dr. Englmeier
Course Type: Obligatory
Term: Summer
Duration: 1 Semester
Medium of Instruction: English
Credits: 5

Title: Text Mining and Search (0.66)
Instructor: Prof. Dr. Englmeier
Course Type: Elective
Term: Winter
Duration: 1 Semester
Medium of Instruction: English
Credits: 5

Course Details

Translate to English

Title: HMI (Wechselwirkung zwischen Mensch und Maschine)

Instructor: Prof. Dr. Englmeier

Learning Objectives: Wissen/Wahrnehmung: Die Schüler lernen Wesentliche in der kognitiven Wissenschaft als Grundlage für die Kommunikation zwischen Menschen und Maschinen, die wiederum die theoretische Grundlage für das erfolgreiche Design der Benutzerinteraktion bilden.Sie befassen sich insbesondere mit der Benutzer- und Aufgabenanalyse. Anwendung: Das theoretische Wissen führt die Schüler bei der Entwicklung von Benutzergeschichten, die als Blaupausen für die Benutzerinteraktion dienen.Der Kurs betont die Implementierung der Interaktion in verschiedenen Umgebungen beispielsweise mit der Beschreibung der Sprache für Benutzeroberflächen in mobilen Anwendungen (XAML usw.).Es beschreibt insbesondere die Rolle der natürlichen Sprache bei der Interaktion. Analyse/Bewertung: Die Schüler entwickeln sich in Teams konkrete Benutzeroberflächen für verschiedene Aufgaben.Gemäß der Aufgabe und der Benutzeranalyse setzen sie Ziele ein, die in der tatsächlichen Implementierung validiert werden. Synthese: Das Ergebnis des Kurses manifestiert sich in einem kursweiten Projekt, das die Entwicklung einer Anwendung mit einem hohen Maß an Benutzerinteraktion beinhaltet.Die Anwendungsentwicklung wird dadurch in kleinere Arbeitspakete unterteilt.Jedes Team (zwei oder drei Studenten) übernimmt ein Arbeitspaket, organisiert seine individuellen Aufgaben und trägt zum Management des Gesamtprojekts bei. Die selbstbeobachtete Organisation der Projektarbeit umfasst auch exploratives Lernen.

Course Contents: 1.Basics • Wesentliche in der Wahrnehmung • grundlegende Informationsabrufkonzepte (IR) • Reguläre Ausdrücke • xml 2. Benutzeranalyse • So definieren Sie Benutzer und Aufgaben • Mentale Modelle • Entwicklung von Benutzergeschichten 3. Design, Implementierung • GUI -Kontrollen • xaml • GUI -Entwicklung in verschiedenen Umgebungen 4. Bewertung • Usability -Prinzipien • Methoden

Teaching Methods: Vorlesungen, die mit Multimedia -Kursen von ACM unterstützt werden.Workshops, Teamkooperation

Prerequisites: Solide praktische Programmierfähigkeiten

Readings: Carroll, J.M.: "Human-Computer-Wechselwirkung im neuen Jahrtausend", ACM Press, New York, 2001. Cohn, M.: „User Stories Applied“, Addison-Wesley, 2004. Online-Kurse von ACM, in denen Benutzergeschichten und benutzerzentriertes Design angesprochen werden

Applicability: Master angewandte Informatik

Workload: Insgesamt 150 Stunden.Teilnahme: 60 Stunden, Selbststudie: 45 Stunden, Prüfung

Credits: 5

Evaluation: Projektarbeit

Term: Sommer

Duration: 1 Semester

Course Type: Elektiv

Medium of Instruction: English

Download Course PDF

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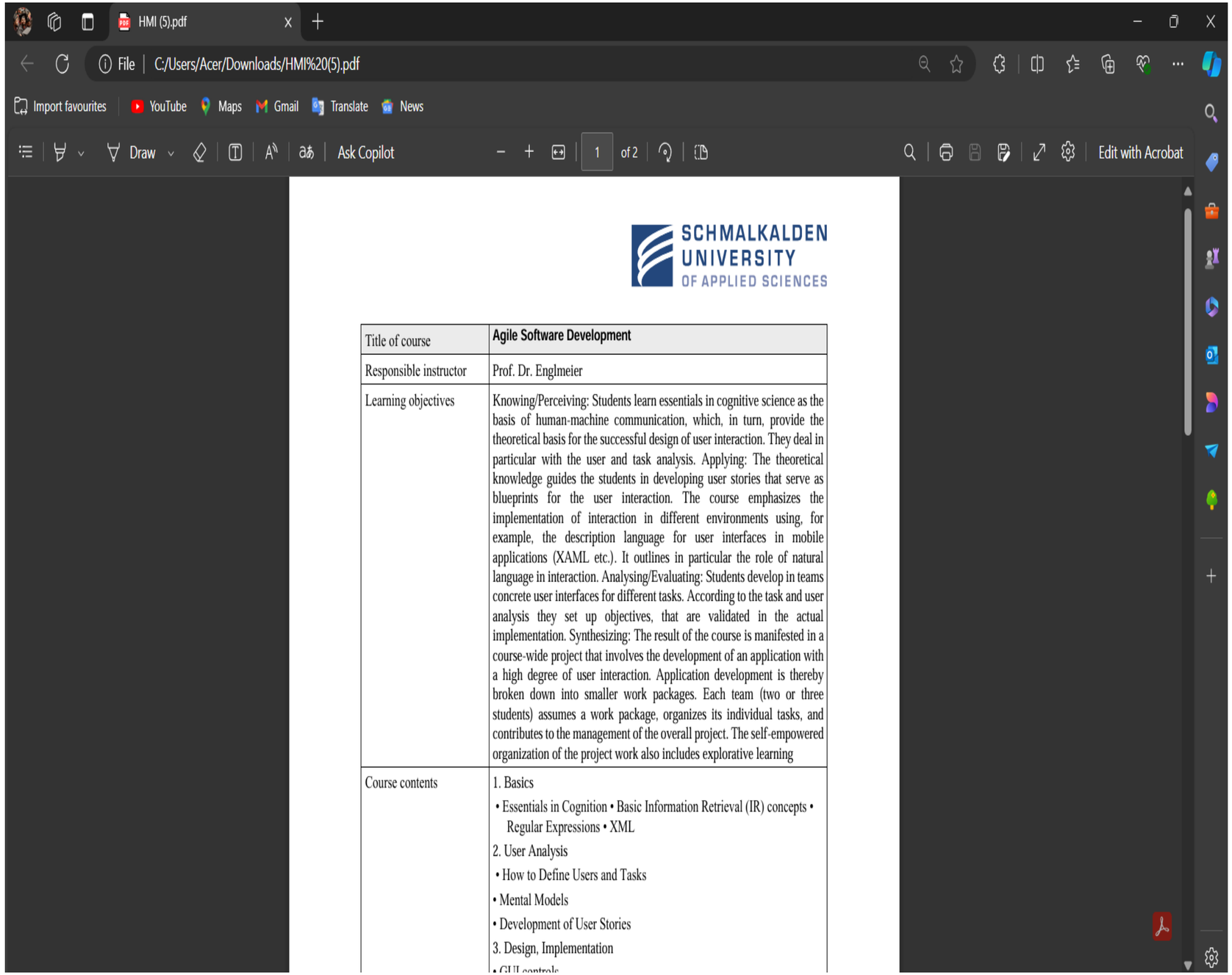
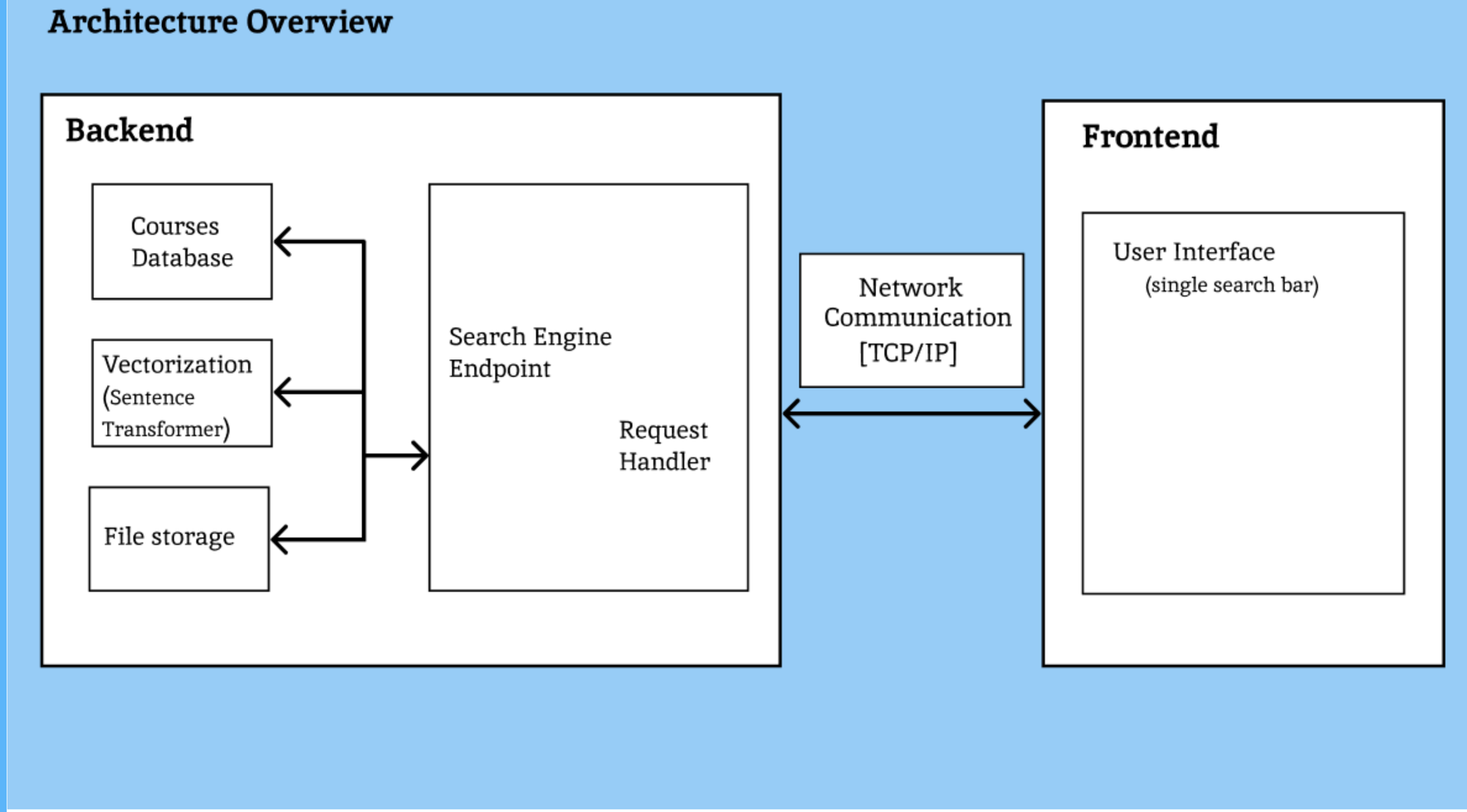


Title of course	**Agile Software Development**
Responsible instructor	Prof. Dr. Englmeier
Learning objectives	Knowing/Perceiving: Students learn essentials in cognitive science as the basis of human-machine communication, which, in turn, provide the theoretical basis for the successful design of user interaction. They deal in particular with the user and task analysis. Applying: The theoretical knowledge guides the students in developing user stories that serve as blueprints for the user interaction. The course emphasizes the implementation of interaction in different environments using, for example, the description language for user interfaces in mobile applications (XAML etc.). It outlines in particular the role of natural language in interaction. Analysing/Evaluating: Students develop in teams concrete user interfaces for different tasks. According to the task and user analysis they set up objectives, that are validated in the actual implementation. Synthesizing: The result of the course is manifested in a course-wide project that involves the development of an application with a high degree of user interaction. Application development is thereby broken down into smaller work packages. Each team (two or three students) assumes a work package, organizes its individual tasks, and contributes to the management of the overall project. The self-empowered organization of the project work also includes explorative learning
Course contents	1. Basics • Essentials in Cognition • Basic Information Retrieval (IR) concepts • Regular Expressions • XML 2. User Analysis • How to Define Users and Tasks • Mental Models • Development of User Stories 3. Design, Implementation • GUI controls

Architecture



Conclusion

- Organized and integrated data in the database
- Applied vectorization to the data and retrives data using vectorized inputs with error handling
- Supported facets through search bar
- Ensured robust facet implementation.
- Effectively process explicit queries and achieves optimal performance by ensuring keyword alignment in implicit queries

Thank you!