Programmable Web Project

Course Description

Spring 2020

521260S

5 ECTS

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Course goal

This course aims to provide adequate knowledge to design, implement, test and document a Web API.

Learning outcomes (I)

- Understand what a Web API is and learn different Web API architectures.
- Learn how to design and implement a Web API following REST architectural style principles using existing web frameworks.
- Understand *hypermedia* concept and how it can be used to build Web APIs.

Learning outcomes (II)

- Learn how to write unit and functional tests to find errors in implemented APIS.
- Know different software tools to document Web APIs
- Learn how to implement simple software applications that make use of the APIs (clients).

WHY THIS COURSE?

- **This course serves as an introductory course to API design and development**
  - Helps to develop BACKEND DEVELOPER SKILLS

- Full work cycle
  - Design, implementation, documentation and test
  - Several iterations based on customer (course staff) feedback
  - This work resembles quite a lot the way of working in IT companies

- Team work (3 people)
  - You need to define roles
  - You need to manage time.

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写在开头： 本译文源自芬兰奥卢大学Ivan Sanchez的课程Programmable web project，由三位在奥卢大学交换生分享译制，如有措辞不当或任何不妥，请前辈们多多在评论中指点。原课程programmable-web-project。课程中的练习原本有上传自动检验，但需要学校账号选课登陆，在此直接分享答案。
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网络开发导论

这个练习中涵盖了比较基础的简单网页应用开发，目的是开发一个能远程访问、管理服务器数据库

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[Translation] Programmable web projects (1) Introduction to web development

Written at the beginning: This translation is from the Programmable web project of Ivan Sanchez University of Oulu, Finland. The translation is shared by three exchange students at the University of Oulu. If there is any improper wording or any inappropriateness, please give pointers to the comments in the comments. The original course is programmable-web-project . The exercises in the course were originally uploaded and automatically checked, but the school account is required to log in to select courses, and share the answers directly here.
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About the author

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Course implementation

Practical approach

- **Project work**: Students design, document, implement and test a RESTful Web API.
  - Different deadlines with intermediate feedback from course staff

- Lecture at the begining of the course provides the theoretical background
- Exercises provides necessary practibal knowledge to perform required tasks (workflow, toolchain, architecture...)

Course implementation

Presential course

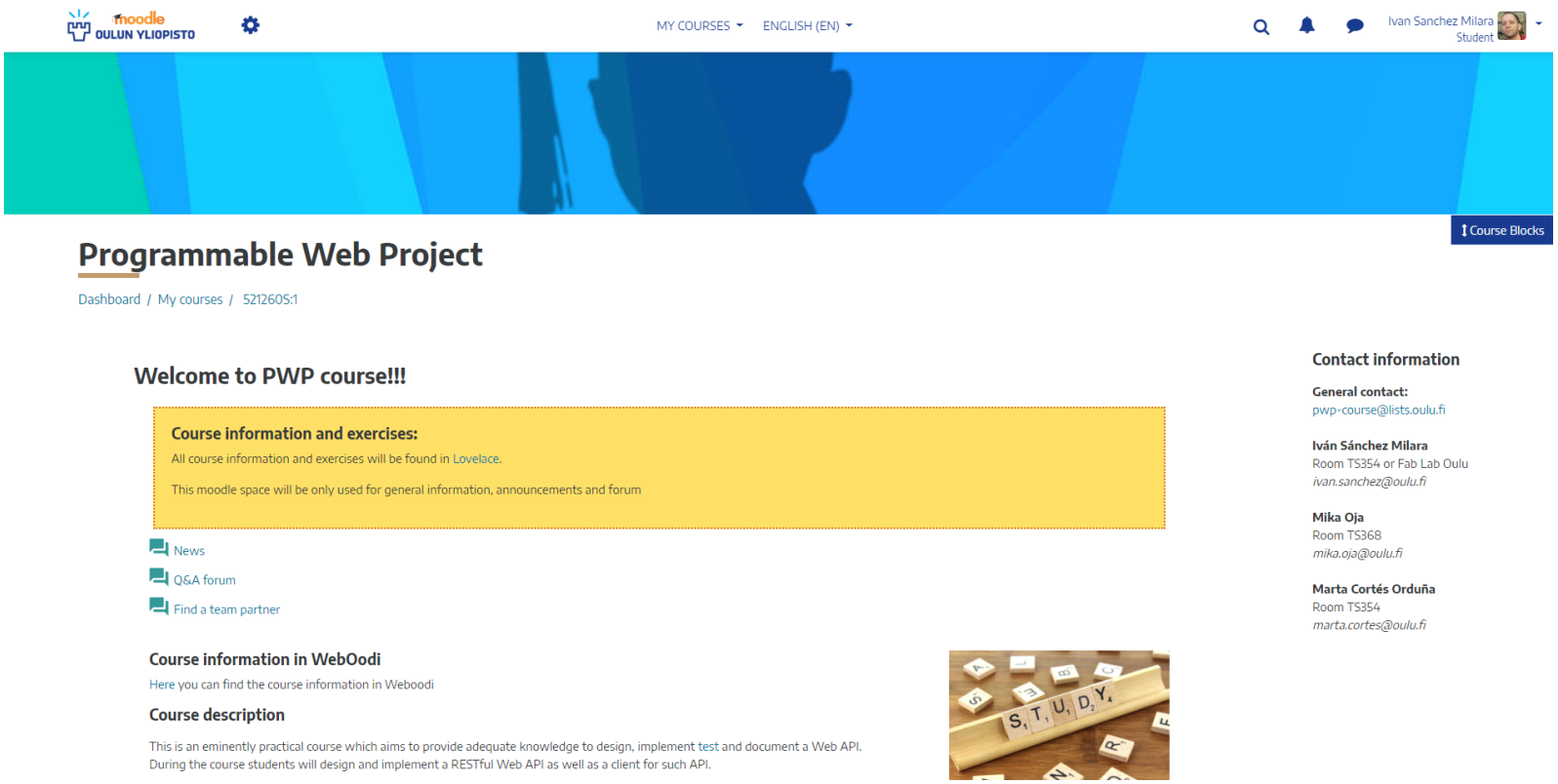
- For University of Oulu students
- Work in teams (3 people)
- Meeting with assistants in person

Online course

- For students from other universities
- Individual work
  - Less strict requirements
- Meeting with assistants via videoconference
  - At least 2 meetings.

Each version has its own Lovelace page

Platforms. Moodle.



- Placeholder for general course information
- Group registration
- Announcements
- Forum

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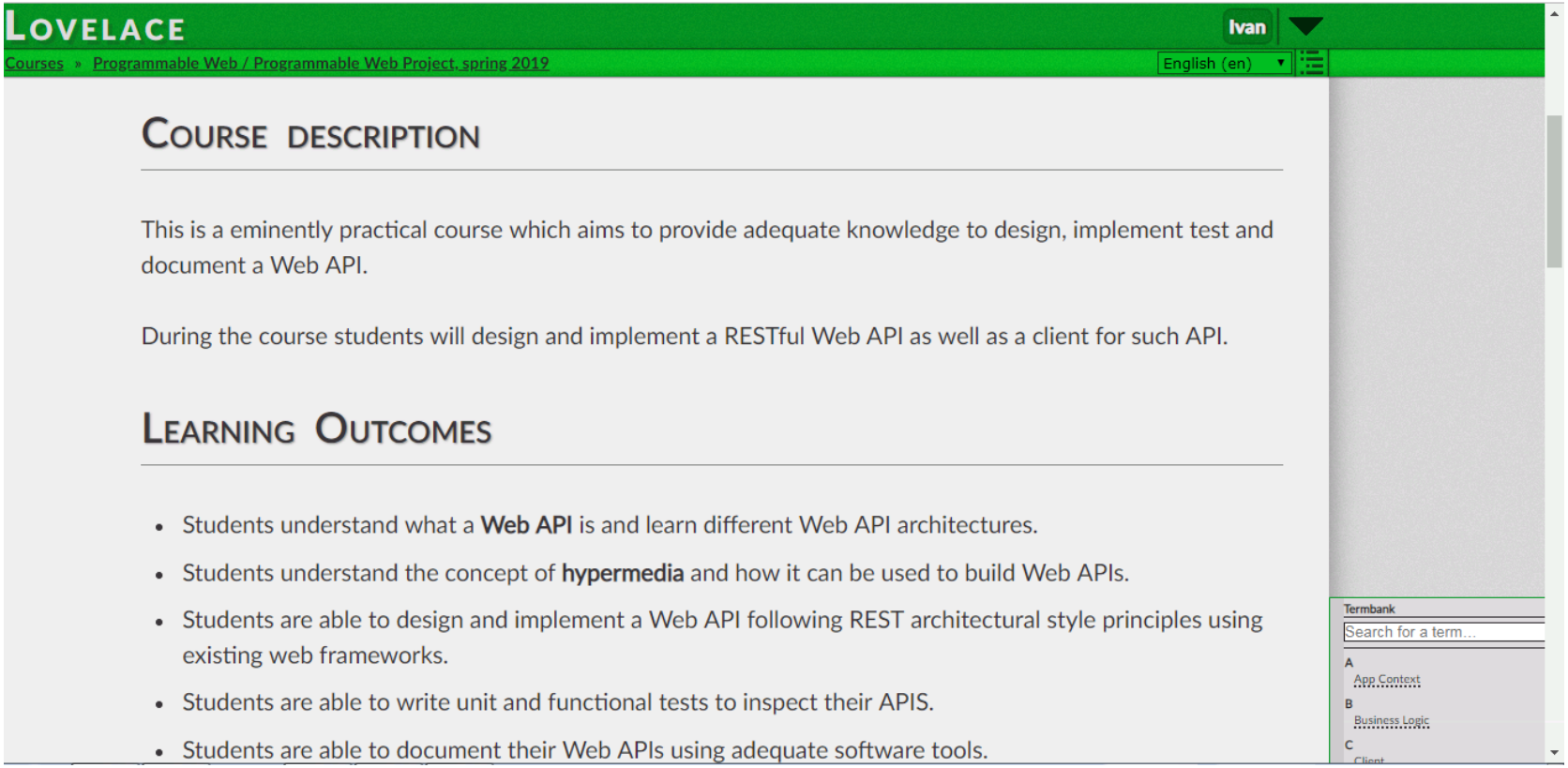
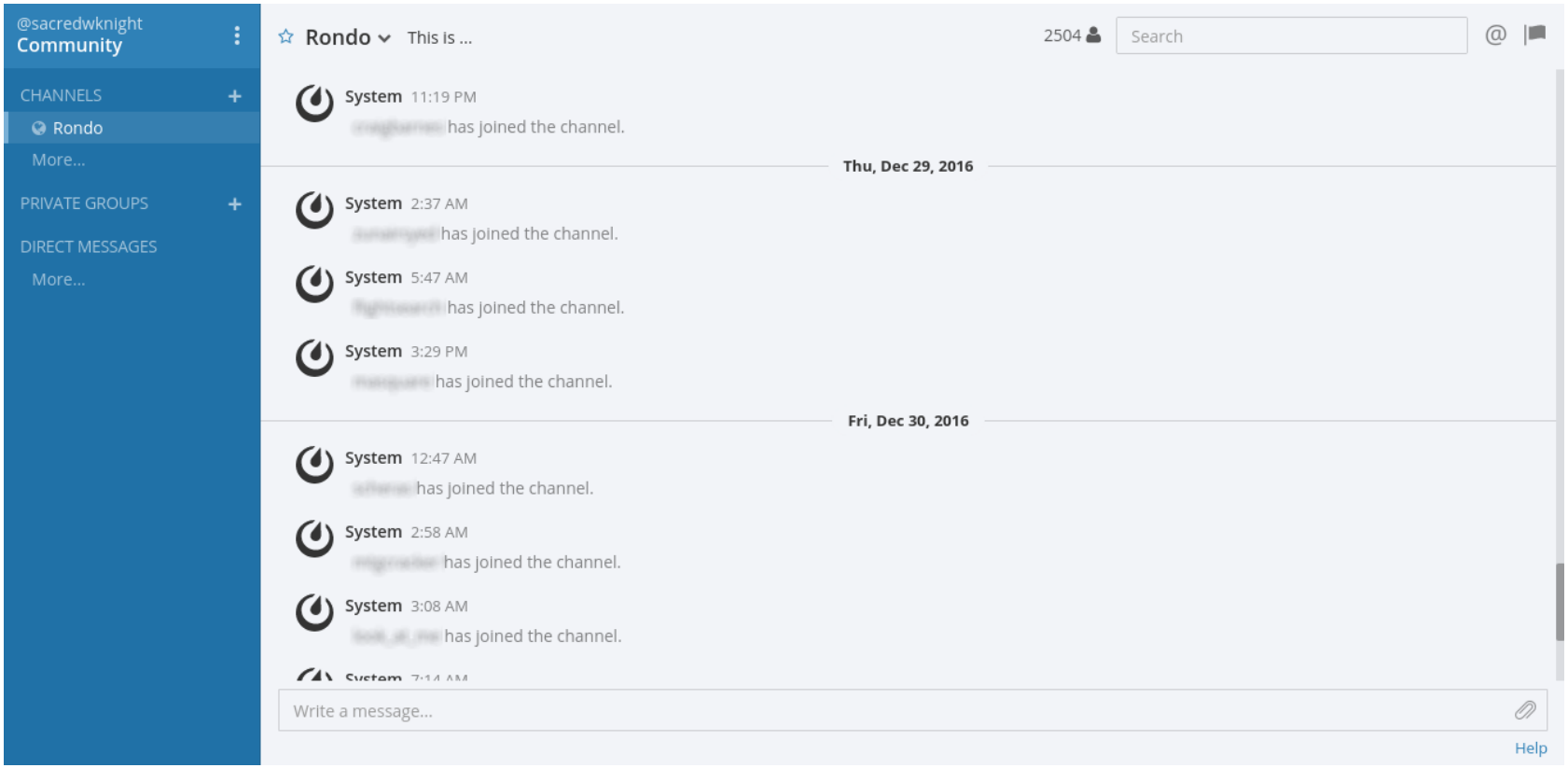
Platforms. LOVELACE



- Course documentation
- Exercises

Platforms. Mattermost



- Instant communication
- Discussion

Platforms. Github / Gitlab

GitHub

https://github.com/

GitLab

https://about.gitlab.com/

- Project documentation
- Project code
- Meeting notes

Lecture

4 hours lecture (2+2 hours)

Monday:

- Programmable Web
  - Definition and concepts
- Technologies for the Programmable Web
  - Databases
  - HTTP
  - Representation format: JSON, XML and Hypermedia
  - Web Clients
- Services and APIs

Wednesday:

- RESTful Web APIs and Hypermedia
- Creating RESTful Web services

Exercises (I)

- 5 mandatory exercises (TS135 or TS137)
  - **Schedule in Weboodi**

- Guided lab sessions take 2 hour 45 min
  - Aprox 20 min of theoretical presentation followed by guided exercise.
    - **Individual deliverable but can be done (and we encourage to be done) collaboratively**
  - Students might need extra time to complete exercise (outside lab schedule)
  - Material will be provided beforehand through Lovelace

Exercises (II)

- Exercise 0. Project Work Presentation.
  - Project Work requirements explained in detail
  - **READ PROJECT WORK ASSIGNMENT BEFOREHAND**
  - Voluntary: introduction to GIT.
- Exercise 1: Introduction to Web Development.
- Exercise 2: API design and documentation.
- Exercise 3: Implemententig REST APIs with Flask.
- Exercise 4: Implementing Hypermedia Clients

Project Work in Brief (I)

- The project must be done in **groups of three people.**
  - **BE ACTIVE IN THE SEARCH OF A PARTNER**
  - Use the Mattermost course channel or the Moodle Find a Partner forum
- Detailed instructions in the Exercise 0 and Project Work Assignment (Lovelace)
- **Language:** English

Project Work in Brief (II)

OPTION 1: Deadlines

- The project is divided in **6 deadlines**
- Meeting with course staff after deadlines 1-4
- Students **attend guided exercise sessions** and complete the exercise before deadline.
- Missing one deadline -> automatically move to option 2

OPTION 2:

Final deliverable

- All the project content is delivered by the **final deadline**
  - **One intermediate meeting with assistants is required**
- Students MUST complete the exercises by themselves.
  - **No deadline for the exercises**
  - No attendance to the guided session required

Project Work in Brief (III)

OPTION 1: Deadlines

- Due to course schedule, **deadlines are very tight**
  - Do not leave the work for the last minute !!!
  - Deadline 3 – 5 require more work than others
- **Everybody who has finished the course has also passed**

OPTION 2: Final deliverable

- DROPPING RATE HIGHER THAN DEADLINES:
  - **45 % vs 20%** (2015)
  - **42% vs 17%**(2017)
  - **73% vs 21%** (2020)
- RECOMMENDED only for experimented programmers and people who is working

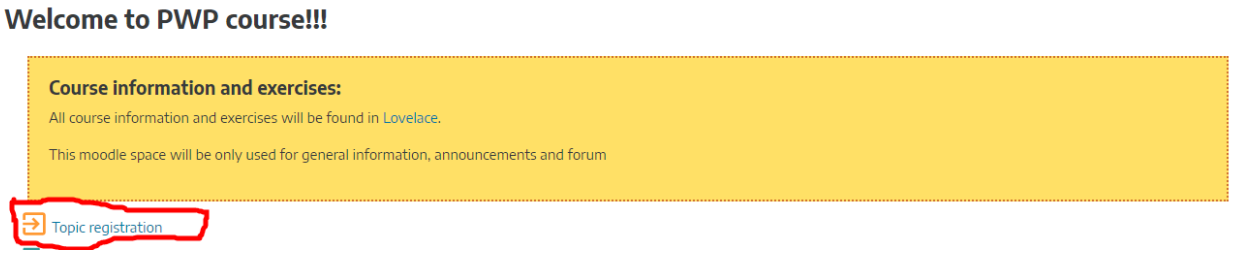
Project Work in Brief (IV)

Online version of the course

- Similar requirements than Option II (Final Deliverable)
- Individual work
- Meeting with assistants via videoconference

Major Deadlines

- **Deadline 0** (26th Jan) : FOR ALL STUDENTS
  - Register the project topic (Registration form in Moodle-> Topic registration)
  - INFO REQUIRED: (1) project work title, (2) project work documentation link, (3) team members information (4) Deliverable option



- **Deadline 1**: RESTful API introduction (02.02.2020)
- **Deadline 2**: Database design and implementation (16.02.2020)
- **Deadline 3**: RESTful API Design (08.03.2020)
- **Deadline 4**: RESTful API implementation (05.04.2020)
- **Deadline 5**: Client design and implementation (26.04.2020)
- **Deadline 6:** Final Deliverable (07.05.2020)

Evaluation (I)

- The grade is determined mainly based on the project work
  - Both design report and software generated will be considered.
  - Project template has detailed information of how we grade each section.
- The exercises returned by students have also influence in the final grade
- Initiative and participation are also considered
- Extra points can be obtained doing some extra work (see the document ”Project Work Assigment”).

Plagiarism will not be tolerated!
See ”Project Work Assigment” for more information.

Evaluation (II)

Project Work Topic	Deadlines	Points (out of 100) [*]
RESTful API description	D1	8
Database design and implementation	D2	10
RESTful API design	D3	25
RESTful API implementation	D4	18
Client design and implementation	D5	15.5
Analysis	D6	5.5
Project management	-	3
Exercises, meeting and participation	-	15

*** NOT DEFINITIVE**

- The final grade is obtained adding up the points of each deliverable.
  - Improving the deliverable by the final deadline => Increase the grade
- More accurate grading information will be published later in Lovelace

Evaluation (III)

Points (out of 100)	Final grade
< 51	0
51 - 60	1
61- 70	2
71 - 80	3
81 -90	4
> 90	5

Material and resources. Bibliography.

- Books:
  - **Leonard Richardson, Mike Amundsen, Sam Ruby. *RESTful Web APIs*. O'Reilly Media, 2013. ISBN: 978-1-4493-5806-8**
  - **Leonard Richardson & Sam Ruby,RESTful Web Services. O'Reilly Media 2007. ISBN: 978-0-596-52926-0.** Free available at http://restfulwebapis.org/rws.html

  An electronic version of the books are accessible through Oulu University Library catalogue.

- **Lecture and lab slides.**

- Extra study material will be provided during the course through Lovelace.

PLEASE USE THE BIBLIOGRPAHY

WHERE TO START

- Register in WebOodi -> You will get access to Moodle

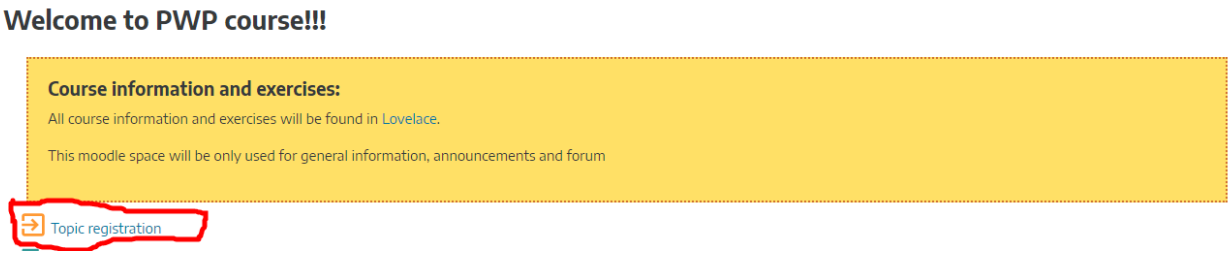
- Register in Lovelace (https://lovelace.oulu.fi/)

  Programmable Web Project, spring 2020

- Look for partners, select a topic and register the group information at Moodle:

  Deadline 0: 26th January

  Only students meeting this deadline can participate in the course.



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CONTACT

- Mail:

  pwp-course@lists.oulu.fi

- Room:

  TS354 (Iván and Marta)

  TS368 (Mika)

- Mattermost chat channel:

  You will receive an email with the information

  Assistants will be available during office hours

- Moodle forum:

  Communication with other students