# SUSTAINICUM COLLECTION
## LEHRMATERIALIEN FÜR BILDUNG ZUR NACHHALTIGKEIT

# Smart City Lights through Programming

(Resource ID: 300)

**Arben Damoni**
arben.damoni(at)riinvest.net
This teaching resource is allocated to following University:
**RIINVEST - Riinvest College**

Institution:
**Riinvest**

http://www.sustainicum.at/en/modules/view/300.Smart-City-Lights-through-Programming

---

| Group work | Less than 5 students | up to 1 semester | Internet connection necessary | English, Shqip |
|---|---|---|---|---|

Please note: module with excess length - more than 7 lecture units required! ⊗

The application for the creation of an automatic system of lighting the city streets called "City Lighting" consists of many functions that users can perform on this system, depending on their role and privileges given to the system. With this resource, students in the framework of the course Project TI-3 will design a web application which aims to easily manage and automatically light the cilty between the hours of sunset and sunrise for Kosovo. The requirements will be gathered by the lecturer from many of the companies in this industry. From this pool the students will create

variations of the application or continue advancing one of the applications. Implementing the application will last at least 15 weeks, but may be extended further through direct cooperation with the beneficiary (industry).

The teaching resource will require 12 weeks.

Reducing the cost of expenses, especially in terms of saving electricity consumption is one of the most controversial topics in recent years around the world.

Lighting remains one of the areas that greatly consumes electricity.

It is about 19% of global electricity consumption.

Regulation of hours of public lighting in some city streets of Kosovo is based on sensors that are placed in substations and work on the principle of detecting the percentage of sunlight.  If a certain threshold / percentage is achieved, the pre-configured devices, switch the lights on or off.   From the moment the lamp is on to their extinguishing it will work with full intensity 100%.

The public lighting system in Kosovo has the same basic functionality as in most European countries.

The application for automation of lighting city streets "City Lighting" is based on facilitating the work of parties who participate directly or indirectly in this application.
The application is a Web application which will be able to easily manage and automatically city lighting by hours of sunrise or sunset for Kosovo.

Reduction will be on several areas: reduction on expenditure i.e. on the purchase and maintenance of light sensors detector, energy saving which is obtained by reducing the intensity of lighting the lamps during late night hours.

Such a system would enable the city street lighting to be completely automatically.

This will be applied in terms of programming.   The theory will be taught and homework shall be given, but the actual software application will be

achieved through City Lighting from various factors, therefore there will be many parameters to feed each of the students.

This Project will be part of the final mark/grade.

---

## Teaching Tools & Methods

Mini-project    Written material    Computer program    Measurement device

## Integration of Social Stakeholders

Local businesses which are currently involved in the maintenance of the city street lighting will be approached with the view of collaborating and promoting energy reduction. Collaboration will happen on both sides, because the local companies will have to explain the practical points of the application, while the students will be actively involved in finding new applicable solutions. Also the local companies can orientate part of the students' research and derive some conclusions based on its results.

## Strength

- Out of the box learning for students for the areas that have very little to do with programming, but influence the programming algorithm
- hands on experience
- collaboration with local companies
- students are using critical reasoning
- students are learning to research and express alternative ideas / approaches

## Weakness

- groups of excellent and mediocre students
- innovation may distract them from the goal of achieving their degree
- lack of collaboration with local companies, due to the competition

## Learning Outcomes

- hands on experience
- talking to people from the industry with different vocabulary

- presenting to the industry workers
- working product
- sustainable application
- working in groups and learning independently
- provide the basic platform that can be later expanded to include the module that can be used by the business students to do the cost benefit analysis
- to show the energy consumption proportionally with the max lighting, reduced voltage etc during working hours of lamps
- evaluate the performance by the stakeholders
- potential student-employment with the stakeholders

## Relevance for Sustainability

- real life problem - therefore direct effect on sustainability
- awareness raised through application
- involvement with local companies

## Related Teaching Resources

No specific previous knowledge / related resources required

## Preparation Efforts

Medium

## Preparation Efforts Description

- Preparation for lectures - meeting with student groups - code-review and suggestions - meeting with students and clients at the same time. - initial presentation on sustainability will be shown to students

## Access

Free

## Assessment

Homework (individual), assignments and the project which will be done as a group.

## Credit/Certification Description

15 weeks of lectures @ 2 hours per week 15 weeks of exercises @ 2 hours per week 10 weeks of meetings (student groups and / or businesses) @ 1 hour per group per week.

## Sources and Links

1. http://www.timeanddate.com/sun/kosovo/pristina – 02/06/2015 11:23

2. http://www.academia.edu/6738352/Smart_Street_Lights – 03/06/2015 15:39

3. http://energjia.al/2014/11/27/miliona-mund-te-kursehen-nga-ndricimi-rrugor/ – 06/06/2015 20:15

4. https://en.wikipedia.org/wiki/High-intensity_discharge_lamp – 07/06/2015 11:53

5. https://en.wikipedia.org/wiki/Sodium-vapor_lamp#High-pressure_sodium – 07/06/2015 11:55

6. Paul Deitel, Harvey Deitel, Visual C# 2012 How to Program

## Funded by