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# Catalogue of modernized courses with ICT oriented learning materials and tools

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# Catalogue need to be conceived in order to:



- **Improve visibility** of the modernised courses with ICT oriented learning materials and tools
- Make the developed material be **easy-to-use**
- Quickly search for topics, courses, and get information on which the course on platform contain the certain topics...
- .....

# To be discussed:

- Catalogue content
- Target group
- Work organization
  - Material collecting
  - Catalogue writing
- Publishing
- Deadline for catalogue to be finished

# Summary of Catalogue

- ✓ List of Study programmes modernized by NETCHEM OER/WARIAL approach
- ✓ List of MSc/PhD courses with implemented OER/WARIAL educational elements
- ✓ Description of Educational elements with NETCHEM OER/WARIAL approach
- ✓ List of Movies made through NETCHEM project (description and web - addresses)
- ✓ Laboratory guides with NETCHEM OER/WARIAL approach (description and web - addresses)
- ✓ Overview of CPD courses with NETCHEM OER/WARIAL Approach

# Information related to the project

- **Project title:** NetChem : ICT Networking for Overcoming Technical and Social Barriers in Instrumental Analytical Chemistry education
- **Project Coordinator.....**
- **Scope and aim of the catalogue.....**
- To whom the catalog is intended (Target group) – **students, researchers, teachers, stakeholders**
- **Authors of the catalogue.....**

# List of Study programmes modernized by NETCHEM OER/WARIAL approach



| Study programmes   | University                                  | ECTS | Duration of the Study    | Web site |
|--|---|------|--------------------------|----------|
| <b>MSc</b>   |   |      |                          |          |
| MASTER ACADEMIC STUDIES<br>IN ENVIRONMENTAL<br>PROTECTION -<br>ENVIRONMENTAL<br>PROTECTION ANALYST | UNS PMF                                     | 60   | One academic<br>year     |          |
| .....  |   |      |                          |          |
| .....  |   |      |                          |          |
| <b>PhD</b>   |   |      |                          |          |
| DOCTORAL ACADEMIC<br>STUDIES IN ENVIRONMENTAL<br>PROTECTION  | UNS PMF                                     | 180  | 3 years (6<br>semesters) |          |
| .....9/25/2018.....  | Meeting in Nis, 24th to 25th September 2018 |      |                          |          |

# Study programmes modernized by NETCHEM OER/WARIAL approach



- Scope of the study programme – up to 100 words
- Aim – up to 100 words

# List of MSc/PhD courses with implemented OER/WARIAL educational elements – sorted by lecture and instrumental techniques



| Lecture title  | Technique                                   | Remote access level    | Material type          | Laboratory guide | Course   | Level of the study | Website |
|--|---|------------------------|------------------------|------------------|--|--------------------|---------|
| <b>GAS CHROMATOGRAPHY</b>  |   |                        |                        |                  |  |                    |         |
| Detection pesticide  | GC-MS                                       | Control of instruments |                        | +                | Chemodynamics of pollutants                      | MSc                |         |
| 2 dimensional gas chromatography   | GC-GC-MS                                    | Control of instruments |                        | +                | Remediation                                      | MSc                |         |
| Develop GC/MS method validation plan   | GC-MS                                       | Live                   | Movie, C-map, PDF, PPT | +                | Environmental quality control (Advanced Course)  | PhD                |         |
| .....  |   |                        |                        |                  |  |                    |         |
| <b>LIQUID CHROMATOGRAPHY</b>   |   |                        |                        |                  |  |                    |         |
| Measure concentration of organic pollutant before and during the treatment     | LC-DAD                                      |                        |                        | +                | Analytics of Organic Pollutants                  | MSc                |         |
| LC-DAD-MS/MS analysis  | LC-DAD-MS/MS                                | Control of instruments |                        | +                | Chromatographic analysis of food and supplements | MSc                |         |
| How eluent gradient and concentration affect on ion separation and selectivity | IC -CD                                      | Live                   | Movie, PPT             | +                | Environmental quality control (Advanced Course)  | PhD                |         |
| .....9/25/2018   | Meeting in Nis, 24th to 25th September 2018 |                        |                        |                  |  |                    |         |



# List of MSc/PhD courses with implemented OER/WARIAL educational elements – sorted by lecture and instrumental techniques



| Lecture title   | Technique | Remote access level                                      | Material type | Laboratory guide | Course   | Level of the study | Website |
|---|-----------|--|---------------|------------------|--|--------------------|---------|
| <b>AAS</b>  |           |  |               |                  |  |                    |         |
| Determination of heavy metals in water by AAS   | AAS       | -  | Movie         | +                | Chemistry of water and wastewater                                  | MSc                |         |
| Matrixes influence on absorbance signal and subsequently on the resulting metal concentration | AAS       | Live   | PPT, movie    | +                | Environmental quality control (Advanced Course)                    | PhD                |         |
| .....   |           |  |               |                  |  |                    |         |
| <b>UV-VIS</b>   |           |  |               |                  |  |                    |         |
| Determination of quantitative polyphenols in olive oils                                       |           | -  | PPT, movie    | +                | Modern electrochemical and optical methods in analytical chemistry |                    |         |
| <b>OTHER INSTRUMENTAL TECHNIQUES</b>  |           |  |               |                  |  |                    |         |
| detection and quantification limits on WD-XRF instrument                                      | WD-XRF    | Instrument control                                       | PPT, DOC,     | +                | Environmental Monitoring   | MSc                |         |
| <b>OTHER NON INSTRUMENTAL TECHNIQUES</b>  |           |  |               |                  |  |                    |         |
| Usage of data set to calculate different statistical tests 9/25/2018                          | -         | -  | DOC           | +                | Human Health and Environment Risk Assessment                       | MSc                |         |
|   |           | Meeting in Nis, 24th to 25th September 2018 <sup>+</sup> |               |                  |  |                    |         |

# Short description of the each lecture

## 50-100 words

- The aim of the lecture
- The outcomes of the lecture
- Or short description of the lecture

### The aims of the course

- to develop knowledge about structure and properties of most common contaminants in the environment (air, soil, water, food)
- to provide students some basic concepts about instrumental techniques used in the the pollutants analysis: UV/VIS, AAS, ICP/MS, HPLC/MS, GC/MS
- to provide students basic principles of sample preparation techniques
- to develop student skills for sample preparation and appropriate instrumental technique usage
- to develop student knowledge and skills in statistical evaluation of analytical data
- to train students in communication, written and oral presentation of analytical results.

### Outcomes of this course

At the end of this course, students should be able to:

1. list and describe the most common pollutants in environment
2. select and use the proper instrumental techniques for determination of contaminants based on the structure and properties of analytes
3. select and implement the proper sample preparation technique
4. evaluate obtained analytical results by one of statistical softwares (Excell, Origin or Matlab)
5. make written reports, posters and oral presentations with Prezi software

# List of CPD courses – sorted by the field

| CPD name   | Duration | No of participants | Realizator | Teacher in charge | Frequency of organizing | Contact/web address |
|--|----------|--------------------|------------|-------------------|-------------------------|---------------------|
| <b>TEACHER EDUCATION</b>   |          |                    |            |                   |                         |                     |
| Creation of contemporarily designed courses based on the principle of constructive alignment | 1 day    | 20                 | UNS        | Jasna Adamov      | ?                       |                     |
| Virtual Learning Environment in University Laboratory Classes                                | 1 day    |                    | UN         | Darko Andjelkovic |                         |                     |
| .....  |          |                    |            |                   |                         |                     |
| <b>CHROMATOGRAPHY</b>  |          |                    |            |                   |                         |                     |
| Mass spectrometry in life science  |          |                    | UN         |                   |                         |                     |
| School of GC/MS  |          |                    | UK         | Nenad Vukovic     |                         |                     |
| .....  |          |                    |            |                   |                         |                     |
| <b>QA/QC</b>   |          |                    |            |                   |                         |                     |
| Quality assurance of analytical results  | 2 day    |                    | UT         |                   |                         |                     |

# List of CPD courses – sorted by the field

| CPD name   | Duration | No of participants | Realizator | Teacher in charge     | Frequency of organizing | Contact/web address |
|--|----------|--------------------|------------|-----------------------|-------------------------|---------------------|
| <b>Environmental management</b>  |          |                    |            |                       |                         |                     |
| How to cleaner public areas - communal waste                             | 1 day    |                    | UB         | Branimir Jovančičević |                         |                     |
| Law on Chemicals - the impact of chemicals on humans and the environment | 2 day    |                    | UB         | Mališa Antić          |                         |                     |
| .....  |          |                    |            |                       |                         |                     |
| <b>OTEMER INSTRUMENTAL TECHNIQUES</b>                                    |          |                    |            |                       |                         |                     |
| Atomic spectroscopy for water analysis                                   | 2 day    |                    | UT         | Alma Shehu            |                         |                     |
| Sensory evaluation of food products                                      | 1 day    |                    | UT         | Alma Shehu            |                         |                     |
| Methods of sampling and preparation                                      | 2 day    |                    | UT         | Ariola Devolli        |                         |                     |
| .....  |          |                    |            |                       |                         |                     |

- CPD-aim
- CPD –outcomes
- CPD target group
- CPD content – brief description

# Work organization?

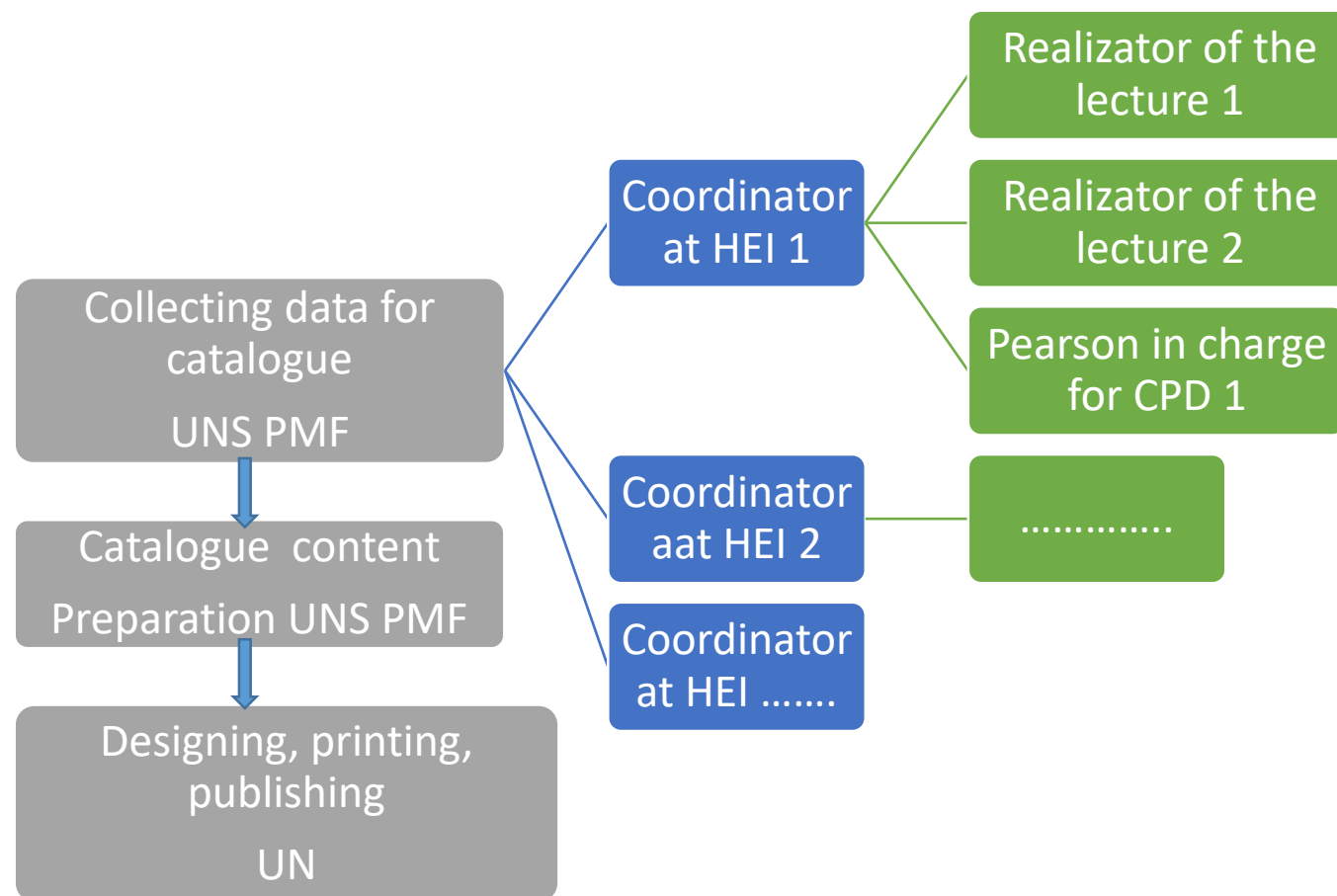
## UNS PMF

- Catalogue text preparation
  - Collecting the necessary data for the catalogue – through
    - Creating template table –to be filled in by lecture/course realisor
    - Questioner
  - Arranging collected data
  - Finalization of the catalogue content

## UN

- Designing
- Printing
- Publishing

# Work organization?



# Deadline for catalogue preparation?

| Step  | Responsible        | Deadline    |
|---|--------------------|-------------|
| Template/ questioner design for collecting necessary data - | UNS PMF            | 01.11.2018. |
| Return filled templates                                     | Coordinator at HEI | 21.12.2018. |
| Finalization of the catalogue content                       | UNS PMF            | 01.03.2019. |
| Designing catalogue   | UN                 | 19.04.2019. |
| Publishing electronic document (USB, website)               | UN                 | 19.04.2019. |



- Do we need revision of this material?
- To whom the catalogue will be distributed?
- Other...

# THANK YOU FOR YOUR ATTENTION!