Title of the proposed activity: CATALYTIC MATERIALS - course and research activities

Participant universities: University of Bucharest within the frame of CIVIS

Participant academics (indicating university, department, e-mail): University of Bucharest, Department of Organic Chemistry, Biochemistry & Catalysis, ioancezar.marcu@chimie.unibuc.ro

Kind of activity:
- Individual courses
  - Virtual mobility courses/modules
  - Short courses/workshops (1-2 ECTS)
- Summer School
- Workshops/Days

Terms/semesters
- Erasmus research exchanges/traineeships
- Independent projects (e.g. joint supervision of thesis work)
- Erasmus-term semesters (30 ECTS)

Various
- Other (please elaborate): -

Capacity (total # of participants): For the course: 20 students in campus, unlimited online.
One exchange/traineeship per year and one PhD student/year for a jointly supervised thesis.

Brief description of the activity (Aims and Scopes, content, etc): The course Catalytic Materials aims to familiarize the interested student with the main classes of solid catalysts and supports for the active component, i.e. metals and metallic alloys, oxides with variable valence state, acidic oxides, base oxides and sulfides (the “workhorses” of heterogeneous catalysis), also including porous materials for catalyst supports, focusing on the understanding of the correlation synthesis method – structure – physico-chemical characteristics – catalytic behavior, including their functioning mechanism during catalysis.
The research work aims to find new active and selective oxide-based catalysts for different energy and environmental technologies.

Scheduled time (if flexible, please write “flexible”): flexible

Other remarkable features of the proposal (interdisciplinary/multidisciplinary character; contribution to CIVIS goals; etc): From the design and preparation to the eventual industrial application of a solid catalyst, passing through the understanding of its functioning mechanism, several scientific disciplines are involved, such as materials chemistry, physical chemistry, physics, spectroscopy, computational chemistry, and chemical engineering, to mention the most important of them, pointing out the multidisciplinary character of this field.

Prof. Ioan-Cezar MARCU
CALL FOR HUB 1 ACTIVITIES

Title of the proposed activity: Chemical modelling; **Quantitative structure activity relationships (QSAR) of pollutants**

Participant universities:
University of Bucharest,
CIVIS universities

Participant academics (indicating university, department, e-mail)
Form University of Bucharest
1. Lecturer Ioana Stanculescu
   Physical Chemistry Department
   ioana.stanculescu@chimie.unibuc.ro
2. Assoc. Prof. Ludmila Otilia Cinteza
   Physical Chemistry Department
   ocinteza@gw-chimie.math.unibuc.ro

Kind of activity:

**Individual courses**
- Virtual mobility courses/modules
- X Short courses/workshops (1-2 ECTS)
- □ Summer School
- X Workshops/Days

**Terms/semesters**
- □ Erasmus research exchanges/traineeships
- X Independent projects (e.g. joint supervision of thesis work)
- □ Erasmus-term semesters (30 ECTS)

**Various**
- □ Other (please elaborate): ...........................................

Capacity (total # of participants): 30 participants

Brief description of the activity (Aims and Scopes, content, etc): Formation of the cognitive and functional competencies of the participants in the field of QSAR. Gaining knowledge on: characterization of the molecular structure through a set of relevant molecular parameters (descriptors), Hansch analysis, basic principles of molecular modeling and principles of construction and application of methods of quantitative correlation structure-biological activity (QSAR).
Developing the ability to estimate pollutants toxicity based on structural parameters and to apply knowledge of structural chemistry in related branches.

Scheduled time (if flexible, please write “flexible”): flexible

Other remarkable features of the proposal (interdisciplinary/multidisciplinary character; contribution to CIVIS goals; etc): The proposed topic has a strong interdisciplinary/multidisciplinary character; QSAR approaches being increasingly used worldwide to estimate the pollutants harmful effect both on human health and ecosystems.
CALL FOR HUB 1 ACTIVITIES

Title of the proposed activity: Climate Effects of Pollutants & Human Health (Climate Effects of Pollutants, Topic 1: Climate - Natural Science)

Participant universities: University of Bucharest

Participant academics
Lecturer dr. Eliza Oprea
Department of Organic Chemistry, Biochemistry and Catalysis, University of Bucharest 4-12 Regina Elisabeta Blvd., 030018 Bucharest, Romania
eliza.oprea@g.unibuc.ro

Kind of activity:

Individual courses
□ Virtual mobility courses/modules
X Short courses/workshops (1-2 ECTS)
□ Summer School
□ Workshops/Days

Terms/semesters
□ Erasmus research exchanges/traineeships
□ Independent projects (e.g. joint supervision of thesis work)
□ Erasmus-term semesters (30 ECTS)

Various
□ Other (please elaborate): ..........................

Capacity (total # of participants): .....................

Brief description of the activity - content:
Substances in the environment in relation to human health, the toxicological effect of pollutants on humans, natural resources for drugs, methods for the examination of biological tissues and fluids.

Scheduled time (if flexible, please write “flexible”): flexible

Other remarkable features of the proposal (interdisciplinary/multidisciplinary character; contribution to CIVIS goals; etc): interdisciplinary character.
Title of the proposed activity: Electrochemical converters for energy generation and storage

Participant universities: University of Bucharest

Participant academics (indicating university, department, e-mail) Faculty of Physics, Bucharest, Department of matter structure, physics of the earth and the atmosphere, astrophysics -Renewable energies, serban.stamatin@unibuc.ro

Kind of activity:

Individual courses
- Virtual mobility courses/modules
- Short courses/workshops (1-2 ECTS)
- Summer School
- Workshops/Days

Terms/semesters
- Erasmus research exchanges/traineeships
- Independent projects (e.g. joint supervision of thesis work)
- Erasmus-term semesters (30 ECTS)

Various
- Other (please elaborate): Lectures (optional-provided on line) and laboratories (face to face in specialized laboratory, optional-short time mobilities) (6 ECTS)

Capacity (total # of participants): 25

Brief description of the activity (Aims and Scopes, content, etc):

Aims and scopes: Understanding of theoretical and experimental foundations associated with electrochemical converters and their specific parameters. Understanding the theoretical and practical principles of construction and use of fuel cells, batteries and supercapacitors.

Content

Lectures

Laboratories (practical activity)
introduction of oxygen on the fuel cell. Mg fuel cell. Study of the electrochemical behavior of some electrodes by voltammetry.

Scheduled time (if flexible, please write “flexible”): according to the schedule of faculty

Other remarkable features of the proposal (interdisciplinary/multidisciplinary character; contribution to CIVIS goals; etc): interdisciplinary physics-chemistry
CALL FOR HUB 1 ACTIVITIES

Title of the proposed activity: Environmentally Friendly Fuels from renewable resources (Biodiesel/Bioethanol)

Participant universities: University of Bucharest and other interested universities

Participant academics (indicating university, department, e-mail): Rodica Zavoianu, University of Bucharest, Department of Organic Chemistry, Biochemistry and Catalysis, rodica.zavoianu@chimie.unibuc.ro

Kind of activity:
- Individual courses
- Virtual mobility courses/modules
- Short courses/workshops (1-2 ECTS)
- Summer School
- Workshops/Days

Terms/semesters:
- Erasmus research exchanges/traineeships
- Independent projects (e.g. joint supervision of thesis work)
- Erasmus-term semesters (30 ECTS)
- Various
- Other (please elaborate): ........................................

Capacity (total # of participants): 25 students

Brief description of the activity (Aims and Scopes, content, etc):

The crisis of fossil resources used traditionally for the production of automotive fuels lead to an extensive research for finding alternative resources for their manufacture. In this context the use of vegetal or animal fats was considered a potential resource for obtaining a diesel-like fuel (called biodiesel) following their transesterification with methanol or ethanol. Both alcohols can also be obtained from biomass renewable resources by fermentation. This course intends to familiarize the students with the theoretical aspects related to biodiesel and bio-ethanol manufacture, the main issues that have to be addressed in order to achieve higher production yields and cost efficiencies. Aspects related to the appropriate choice of the biomass resource in order to avoid the negative effects on the agricultural crops needed for human and animal feeding, the design and the selection of the catalysts and operational parameters are going to be discussed. A special attention will be drawn on the valorization of waste biomass resources in what concerns their use as raw materials both in the synthesis of biofuels and of new catalysts for these processes. The students will be also familiarized to the characterization techniques required for the assessment of the physical and chemical characteristics of the fuels. Based on the acquired knowledge the students will be able to perform a critical analysis of the conventional and non-conventional fuel manufacturing processes and to select the most appropriate strategies to increase their sustainability.
Scheduled time (if flexible, please write “flexible”):

module of 2 hours per week, for a period of 7 weeks, Autumn term 2021

Other remarkable features of the proposal (interdisciplinary/multidisciplinary character; contribution to CIVIS goals; etc):

The activity has an interdisciplinary character, combining elements from different areas of chemistry and chemical engineering, biochemistry, biology, as well as economy. Environmentally Friendly Fuels from renewable resources can lead to the increase of the awareness of students on the crisis of the natural resources and the possible ways to overcome this issue while considering the impact of the environmental, social and economic factors.
CALL FOR HUB 1 ACTIVITIES

Title of the proposed activity: General and Applied Microbial Ecology

Participant universities: University of Bucharest, Romanian Academy – Institute of Biology – Microbiology Department and other interested universities

Participant academics (indicating university, department, e-mail): Luminița Măruțescu, University of Bucharest, Department of Botany and Microbiology, luminita.marutescu@bio.unibuc.ro, Mădălin Enache, PhD, Senior Researcher, Institute of Biology, Bucharest, Head of Microbiology Department, madalin.enache@ibiol.ro

Kind of activity:

- Individual courses
- x Virtual mobility courses/modules
- x Short courses/workshops (1-2 ECTS)
- x Summer School
- x Workshops/Days

Terms/semesters

- x Erasmus research exchanges/traineeships
- x Independent projects (e.g. joint supervision of thesis work)
- □ Erasmus-term semesters (30 ECTS)

Various

- □ Other (please elaborate): thematic scientific meetings/session

Capacity (total # of participants): 10 students from master level

Brief description of the activity (Aims and Scopes, content, etc):

**Aims:** Microbial Ecology lectures and laboratories are providing in-depth understanding of the microbial diversity in different habitats and their roles in the functioning of natural ecosystems.

**Specific objectives:** The course provides: (i) theoretical knowledge about the principles of methods for assessing diversity, abundance and metabolic activities of communities of microorganisms in natural aquatic and terrestrial ecosystems; (ii) knowledge on microbial processes involved in the biogeochemical cycles and the interrelationships between microorganisms and living (biotic) environments; (iii) knowledge of the main microbiological aspects related to pollution and understanding the roles of microorganisms as indicators of environmental quality involved in the purification process of wastewater; involvement of microorganisms in biodegradation and bioremediation processes; (iv) knowledge and understanding of the ecological significance of microbial biofilms. The laboratories explore some of the methods (culture-dependent and culture-independent) that environmental microbiologists use to assess the diversity, abundance and activity of microorganisms in various environmental samples.

**Course contents:** The microbial ecosystem concept, characteristics of microbial ecosystems. The roles of microorganisms in the functioning of the ecosystems. Adaptive mechanisms with ecological significance (phenotypic adaptation, genetic adaptation, “social” adaptation). Selection of the
microorganisms into the ecosystem. Habitats and niches. Microbial populations and communities. Microbial diversity. Ecological energy – Energy transfer and food webs. Interrelationship between microorganisms and their living(biotic) and nonliving(abiotic) environments. Microbial processes contributing to biogeochemical cycles Extremophiles, practical and theoretical significance. Soil microbiology. Aquatic microbiology, the impact of anthropic activities. Microbial biofilms: structure, properties and their ecological significance.

**Laboratories contents:** Analysis of the diversity and abundance of microorganisms in natural environments: isolation and quantification of physiological groups of microorganisms in soil and water samples. Anaerobic culture to isolate different types of phototrophic bacteria from sewage. Analysis of the diversity of metabolic activities of of microorganisms in natural samples: Students use Ecoplates plates for determination of physiological profiles of microbial communities. Analysis of the interrelationships between microorganisms: commensalism, synergism, antagonism. Analysis of the microorganisms interactions with higher plants: isolation of nitrogen fixing bacteria. Environmental DNA isolation and analysis- Students attempt to isolate PCR quality template DNA from soil using two different commercially available kits (PowerSoil, FastDNA for Soil) with very different protocols. Suitability of the template is tested by attempting to amplify bacterial 16S rRNA genes in the sample. If the template fails to amplify, students trouble-shoot until they successfully amplify the template. Discussions on the results obtained in previous week’s laboratories. Detection and quantification of clinical bacteria with different antibiotic resistance phenotypes in wastewater and surface water samples

**Learning objectives.** Upon completing the course, the students can:

- Gain an appreciation for and understanding of the ecology of microorganisms
- Explain the ways microorganisms interact with biotic environments such as other microorganisms, plants, and animals.
- Explain the ways microorganisms interact with abiotic environments
- Recognize and provide detailed examples of the complexity of microbial metabolism.
- Explain how the methods used by environmental microbiologists work.
  - Explain the information that can be derived from the use of these methods.
  - Explain the strengths and weaknesses of these methods.
  - Demonstrate proficiency in the execution of these methods in a teaching laboratory setting.
  - Correctly interpret relevant passages in primary scientific publications that employ these methods.

Scheduled time (if flexible, please write “flexible”): **Spring 2021 (March 2021-May 2021).** The course and laboratories extend over 14 Total lecture hours: 28 hours. Laboratory work: 28 hours. Fieldwork/excursions: ..... Credits: 4 ECT

**Other remarkable features of the proposal (interdisciplinary/multidisciplinary character; contribution to CIVIS goals; etc):** The proposed activity is an interdisciplinary graduate-level and advanced undergraduate-level course in which students explore topics in molecular microbiology, microbial diversity. The Microbial Ecology course contribution to CIVIS goals: the proposal will contribute to increasing the capacity of co-operation between participant universities in benefit of the students and also for the involved teachers and researchers. On the other hand the proposal will have a huge impact for dissemination of the novelty into filed of General and Applied Microbial Ecology.
Title of the proposed activity: **GOING GREEN – Ethics of a sustainable environment**

Participant universities:
- University of Bucharest
- Other interested CIVIS universities

Participant academics (indicating university, department, e-mail): Delia Popescu, University of Bucharest, Faculty of Chemistry, delia.popescu@chimie.unibuc.ro

Kind of activity:
- **Individual courses**
  - Virtual mobility courses/modules
  - Short courses/workshops (1-2 ECTS)
  - Summer School
  - Workshops/Days
- **Terms/semesters**
  - Erasmus research exchanges/traineeships
  - Independent projects (e.g. joint supervision of thesis work)
  - Erasmus-term semesters (30 ECTS)
- **Various**
  - Other (please elaborate): teaching activities and service-learning projects related to stakeholders and Open Labs

Capacity (total # of participants): **bachelor and master level students**

Brief description of the activity (Aims and Scopes, content, etc):

The main aim of this proposal is to motivate and encourage students to get authentic and hands-on opportunities to:
- experience sustainable environmental ethics beyond what is taught in academic courses;
- initiate partnerships with local stakeholders or Open Labs in order to develop service-learning projects;
- provide service for the betterment of their communities.

The proposed program will start with teaching activities in the form of several virtual mobility course modules or a short course/workshop in Sustainable Environment Ethics, followed by the involvement into a community outreach experience. During this stage, the students are required to identify, design, implement, and engage in service-learning projects developed in conjunction with stakeholders or Open Labs, in which they are expected to develop ethical and sustainable environmental solutions to real-world problems.

Scheduled time (if flexible, please write “flexible”): flexible
Other remarkable features of the proposal (interdisciplinary/multidisciplinary character; contribution to CIVIS goals; etc):

The proposed activity is an innovative educational path that allows students to be exposed to different international academic and non-academic environments in an accelerated manner. Engaging in such programs will provide students the opportunity to extend their course learning and to apply their knowledge during the identification, development, and implementation of the service-learning projects in order to improve their communities.
CALL FOR HUB 1 ACTIVITIES

Title of the proposed activity: Green Chemistry in the Pharmaceutical Industry

Participant universities: University of Bucharest and other interested universities

Participant academics (indicating university, department, e-mail): Simona Coman, University of Bucharest, Department of Organic Chemistry, Biochemistry and Catalysis, simona.coman@chimie.unibuc.ro

Kind of activity:

- Individual courses
  - x Virtual mobility courses/modules
  - □ Short courses/workshops (1-2 ECTS)
  - □ Summer School
  - □ Workshops/Days

Terms/semesters

- □ Erasmus research exchanges/traineeships
- □ Independent projects (e.g. joint supervision of thesis work)
- □ Erasmus-term semesters (30 ECTS)

Various

- □ Other (please elaborate): ..............................

Capacity (total # of participants): 25 students from bachelor level

Brief description of the activity (Aims and Scopes, content, etc):

Over the last twenty-five years the manufacture of pharmaceuticals has undergone revolutionary changes. These changes were possible due to the development of modern synthetic organic chemistry, which enabled chemists to synthesize molecules with increasingly complexity by using very elaborate procedures. Unfortunately, these procedures also brought very serious drawbacks related to the huge amounts of organic solvent usage and waste generation. This situation stimulated the development of cost-effective methods for pharmaceuticals manufacture. On top of this, there has been a paradigm shift from the traditional concept of process efficiency to one that assigns economic value to conserving energy and raw materials, eliminating waste, and avoiding the use of toxic and/or hazardous chemicals. The concepts of E factors, atom economy, and step economy have gradually become incorporated into mainstream organic synthesis.

The pharmaceutical industry is making substantial progress in replacing traditional processes with greener, more sustainable alternatives, though there is much still to do.

Learning objectives:

- become familiar with the concept of green chemistry and the basics of pharmaceutical industry
- introduce the 12 principles of green chemistry as well as the tools of green chemistry including the use of alternative starting materials, reagents, solvents and catalysts.
- learn about inherent difficulties of the pharmaceutical industry in meeting green chemistry goals
- introduce the green chemistry metrics, learn how to evaluate a reaction or process and determine “greener” alternatives.
- learn about the greening of the pharmaceutical industry, including specific examples.

Scheduled time (if flexible, please write “flexible”):

**Spring 2021 (March 2021-May 2021). Course of 2 hours per week, third year study, bachelor level.**

Other remarkable features of the proposal (interdisciplinary/multidisciplinary character; contribution to CIVIS goals; etc):

Green Chemistry in the Pharmaceutical Industry is an advanced level course designed for junior level undergraduate students. Successful completion of general chemistry and organic chemistry courses are the only specific prerequisites for the course.
CALL FOR HUB 1 ACTIVITIES

Title of the proposed activity: Green Organic Chemistry and Interdisciplinary Activities

Participant universities: University of Bucharest and other interested universities

Participant academics (indicating university, department, e-mail): Lecturer dr. Adriana Urda, University of Bucharest, Faculty of Chemistry, Department of Organic Chemistry, Biochemistry and Catalysis, adriana.urda@chimie.unibuc.ro

Kind of activity:
- Individual courses
  - Virtual mobility courses/modules
  - Short courses/workshops (1-2 ECTS)
  - Summer School
  - Workshops/Days
- Terms/semesters
  - Erasmus research exchanges/traineeships
  - Independent projects (e.g. joint supervision of thesis work)
  - Erasmus-term semesters (30 ECTS)
- Various
  - Other (please elaborate): ........................................

Capacity (total # of participants): 25 students, master level

Brief description of the activity (Aims and Scopes, content, etc):

A sustainable future cannot be attained without sustainable chemistry, and progress in this area is critically dependent upon advances in green chemistry, that uses fundamental principles related to all chemical fields in order to “reduce or eliminate the use and generation of hazardous substances” in the design, manufacture and application of chemical products, as the International Union of Pure and Applied Chemistry defined green chemistry.

The course will teach the students that green organic chemistry can and must be integrated into every aspect of the chemical processes, from the starting materials (renewable feedstock if possible, from biological and plant-based starting materials), greener reagents and solvents (no halogenated or aromatic solvents; using green solvents such as water, ionic liquids or even solvent-free reactions), use of catalysts instead of stoichiometric reactants, reducing energy needs (reactions to be carried out at ambient temperature and pressure), and using alternative energy input methods (e.g. microwave irradiation). Students will be encouraged to seek alternative methods to minimize waste produced in the chemical processes.

The course will emphasize the link between green organic chemistry and other chemistry fields, such as catalysis, analytical chemistry and environmental chemistry. Catalysts are key in green chemistry, as they have the ability to increase the selectivity for one product from many possible in complex reaction pathways. They lower the activation energy barrier for the reaction, allowing processes to occur faster and at lower temperatures, and can often be recycled. Stereoselectivity and
achievement of a high enantiomeric excess are necessary in the syntheses of fine chemicals, especially in the pharmaceutical industry, where often only one enantiomer has the desired biological properties, and the other one may be toxic. Besides producing waste with the undesired isomer, the isolation of the biologically active one from the mixture creates serious technological problems, being a major factor in the high cost of pharmaceutical products. Highly selective catalysts are needed for fine chemicals syntheses. Green analytical methods and procedures should not require hazardous chemicals for the preparation and preservation of samples, instrument calibration and cleaning, since often analytical procedures create waste in larger amounts and greater toxicity than the sample that is analysed. Direct and integrated analytical techniques, that generate as little waste as possible are desired. Environmental chemistry detects and monitors chemical compounds in the environment, studies the toxic effects of anthropogenic chemicals on life and environment and the ways they are removed from the environmental systems. Environmental chemistry thus both informs and challenges green chemistry: when we design chemicals that can find their way into the environment, we should design them to be green, and thus as harmless to the life and environment as possible.

The course will teach students to evaluate the greenness of a chemical process by using green chemistry principles such as E-factor, atom economy, overall reaction efficiency. All sections of the course will show examples of green routes that replaced older, polluting processes, while providing economic benefits.

Scheduled time (if flexible, please write “flexible”): Flexible, during 2nd semester 2021-2022. Module of 4 hours per week, for a period of one month. Master level.

Other remarkable features of the proposal (interdisciplinary/multidisciplinary character; contribution to CIVIS goals; etc):

The activity has an interdisciplinary character, combining elements from organic, analytic and environmental chemistry, catalysis and catalytic materials, aiming to educate students to think deeper and take environmental factors into consideration in all aspects of organic chemistry.
CALL FOR HUB 1 ACTIVITIES

Title of the proposed activity: Nanomaterials and nanotechnologies

Participant universities: Rome, Marseille, Bucharest as well as all interested universities

Participant academics (indicating university, department, e-mail) University of Bucharest, Faculty of Chemistry, Department of Organic Chemistry, Biochemistry and Catalysis, email: octavian.pavel@chimie.unibuc.ro

Kind of activity:

- Individual courses
  - x Virtual mobility courses/modules
  - x Short courses/workshops (1-2 ECTS)
  - □ Summer School
  - x Workshops/Days
- Terms/semesters
  - x Erasmus research exchanges/traineeships
  - x Independent projects (e.g. joint supervision of thesis work)
  - x Erasmus-term semesters (30 ECTS)
- Various
  - □ Other (please elaborate): ........................................

Capacity (total # of participants): 30

Brief description of the activity (Aims and Scopes, content, etc): The aims of proposing activity are: familiarizing with the main currents and approaches in the field of nanomaterials, understanding of preparation methods as well as physical and chemical characterization, knowledge of physicochemical properties of represented materials, foray into nano present and future technologies. There will be many discussions, both online and in physical format, regarding the approach to the topics and technologies at the nano level with the search for ways that can generate future perspectives for collaboration and generation of scientific papers.

Scheduled time (if flexible, please write “flexible”): flexible

Other remarkable features of the proposal (interdisciplinary/multidisciplinary character; contribution to CIVIS goals; etc): a good opportunity for collaboration, exchange of ideas and staff that will surely lead only to benefits. It can be part of a multidisciplinary network with tentacles in all exact areas.
CALL FOR HUB 1 ACTIVITIES

Title of the proposed activity: Nanomaterials for green energies I

Participant universities: University of Bucharest

Participant academics (indicating university, department, e-mail) Faculty of Physics, Bucharest, Department of matter structure, physics of the earth and the atmosphere, astrophysics -Renewable energies, adriana.balan@unibuc.ro

Kind of activity:

Individual courses
- Virtual mobility courses/modules
- Short courses/workshops (1-2 ECTS)
- Summer School
- Workshops/Days

Terms/semesters
- Erasmus research exchanges/traineeships
- Independent projects (e.g. joint supervision of thesis work)
- Erasmus-term semesters (30 ECTS)

Various
- Other (please elaborate): Lectures (optional-provided on line) and laboratories (face to face in specialized laboratory, optional- short time mobilities) (6 ECTS)

Capacity (total # of participants): 25

Brief description of the activity (Aims and Scopes, content, etc):
Aims and scopes: Understanding of the phenomena of conversion of solar energy into chemical energy and of the properties of nanomaterials used in energy conversion; knowledge of the specific principles of nanotechnologies

Content

Lectures

Laboratories (practical activity)
Scheduled time (if flexible, please write “flexible”): according to the schedule of faculty

Other remarkable features of the proposal (interdisciplinary/multidisciplinary character; contribution to CIVIS goals; etc): interdisciplinary physics-chemistry
CALL FOR HUB 1 ACTIVITIES

Title of the proposed activity: **Nanomaterials in water treatment**

Participant universities:
1) University of Bucharest
   CIVIS universities

Participant academics
From University of Bucharest:
1. Assoc. Prof. Ludmila Otilia Cinteza
   Physical Chemistry Department
   ocinteza@gw-chimie.math.unibuc.ro
2. Lecturer Adina Raducan
   Physical Chemistry Department
   adina.raducan@g.unibuc.ro
3. Lecturer Delia Popescu
   Inorganic Chemistry Department
   delia.popescu@chimie.unibuc.ro

Kind of activity:
- **Individual courses**
- □ Virtual mobility courses/modules
- □ Short courses/workshops (1-2 ECTS)
- □ Summer School
- □ Workshops/Days

Terms/semesters
- X Erasmus research exchanges/traineeships
- □ Independent projects (e.g. joint supervision of thesis work)
- □ Erasmus-term semesters (30 ECTS)

Various
- □ Other (please elaborate): .........................

Capacity (total # of participants): **minimum 3 students from each participant**

Brief description of the activity (Aims and Scopes, content, etc):
Research stages for students (2-3 months) on specific topics related to various nanomaterials used in modern technologies of water treatment.

Scheduled time (if flexible, please write “flexible”): July-September 2021

Other remarkable features of the proposal (interdisciplinary/multidisciplinary character; contribution to CIVIS goals; etc):
The proposal contributes to the creation of an inter-university campus, with blended on campus and online activities, to ensure the widest possible participation of students.
CALL FOR HUB 1 ACTIVITIES

Title of the proposed activity: **Nanotoxicology – relevance to the aquatic pollution**

Participant universities:

1) University of Bucharest  
**CIVIS universities**

Participant academics:

From University of Bucharest: 1. Assoc. Prof. Ludmila Otilia Cinteza  
Physical Chemistry Department  
ocinteza@gw-chimie.math.unibuc.ro

2. Lecturer Miruna Stan  
Biochemistry and Molecular Biology Department  
Miruna_stan@yahoo.com

Kind of activity:

- **Individual courses**
  - Virtual mobility courses/modules
  - X Short courses/workshops (1-2 ECTS)
  -□ Summer School
  -□ Workshops/Days

Terms/semesters

-□ Erasmus research exchanges/traineeships
-□ Independent projects (e.g. joint supervision of thesis work)
-□ Erasmus-term semesters (30 ECTS)

**Various**

-□ Other (please elaborate): ................................

Capacity (total # of participants): **10 (2-3 students from each university)**

Brief description of the activity (Aims and Scopes, content, etc):
A short course/workshop to introduce to students basics of nanotoxicology.

The course content:
- Nanomaterial characteristics and the influence on toxicological profile
- Nanomaterials in water pollution
- Case studies (Ag nanoparticles, TiO$_2$ nanoparticles, etc).

Scheduled time (if flexible, please write “flexible”): flexible

Other remarkable features of the proposal (interdisciplinary/multidisciplinary character; contribution to CIVIS goals; etc): The activity has an interdisciplinary character. It contributes to the realization of short teaching modules on very hot research topics, by bringing together the capabilities and interests of several universities in the consortium. The proposal also contributes to the creation of an inter-university campus, with activities in virtual environment, to ensure the widest possible participation of students.
Title of the proposed activity: **Photocatalytic depollution processes**

Participant universities: **University of Bucharest and other interested universities**

Participant academics (indicating university, department, e-mail): **Bogdan Cojocaru, University of Bucharest, Department of Organic Chemistry, Biochemistry and Catalysis,**

[bogdan.cojocaru@chimie.unibuc.ro](mailto:bogdan.cojocaru@chimie.unibuc.ro)

Kind of activity:

- **Individual courses**
  - x Virtual mobility courses/modules
  - □ Short courses/workshops (1-2 ECTS)
  - □ Summer School
  - □ Workshops/Days

Terms/semesters

- □ Erasmus research exchanges/traineeships
- □ Independent projects (e.g. joint supervision of thesis work)
- □ Erasmus-term semesters (30 ECTS)

**Various**

- □ Other (please elaborate): ..........................

Capacity (total # of participants): **25 students of master level**

Brief description of the activity (Aims and Scopes, content, etc):

Water and air pollution has a huge impact on ecosystems and human health all over the world. Pharmaceuticals, pesticides, plasticizers, phenolic compounds, industrial solvents, automotive emissions (CO₂, NOₓ) and many other chemicals are the source of the pollution. Waste is more and more a problem. Both the low and high concentrations of the pollutants are hazardous to the environment. Many compounds can be present in the environment in the ppb-ppm range, being difficult to detect and degrade. The removal of these contaminants from waste waters requires efficient technologies. Physical, chemical, physico-chemical, electro-chemical or biological decontamination processes are widely used due to their simple setup and their ability to work for high flows, although total removal of complex molecules can still remain a problem. Moreover, energy consumption for removal of pollutants is a sensible issue, this adding to the problem of removing the chemicals or catalysts added for decontamination. Advanced oxidation processes (AOPs) as UV irradiation, UV/H₂O₂, ozonation, O₃/H₂O₂, UV/O₃/H₂O₂, Fenton, photo-Fenton (Fe²⁺/H₂O₂ and Fe³⁺/H₂O₂/UV), sonication and photocatalysis are viable solutions for the treatment of wastewater pollutants and total mineralization of them. AOPs usually generate high amounts of OH radicals, these radicals being accountable for the degradation of organic contaminants in the wastewater system. When associated with conventional methods, AOPs are effective and capable of degrading the pollutants generating less toxic intermediate products. In this context, the aim of the “Photocatalytic depollution processes” course, is to introduce and discuss the light-driven methods
and strategies to remediate the environment. The scope of the course is to make students familiar with the fundamental concepts of photocatalysis, which is a cheap or free (when Sun is used as irradiation source) method to reach a cleaner environment, and to demonstrate the need for Green Chemistry in a modern and actual sustainable chemical industry. This will challenge students to be able, as new generation of chemists, to develop new products, processes and services that achieve all the benefits of sustainable development. This requires a new approach whereby the materials and energy input to a process are minimized and thus utilized at maximum efficiency. In the end, prevention must prevail remediation. The course contains elements to underline the advantages of these processes and discussions by examples on all the above stringent problems.

Scheduled time (if flexible, please write “flexible”):

**Autumn 2021 (November 2021-December 2021). Module of 4 hours per week, for a period of one month. Master level.**

Other remarkable features of the proposal (interdisciplinary/multidisciplinary character; contribution to CIVIS goals; etc):

The activity has an interdisciplinary character, combining elements from different areas of chemistry such as organic, inorganic, catalysis and environmental chemistry. Environmental consciousness should be part of every young student in chemistry.
### Summary of Bucharest University proposals for Hub 1 CIVIS Activities: Climate, Environment and Energy

<table>
<thead>
<tr>
<th>TITLE</th>
<th>KIND OF ACTIVITY</th>
<th>CAPACITY (TOTAL # OF PARTICIPANTS):</th>
<th>Scheduled</th>
<th>CONTACTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>The climate challenge. Physical mechanisms and implications for society</td>
<td></td>
<td>20</td>
<td>Flexible</td>
<td>Faculty of Physics, Bucharest, Department of matter structure, physics of the earth and the atmosphere, astrophysics; Prof. Mihai Dima - <a href="mailto:mihai.dima@unibuc.ro">mihai.dima@unibuc.ro</a> <a href="mailto:vasile.bercu@fizica.unibuc.ro">vasile.bercu@fizica.unibuc.ro</a></td>
</tr>
<tr>
<td>Electrochemical converters for energy generation and storage</td>
<td></td>
<td>25</td>
<td>Flexible</td>
<td>Faculty of Physics, Bucharest, Department of matter structure, physics of the earth and the atmosphere, astrophysics -Renewable energies <a href="mailto:vasile.bercu@fizica.unibuc.ro">vasile.bercu@fizica.unibuc.ro</a> <a href="mailto:serban.stamatin@unibuc.ro">serban.stamatin@unibuc.ro</a></td>
</tr>
<tr>
<td>Nanomaterials for green energy</td>
<td></td>
<td>25</td>
<td>Flexible</td>
<td>Faculty of Physics, Bucharest, Department of matter structure, physics of the earth and the atmosphere, astrophysics -Renewable energies, <a href="mailto:adriana.balan@unibuc.ro">adriana.balan@unibuc.ro</a> <a href="mailto:vasile.bercu@fizica.unibuc.ro">vasile.bercu@fizica.unibuc.ro</a></td>
</tr>
<tr>
<td>Nanomaterials and nanotechnologies</td>
<td>Individual courses</td>
<td>✓ Virtual mobility courses/modules</td>
<td>30</td>
<td>Flexible</td>
</tr>
<tr>
<td></td>
<td></td>
<td>✓ Short courses/workshops (1-2 ECTS)</td>
<td></td>
<td>Octavian Pavel, University of Bucharest, Faculty of Chemistry, Department of Organic Chemistry, Biochemistry and Catalysis, <a href="mailto:octavian.pavel@chimie.unibuc.ro">octavian.pavel@chimie.unibuc.ro</a></td>
</tr>
<tr>
<td>Terms/semesters</td>
<td>Courses/Modules</td>
<td>Duration</td>
<td>Contact Information</td>
<td></td>
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<tr>
<td>--------------------------------------------------------------------------------</td>
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<td></td>
</tr>
<tr>
<td>Technologies for heavy metals bioremediation</td>
<td>Individual courses: Virtual mobility courses/modules</td>
<td>10</td>
<td>Flexible Ileana Fărcăşanu &amp; Lavinia Ruţă, University of Bucharest, Faculty of Chemistry, Organic Chemistry, Biochemistry and Catalysis Department <a href="mailto:ileana.farcasanu@chimie.unibuc.ro">ileana.farcasanu@chimie.unibuc.ro</a> <a href="mailto:lavinia.ruta@chimie.unibuc.ro">lavinia.ruta@chimie.unibuc.ro</a></td>
<td></td>
</tr>
<tr>
<td>Climate Effects of Pollutants &amp; Human Health (Climate Effects of Pollutants, Topic 1: Climate - Natural Science)</td>
<td>Individual courses: Short courses/workshops (1-2 ECTS)</td>
<td>Flexible</td>
<td>Participant academics Lecturer dr. Eliza Oprea University of Bucharest, Faculty of Chemistry, Department of Organic Chemistry, Biochemistry and Catalysis, University of Bucharest 4-12 Regina Elisabeta Blvd., 030018 Bucharest, Romania <a href="mailto:eliza.oprea@g.unibuc.ro">eliza.oprea@g.unibuc.ro</a></td>
<td></td>
</tr>
<tr>
<td>Green Chemistry in the Pharmaceutical Industry</td>
<td>Individual courses: Virtual mobility courses/modules</td>
<td>25 students from bachelor level</td>
<td>Spring 2021 (March 2021-May 2021). Course of 2 hours per week, third year study, bachelor level. Simon Coman, University of Bucharest, Faculty of Chemistry, Department of Organic Chemistry, Biochemistry and Catalysis, <a href="mailto:simona.coman@chimie.unibuc.ro">simona.coman@chimie.unibuc.ro</a></td>
<td></td>
</tr>
<tr>
<td>Sustainability in Chemistry: methods and strategies</td>
<td>Individual courses: Virtual mobility courses/modules</td>
<td>25 students, master level</td>
<td>Autumn 2021 (November 2021-December 2021). Module of 4 hours per week, for a period of one month. Master level. Simon Coman, University of Bucharest, Faculty of Chemistry, Department of Organic Chemistry, Biochemistry and Catalysis, <a href="mailto:simona.coman@chimie.unibuc.ro">simona.coman@chimie.unibuc.ro</a></td>
<td></td>
</tr>
<tr>
<td>GOING GREEN – Ethics of a sustainable environment</td>
<td>Individual courses</td>
<td>✓ Virtual mobility courses/modules ✓ Short courses/workshops (1-2 ECTS)</td>
<td>bachelor and master level students</td>
<td>Flexible</td>
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<td>-----------------------------------------------</td>
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<tr>
<td>Others</td>
<td>✓ teaching activities and service-learning projects related to stakeholders and Open Labs</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Environmentally Friendly Fuels from renewable resources (Biodiesel/Bioethanol)</td>
<td>Individual courses</td>
<td>✓ Virtual mobility courses/modules</td>
<td>25 students</td>
<td>module of 2 hours per week, for a period of 7 weeks, Autumn term 2021</td>
</tr>
<tr>
<td>Photocatalytic depollution processes</td>
<td>Individual courses</td>
<td>✓ Virtual mobility courses/modules</td>
<td>25 students, master level</td>
<td>Autumn 2021 (November 2021-December 2021). Module of 4 hours per week, for a period of one month. Master level.</td>
</tr>
<tr>
<td>Green Organic Chemistry and Interdisciplinary Activities</td>
<td>Individual courses</td>
<td>✓ Virtual mobility courses/modules</td>
<td>25 students, master level</td>
<td>Flexible, during 2nd semester 2021-2022. Module of 4 hours per week, for a period of one month. Master level.</td>
</tr>
<tr>
<td>Nanotoxicology – relevance to the aquatic pollution</td>
<td>Individual courses</td>
<td>✓ Virtual mobility courses/modules ✓ Short courses/workshops (1-2 ECTS)</td>
<td>10 (2-3 students from each university)</td>
<td>flexible</td>
</tr>
<tr>
<td>Program</td>
<td>Terms/semesters</td>
<td>Details</td>
<td>Participants</td>
<td>Institution</td>
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<td>------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>Nanomaterials in water treatment</td>
<td>✓ Erasmus research exchanges/traineeships</td>
<td>minimum 3 students from each participant</td>
<td>July-September 2021</td>
<td>University of Bucharest, Faculty of Chemistry 1. Assoc. Prof. Ludmila Otilia Cinteza Physical Chemistry Department <a href="mailto:ocinteza@gw-chimie.math.unibuc.ro">ocinteza@gw-chimie.math.unibuc.ro</a> 2. Lecturer Adina Raducan Physical Chemistry Department <a href="mailto:adina.raducan@q.unibuc.ro">adina.raducan@q.unibuc.ro</a> 3. Lecturer Delia Popescu Inorganic Chemistry Department <a href="mailto:delia.popescu@chimie.unibuc.ro">delia.popescu@chimie.unibuc.ro</a></td>
</tr>
<tr>
<td>Trends in nanotechnology solutions for environmental protection</td>
<td>Individual courses ✓ Workshops/Days</td>
<td>25</td>
<td>July-September 2021</td>
<td>University of Bucharest, Faculty of Chemistry 1. Assoc. Prof. Ludmila Otilia Cinteza Physical Chemistry Department <a href="mailto:ocinteza@gw-chimie.math.unibuc.ro">ocinteza@gw-chimie.math.unibuc.ro</a> 2. Lecturer Adina Raducan Physical Chemistry Department <a href="mailto:adina.raducan@q.unibuc.ro">adina.raducan@q.unibuc.ro</a> 3. Lecturer Delia Popescu Inorganic Chemistry Department <a href="mailto:delia.popescu@chimie.unibuc.ro">delia.popescu@chimie.unibuc.ro</a></td>
</tr>
<tr>
<td>Chemical modelling; Quantitative structure activity relationships (QSAR) of pollutants</td>
<td>Individual courses ✓ Short courses/workshops (1-2 ECTS) ✓ Workshops/Days</td>
<td>30 participants</td>
<td>Flexible</td>
<td>University of Bucharest, Faculty of Chemistry 1. Lecturer Ioana Stanculescu Physical Chemistry Department <a href="mailto:joana.stanculescu@chimie.unibuc.ro">joana.stanculescu@chimie.unibuc.ro</a> 2. Assoc. Prof. Ludmila Otilia Cinteza Physical Chemistry Department <a href="mailto:ocinteza@gw-chimie.math.unibuc.ro">ocinteza@gw-chimie.math.unibuc.ro</a></td>
</tr>
<tr>
<td>CATALYTIC MATERIALS - course</td>
<td>Individual courses ✓ Virtual mobility courses/modules</td>
<td>20 students in campus,</td>
<td>Flexible</td>
<td>Prof. Ioan Cezar Marcu, University of Bucharest, Faculty of Chemistry,</td>
</tr>
<tr>
<td>and research activities</td>
<td>Terms/semesters</td>
<td>unlimited online. One exchange/traineeship per year and one PhD student/year for a jointly supervised thesis.</td>
<td>Department of Organic Chemistry, Biochemistry &amp; Catalysis, <a href="mailto:ioancezar.marcu@chimie.unibuc.ro">ioancezar.marcu@chimie.unibuc.ro</a></td>
<td></td>
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<td>-------------------------</td>
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</tr>
<tr>
<td>General and Applied Microbial Ecology</td>
<td>Individual courses</td>
<td>10 students</td>
<td>Flexible</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Terms/semesters</td>
<td>Virtual mobility courses/modules</td>
<td>10 students</td>
<td>Flexible</td>
</tr>
</tbody>
</table>

Luminița Măruțescu, University of Bucharest, Department of Botany and Microbiology, luminita.marutescu@bio.unibuc.ro, Mădălin Enache, PhD, Senior Researcher, Institute of Biology, Bucharest, Head of Microbiology Department, madalin.enache@ibiol.ro
CALL FOR HUB 1 ACTIVITIES

Title of the proposed activity: **Sustainability in Chemistry: methods and strategies**

Participant universities: **University of Bucharest and other interested universities**

Participant academics (indicating university, department, e-mail): **Simona Coman, University of Bucharest, Department of Organic Chemistry, Biochemistry and Catalysis, simona.coman@chimie.unibuc.ro**

Kind of activity:

- **Individual courses**
  - x Virtual mobility courses/modules
  - □ Short courses/workshops (1-2 ECTS)
  - □ Summer School
  - □ Workshops/Days

Terms/semesters

- □ Erasmus research exchanges/traineeships
- □ Independent projects (e.g. joint supervision of thesis work)
- □ Erasmus-term semesters (30 ECTS)

**Various**

- □ Other (please elaborate): ........................................

Capacity (total # of participants): **25 students of master level**

Brief description of the activity (Aims and Scopes, content, etc):

In the context of sustainable development, chemistry is at the same time a chance and a risk. The risks are high, as demonstrated by several terrible industrial accidents and emission and accumulation of persistent pollutants, which have their origin in the chemical industry. However, besides these dangers, chemistry offers great potentials for sustainable development. As demonstrated already, the chemical industry can support the development towards a more sustainable lifestyle of society according to its competence in the field of transformation of products and materials. The production of insulation material for public and private buildings is a good example of the contributions chemistry has made in this process. The energy necessary for the production of these materials is conserved within the first year of operation by reduced heating needs. A long-term reduction of the energy used for heating buildings has become possible. Another example is the development of catalytic converters for motor vehicles, which led to a great reduction in emissions. Therefore, to reach sustainability in chemistry the new generation of chemists must be trained to think of the environmental, social and economic factors in chemicals manufacturing. In this context, the aim of the "Sustainability in Chemistry: methods and strategies" course, is to introduce and discuss the methods and strategies to reach sustainability in chemistry. The scope of the course is to make students familiarly with the fundamental concepts in Green Chemistry and Green Engineering, which are the methods to reach sustainability as practical approaches, to interwoven them within contextual societal frameworks, and to demonstrate the
need for Green Chemistry in a modern and actual sustainable industry. This will challenge students to be able, as new generation of chemists, to develop new products, processes and services that achieve all the benefits of sustainable development. This requires a new approach whereby the materials and energy input to a process are minimized and thus utilized at maximum efficiency. The dispersion of harmful chemicals in the environment must be minimized or, preferably, completely eliminated. The use of renewable resources must be maximize, the by-products must be minimized or, preferable, completely eliminated, the solvents, catalysts and not transformed raw materials must be recycled, and all of these must be achieved in a way that provides economic benefit to the producer and enables industry to meet the needs of society. The course contains elements to evaluate the greenness of a chemical reaction by adopting a variety of metrics to measure ‘greenness’ of a process and discussions by examples on all the above stringent problems.

Scheduled time (if flexible, please write “flexible”):

**Autumn 2021 (November 2021-December 2021). Module of 4 hours per week, for a period of one month. Master level.**

Other remarkable features of the proposal (interdisciplinary/multidisciplinary character; contribution to CIVIS goals; etc):

The activity has an interdisciplinary character, combining elements from different areas of chemistry such as organic, inorganic, catalysis and environmental chemistry. Sustainability in chemistry have to start within the schools by educating young students in chemistry to think of the environmental, social and economic factors in chemicals manufacturing.
CALL FOR HUB 1 ACTIVITIES

Title of the proposed activity: Technologies for heavy metals bioremediation

Participant universities: University of Bucharest and other interested universities

Participant academics (indicating university, department, e-mail):
University of Bucharest; Organic Chemistry, Biochemistry and Catalysis Department
ileana.farcasanu@chimie.unibuc.ro
lavinia.ruta@chimie.unibuc.ro

Kind of activity:
- Individual courses
- X Virtual mobility courses/modules
- □ Short courses/workshops (1-2 ECTS)
- □ Summer School
- □ Workshops/Days

Terms/semesters
- □ Erasmus research exchanges/traineeships
- X Independent projects (e.g. joint supervision of thesis work)
- □ Erasmus-term semesters (30 ECTS)

Various
- □ Other (please elaborate): ………………………….

Capacity (total # of participants): 10

Brief description of the activity (Aims and Scopes, content, etc):

Bioremediation is one of the most effective approaches in the fight against heavy metal pollution. In this course we will introduce our research on the possibilities to manipulate Saccharomyces cerevisiae cells towards heavy metal (hyper) accumulation.

Scheduled time (if flexible, please write “flexible”): …………flexible………………

Other remarkable features of the proposal (interdisciplinary/multidisciplinary character; contribution to CIVIS goals; etc):

The main objectives of the courses are the exchanging of expertise and experience on pedagogical methods and connecting the University of Bucharest with other interested universities in order to motivate students to become mobile. Also, the mobility will assure the exchanging of innovative teaching practices and will create an international learning experience for students.
CALL FOR HUB 1 ACTIVITIES

Title of the proposed activity:
The climate challenge: physical mechanisms and implications for society

Participant universities:
University of Bucharest

Participant academics (indicating university, department, e-mail)
Faculty of Physics, Bucharest, Department of matter structure, physics of the earth and the atmosphere, astrophysics;  Prof. Mihai Dima - mihai.dima@unibuc.ro
Can be taught in first (autumn) or in second (spring) semester of 2020-2021 academic year

Kind of activity:

- Individual courses
  - Virtual mobility courses/modules
  - Short courses/workshops (1-2 ECTS)
  - Summer School
  - Workshops/Days

- Terms/semesters
  - Erasmus research exchanges/traineeships
  - Independent projects (e.g. joint supervision of thesis work)
  - Erasmus-term semesters (30 ECTS)

- Various
  - Other (please elaborate): ....................................

Capacity (total # of participants): 20

Brief description of the activity (Aims and Scopes, content, etc):

Aims and scopes:
1. Understanding of the main physical processes associated to climate change
2. Understanding the complexity and the implications of the climate changes for society

Content

Lectures
Main causes of climate variations. General circulation of atmosphere and ocean.
Paleoclimate perspective on present variations.
General circulation models. Climate projections.
Tipping components of the climate system. The thermohaline circulation.
Key quasi-global physical feedbacks.
Climate system – human society feedbacks.
Sources of the complexity of the climate challenge.
Types of climate changes discourses.

Laboratories (practical activity)
Using tools used to analyze and visualize climate data.
Emphasize the global warming based on surface air temperature.
Determine the inter-hemispheric asymmetry of global warming based on surface air temperature.
Determine trends in global atmospheric surface circulation and precipitation.
Apply methods to identify regimes which are leading to tipping points.
Investigate connections between climatic and economic quasi-global indexes.
Debate on different types of discourses on climate change.

..................

Scheduled time (if flexible, please write “flexible”): according to the schedule of faculty

Other remarkable features of the proposal (interdisciplinary/multidisciplinary character; contribution to CIVIS goals; etc): interdisciplinary physics-sociology
CALL FOR HUB 1 ACTIVITIES

Title of the proposed activity: Trends in nanotechnology solutions for environmental protection

Participant universities:
1) University of Bucharest

Participant academics
From University of Bucharest:
1. Assoc. Prof. Ludmila Otilia Cinteza
   Physical Chemistry Department
   ocinteza@gw-chimie.math.unibuc.ro
2. Lecturer Adina Raducan
   Physical Chemistry Department
   adina.raducan@q.unibuc.ro
3. Lecturer Delia Popescu
   Inorganic Chemistry Department
   delia.popescu@chimie.unibuc.ro

Kind of activity:

- Individual courses
- Virtual mobility courses/modules
- Short courses/workshops (1-2 ECTS)
- Summer School
- Workshops/Days

Terms/semesters
- Erasmus research exchanges/traineeships
- Independent projects (e.g. joint supervision of thesis work)
- Erasmus-term semesters (30 ECTS)
- Various
- Other (please elaborate): .........................

Capacity (total # of participants): 25

Brief description of the activity (Aims and Scopes, content, etc):
Workshop on the impact of nanotechnology in developing advanced solutions for the pollution control and environmental protection.

Proposed Sections
- Nanomaterial-based detection of pollutants
- Nanomaterials for air and water treatment
- Nanotechnology and climate change
- Future of nanotechnology in academic programmes for Environmental Science

Scheduled time (if flexible, please write “flexible”): July-September 2021
Other remarkable features of the proposal (interdisciplinary/multidisciplinary character; contribution to CIVIS goals; etc):
The proposal contributes to the identification of research topics of interest and coagulates resources from various partner universities in CIVIS consortium, in order to accelerate the development of partnerships for scientific projects to response European and global challenges in environmental protection.