



SURVEY QUESTIONNAIRE ON CURRICULUM IN MOLECULAR AND MATERIALS SCIENCES

Dear Bachelor students and Master students,

Molecular and Material Science (MMS) is a comparatively recent field of research encompassing physics, biology, chemistry and technology. It is aiming to find out novel properties and activities of molecules so far unexplored, and to create innovative materials with new and valuable functionalities which can be applied in medicine, pharmacy, electrical engineering, environmental treatment, new energy,... In Viet Nam, although integration of courses in MMS into education programmes in chemistry and physics has been recently conducted in universities but still in low scale and the results obtained have still not been met with the demand of the society.

Within the framework of the Project “*Research-based curriculum development in molecular and materials sciences Vietnam*” (MOMA), Project Reference 597795-EPP-1-2018-1-BE-EPPKA2-CBHE-JP, Co-funded by the Erasmus+ Programme of the European Union, we aim to upgrade the quality of education programmes in MMS to match the need of the society. To that end, we will organize a workshop focusing on evaluating the effectiveness thereby orienting the upgrade of the current education programmes. We would like to get feedback from you related to our education programmes in MMS listed below:

I. Bachelor in Chemistry (4 years, 140 credit points)

- Spectroscopic methods for structural determination
- Modern analytical methods.

II. Bachelor in Medicinal Chemistry (4 years, 140 credit points)

- Quantitative molecular structure–activity relationship
- Techniques for extraction and isolation of natural compounds
- Biomedical materials
- Synthetic Medicinal Chemistry.

Your feedback will be valuable foundation for upgrading the above education programmes.

A. Personal information

- Sex: Male Female
- You are: Bachelor student Master student
- Year: 1st 2nd 3rd 4th
- Your training program:

B. Survey questionnaire

1. Please circle the level of necessity in the questions below. The scale of necessity is arranged from low to high level: 1=(0–20%); 2=(21–40%); 3=(41–60%); 4=(61–80%); 5=(81–100%).

| No. | Question | Level of necessity | | | | | Explanation (if any) |
|-----|--|--------------------|---|---|---|---|----------------------|
| 1.1 | The level of necessity of interdisciplinary knowledge (Physics, Chemistry, Biology and Technology) in the above training programs | 1 | 2 | 3 | 4 | 5 | |
| 1.2 | The level of necessity of a collaboration between universities and companies in training programs related to the field of Molecular and Materials Sciences | 1 | 2 | 3 | 4 | 5 | |

2. How could you predict the labour market trend for the above education programmes in MMS in the coming years?

| Answer | Explanation (if any) |
|------------------------------------|----------------------|
| Increase <input type="checkbox"/> | |
| Decrease <input type="checkbox"/> | |
| Unchanged <input type="checkbox"/> | |

3. Could you please tell us why you chose the training program you are following?

- Due to the interest in this training program
- Easy to apply for a job after graduation
- Easy to pass the entrance university exam
- Failure to meet the first expectation into the desired university
- Impact from family and relatives
- Impact from teachers and friends
- Other reasons

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4. Do you intend to advise your relatives/acquaintances to follow the above training programmes in Molecular and Materials Sciences?

| Answer | Explanation (if any) |
|-----------------------------------|----------------------|
| Yes <input type="checkbox"/> | |
| No <input type="checkbox"/> | |
| Not sure <input type="checkbox"/> | |

5. Which of the following soft skills have you successfully trained yourself upon attending your current training program:
- Group working
 - Performance of professional reports
 - Adaptation to a diverse working environment
 - English for common communication; English for reading, understanding professional documents
 - Using basic office softwares such as Word, Excel, Power-point, exploitation and using the Internet.
6. Which of the following knowledge do you wish to develop during your study at the university:
- Scientific thinking
 - Rules/scientific principles
 - Analyzing the problems
 - Solving the problems
 - Operating the laboratory equipment
 - Planning and designing the experiments
 - Calculating and processing the data
 - Writing a report
 - Presentation
 - Searching and retrieving the information
 - Group working
 - Self-learning and self-study
7. Please circle the level of importance of the following knowledge/skills for Bachelor students / Master students in the field related to Molecular and Materials Sciences mentioned above. Evaluation scale is arranged from low to high level: 1=(0–20%); 2=(21–40%); 3=(41–60%); 4=(61–80%); 5=(81–100%).

| No. | Question | Level of importance | | | | | Explanation (if any) |
|------------------------------------|--|---------------------|---|---|---|---|----------------------|
| <i>Scientific knowledge</i> | | | | | | | |
| 7.1 | Concept, scientific terms | 1 | 2 | 3 | 4 | 5 | |
| 7.2 | Rules/scientific principles | 1 | 2 | 3 | 4 | 5 | |
| 7.3 | Analytical techniques | 1 | 2 | 3 | 4 | 5 | |
| 7.4 | Safety in handling chemicals and materials | 1 | 2 | 3 | 4 | 5 | |
| 7.5 | Practical skills | 1 | 2 | 3 | 4 | 5 | |
| <i>Exchange skills</i> | | | | | | | |
| 7.6 | Planning and designing experiments | 1 | 2 | 3 | 4 | 5 | |
| 7.7 | Calculating and processing data | 1 | 2 | 3 | 4 | 5 | |
| 7.8 | Write a report | 1 | 2 | 3 | 4 | 5 | |



| No. | Question | Level of importance | | | | | Explanation (if any) |
|------|-----------------------------------|---------------------|---|---|---|---|----------------------|
| | | 1 | 2 | 3 | 4 | 5 | |
| 7.9 | Presentation | 1 | 2 | 3 | 4 | 5 | |
| 7.10 | Searching, retrieving information | 1 | 2 | 3 | 4 | 5 | |
| 7.11 | Problem solving | 1 | 2 | 3 | 4 | 5 | |
| 7.12 | Group working | 1 | 2 | 3 | 4 | 5 | |
| 7.13 | Time management | 1 | 2 | 3 | 4 | 5 | |
| 7.14 | Self-learning, self-study | 1 | 2 | 3 | 4 | 5 | |

8. Apart from the knowledge/skills mentioned above, according to you, which knowledge/skills (if any) do we need to complement into your current training program? Explain if any.
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9. Please circle the level of necessity of the existing courses in the above training programs. The scale of necessity is arranged from low to high level.: 1=(0–20%); 2=(21–40%); 3=(41–60%); 4=(61–80%); 5=(81–100%).

| No | Course | Satisfactory scale | | | | | Explanation (if any) |
|-----|--|--------------------|---|---|---|---|----------------------|
| 9.1 | Quantitative molecular structure–activity relationship | 1 | 2 | 3 | 4 | 5 | |
| 9.2 | Techniques for extraction and isolation of natural compounds | | | | | | |
| 9.3 | Modern analytical methods | | | | | | |
| 9.4 | Spectroscopic methods for structural determination | | | | | | |
| 9.5 | Biomedical materials | | | | | | |
| 9.6 | Synthetic Medicinal Chemistry | | | | | | |

10. According to you, which courses in the field of Molecular and Materials Sciences should be added into the existing training programs?

| No. | Course | Description | Yes | No |
|------|----------------------------------|---|-----|----|
| 10.1 | Molecular and material modeling. | This course introduces students to different modeling methods and different simulation from molecular dynamics to quantum mechanics such as continuum models, CG models (coarse grain models), AA methods (All Atoms), DFT (density functional theory) theory, as well as their applications in the field of molecular science and materials. At the end of the module, students have the ability to (i) perform simple simulations by using techniques appropriate to existing | | |



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| | | conditions; (ii) select the appropriate simulation method for each specific object (molecule, material); (iii) read and criticize scientific documents on calculations and material and molecular simulation. | | |
| 10.2 | Design, discovery and synthesis of rational drugs | This course provides knowledge related to drug design / discovery / synthesis processes including understanding characteristics of targets (enzymes, cells, tissues, ...) related to disease, setting up drug design concepts, providing compounds called LEADs (through traditional medicine, natural products, biological macromolecules, synthetic compound library, computational chemistry, etc.), design and optimize LEAD by analyzing structural-activity relationships. The module will also help understand deeply molecular-level action mechanisms and effectively active synthesis methods. | | |
| 10.3 | Bioinorganic chemistry | This course provides the learners the basic principles of Inorganic Chemistry related to bioinorganic researches. It also helps the learners understand the physical methods used in Bioinorganic Chemistry such as EPR spectroscopy, Mössbauer spectroscopy, EXAFS spectroscopy, etc. In addition, the learners would understand the role of metals in biochemical systems as well as the transport and storage of metal ions. For example, the function of metals in metalloproteins in transporting and storing oxygen; the electronic transport function of metals in metalloproteins. Besides, the learners can understand the structures and functions of enzymes containing iron, copper, sulfur, etc. Furthermore, the learners can learn the use of metals for drug preparation and mechanism of action of drugs such as vanadium-containing drugs for the treatment of diabetes, platinum-containing drugs for cancer treatment, etc. | | |

11. In your opinion, which courses listed below need to be strongly research-based orientedly upgraded?

| No. | Course | Yes | No | Explanation |
|------|--|-----|----|-------------|
| 11.1 | Quantitative molecular structure–activity relationship | | | |
| 11.2 | Techniques for extraction and isolation of natural compounds | | | |
| 11.3 | Modern analytical methods | | | |
| 11.4 | Spectroscopic methods for structural determination | | | |
| 11.5 | Biomedical materials | | | |
| 11.6 | Synthetic Medicinal Chemistry | | | |

12. Please provide the solutions (if any) to improve the quality of the training program that you are following:

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13. Your other comments (if any):

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Thank you for your valuable cooperation and support.

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