#### Course Title: Food Nano-technology

|  |  |
| --- | --- |
| **University** | **Benha** |
| **Faculty** | **Faculty of Agriculture** |
| **COURSE SPECIFICATIONS:** | |
| Program of which the course is given | Agricultural Biotechnology program |
| Major or Minor element of Program | Minor |
| Departments offering the Program | Faculty of Agriculture, Benha university |
| Department offering the course | Food technology |
| Academic year / Level | Level 4 second semester |
| Date of specification approval |  |

|  |  |
| --- | --- |
| **A- BASIC INFORMATION** | |
| Title | Food Nano-technology |
| Code | FS 0722 |
| Credit Hours | 3 Hours |
| Lecture | 2 Hours / week |
| Practical | 2 Hours / week |
| Total: | Hours |

|  |
| --- |
| **B- PROFESSIONAL INFORMATION** |
| **1 – OVERALL AIMS OF COURSE** |
| 1. To comprehensive the understanding of nanotechnology and the basics of new detection methods. 2. To know nanotechnology application in food processing as well as application and risks of food nanomaterials used in food applications. |

|  |
| --- |
| **2 – Intended Learning Outcomes of Course (ILOs)** |
| **A. Knowledge and Understanding:** |
| ***By the end of the course, students should:***   1. To know the applications of food nanotechnology. 2. To know Bio-nano-technology application in food manufacturing and inspection. 3. To describe the [nanoencapsulation](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557284) and [nano-biosensor.](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557287) 4. To know [Nano emulsion](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557288), [structured multilayer emulsions](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557290), [and laminates: edible coatings](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557291). Bio polymeric Nanoparticles. 5. To specify the antimicrobial food packaging types, and [detection of foodborne pathogens and their toxins](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557307). 6. To know the overview about [Nanotechnology in the food Market](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557319) |

|  |
| --- |
| B. Intellectual Skills: |
| ***Successful completion of this course will allow students to:***   1. To create the Bio-nano-technology application in food manufacturing and inspection. 2. To innovate the [nanoencapsulation](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557284) and [nano-biosensor.](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557287) 3. To design [Nano emulsion](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557288), [structured multilayer emulsions](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557290), [and laminates: edible coatings](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557291). Bio polymeric Nanoparticles. 4. To specify the antimicrobial food packaging types, and [detection of foodborne pathogens and their toxins](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557307). 5. To rearrange the overview about [Nanotechnology in the food Market](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557319) |

|  |
| --- |
| C. Professional and Practical Skills: |
| 1. To specify the antimicrobial food packaging types, and [detection of foodborne pathogens and their toxins](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557307) 2. To design [Nano emulsion](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557288), [structured multilayer emulsions](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557290), [and laminates: edible coatings](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557291). Bio polymeric Nanoparticles. 3. To create the Bio-nano-technology application in food manufacturing and inspection. 4. To innovate the [nanoencapsulation](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557284) and [nano-biosensor.](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557287) 5. To rearrange the overview about [Nanotechnology in the food Market](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557319) |

|  |
| --- |
| D. General and Transferable Skills: |
| 1. Students should be familiar with working in small groups in the practical classes from which they produce individual reports. 2. They will be able to communicate effectively with a wide range of individuals using a variety of means. 3. Plan and organize their time to ensure that all tasks are completed and deadlines met. 4. Utilize problem solving skills in a variety of theoretical and practical situations. 5. Use computers for communication, data handling and word processing 6. Students should be familiar with writing a case study 7. Use of new technological tools and ICDL. 8. 8) Access to Web sites |

|  |  |  |  |
| --- | --- | --- | --- |
| 3. CONTENTS | | | |
| **Topic** | **No. of hours** | **Lectures** | **Practical** |
| 1. Introduction and applications to food nanotechnology. | 3 | 2 | 2 |
| 1. Bio-nano-technology application in food manufacturing and inspection. | 3 | 2 | 2 |
| 1. [Potential food applications:](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557279) [Nanotechnology in the food industry](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557280). | 3 | 2 | 2 |
| 1. [Nanoencapsulation](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557284) and [nano-biosensor.](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557287) | 3 | 2 | 2 |
| 1. [Nano emulsion](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557288), [structured multilayer emulsions](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557290), [and laminates: edible coatings](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557291). Bio polymeric Nanoparticles. | 6 | 4 | 4 |
| 1. [Nano-packaging.](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557296) | 3 | 2 | 2 |
| 1. Antimicrobial food packaging types, and [detection of foodborne pathogens and their toxins](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557307). | 3 | 2 | 2 |
| 1. [Detection of chemicals and contaminants](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557308). | 3 | 2 | 2 |
| 1. [Regulations on safety of nano-products and risk assessment of nanomaterials in food](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557312). | 3 | 2 | 2 |
| [Nanotechnology in the food Market](../../D-MAHER/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/6KBR4JMH/البرامج%20الجديده%20باللغة%20الإنجليزية.doc#_Toc349557319) | 3 | 2 | 2 |
| 1. Introduction and applications to food nanotechnology. | 6 | 4 | 4 |
| 1. Bio-nano-technology application in food manufacturing and inspection. | 3 | 2 | 2 |

|  |
| --- |
| 4. TEACHING AND LEARNING METHODS |
| 1. The main subject areas are covered in the lectures (see syllabus Plan). 2. Several student seminar sessions give the opportunity for students to bring questions or discuss any aspects of the course with the tutor. 3. Students are given a topic to research in small groups which they report as an oral presentation. Collective feedback on the strengths and weaknesses of the presentations are provided. |

|  |
| --- |
| 5. STUDENT ASSESSMENT METHODS |
| ***Students will be evaluated by attendance, fulfillment and effort in exercises and presentations, and examination grades:***  1) Laboratory work: to assess the ability of students to understand and perform small laboratory experiments. |

|  |  |  |
| --- | --- | --- |
| 6. ASSESSMENT SCHEDULE | | |
| No | Assessment | **Week No.** |
| 1 | Periodical exam | 4, 8, 12 |
| 2 | Practical exam | 13 |
| 3 | Oral exam | 13 |
| 4 | Final exam | 14 |

|  |  |  |
| --- | --- | --- |
| 7. WEIGHTING OF ASSESSMENT | | |
| No | Assessment | **%** |
| 1 | Periodical exam | 15% |
| 2 | Practical exam | 15% |
| 3 | Oral exam | 10 % |
| 4 | Final exam | 60 % |
| TOTAL | | 100 % |

|  |
| --- |
| 8. LIST OF REFERENCES |
| 1. **Fulekar, M.H. 2010.** Nanotechnology: Importance and applications. I.K. International Publ. House Pvt. Lts., New Delhi, India.   <http://books.google.com.eg/books?id=wYie57y1zj8C&printsec=frontcover&dq=Nanotechnology:+Importance+and+applications&hl=en&sa=X&ei=S23pUpWrC6rX7Abs14CIAw&ved=0CCoQ6AEwAA#v=onepage&q=Nanotechnology%3A%20Importance%20and%20applications&f=false>   1. **Chaudry, Q., Castle, L. and Watkins, R. 2010**. Nanotechnologies in food. Royal Society of Chemistry (CRC), Cambridge, UK.   <http://books.google.com.eg/books?id=p3Gi7ccwCWAC&printsec=frontcover&dq=Nanotechnologies+in+food&hl=en&sa=X&ei=YW3pUt2_JuTR7AaMs4HYBg&ved=0CC4Q6AEwAQ#v=onepage&q=Nanotechnologies%20in%20food&f=false> |

|  |
| --- |
| 9. FACILITIES REQUIRED FOR TEACHING AND LEARNING |
| 1. Teaching aids/ materials: e.g. boards – overhead projector – data-show projector – stationary.. etc. 2. Teaching room/hall. 3. Computers. 4. Facilities for site visits etc., which are necessary for teaching the course. |

|  |  |
| --- | --- |
| **Course Coordinators:** | **Prof. Dr.**  **Prof. Dr.** |
| **Date: / / 2015** | |