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**Department of : Horticulture**

**College of : Agriculture**

**University of : Salahaddin-Hawler**

**Subject : Tissue culture**

**Course Book : 4th Year Student**

**Lecturer's name: Sara Dasko Yunis**

**Academic Year : 2018/2019**

**Course Book**

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| **1. Course name** | **Tissue culture -First semester/ Fall Semester**  |
| **2. Lecturer in charge** | **Sara Dasko Yunis** |
| **3. Department/ College** | **Horticulture , College of Agriculture** |
| **4. Contact** | **e-mail:**  **Sara.yunis @su.edu.krd****Tel: 07508851114** |
| **5. Time (in hours) per week**  | **Practical: 3**  |
| **6. Office hours** |  |
| **7. Course code** | **-** |
| **8. Teacher's academic profile**  | B. Sc. In Agriculture college , Erbil University2008. MSc. in Horticulture insects -Salahaddin University. Erbil. Biology. Thesis : Biology Studies on the grape leafhoppers in Erbil city. |
| **9. Keywords** |  |
| **10. Course overview:** **Tissue culture** is the growth of [tissues](https://en.wikipedia.org/wiki/Tissue_%28biology%29) or [cells](https://en.wikipedia.org/wiki/Cell_%28biology%29) separate from the organism. This is typically facilitated via use of a liquid, semi-solid, or solid [growth medium](https://en.wikipedia.org/wiki/Growth_medium), such as broth or agar. Tissue culture commonly refers to the culture of animal cells and tissues, with the more specific term [plant tissue culture](https://en.wikipedia.org/wiki/Plant_tissue_culture) being used for plants. The term "tissue culture" was coined by American pathologistPlant tissue culture is a collection of techniques used to maintain or grow plant cells, tissues or organs under sterile conditions on a nutrient culture medium of known composition. Plant tissue culture is widely used to produce clones of a plant in a method known as micro propagation. Different techniques in plant tissue culture may offer certain advantages over traditional methods of propagation, including: The production of exact copies of plants that produce particularly good flowers, fruits, or have other desirable traits. To quickly produce mature plants. The production of multiples of plants in the absence of seeds or necessary pollinators to produce seeds. The regeneration of whole plants from plant cells that have been genetically modified. The production of plants in sterile containers that allows them to be moved with greatly reduced chances of transmitting diseases, pests, and pathogens. The production of plants from seeds that otherwise have very low chances of germinating and growing, i.e.: orchids and Nepenthes. To clear particular plants of viral and other infections and to quickly multiply these plants as 'cleaned stock' for horticulture and agriculture. Plant tissue culture relies on the fact that many plant cells have the ability to regenerate a whole plant (totipotency). Single cells, plant cells without cell walls (protoplasts), pieces of leaves, stems or roots can often be used to generate a new plant on culture media given the required nutrients and plant hormones |
| **11. Course objective:**  **The main aim of this important subject to maintenance our great forests for our people and visitors and resolving most forests problem in Kurdistan.** |
| **12. Student's obligation** The student has to prove its presence in the lecture and that by taking the percentage of attendance by me and be prepared in every lecture for weekly cuisse and the form of attending a report at the end of the term on relevant lesson and lectures taken the students subject and in the end are the students exam monthly and final exam.  |
| **13. Forms of teaching**The use of the following methods in the teaching process:1. Data Show
2. Presentation
3. Course book
4. White board .
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| **14. Assessment scheme**

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| **Assignment** | **Point Each** | **Total Points** |
| **cuisse** |

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| --- | --- |
| **1** |  |
| **10** |  |
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| **1** |  |
|  | **15** |

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| **15. Student learning outcome:**1. Helping the students in acquiring the required skills.
2. Easy to do very rapid prototyping
3. Quick to learn, and good documentation
4. A good library of image processing functions
5. The student learns how to get accurate results and their use in matters concerning market.
6. Students learn programming and agriculture engineering in a way.
7. Students learn the difference between different forest tree pests.
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| **16. Course Reading List and References‌:**Useful references:1. 1-  *Sathyanarayana, B.N. (2007).*[*Plant Tissue Culture: Practices and New Experimental Protocols*](https://books.google.com/books?id=4MdNDYBEwZAC&pg=PA106)*. I. K. International. pp. 106–.*[*ISBN*](https://en.wikipedia.org/wiki/International_Standard_Book_Number)[*978-81-89866-11-2*](https://en.wikipedia.org/wiki/Special%3ABookSources/978-81-89866-11-2)*.*
2. [**^**](https://en.wikipedia.org/wiki/Plant_tissue_culture#cite_ref-2) *Bhojwani, S. S.; Razdan, M. K. (1996).*[*Plant tissue culture: theory and practice*](https://books.google.com/books?id=VwSR-77kh94C&dq=Bhojwani+plant+tissue+culture)*(Revised ed.). Elsevier.*[*ISBN*](https://en.wikipedia.org/wiki/International_Standard_Book_Number)[*0-444-81623-2*](https://en.wikipedia.org/wiki/Special%3ABookSources/0-444-81623-2)*.*
3. [**^**](https://en.wikipedia.org/wiki/Plant_tissue_culture#cite_ref-Vasil_3-0) *Vasil, I.K.; Vasil, V. (1972). "Totipotency and embryogenesis in plant cell and tissue cultures". In Vitro.****8****: 117–125.*[*doi*](https://en.wikipedia.org/wiki/Digital_object_identifier)*:*[*10.1007/BF02619487*](https://doi.org/10.1007/BF02619487)*.*
4. [**^**](https://en.wikipedia.org/wiki/Plant_tissue_culture#cite_ref-VasilThorpe1994_4-0) *Indra K. Vasil; Trevor A. Thorpe (1994).*[*Plant Cell and Tissue Culture*](https://books.google.com/books?id=y4Z1l0ewvr4C&pg=PA4)*. Springer. pp. 4–.*[*ISBN*](https://en.wikipedia.org/wiki/International_Standard_Book_Number)[*978-0-7923-2493-5*](https://en.wikipedia.org/wiki/Special%3ABookSources/978-0-7923-2493-5)*.*
5. ^ [Jump up to:***a***](https://en.wikipedia.org/wiki/Plant_tissue_culture#cite_ref-pazuki_5-0) [***b***](https://en.wikipedia.org/wiki/Plant_tissue_culture#cite_ref-pazuki_5-1) *Pazuki, Arman & Sohani, Mehdi (2013).*[*"Phenotypic evaluation of scutellum-derived calluses in 'Indica' rice cultivars"*](http://aas.bf.uni-lj.si/september2013/08Pazuki.pdf)*(PDF). Acta Agriculturae Slovenica.****101****(2): 239–247.*[*doi*](https://en.wikipedia.org/wiki/Digital_object_identifier)*:*[*10.2478/acas-2013-0020*](https://doi.org/10.2478/acas-2013-0020)*.*
6. [**^**](https://en.wikipedia.org/wiki/Plant_tissue_culture#cite_ref-6) *Mukund R. Shukla; A. Maxwell P. Jones; J. Alan Sullivan; Chunzhao Liu; Susan Gosling; Praveen K. Saxena (April 2012).*[*"In vitro conservation of American elm (Ulmus americana): potential role of auxin metabolism in sustained plant proliferation"*](http://www.nrcresearchpress.com/doi/abs/10.1139/x2012-022)*. Canadian Journal of Forest Research.****42****(4): 686–697.*[*doi*](https://en.wikipedia.org/wiki/Digital_object_identifier)*:*[*10.1139/x2012-022*](https://doi.org/10.1139/x2012-022)

7. *Georgiev, Milen I.; Weber, Jost; MacIuk, Alexandre (2009). "Bioprocessing of plant cell cultures for mass production of targeted compounds". Applied Microbiology and Biotechnology.****83****(5): 809–23.*[*doi*](https://en.wikipedia.org/wiki/Digital_object_identifier)*:*[*10.1007/s00253-009-2049-x*](https://doi.org/10.1007/s00253-009-2049-x)*.*[*PMID*](https://en.wikipedia.org/wiki/PubMed_Identifier)[*19488748*](https://www.ncbi.nlm.nih.gov/pubmed/19488748)*.***8.**[**^**](https://en.wikipedia.org/wiki/Plant_tissue_culture#cite_ref-8) *Manoj K. Rai; Rajwant K. Kalia; Rohtas Singh; Manu P. Gangola; A.K. Dhawan (April 2011). "Developing stress tolerant plants through in vitro selection—An overview of the recent progress". Environmental and Experimental Botany.****71****(1): 89–98.*[*doi*](https://en.wikipedia.org/wiki/Digital_object_identifier)*:*[*10.1016/j.envexpbot.2010.10.021*](https://doi.org/10.1016/j.envexpbot.2010.10.021)*.***9.**[**^**](https://en.wikipedia.org/wiki/Plant_tissue_culture#cite_ref-9) *Aina, O; Quesenberry, K.; Gallo, M (2012).*[*"In vitro induction of tetraploids in Arachis paraguariensis"*](https://link.springer.com/article/10.1007/s11240-012-0191-0)*. Plant Cell, Tissue and Organ Culture (PCTOC).****111****: 231–238.*[*doi*](https://en.wikipedia.org/wiki/Digital_object_identifier)*:*[*10.1007/s11240-012-0191-0*](https://doi.org/10.1007/s11240-012-0191-0)*.***10.**[**^**](https://en.wikipedia.org/wiki/Plant_tissue_culture#cite_ref-10) Pawar, K. R., Waghmare, S. G., Tabe, R., Patil, A. and Ambavane, A. R. 2017. [In vitro regeneration of *Saccharum officinarum* var. Co 92005 using shoot tip explant](https://www.researchgate.net/publication/315477591_IN_VITRO_REGENERATION_OF_SACCHARUM_OFFICINARUM_VAR_CO_92005_USING_SHOOT_TIP_EXPLANT). International Journal of Science and Nature 8(1): 154-157.**11.**[**^**](https://en.wikipedia.org/wiki/Plant_tissue_culture#cite_ref-11) Waghmare, S. G., Pawar, K. R., and Tabe, R. 2017. [Somatic embryogenesis in Strawberry (Fragaria ananassa) var. Camarosa](https://www.researchgate.net/publication/316439140_Somatic_embryogenesis_in_Strawberry_Fragaria_ananassa_var_Camarosa). Global Journal of Bioscience and Biotechnology 6(2): 309 - 313 |
| **17. The Topics:** | **Lecturer's name** |
| 1st Week :**-Laboratory Safety and Daily Maintenance Operations****-Sterile Handling** | Sara Dasko Yunis3hrs  |
| **2nd Week :**-Laboratory Requirements-Media Preparation Room or Space | Sara Dasko Yunis3hrs |
| 3rd Week: -Aseptic Techniques in Plant Tissue Culture-Possible sources of contamination | Sara Dasko Yunis3hrs |
| 4th Week:-Plant Tissue Culture Media Preparation | Sara Dasko Yunis3hrs |
| 1st monthly Examination5th Week:  -Preparing Stock Solutions for Plant Tissue Culture-Storage of Stock Solutions  | Sara Dasko Yunis3hrs |
| 6th Weak:-Explant Preparation | Sara Dasko Yunis3hrs |
| 7th Week:-Propagation of Miniature Roses by Plant Tissue Culture- Preparing Nodal Explants (May be done by instructor or students)-Sterilizing Nodal Explants-Initiating Explants (Stage I) Growth of Meristem cells in Axillary Buds.-Transplanting | Sara Dasko Yunis3hrs |
| 8th Week:-Photographic methods for plant cell and tissue culture- Types of photography used in plant cell and tissue culture research | Sara Dasko Yunis3hrs |
| **Examinations:** **The examination :** **The examination manner as follow :****Q1/ Define the following.****Q2 /What are the justification of the following.** **Q3/ Draw and fully labeled.****Q4/ Explain the……. .****Q5/ Mention the functions of.****Q6/ what the specimen** **Q7/Complete the following sentences.**  |