



M.Sc. of Cytology and Genetics Program

A. Basic Information

| | |
|--|-------------------------------------|
| Program Title: | Cytology and Genetics M.Sc. Program |
| Program Type: | Single |
| Department: | Botany |
| Coordinator: | Dr. Mahmoud Abderraouf Elshafey |
| Assistant Co-ordinator: | Name/s of assistant coordinator/s. |
| Dates of program specifications approval: | 11/5/2011 |

B. Professional Information

1. Program Aims

By the end of the Cytology and Genetics M.Sc. Program graduates must be able to:

- 1.1. Understanding and mastery concepts, principles and applications of cytology and genetics.
- 1.2. Commitment to continuing self learning with work on the addendum to the knowledge in cytology and genetics and transfer of knowledge and expertise to others.
- 1.3. Application of the analytical method and critic of knowledge in cytology and genetics and related areas.
- 1.4. Use cytology and genetics knowledge combined with related knowledge to find innovative solutions for professional problems.
- 1.5. Mastery of a wide range of professional skills in cytology and genetics and development of methods and tools, and new techniques in professional practice.
- 1.6. Communicate effectively and have the ability to lead teams and make decisions in light of available information.
- 1.7. Show awareness of his/her role in community development and preservation of the environment.
- 1.8. Behave in a manner reflecting the commitment to integrity and credibility of the profession and abide by the rules.



2. Intended Learning Outcomes (ILO's)

2.1. Knowledge and Understanding

By the end of the Cytology and Genetics M.Sc. Program graduates must be able to know and understand the followings:

- 2.1.1 Theories and fundamentals and modern knowledge in cytology and genetics and related sciences in Botany.
- 2.1.2. The basics and ethics of the scientific research in cytology and genetics.
- 2.1.3. Legal and ethical principles for professional practice in cytology and genetics.
- 2.1.4. Principles and fundamentals of quality in professional practice in cytology and genetics.
- 2.1.5. Knowledge related to the effects of professional practice on the environment and society and ways of development and preservation of the environment.
- 2 1.6. Applied Scientific developments in the area of specialization.

2.2 Intellectual Skills

By the end of the the Cytology and Genetics M.Sc. Program graduates must be able to:

- 2.2.1. Analyze and evaluate the information in cytology and genetics and related sciences.
- 2.2.2. Interpret and correlate data for solve problems in cytology and genetics and related sciences in Botany.
- 2.2.3. Develop research study which contributes to add the knowledge in cytology and genetics and related sciences.
- 2.2.4. Formulate scientific research in cytology and genetics.
- 2.2.5. Evaluate risks during the professional practice in cytology and genetics.
- 2.2.6. Planning and innovation for the development of performance in cytology and genetics.
- 2.2.7. Make professional decisions in professional practices in cytology and genetics.
- 2.2.8. Discussion based on evidences and conclusions in cytology and genetics and related sciences.



2.3. Professional and Practical Skills

By the end of the cytology and genetics M.Sc. Program graduates must be able to:

- 2.3.1. Mastery of basic, professional and modern skills in cytology and genetics.
- 2.3.2. Writing and evaluation of professional reports in cytology and genetics and related sciences.
- 2.3.3. Label different methodologies and techniques in cytology and genetics and related sciences in Botany.
- 2.3.4. Use technological means to serve the professional practice in cytology and genetics.
- 2.3.5. Planning for the development of professional practice and development of the performance of others.

2.4. General Skills and Transition

By the end of the cytology and genetics M.Sc. Program graduates must be able to:

- 2.4.1. Communicate effectively by using different methods.
- 2.4.2. Use of information technology to development of professional practice and to obtain information and knowledge.
- 2.4.3. Teach others and evaluate their performance during laboratory work.
- 2.4.4. Self-evaluation and continuous learning.
- 2.4.5. Work in a team and lead working groups.
- 2.4.6. Management of scientific meetings and the ability to manage time.

3- Academic standards of the program

The Academic Reference Standards (ARS) of this program is based upon the Standard Criteria for Postgraduate Programs published by the National Authority of Quality Assurance and Accreditation of Education in (2009). Specific Academic Reference Standards for M.Sc. in Botany were approved by the Council of Faculty of Science, Benha University in --/--/2015 (**Appendices 1, 2, 3, 4, 5 and 6**).



4- Reference indices (Benchmarks)

Not utilized.

5- Program structure and contents

a- Program duration: 1-5 years.

b- Program structure:

| Program structure | Credit hours |
|---|--------------|
| Obligatory courses | 15 |
| Optional courses | 9 |
| Research and preparing the M.Sc. thesis | 24 |
| Total | 48 |

c- Program Courses:

| Code No. | Course Title | No. of hours | | |
|--|----------------------------------|--------------|-----------|--------------|
| | | Lectures | Practical | Credit hours |
| The graduate studies total (24 hours) | | | | |
| Obligatory courses (15 hours) | | | | |
| 613 B | Molecular Genetics | 3 | | 3 |
| 614 B | Molecular Biology Techniques | 3 | | 3 |
| 615 B | Cell and Molecular Biology | 3 | | 3 |
| 610 B | Bioinformatics (1) | 2 | | 2 |
| 616 B | Genetic Engineering | 2 | | 2 |
| 607 B | Plant Tissue Culture | 2 | | 2 |
| Optional courses (9 hours) | | | | |
| 617 B | Genetic Toxicology and Mutations | 3 | | 3 |
| 618 B | Microbial Genetics | 3 | | 3 |
| 619 B | Cytology (1) | 3 | | 3 |
| 620 B | Cytology (2) | 3 | | 3 |
| 621 B | Medical Genetics | 3 | | 3 |
| 622 B | Biochemistry | 3 | | 3 |
| 623 B | Research projects and seminar | 3 | | 3 |
| 24 credit hours for research and preparing the PhD thesis | | | | |
| 699 B | Master thesis 699B | - | - | 24 |



6- Contents of the Courses

See course specification

7- Program admission requirements

١ - يشترط لقيد الطالب لدرجة الماجستير في العلوم أن يكون حاصلًا علي درجة البكالوريوس في العلوم في نفس التخصص من كلية العلوم جامعة بنها أو من إحدى كليات العلوم بالجامعات المصرية أو أي درجة معادلة لها من معهد علمي آخر معترف به من المجلس الأعلى للجامعات، وألا يقل تقديره عن جيد// في درجة البكالوريوس بالنسبة للتخصص المنفرد ويجوز قيد الطلاب الحاصلين علي درجة بكالوريوس العلوم في التخصصات المزدوجة بتقدير عام جيد في درجة البكالوريوس وتقدير جيد علي الأقل في مادة التخصص. ويجوز تحميلهم بساعات من الكود ٣٠٠ و ٤٠٠ لمرحلة البكالوريوس.

٢ - يجوز قيد وتسجيل الطالب بدرجة الماجستير من بين الحاصلين علي تقدير عام مقبول في درجة البكالوريوس بشرط حصوله علي إحدى دبلومات التخصص بتقدير عام (جيد جدا) .

٣ - لا يتم قبول الطلاب اللذين مر على حصولهم على الدرجة الجامعية الأولى أكثر من خمس سنوات إلا في حالة حصولهم على أحد دبلومات التخصص ونفس الشروط الواردة باللائحة الداخلية للكلية.

٤ - يشترط لتسجيل الطلاب لدرجة الماجستير في العلوم اجتياز امتحان اتقان اللغة الانجليزية او ما يعادلها بمستوي يحدده مجلس الجامعة وكذلك استيفاء أي شروط إضافية تراها الكلية و الجامعة لازمة للقيد والتسجيل للدرجة.

٥ - المدة اللازمة للحصول علي درجة الماجستير سنة واحدة علي الأقل منذ موافقة الجامعة علي تسجيل موضوع البحث، وبعد أقصي خمس سنوات (المدة الأساسية) ويجوز مد التسجيل لمدة سنة علي أن لا تزيد عن ثلاث سنوات بناء علي التقارير العلمية المقدمة من لجنة الأشراف وموافقة مجلس القسم العلمي المختص ولجنة الدراسات العليا والبحوث ومجلس الكلية ومجلس الدراسات.

8- Regulations for progression and program completion:

- يشترط في الطالب لنيل درجة الماجستير في العلوم :

١ - أن ينجز الطالب عدد ٢٤ ساعة دراسية معتمدة (١٥ إجبارية و ٩ اختيارية) من المقررات الدراسية (كدراسة تمهيدية ومتطلب للتسجيل) لمرحلة ما بعد البكالوريوس

- بالإضافة إلى تسجيل عدد ٢٤ ساعة معتمدة للرسالة العلمية خلال فترة الدراسة. ويشترط عدم مرور أكثر من عامين علي اجتياز المقررات المطلوبة عند التسجيل لدرجة الماجستير.
- ٢ - يخصص لكل ساعة معتمدة خمسون درجة وتوزع الدرجات كالآتي:
- أ- بالنسبة للمقرر النظر يخصص ٨٠٪ من الدرجات للامتحان النهائي، و ٢٠٪ للامتحان الشفوي.
- ب- بالنسبة للمقرر العملي يخصص ٦٠٪ من الدرجات للامتحان النهائي، و ٤٠٪ للامتحان الشفوي .
- ج- بالنسبة للمقرر المحتوي علي نظري وعملي يخصص ٨٠٪ من درجات الجزء النظري للامتحان النهائي، و ٢٠٪ للشفوي، ويخصص ٤٠٪ من درجة الجزء العملي للشفوي و ٦٠٪ للامتحان النهائي.
- ٣ - تعقد امتحانات الدراسة الخاصة بتمهيدي الماجستير في نهاية كل فصل دراسي في المواعيد التي يقرها مجلس الكلية بناء علي اقتراح الدراسات العليا ويشترط لنجاح الطالب في المقررات الدراسية أن يكون حاصلًا في كل مقرر على تقادير C على الأقل، ويقدر نجاح الطلاب على النحو المبين بالمادة (٨) من اللائحة.
- ٤ - الطالب الذي يرسب في أي مقرر اجباري عليه إعادة دراسة ذلك المقرر والامتحان فيه وفي حالة رسوبه في مقرر اختياري فعليه دراسة ذلك المقرر أو اختيار مقرر آخر بديل له ويدخل تقدير المقرر في كل من حالتي الرسوب و النجاح في حساب المعدل الفصلي او التراكمي.
- ٥ - يقوم الطالب بعد نجاحه في المقررات الدراسية بأجراء مناقشة علنية (سيمينار) للخطة البحثية المقترحة علي أن يوافق عليها مجلس القسم، وبناء عليه يقوم الطالب بأجراء بحث يقره مجلس الجامعة ويقدم الطالب نتائج بحثية في رسالة تقبلها لجنة الحكم، وعلي أن يقوم الطالب بعمل سيمينار قبل التقدم بالرسالة بثلاثة اشهر على الاقل.
- ٦ - يجوز لمجلس القسم المختص الموافقة على تغيير الشعبة التي درس بها الطالب و نجح في امتحانها الى شعبة أخرى يرغب في القيد أو التسجيل بها بشرط استيفائه لشروط القيد و التسجيل بالشعبة الجديدة و على ان يقوم القسم بعمل مقاصة للمقررات التي درسها الطالب و تحميله بالمقررات اللازم استيفائها.



9- Methods and rules of evaluation of graduates enrolled in the program:

a- Theoretical courses:

| Method of Assessment | Percent |
|-----------------------------|----------------|
| Oral Exam | 20% |
| Final Term Examination | 80% |
| Total | 100% |

b- Master Thesis evaluation:

- The senior supervisor reports.
 - Individual Reports of the Judge Committee
(Three specialist professors including the senior supervisor).
 - The Public Discussion
 - The Common Report of the Judge Committee.
 - Department, Faculty and University Boards.
- Assessment Recommendations:
- The Judge Committee has to recommend one of the following:
 - Accepting the thesis as it is.
 - Accept the thesis and recommends awarding after correction performing.
 - Delaying awarding for maximum three months to perform corrections.
 - Re-displaying the thesis to the judge committee within limited period.
 - Rejecting the thesis at all.



10- Methods of program evaluation: (Appendix 9)

| Samples | Tool |
|-------------------------------|---|
| 1- Senior Students | Questionnaire |
| 2- Alumni | Questionnaire |
| 3- External Evaluators | Reports |
| 4- Stakeholders | Questionnaire, workshops, seminars, conferences |

Head of the department: Prof. Dr. Mahmoud Mostafa Amer

Date: 2015 / 2016



Benha University
Faculty of Science
Department of Botany



M.Sc. Ecology, Taxonomy, Flora Program PROGRAM SPECIFICATION



Program Specification

A. Basic Information

| | |
|--|--|
| Program Title: | Pre-Master of Ecology, Taxonomy, Flora Program |
| Program Type: | Single |
| Department: | Botany |
| Coordinators: | Dr Dina Baraka, Dr Reyad Elsharkawy |
| Dates of program specifications approval: | 14/11/2015 |

B. Professional Information

1. Program Aims to

- a) prepare the students to carry out scientific research in different areas of plant science (Ecology, Taxonomy, Flora Program), aiming either to pursue for a M. Sc degree , or to work in the research development divisions of industrial companies, pharmatheotical agents, medical centers and diagnostic laboratories for pathogenic agents to plants, human and animals, water purification and treatment industrial agents ,environmental agent and physiology of microorgnaisms.
- b) Understand the external and internal structure of the different microorganisms, focusing on understanding their behavior, biology in different habitat.
- c) Equip the students with traditional techniques and recent trends in modern techniques in the fielded of plant sciences (Ecology, Taxonomy, Flora Program) applied to plants, human, animals, environment, industry, pharmatheotical and medical sectors.
- d) Utilize the conventional and methodologies in the areas of diagnostics,detection, identification of the causal agents of the dieses of concern locally and globally , industrial applications i.e. food – based industry, drug based industry , vaccines , diagnostics, bioremediation and water purification.
- e) Know how to adapt the data in a coherent fashion (in a multidisplinary base and interdisplinary base)
- f) Identify actinomycetes, method of isolation and identification, classification, physiological characteristics and its economic importance.
- g) Provide students with a broad and balanced foundation of knowledge and practical skills in all of Ecology, Taxonomy, Flora Program and other subjects.
- h) Provide the necessary skills and training for further study or research in pure Ecology, Taxonomy, Flora Program.



2. Intended Learning Outcomes (ILO's)

a. Knowledge and Understanding

By the end of the master's program in pure Ecology, Taxonomy, Flora Program graduate must be able to:

- a1. memorize the ecological systems and of the interrelationships between organisms and the environment they live in focussing on population processes, dynamics and interactions; community structure development and biodiversity; ecological methodologies and data analyses; the impact of different approaches to species management and conservation; nutrient and energy flow through populations and communities;
- a2. outline of the evolutionary processes that give rise to the diversity and complexity of life;
- a3. Record cutting edge developments in a range of areas specific to the subject;
- a4. locate with philosophical and ethical issues arising from some of the current developments in the biosciences;

b. Intellectual Skills

By the end of the master's program in pure Ecology, Taxonomy, Flora Program graduate must be able to:

- b1. solve problems and find solutions.
- b2. apply the correct methods for studying of microorganisms
- b3. interpret the differences between world of microorganisms
- b4. confirm the relations between human, animal, plant, and microorganisms.
- b5. create a good handling in practical applied Ecology, Taxonomy, Flora Program research work.

c. Professional and Practical Skills

By the end of the master's program in pure Ecology, Taxonomy, Flora Program graduate must be able to:



- C1. Show the ability to employ and evaluate suitable experimental methods (both laboratory and fieldwork based) for the investigation of relevant areas of biology;
- C2. a range of laboratory and fieldwork techniques of key importance in biology;
- C3. examine safely in a scientific laboratory and in the field, with awareness of standard safety protocols; the ability to apply relevant numerical skills, including statistics to biological data; the ability to access bioscience information from a wide range of sources in order to maintain and enhance knowledge of the Biosciences and to communicate that information clearly in oral and written forms; assessing the merits of contrasting subject-specific theories, paradigms, concepts and principles; critically interpreting and evaluating experimental data and relevant literature, analysing and solving problems, and decision-making; applying subject-specific knowledge and understanding to address familiar and unfamiliar problems; the ability to plan, design and execute an independent piece of research through a theoretical or practical project in environmental biology, including the production of the final report; taking personal responsibility for learning, and developing habits of reflection on that learning;
- C4. identifying, retrieving (including the use of online computer searches), sorting and exchanging information; abstracting and synthesising information, and developing a reasoned argument; written communication and verbal presentation; information technology (including spreadsheets, databases, word processing, email and WWW); interpersonal skills, including working in groups/teams and recognising and respecting the viewpoints of others

d. General Skills

By the end of the master's program in pure Ecology, Taxonomy, Flora Program graduate must be able to:

- d1. Interpret the information, discuss and communicate ideas effectively both orally and in writing using a range of formats.
- d2. Use of information technology to serve the development of Ecology, Taxonomy, Flora Program.
- d3. Self-evaluation and ability to identify personal learning needs.
- d4. Use different sources for information and knowledge in Ecology, Taxonomy, Flora Program.
- d5. Assess the relevance and importance of ideas of others.



d6. Evaluate own performance and working standards and those of others.

3- Academic standards of the program

The Academic Reference Standards (ARS) of this program compile with the Standard Criteria for Postgraduate Programs published by the National Authority of Quality Assurance and Accreditation of Education in (2009). Specific Academic Reference Standards for M.Sc. in Ecology, Taxonomy, Flora Program were approved by the Council of Faculty of Science, Benha University in --/--/2015 (**Appendices 1, 2, 3, 4, 5 and 6**).

4- Reference indices (Benchmarks)

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5- Curriculum structure and contents of program

a- Program duration: 2 years

b- Program structure:

- 15 compulsory credit hours.
- 9 elective credit hours.
- 24 credit hours for the preparation of final thesis.
- Total crd hrs. 48

d- Program Courses:

Compulsory courses:

| No. | Code No. | Course Title | No. of hours | | |
|-----|----------|-------------------------|--------------|-----------|--------------|
| | | | Lectures | Practical | Credit hours |
| 1 | 624B | Advanced vegetation | 1 | 2 | 2 |
| 2 | 625B | Environmental detectors | 1 | 2 | 2 |
| 3 | 626B | Invasive plants | 1 | 2 | 2 |
| 4 | 627B | Vegetative behaviour | 2 | | 2 |
| 5 | 628B | Advanced taxonomy | 1 | 2 | 2 |
| 6 | 611B | Biostatistics | 1 | 2 | 2 |
| 7 | 629B | Field studies | 2 | 3 | 3 |
| 8 | 699B | M. Sc. Research thesis | 24 | - | - |



Elective courses:

| No. | Code No. | Course Title | No. of hours | | |
|-----|----------|--|--------------|----------|--------------|
| | | | Lectures | Tutorial | Credit hours |
| 1 | 630B | Pollution and its effect on plant life | 3 | - | 3 |
| 2 | 631B | Applied ecology | 3 | - | 3 |
| 3 | 632B | Plant extracxt | 3 | - | 3 |
| 4 | 633B | Garden and herbarum | 3 | - | 3 |
| 5 | 634B | Biodiversity | 3 | - | 3 |
| 6 | 635B | Enviromental water relations | 3 | - | 3 |

6- Contents of the Courses

See course specification (**Appendix 7 and 8**)

7- Program admission requirements

Admission is achieved on the basis of:

- Completion of a B.Sc. degree or any equivalent Arabic or international certificate.
- Passing the TOFEL test with the score determined by the University Council.
- Meeting any additional conditions the college and university deems necessary to register for the M.Sc. degree.

8- Regulations for progression and program completion:

- According to the law of Benha Faculty of Science - the regulations for progression and program completion - the graduate must pass:
 - 15 compulsory credit hours.
 - 9 elective credit hours.
 - 24 credit hours for preparing the M.Sc. Thesis.
- 3 computer courses.
- 2 seminars approved by Department Council.
- Student is considered absent, if he/she misses the final written exam with no acceptable excuse.

9- Methods and rules of evaluation of students in rolled in the program:

- Courses evaluation:

| Method of Assessment | | Percent |
|----------------------|-----------------|---------|
| 1 | Final Oral Exam | 14% |



| | | |
|----|------------------------|------|
| 2 | Mid-term Exam | 14% |
| 3 | Practical Exam | 24% |
| 2- | Final Term Examination | 48% |
| | Total | 100% |

▪ **Master's Thesis evaluation:**

- 5-1. The senior supervisor reports.
- 5-2. Individual Reports of the Judging Committee (Three specialist professors including the senior supervisor).
- 5-3. The Public Discussion
- 5-4. The Common Report of the Judging Committee.
- 5-5. Department, Faculty and University Boards.

• **Assessment Recommendations:**

- The Judging Committee has to recommend one of the following:
 - Accepting the thesis as it is.
 - Accepting the thesis and recommends awarding after correction performing.
 - Delaying awarding for maximum three months to perform corrections.
 - Re-displaying the thesis to the judging committee within limited period.
 - Rejecting the thesis at all.

10- Methods of program evaluation:

| Samples | Tool |
|------------------------|---|
| 1- Senior Students | Questionnaire |
| 2- Alumni | Questionnaire |
| 3- External Evaluators | Reports |
| 4- Stakeholders | Questionnaire, workshops, seminars, conferences |

Head of the Department: Prof. Dr. Mahmoud Amer

Program coordinator: Dr Dina Baraka, Dr Reyad Elsharkawy

Date: 2015/2016



Benha University
Faculty of Science
Department of Botany



M.Sc. Microbiology PROGRAM PROGRAM SPECIFICATION



Program Specification

A. Basic Information

Program Title: Pre-Master of Microbiology
Program Type: Single
Department: Botany
Coordinator:
Assistant Co-ordinator: **Dr Mohamed Othman**
Dates of program specifications approval: 14/11/2015

B. Professional Information

1. Program Aims to

- a) prepare the students to carry out scientific research in different areas of plant science (microbiology), aiming either to pursue for a M. Sc degree , or to work in the research development divisions of industrial companies, pharmitheotical agents, medical centers and diagnostic laboratories for pathogenic agents to plants, human and animals, water purification and treatment industrial agents ,environmental agent and physiology of microorgnaisms.
- b) Understand the external and internal structure of the different microorganisms, focusing on understanding their behavior, biology in different habitat.
- c) Equip the students with traditional techniques and recent trends in modern techniques in the fielded of plant sciences (microbiology) applied to plants, human, animals, environment, industry, pharmitheotical and medical sectors.
- d) Utilize the conventional and methodologies in the areas of diagnostics,detection, identification of the causal agents of the dieses of concern locally and globally , industrial applications i.e. food – based industry, drug based industry , vaccines , diagnostics, bioremediation and water purification.
- e) Know how to adapt the data in a coherent fashion (in a multidisplinary base and interdisplinary base)
- f) Identify actinomycetes, method of isolation and identification, classification, physiological characteristics and its economic importance.
- g) Provide students with a broad and balanced foundation of knowledge and practical skills in all of Microbiology and other subjects.
- h) Provide the necessary skills and training for further study or research in pure Microbiology.



2. Intended Learning Outcomes (ILO's)

a. Knowledge and Understanding

By the end of the master's program in pure mathematics graduate must be able to:

- a1. Understand the basic concepts related to microbial biology, population dynamics, pathogenesis of microbial pathogens, the nature of the interaction between the microbes with their habitat at local and global levels.
- a2. Understand the bases of the traditional and molecular based techniques for identification, characterization and detection of the microbial agent (either single or in a complex) in vitro and in vivo (that is divergent biological systems such as plants, fungi, bacteria, viruses, viroids mycoplasma, phytoplasma, rickettsia, algae, human and animals).
- a3. Understand the metabolic kinetics of the microbial agents and their utilization for industrial products. Understand the concepts of bioremediation and its application in the environment.
- a4. describe and investigate the different specimens, identification of species understand the role played by microorganism in the decomposition of plant and animal remains as well as its importance in production of enzymes, unicellular protein, vitamins and antibiotics.
- a5. Express theories, principles and fundamentals of quality in professional practice in Microbiology and other disciplines.

b. Intellectual Skills

By the end of the master's program in pure mathematics graduate must be able to:

- b1. solve problems and find solutions.
- b2. apply the correct methods for studying of microorganisms
- b3. interpret the differences between world of microorganisms
- b4. confirm the relations between human, animal, plant, and microorganisms.
- b5. create a good handling in practical applied Microbiology research work.

c. Professional and Practical Skills

By the end of the master's program in pure mathematics graduate must be able to:

- c1. extract the active constituents from the desired microbial agents and plants.
- c2. identify the active constituents from the desired microbial agents and plants.



- c3. Perform experimental procedures aiming to characterize, identify and quantify the microbial levels in the desert samples.
- c4. Compare between the traditional and recent methods for extraction of microbial nucleic acids (RNA, DNA).
- c5. Summarize the important role of microorganisms in our life .

d. General Skills

By the end of the master's program in pure mathematics graduate must be able to:

- d1. Interpret the information, discuss and communicate ideas effectively both orally and in writing using a range of formats.
- d2. Use of information technology to serve the development of Microbiology.
- d3. Self-evaluation and ability to identify personal learning needs.
- d4. Use different sources for information and knowledge in Microbiology.
- d5. Assess the relevance and importance of ideas of others.
- d6. Evaluate own performance and working standards and those of others.

3- Academic standards of the program

The Academic Reference Standards (ARS) of this program compile with the Standard Criteria for Postgraduate Programs published by the National Authority of Quality Assurance and Accreditation of Education in (2009). Specific Academic Reference Standards for M.Sc. in Microbiology were approved by the Council of Faculty of Science, Benha University in --/--/2015 (**Appendices 1, 2, 3, 4, 5 and 6**).

4- Reference indices (Benchmarks)

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5- Curriculum structure and contents of program

a- Program duration: 2 years

b- Program structure:

- 15 compulsory credit hours.
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- Total crd hrs. 48



d- Program Courses:

Compulsory courses:

| No. | Code No. | Course Title | No. of hours | | |
|-----|----------|---|--------------|-----------|--------------|
| | | | Lectures | Practical | Credit hours |
| 1 | 636 B | Biotransformations and fermentations | 2 | 3 | 3 |
| 2 | 637 B | Water and food Microbiology | 1 | 3 | 2 |
| 3 | 638 B | Phycology and physiology of algae | 2 | 3 | 3 |
| 4 | 639 B | Advanced Mycology and Physiology of Fungi | 2 | 3 | 3 |
| 5 | 640 B | Bacteriology and Physiology bacteria. | 2 | 3 | 3 |
| 6 | 641 B | Microbial Ecology | 1 | - | 1 |
| 7 | 699 B | M.Sc. Research thesis | 24 | | |

Elective courses:

| No. | Code No. | Course Title | No. of hours | | |
|-----|----------|-------------------------|--------------|----------|--------------|
| | | | Lectures | Tutorial | Credit hours |
| 1 | 611 B | Biostatistics | 3 | - | 3 |
| 2 | 616 B | Genetics Engineering | 3 | - | 3 |
| 3 | 622 B | Biochemistry | 3 | - | 3 |
| 4 | 642 B | Soil Microbiology | 3 | - | 3 |
| 5 | 643 B | Advanced Virology | 3 | - | 3 |
| 6 | 644 B | Enzymology and Hormones | 3 | - | 3 |

6- Contents of the Courses

See course specification (**Appendix 7 and 8**)

7- Program admission requirements

Admission is achieved on the basis of:

- Completion of a B.Sc. degree or any equivalent Arabic or international certificate.
- Passing the TOFEL test with the score determined by the University Council.
- Meeting any additional conditions the college and university deems necessary to register for the M.Sc. degree.



8- Regulations for progression and program completion:

- According to the law of Benha Faculty of Science - the regulations for progression and program completion - the graduate must pass:
 - 15 compulsory credit hours.
 - 9 elective credit hours.
 - 24 credit hours for preparing the M.Sc. Thesis.
- 3 computer courses.
- 2 seminars approved by Department Council.
- Student is considered absent, if he/she misses the final written exam with no acceptable excuse.

9- Methods and rules of evaluation of students in rolled in the program:

- Courses evaluation:

| Method of Assessment | | Percent |
|----------------------|------------------------|---------|
| 1 | Final Oral Exam | 14% |
| 2 | Mid-term Exam | 14% |
| 3 | Practical Exam | 24% |
| 2- | Final Term Examination | 48% |
| | Total | 100% |

- Master's Thesis evaluation:

- 5-1. The senior supervisor reports.
- 5-2. Individual Reports of the Judging Committee (Three specialist professors including the senior supervisor).
- 5-3. The Public Discussion
- 5-4. The Common Report of the Judging Committee.
- 5-5. Department, Faculty and University Boards.

- Assessment Recommendations:

- The Judging Committee has to recommend one of the following:
 - Accepting the thesis as it is.
 - Accepting the thesis and recommends awarding after correction performing.
 - Delaying awarding for maximum three months to perform corrections.
 - Re-displaying the thesis to the judging committee within limited period.
 - Rejecting the thesis at all.



10- Methods of program evaluation:

| Samples | Tool |
|------------------------|---|
| 1- Senior Students | Questionnaire |
| 2- Alumni | Questionnaire |
| 3- External Evaluators | Reports |
| 4- Stakeholders | Questionnaire, workshops, seminars, conferences |

Head of the Department: Prof. Dr. Mahmoud Amer

Program coordinator: Dr Mohamed Othman, Dr Ahmed Ghamry

Date: 2015/2016



M.Sc. of Plant Physiology Program

A. Basic Information

| | |
|--|------------------------------------|
| Program Title: | Plant Physiology M.Sc. Program |
| Program Type: | Single |
| Department: | Botany |
| Coordinator: | Dr. Mahmoud Abderraouf Elshafey |
| Assistant Co-ordinator: | Name/s of assistant coordinator/s. |
| Dates of program specifications approval: | 11/5/2011 |

B. Professional Information

1. Program Aims

By the end of the Plant Physiology M.Sc. Program graduates must be able to:

- 1.1. Understanding and mastery concepts, principles and applications of Plant Physiology.
- 1.2. Commitment to continuing self learning with work on the addendum to the knowledge in plant physiology and transfer of knowledge and expertise to others.
- 1.3. Application of the analytical method and critic of knowledge in plant physiology and related areas.
- 1.4. Use plant physiology knowledge combined with related knowledge to find innovative solutions for professional problems.
- 1.5. Mastery of a wide range of professional skills in plant physiology and development of methods and tools, and new techniques in professional practice.
- 1.6. Communicate effectively and have the ability to lead teams and make decisions in light of available information.
- 1.7. Show awareness of his/her role in community development and preservation of the environment.
- 1.8. Behave in a manner reflecting the commitment to integrity and credibility of the profession and abide by the rules.



2. Intended Learning Outcomes (ILO's)

2.1. Knowledge and Understanding

By the end of the Plant Physiology M.Sc. Program graduates must be able to know and understand the followings:

- 2.1.1 Theories and fundamentals and modern knowledge in plant physiology and related sciences in Botany.
- 2.1.2. The basics and ethics of the scientific research in plant physiology.
- 2.1.3. Legal and ethical principles for professional practice in plant physiology.
- 2.1.4. Principles and fundamentals of quality in professional practice in plant physiology.
- 2.1.5. Knowledge related to the effects of professional practice on the environment and society and ways of development and preservation of the environment.
- 2 1.6. Applied Scientific developments in the area of specialization.

2.2 Intellectual Skills

By the end of the the Plant Physiology M.Sc. Program graduates must be able to:

- 2.2.1. Analyze and evaluate the information in plant physiology and related sciences.
- 2.2.2. Interpret and correlate data for solve problems in plant physiology and related sciences in Botany.
- 2.2.3. Develop research study which contributes to add the knowledge in plant physiology and related sciences.
- 2.2.4. Formulate scientific research in plant physiology.
- 2.2.5. Evaluate risks during the professional practice in plant physiology.
- 2.2.6. Planning and innovation for the development of performance in plant physiology.
- 2.2.7. Make professional decisions in professional practices in plant physiology.
- 2.2.8. Discussion based on evidences and conclusions in plant physiology and related sciences.



2.3. Professional and Practical Skills

By the end of the Plant Physiology M.Sc. Program graduates must be able to:

- 2.3.1. Mastery of basic, professional and modern skills in plant physiology.
- 2.3.2. Writing and evaluation of professional reports in plant physiology and related sciences.
- 2.3.3. Label different methodologies and techniques in plant physiology and related sciences in Botany.
- 2.3.4. Use technological means to serve the professional practice in plant physiology.
- 2.3.5. Planning for the development of professional practice and development of the performance of others.

2.4. General Skills and Transition

By the end of the Plant Physiology M.Sc. Program graduates must be able to:

- 2.4.1. Communicate effectively by using different methods.
- 2.4.2. Use of information technology to development of professional practice and to obtain information and knowledge.
- 2.4.3. Teach others and evaluate their performance during laboratory work.
- 2.4.4. Self-evaluation and continuous learning.
- 2.4.5. Work in a team and lead working groups.
- 2.4.6. Management of scientific meetings and the ability to manage time.

3- Academic standards of the program

The Academic Reference Standards (ARS) of this program is based upon the Standard Criteria for Postgraduate Programs published by the National Authority of Quality Assurance and Accreditation of Education in (2009). Specific Academic Reference Standards for M.Sc. in Botany were approved by the Council of Faculty of Science, Benha University in --/--/2015 (**Appendices 1, 2, 3, 4, 5 and 6**).

4- Reference indices (Benchmarks)

Not utilized.



5- Program structure and contents

a- Program duration: 1-5 years.

b- Program structure:

| Program structure | Credit hours |
|---|--------------|
| Obligatory courses | 15 |
| Optional courses | 9 |
| Research and preparing the M.Sc. thesis | 24 |
| Total | 48 |

c- Program Courses:

| Code No. | Course Title | No. of hours | | |
|--|---|--------------|-----------|--------------|
| | | Lectures | Practical | Credit hours |
| The graduate studies total (24 hours) | | | | |
| Obligatory courses (15 hours) | | | | |
| 601 B | Plant Enzymology | 3 | | 3 |
| 602 B | Plant Metabolism | 3 | | 3 |
| 603 B | Plant Growth Regulators | 3 | | 3 |
| 604 B | Plant water relations | 2 | | 2 |
| 605 B | Mineral nutrition and solutes transport | 2 | | 2 |
| 606 B | Biological nitrogen fixation | 2 | | 2 |
| Optional courses (9 hours) | | | | |
| 607 B | Plant tissue culture | 2 | | 2 |
| 608 B | Physiological stresses | 3 | | 3 |
| 609 B | Ultrastructure and functions of cell components | 2 | | 2 |
| 610 B | Bioinformatics (1) | 2 | | 2 |
| 611 B | Biostatistics | 1 | | 1 |
| 612 B | Specialized topics | 3 | | 3 |
| 24 credit hours for research and preparing the PhD thesis | | | | |
| 699 B | Master thesis 699B | - | - | 24 |

6- Contents of the Courses

See course specification

7- Program admission requirements

١ - يشترط لقيد الطالب لدرجة الماجستير في العلوم أن يكون حاصلًا علي درجة البكالوريوس في العلوم في نفس التخصص من كلية العلوم جامعة بنها أو من إحدى كليات العلوم بالجامعات المصرية أو أي درجة معادلة لها من معهد علمي آخر معترف به من المجلس الأعلى للجامعات، وألا يقل تقديره عن جيد// في درجة البكالوريوس بالنسبة للتخصص المنفرد ويجوز قيد الطلاب الحاصلين علي درجة بكالوريوس العلوم في التخصصات المزدوجة بتقدير عام جيد في درجة البكالوريوس وتقدير جيد علي الأقل في مادة التخصص. ويجوز تحميلهم بساعات من الكود ٣٠٠ و ٤٠٠ لمرحلة البكالوريوس.

٢ - يجوز قيد وتسجيل الطالب بدرجة الماجستير من بين الحاصلين علي تقدير عام مقبول في درجة البكالوريوس بشرط حصوله علي إحدى دبلومات التخصص بتقدير عام (جيد جدا) .

٣ - لا يتم قبول الطلاب اللذين مر علي حصولهم علي الدرجة الجامعية الأولى أكثر من خمس سنوات إلا في حالة حصولهم علي أحد دبلومات التخصص ونفس الشروط الواردة باللائحة الداخلية للكلية.

٤ - يشترط لتسجيل الطلاب لدرجة الماجستير في العلوم اجتياز امتحان اتقان اللغة الانجليزية او ما يعادلها بمستوي يحدده مجلس الجامعة وكذلك استيفاء أي شروط إضافية تراها الكلية و الجامعة لازمة للقيد والتسجيل للدرجة.

٥ - المدة اللازمة للحصول علي درجة الماجستير سنة واحدة علي الأقل منذ موافقة الجامعة علي تسجيل موضوع البحث، وبعد أقصى خمس سنوات (المدة الأساسية) ويجوز مد التسجيل لمدة سنة علي أن لا تزيد عن ثلاث سنوات بناء علي التقارير العلمية المقدمة من لجنة الأشراف وموافقة مجلس القسم العلمي المختص ولجنة الدراسات العليا والبحوث ومجلس الكلية ومجلس الدراسات.

8- Regulations for progression and program completion:

- يشترط في الطالب لنيل درجة الماجستير في العلوم :

١ - أن ينجز الطالب عدد ٢٤ ساعة دراسية معتمدة (١٥ إجبارية و ٩ اختيارية) من المقررات الدراسية (كدراسة تمهيدية ومتطلب للتسجيل) لمرحلة ما بعد البكالوريوس بالإضافة إلي تسجيل عدد ٢٤ ساعة معتمدة للرسالة العلمية خلال فترة الدراسة. ويشترط عدم مرور أكثر من عامين علي اجتياز المقررات المطلوبة عند التسجيل لدرجة الماجستير.

٢ - يخصص لكل ساعة معتمدة خمسون درجة وتوزع الدرجات كالتالي:

أ- بالنسبة للمقرر النظر يخصص ٨٠٪ من الدرجات للامتحان النهائي، و ٢٠٪ للامتحان



الشفوي.

ب- بالنسبة للمقرر العملي يخصص ٦٠٪ من الدرجات للامتحان النهائي، و ٤٠٪ للامتحان الشفوي .

ج- بالنسبة للمقرر المحتوي علي نظري وعملي يخصص ٨٠٪ من درجات الجزء النظري للامتحان النهائي، و ٢٠٪ للشفوي، ويخصص ٤٠٪ من درجة الجزء العملي للشفوي و ٦٠٪ للامتحان النهائي.

٣ - تعقد امتحانات الدراسة الخاصة بتمهيدي الماجستير في نهاية كل فصل دراسي في المواعيد التي يقرها مجلس الكلية بناء علي اقتراح الدراسات العليا ويشترط لنجاح الطالب في المقررات الدراسية أن يكون حاصلًا في كل مقرر على تقادير C على الأقل، ويقدر نجاح الطلاب على النحو المبين بالمادة (٨) من اللائحة.

٤ - الطالب الذي يرسب في أي مقرر اجباري عليه اعادة دراسة ذلك المقرر والامتحان فيه وفي حالة رسوبه في مقرر اختياري فعليه دراسة ذلك المقرر أو اختيار مقرر آخر بديل له ويدخل تقدير المقرر في كل من حالتي الرسوب و النجاح في حساب المعدل الفصلي او التراكمي.

٥ - يقوم الطالب بعد نجاحه في المقررات الدراسية بأجراء مناقشة علنية (سيمينار) للخطة البحثية المقترحة علي أن يوافق عليها مجلس القسم، وبناء عليه يقوم الطالب بأجراء بحث يقره مجلس الجامعة ويقدم الطالب نتائج بحثية في رسالة تقبلها لجنة الحكم، و علي أن يقوم الطالب بعمل سيمينار قبل التقدم بالرسالة بثلاثة اشهر على الاقل.

٦ - يجوز لمجلس القسم المختص الموافقة على تغيير الشعبة التي درس بها الطالب و نجاح في امتحانها الي شعبة أخرى يرغب في القيد أو التسجيل بها بشرط استيفاؤه لشروط القيد و التسجيل بالشعبة الجديدة و على ان يقوم القسم بعمل مقاصة للمقررات التي درسها الطالب و تحميله بالمقررات اللازم استيفائها.



9- Methods and rules of evaluation of graduates enrolled in the program:

a- Theoretical courses:

| Method of Assessment | Percent |
|-----------------------------|----------------|
| Oral Exam | 20% |
| Final Term Examination | 80% |
| Total | 100% |

b- Master Thesis evaluation:

- The senior supervisor reports.
 - Individual Reports of the Judge Committee
(Three specialist professors including the senior supervisor).
 - The Public Discussion
 - The Common Report of the Judge Committee.
 - Department, Faculty and University Boards.
- Assessment Recommendations:
- The Judge Committee has to recommend one of the following:
 - Accepting the thesis as it is.
 - Accept the thesis and recommends awarding after correction performing.
 - Delaying awarding for maximum three months to perform corrections.
 - Re-displaying the thesis to the judge committee within limited period.
 - Rejecting the thesis at all.



10- Methods of program evaluation: (Appendix 9)

| Samples | Tool |
|-------------------------------|---|
| 1- Senior Students | Questionnaire |
| 2- Alumni | Questionnaire |
| 3- External Evaluators | Reports |
| 4- Stakeholders | Questionnaire, workshops, seminars, conferences |

Head of the department: Prof. Dr. Mahmoud Mostafa Amer

Date: 2015 / 2016