



Benha University  
Faculty of Science  
Department of Mathematics



# **Ph.D. Computer Science PROGRAM PROGRAM SPECIFICATION**



## Program Specification

### A. Basic Information

**Program Title:** Ph.D. in Computer science  
**Program Type:** Single  
**Department:** Mathematics  
**Coordinator:**  
**Assistant Co-ordinator:**  
**Dates of program specifications approval:** 14/11/2012

### B. Professional Information

#### 1. Program Aims

- a) Apply research qualifications to produce original work.
- b) Work continuously to add new knowledge in the field of computer science.
- c) Use computer science knowledge combined with related knowledge in professional practice.
- d) Work as part of a team, research group leaders, publish scientific articles and participate in or arrange scientific meetings.
- e) Develop students' skills to recognize and use various types of reasoning within an environment committed to excellence in research.
- f) Introduce students to a wide range of applications of computer science.
- g) Use available resources to achieve the highest benefit and its preservation.
- h) Mastery of computer science skills, and can use appropriate technological means to serve the professional practice.

#### 2. Intended Learning Outcomes (ILO's)

##### a. Knowledge and Understanding

*By the end of the Ph.D. program in computer science graduate must be able to:*

- a1. Explain main concepts, fundamentals, specialized knowledge and professional practice in computer science.
- a2. Identify mutual influence between professional practice and its impacts on the environment.
- a3. Understand scientific developments in the area of computer science.
- a4. Explain legal and ethical principles for professional practice in computer science.
- a5. Express theories, principles and fundamentals of quality in professional practice in computer science.
- a6. Discuss the basics and ethics of scientific research.



## **b. Intellectual Skills**

*By the end of the Ph.D. program in Computer science graduate must be able to:*

- b1. Analyze and evaluate the information in the field of Computer science and analogies to solve real world problems.
- b2. Use integrated approaches to problem solving in various subjects in Computer science.
- b3. Think logically by using the appropriate scientific methods.
- b4. Conduct a research study and/or write a methodology of a scientific study on a research problem.
- b5. Plan to improve performance in the area of Computer science.
- b6. Use and explain the ideas and methods from specialized and advanced areas of Computer science.
- b7. Identify the underlying assumptions and issues in complex problems.
- b8. Write scientific papers.

## **c. Professional and Practical Skills**

*By the end of the Ph.D. program in Computer science graduate must be able to:*

- c1. Present and evaluate research results objectively.
- c2. Use an understanding of the limits of accuracy of theoretical and problems applicable in the disciplines of Computer science.
- c3. Apply rules and techniques of Computer science to model and solve real world problem.
- c4. Write and present professional reports.
- c5. Use software to solve different applications.
- c6. Analyze given information to conclude correct results.

## **d. General Skills**

*By the end of the Ph.D. program in Computer science 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 professional practice.
- d3. Self-evaluation and ability to identify personal learning needs.
- d4. Use different sources for information and knowledge.
- d5. Assess the relevance and importance of ideas of others.
- d6. Evaluate own performance and working standards and those of others.
- d7. Demonstrate the ability to work and lead group.
- d8. Be appropriate the ethics of scientific research.



### 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 Ph.D. in Geology 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 applied

### 5- Curriculum structure and contents of program

a- Program duration: 3-5 years

b- Program structure:

- 12 elective credit hours.
- 48 credit hours for the preparation of final thesis.

Program structure	Credit hours
Elective courses	12
Research and preparing the Ph.D. thesis	48
Total	60

### d- Program Courses:

*Elective courses:*

Code No.	Course Title	No. of hours		
		Lectures	Tutorial	Credit hours
701 MC		3	-	3
701 MC		3	-	3
701 MC		3	-	3
701 MC		3	-	3
701 MC		3	-	3
701 MC		3	-	3
701 MC		3	-	3
701 MC		3	-	3
701 MC		3	-	3
701 MC		3	-	3
701 MC		3	-	3
701 MC		3	-	3
701 MC		3	-	3
701 MC		3	-	3
701 MC		3	-	3



## 6- Contents of the Courses

See course specification (Appendix 7, 8)

## 7- Program admission requirements

1. يشترط لقياد الطالب لنيل درجة دكتوراه الفلسفة في العلوم أن يكون حاصلًا على درجة ماجستير في العلوم في نفس التخصص من كلية العلوم جامعة بنها أو أي درجة معادلة لها من معهد علمي آخر معترف به من المجلس الأعلى للجامعات.
2. المدة اللازمة للحصول على درجة دكتوراه الفلسفة في العلوم ثلاث سنوات على الأقل منذ موافقة الجامعة على التسجيل، وبعد أقصى خمس سنوات (المدة الأساسية) ويمكن مد التسجيل لمدة استثنائية لا تزيد عن ثلاث سنوات بناءً على التقارير العلمية المقدمة من لجنة الأشراف وموافقة مجلس القسم العلمي المختص ولجنة الدراسات العليا والبحوث ومجلس الكلية ومجلس الدراسات العليا والبحوث بالجامعة.
3. يشترط لتسجيل الطالب لدرجة دكتوراه الفلسفة في العلوم اجتياز امتحان اتقان اللغة الانجليزية أو ما يعادلها بمستوى يحدده مجلس الجامعة وكذلك استيفاء أي شروط إضافية تراها الكلية والجامعة لازمة للتسجيل للدرجة.

Admission is achieved on the basis of:

- Completion of a M.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 Ph.D. degree.

## 8- Regulations for progression and program completion:

1. أن ينجز الطالب عدد ١٢ ساعة دراسية معتمدة من المقررات الدراسية لمرحلة ما بعد الماجستير متزامنة مع التسجيل للرسالة العلمية (تحتسب ٤٨ ساعة معتمدة) ويخصص لكل ساعة معتمدة خمسون درجة.
2. يقوم الطالب بإجراء مناقشة علنية لخطة البحث (سيمينار) على أن يوافق عليها مجلس القسم تمهيداً لتسجيله للدرجة.
3. تعقد امتحانات الدراسة الخاصة بالدكتوراه في نهاية كل فصل دراسي في المواعيد التي يقرها مجلس الكلية بناءً على اقتراح مجالس الأقسام.
4. يقوم الطالب بإجراء بحث ذا قيمة علمية تمثل إضافة علمية جديدة قائمة على البحث المبتكر في موضوع يقره مجلس القسم ولجنة الدراسات العليا ومجلس الكلية ومجلس الدراسات العليا بالجامعة على أن يقدم الطالب نتائج بحثه في رسالة تقبلها لجنة الحكم، ويقوم الطالب بعمل سيمينار قبل التقدم بالرسالة بثلاثة أشهر على الأقل.
5. يمنح الطالب درجة دكتوراه الفلسفة في العلوم ويذكر في الشهادة التخصص العام والدقيق وعنوان الرسالة.
6. يرجع للائحة التنفيذية لقانون تنظيم الجامعات فيما لم يرد به نص في هذه اللائحة.



- According to the bylaws of Benha Faculty of Science - the regulations for progression and program completion - the graduate must pass:
  - 12 elective credit hours.
  - 48 credit hours for preparing the Ph.D. Thesis.
- Get 3 computer courses.
- Give 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:

##### a- Courses evaluation:

Method of Assessment	Percent
Oral Exam	20%
Final Term Examination	80%
<b>Total</b>	<b>100%</b>

##### b- Doctorate Thesis evaluation:

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

##### • Assessment and Recommendations:

- The Judge 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. Abdel Kareem Soliman

**Program coordinator:**

Date: 2015/2016



Benha University  
Faculty of Science  
Department of Mathematics



# **Ph.D. PURE MATHEMATICS PROGRAM PROGRAM SPECIFICATION**



## Program Specification

### A. Basic Information

**Program Title:** Ph.D. in Pure Mathematics  
**Program Type:** Single  
**Department:** Mathematics  
**Coordinator:**  
**Assistant Co-ordinator:**  
**Dates of program specifications approval:** 14/11/2012

### B. Professional Information

#### 1. Program Aims

- a) Apply research qualifications to produce original work.
- b) Apply the analytical methods in the area of mathematics.
- c) Use mathematical knowledge combined with related knowledge in professional practice.
- d) Work as part of a team, research group leaders, publish scientific articles and participate in or arrange scientific meetings.
- e) Develop students' skills to recognize and use various types of reasoning within an environment committed to excellence in research.
- f) Introduce students to a wide range of applications of Mathematics.
- g) Use available resources to achieve the highest benefit and its preservation.
- h) Mastery of mathematical skills, and can use appropriate technological means to serve the professional practice.

#### 2. Intended Learning Outcomes (ILO's)

##### a. Knowledge and Understanding

*By the end of the Ph.D. program in pure mathematics graduate must be able to:*

- a1. Explain main concepts, fundamentals, specialized knowledge and professional practice in mathematics.
- a2. Identify mutual influence between professional practice and its impacts on the environment.
- a3. Understand scientific developments in the area of mathematics.
- a4. Explain legal and ethical principles for professional practice in mathematics.
- a5. Express theories, principles and fundamentals of quality in professional practice in mathematics.
- a6. Discuss the basics and ethics of scientific research.
- a7. Develop, apply and interpret mathematical models of real world phenomena.
- a8. Use and explain the more advanced concepts which lie behind the basic mathematical objects and ideas





## **b. Intellectual Skills**

*By the end of the Ph.D. program in pure mathematics graduate must be able to:*

- b1. Analyze and evaluate the information in mathematics to solve problems.
- b2. Use integrated approaches to problem solving in various subjects in mathematics.
- b3. Think logically by using the appropriate scientific methods.
- b4. Conduct a research study and/or write a methodology of a scientific study on a research problem.
- b5. Plan to improve performance in the area of mathematics.
- b6. Use and explain the ideas and methods from specialized and advanced areas of mathematics.
- b7. Identify the underlying assumptions and issues in complex problems.
- b8. Write scientific papers.

## **c. Professional and Practical Skills**

*By the end of the Ph.D. program in pure mathematics graduate must be able to:*

- c1. Present and evaluate research results objectively.
- c2. Use an understanding of the limits of accuracy of theoretical and problems applicable in the disciplines of mathematics.
- c3. Apply rules and techniques of mathematics to model and solve real world problem.
- c4. Write and present professional reports.
- c5. Use mathematical software to solve different applications.
- c6. Analyze given information to conclude correct results.
- c7. Provide accurate and logical solutions to different mathematical problems.

## **d. General Skills**

*By the end of the Ph.D. 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 mathematics.
- d3. Self-evaluation and ability to identify personal learning needs.
- d4. Use different sources for information and knowledge in mathematics.
- d5. Assess the relevance and importance of ideas of others.
- d6. Evaluate own performance and working standards and those of others.
- d7. Demonstrate the ability to work and lead group.
- d8. Be appropriate the ethics of scientific research.



### 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 Ph.D. in Geology 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 applied

### 5- Curriculum structure and contents of program

a- Program duration: 3-5 years

b- Program structure:

- 12 elective credit hours.
- 48 credit hours for the preparation of final thesis.

Program structure	Credit hours
Elective courses	12
Research and preparing the Ph.D. thesis	48
Total	60

### d- Program Courses:

*Elective courses:*

Code No.	Course Title	No. of hours		
		Lectures	Tutorial	Credit hours
701 MP	Differential Equations (Advanced Topics).	3	-	3
702 MP	Topology(Advanced Topics).	3	-	3
703 MP	Algebra.	3	-	3
705 MP	Differential Geometry.	3	-	3
706 MP	Functional Analysis(1).	3	-	3
708 MP	Exact Control.	3	-	3
709 MP	Numerical similarity.	3	-	3
710 MP	Mathematical Logic (Advanced Topics).	3	-	3
711 MP	Generalized functions.	3	-	3
713 MP	Dynamical Systems.	3	-	3
781 M	Special Course.	3	-	3
790 M	Seminar.	2	-	2
799 M	Master Thesis.	-	-	48



## 6- Contents of the Courses

See course specification (Appendix 7, 8)

## 7- Program admission requirements

١. يشترط لقياد الطالب لنيل درجة دكتوراه الفلسفة في العلوم أن يكون حاصلًا على درجة ماجستير في العلوم في نفس التخصص من كلية العلوم جامعة بنها أو أي درجة معادلة لها من معهد علمي آخر معترف به من المجلس الأعلى للجامعات.
٢. المدة اللازمة للحصول على درجة دكتوراه الفلسفة في العلوم ثلاث سنوات على الأقل منذ موافقة الجامعة على التسجيل، وبعد أقصى خمس سنوات (المدة الأساسية) ويمكن مد التسجيل لمدة استثنائية لا تزيد عن ثلاث سنوات بناءً على التقارير العلمية المقدمة من لجنة الأشراف وموافقة مجلس القسم العلمي المختص ولجنة الدراسات العليا والبحوث ومجلس الكلية ومجلس الدراسات العليا والبحوث بالجامعة.
٣. يشترط لتسجيل الطالب لدرجة دكتوراه الفلسفة في العلوم اجتياز امتحان اتقان اللغة الانجليزية أو ما يعادلها بمستوى يحدده مجلس الجامعة وكذلك استيفاء أي شروط إضافية تراها الكلية والجامعة لازمة للقياد والتسجيل للدرجة.

Admission is achieved on the basis of:

- Completion of a M.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 Ph.D. degree.

## 8- Regulations for progression and program completion:

١. أن ينجز الطالب عدد ١٢ ساعة دراسية معتمدة من المقررات الدراسية لمرحلة ما بعد الماجستير متزامنة مع التسجيل للرسالة العلمية (تحتسب ٤٨ ساعة معتمدة) ويخصص لكل ساعة معتمدة خمسون درجة.
٢. يقوم الطالب بإجراء مناقشة علنية لخطة البحث (سيمينار) على أن يوافق عليها مجلس القسم تمهيداً لتسجيله للدرجة.
٣. تعقد امتحانات الدراسة الخاصة بالدكتوراه في نهاية كل فصل دراسي في المواعيد التي يقرها مجلس الكلية بناءً على اقتراح مجالس الأقسام.
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٥. يمنح الطالب درجة دكتوراه الفلسفة في العلوم ويذكر في الشهادة التخصص العام والدقيق وعنوان الرسالة.
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- Department, Faculty and University Boards.

##### • Assessment and Recommendations:

- The Judge Committee has to recommend one of the following:
  - Accepting the thesis as it is.
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  - Delaying awarding for maximum three months to perform corrections.
  - Re-displaying the thesis to the judging committee within limited period.
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#### 10- Methods of program evaluation:

Samples	Tool
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2- Alumni	Questionnaire
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4- Stakeholders	Questionnaire, workshops, seminars, conferences

**Head of the Department:** Prof. Dr. Abdel Kareem Soliman

**Program coordinator:**

Date: 2015/2016