



# **Handbook of Ph.D Programmes 2017-18**

**AKAL UNIVERSITY**

Talwandi Sabo  
District Bathinda (Punjab)



Sant Attar Singh ji  
1866-1927



Sant Teja Singh ji  
1877-1965

*The great visionary of 20th century (Sant Attar Singh ji) had a vision that modern scientific education alone will not serve the humanity well, until and unless it is amalgamated with Brahm Vidya (Spiritual Education)*

#### **OUR MISSION**

**"To establish permanent peace in the world through value based scientific education and spiritual rejuvenation creating good global citizens"**



What is that which can empower our nation?  
Obvious answer is Education. Education  
enhances livelihood but education that is  
Value Based gives root and wings as well”

**Our Vision**

**Hon'ble Baba Iqbal Singh Ji (Chancellor)**

**(Retired Director Agriculture, Government of H.P.,INDIA)**

Winner of Sikh Lifetime Achievement Award in London-2012

*[Excerpt from a discussion with Revered Baba Iqbal Singh Ji, President of the Kalgidhar Trust, India with Berkley Center, USA.]*

*The Berkley Center for Religion, Peace, and World Affairs at Georgetown University, created within the Office of the President in 2006, is dedicated to the interdisciplinary study of religion, ethics, and public life. Through research, teaching, and service, the Center explores global challenges of democracy and human rights; economic and social development; international diplomacy; and interreligious understanding.*

*Excerpt*

*Please expand on value-based education, and what it means to you and to your work?*

Broadly speaking, there are three types of education. The first type focuses only on literacy without any moral content. I believe the merely literate person is the most egoistic and selfish because he is taught no moral values and thinks only about himself. Most schools, colleges, and universities around the world, impart literacy and not value-based education.

The second type of education is value-based, where you combine literacy with moral, ethical, and religious instructions and which is far more holistic. An individual who has gone through this type of scholastic career starts to think about the needs of others and begins to see himself connected to them and has a very broad outlook.

The third type of education is the spiritualized education with divine wisdom for which you have no need to go to any school, because the divine knowledge of the universe springs from within. None of the prophets or the founders of the great world religions went to any university to learn the lessons about the Divine. One only needs to delve into the scriptures of the great religions for this type of education.

Our organization combines spirituality with literacy (basic education) to impart value-based education to students. As a result, our students are free from drug/substance abuse and the use of alcohol. They are thus able to focus their minds on study, sports, and the well-being of others around them. Value-based education is the real need of the day to produce good upright human beings, who can inspire others to tread on the divine path and serve mankind selflessly. The effects of Value Based education have been far-reaching. Our students have helped to reduce tension in their homes by counselling their own parents. In some cases, they have succeeded to keep their parents from divorcing. We are convinced that Value Based education is the best way to enable the society to move forward and to bring about sustainable development in the world. Through such education, we will be able to harness the energy of the youth and persuade them to work for the betterment of the world, which is now in turmoil.

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## IMPORTANT DETAILS

### Subjects

Botany, Zoology, Physics, Chemistry, Economics and English.

### General Eligibility

- i. *For Sciences Subjects:* Any candidate who has passed the Master's examination in the concerned subject with a score of not less than 60% or CGPA of 6.0 on a 10 point scale or equivalent (55% or 5.5 CGPA for SC/ST/BC Category) marks in aggregate, or have appeared in the final year examination of Master's degree in the subject concerned from Akal University, Talwandi Sabo or from any other University (approved by the appropriate Academic Bodies of A.U.), shall be eligible to appear for the Ph.D. Entrance Test.
- ii. *For Arts, Humanities or Social Sciences Subjects:* Any candidate who has passed the Master's examination in the concerned subject with a score of not less than 55% or CGPA of 5.5 on a 10 point scale or equivalent (50% or 5.0 CGPA for SC/ST/BC Category) marks in aggregate, or have appeared in the final year examination of Master's degree in the subject concerned from Akal University, Talwandi Sabo or from any other University (approved by the appropriate Academic Bodies of A.U.), shall be eligible to appear for the Ph.D. Entrance Test.

|  |                            |
|--|----------------------------|
| Last Date of Application form submission                 | 1 <sup>st</sup> July 2017  |
| Written test and/or interview                            | 5 <sup>th</sup> July 2017  |
| Announcement of list of selected candidates              | 7 <sup>th</sup> July 2017  |
| Last Date to Submit the registration form along with fee | 11 <sup>th</sup> July 2017 |
| Classes for course work                                  | 24 <sup>th</sup> July 2017 |

| DETAILS OF ENTRANCE EXAM  |                               |                       |
|---------------------------|-------------------------------|-----------------------|
| Date                      | Paper                         | Time                  |
| 05.07.2017<br>(Wednesday) | Paper-I<br>(Objective type)   | 10.00 A.M.-11.00 A.M. |
|                           | Paper-II<br>(Subjective type) | 11.30 AM-1.30 P.M.    |

## ABOUT UNIVERSITY

Three centuries ago, the tenth Master, Guru Gobind Singh Ji stayed at Talwandi Sabo, finalized the compilation of Guru Granth Sahib Ji and prophesied that this place will manifest as Guru Ki Kashi-a great Centre of teaching and learning from where will emerge great scholars of Sikhism. About two centuries thereafter, establishment of *Gurumat Vidyalaya* by Sant Atar Singh Ji Maharaj was the first step in this direction. About a century thereafter, establishment of Akal University, Talwandi Sabo under the benevolent leadership of Revered Baba Iqbal Singh Ji Baru Sahib Wale was culmination of what the tenth Guru prophesied about three centuries ago. The University has started its first academic session this year. The mission and vision of the University is not merely to impart literacy but also to provide high quality spiritual value based education leading to holistic development of complete human beings propagating the message of Universal brotherhood and philosophy of interfaith wisdom enshrined in Sri Guru Granth Sahib Ji .

Unlike most of the educational entities having commercialized the higher education by operating like business ventures, the Akal University has mandated to uphold the three basic principles of higher education namely; Teaching, Learning and Research. Consequently, the University has started with Undergraduate and Postgraduate Honours courses in basic sciences of Mathematics, Physics, Chemistry, Botany, Zoology, Economics and Commerce, and English and Punjabi languages. **The University plans to offer Ph.D programmes in all these areas shortly.**

Offering the three years Bachelor of Arts (Honours) Degree in Sri Guru Granth Sahib Studies is a unique programme of the University, probably first of its kind offered by any University in the country and abroad. The programme is fully residential and totally free including fee, boarding and lodging charges. The course aims not only to impart complete learning of the Holy Scripture but also to teach Guru Darbar Maryada, Sikh tenants, Sikh history and life and teaching of Sant Atar Singh Maharaj Mastuane Wale and other enlightened sages from different sects and religions of the world. Comparative study of different religions is an integral part of the course.

Magnificent building with ultra-modern facilities for teaching and research is the hallmark of the University. Wi-Fi campus, well equipped modern labs, internet linked Smart Class rooms, high tech well stocked library facilities, CCTV cameras for special security of girl students, modern residential accommodation for teachers and separate hostel facilities for boys and girls, 100% healthy vegetarian diet, RO system on all drinking water coolers, well-functional university transport services for staff and day scholars, drug free campus, sports and recreational facilities for boys and girls, and special fee concession ranging from Rs. 10,000 to 52,000 per meritorious student are key features of the education system at the University.

The University has designed goal oriented course curriculum. The unique features of the same include choice based credit system, market oriented skill enhancement courses, special coaching classes for UGC-NET, IAS and other competitive exams. The university adopted English medium for teaching and examination of the students. The University will endeavor to enhance the communication skills of the students by making special efforts on improving the knowledge of English language. Besides teaching

English as compulsory subject to all undergraduate students, special free of cost extra coaching classes are organized for students facing problems in writing of English and oral communication in English.

To strive for excellence in teaching and research, almost all faculty members are UGC qualified with exceptionally good academic records and have earned their Doctorate degrees. Besides following students-teacher interactive mode of teaching, each student has been assigned a teacher mentor to take tutorial and to resolve their academic problems. There is special provision of counselors to motivate, guide and address personal day to day issues and problems of the girl students. 24x7 health facilities along with provision of ambulance services are available on the campus.

The University has a firm resolve to provide a drug free environment and to create a disciplined campus life. In tune with the philosophy of Kalgidhar Trust, Baru Sahib, all efforts are being made to imbibe spiritual, moral and cultural values in the students to make them decent human beings and responsible citizens.

In due course, the University plans to start the great work of translation of the holy scripture in different languages of the world so that the seekers of spirituality from all over the world may submerge themselves in the ocean of divinity and *paramarth* and find the path of ultimate salvation enshrined in the holy scripture of Sri Guru Granth sahib Ji as blessed by the 10<sup>th</sup> Guru Sri Gobind Singh Ji Maharaj.

## OUR MISSION, VISION & MANDATE

“To establish permanent peace in the world through value based scientific education and spiritual rejuvenation by producing good global citizens”

**MISSION:** The mission of the Akal University is to contribute to society through the quest of education, research and public service at the highest international levels of excellence.

**VISION:** To develop University as ‘Modern Gurukul’ providing value based education and developing students intellectually, professionally, socially and spiritually, as educated fine human beings and true global citizens capable of meeting national and global challenges.

### MANDATE

#### Major Components of the mandate are:

- Student Discipline
- Communication Skills
- High Moral Values
- Drug free Environment
- Healthy Vegetarian Food

#### Student Discipline

Every student admitted to the Akal University pledges to observe willingly all the Rules and Regulations and to uphold and respect the principles on which the institute is founded. It is also to be understood that on breaking the pledge, the student forfeits his / her membership of the university. It is the duty of each student to perform all tasks assigned to him/her in connection with the functioning of the University to the best of his/her ability. All Sikh students are required to follow the Sikh spiritual and religious way of life. They have to keep their hair intact and are not allowed to cut hair from any part of their body. Any deviation from the Sikh religious principles, especially the cutting of hair, will lead to strict action and punishment which may lead to expulsion. The students are motivated to prepare themselves for partaking Amrit (through the Sikh way of baptism) during their study period in the Akal University which would provide them better divine wisdom and value based education. It may be mentioned here that a full bench of the Punjab & Haryana High Court, headed by Hon'able Mr. Justice J.S. Khehar, in C.W.P. No. 14859 of 2008, has held that retaining hair unshorn (without trimming hair from the body or plucking hair from the eyebrows) is one of the most important and fundamental tenets of the Sikh religion. In fact, it is undoubtedly a part of the religious consciousness of the Sikh faith. Justice J.S. Khehar is now a judge of the Supreme Court of India. The afore-mentioned judicial verdict is now law of the land on this issue. Any indiscipline on the part of a student may lead to his/her removal from the University rolls legal disputes, if any, shall lie within the jurisdiction of the Courts District Bathinda where the University is located.

### **Communication skills**

Our endeavour at Akal University is to develop in every student the ability to express himself/ herself in English. Good communication abilities are among the most important life skills critical to achieving success in any field. No matter how brilliant you may be, or how knowledgeable about a subject you are, if you can't get the words out in a compelling, convincing, or coherent way, your thoughts are of limited value. This is why teaching effective communication skills must serve as the cornerstone for any program preparing young people for the 21st century. At Akal University, English will not only be the medium of instruction but also the only means for all communications at all levels.

### **Drug Free Environment**

One person (like the bartender) brings the intoxicant, another takes a cup from it; by drinking it he loses his power to think and acts as if mad; he is unable to distinguish the good from bad and is pushed away from the Master; by drinking it, the Master is forgotten and one is punished in His court, Do not take such a drink if it is within your power. (SGGS, p 554).

Punjab represents a sacred portion of our country. The rich history of this ancient land has given its people a sense of native pride. Punjab is a blessed region of India that once stood witness to countless victories and triumphs. Preserved by martyrs who gave their lives to sustain the people and culture, this land was once hallowed by saints. The state is a special place and is close to the heart of India.

Once known for its life, unparalleled fertile land, joy, and vibrancy—Punjab used to set the example. But the Punjabi youth are tragically now turning their backs on their state's legacy. As a result, the tornado of illegal drugs sweeping across the border from Pakistan and Afghanistan is sucking Punjab into an epidemic. The drug menace has intensified in Punjab over the last few years, and currently a large percentage of the Punjabi youth are severely addicted to drugs.

Recognizing the drug addiction menace in Punjab, Akal University will have zero tolerance for the use of drugs and alcohol. All necessary steps will be taken to keep environment at the campus drug free.

### **High Moral Values**

Truth is higher than everything; but higher still is truthful living.

-Sri Guru Granth Sahib Ji, p 62

Our endeavour at Akal University is to help the students to discriminate between the valuable and the superficial in life. To help develop the critical ability to distinguish between essence and form, or between what is of value and what is superficial, in life – this ability is to be developed not for a narrow area or field of study, but for everyday situations in life, covering the widest possible canvas. To help students develop sensitivity and awareness; leading to commitment and courage to act on their own belief. It is not sufficient to develop the ability to discriminate, it is also important to be able to act on such discrimination in a given situation.

### **Healthy Vegetarian Food**

“Non-violence leads to the highest ethics, which is the goal of all evolution. Until we stop harming all other living beings, we are still savages.” - Thomas A. Edison.

“Nothing will benefit human health and increase chances for survival of life on Earth as much as the evolution to a vegetarian diet.”--Albert Einstein.

Vegetarianism is an inalienable feature of a healthy lifestyle. A vegetarian diet reduces the risk for chronic degenerative diseases such as obesity, coronary artery disease, high blood pressure, diabetes and certain types of cancer including colon, breast, prostate, stomach, lung and esophageal cancer. Also, medical studies indicate that that a human being's body was not made to be carnivorous (for example; humans have no fangs or claws) and because our digestive system was not made to digest meat, a vegetarian diet is much easier and healthier for our bodies.

## FACULTY MEMBERS

| Sr. No.  | Name                    | Qualification                            |
|--|-------------------------|--|
| <b>Department of Sri Guru Granth Sahib Studies</b> |                         |  |
| 1.   | Mr. Tarsem Singh        | M.A., DGS, DSS, pursuing Ph.D.           |
| 2.   | Mr. Ajaypal Singh       | M.A., DGS, UGC-NET, pursuing Ph.D.       |
| <b>Department of Botany</b>                        |                         |  |
| 1  | Dr. (Mrs.) K.K. Johal   | M.Sc., Ph.D.                             |
| 2.   | Dr. Harmanjit Kaur      | M.Sc.(Hons. School), UGC-NET, Ph.D.      |
| 3.   | Dr. Arvinder Singh      | M.Sc., UGC-NET, Ph.D.                    |
| 4.   | Dr. Avneesh Kumar       | M.Sc. (Hons. School), UGC-NET, Ph.D.     |
| 5.   | Dr. Simranjeet Kaur     | M.Sc., ICAR-NET, Ph.D.                   |
| 6.   | Dr. Harwinder Kaur      | M.Sc., Inspire(DST)-JRF, Ph.D.           |
| 7.   | Dr. Kuljinder Kaur      | M.Sc., Ph.D.                             |
| <b>Department of Zoology</b>                       |                         |  |
| 1.   | Prof. M.S. Johal        | M.Sc. (Hons. School), Ph.D., PDF (Czech) |
| 2.   | Dr. Vikram Singh Rathor | M.Sc., ICAR-NET, Ph.D.                   |
| 3.   | Dr. Dharmender Sharma   | M. Sc, CSIR-NET, Ph.D.                   |
| 4.   | Dr. Abhinav Saxena      | M.Sc., Ph.D.                             |
| 5.   | Dr. Manjeet Kaur        | M.Sc., Ph.D.                             |
| 6.   | Dr. Rajinder Kaur       | M.Sc., Ph.D.                             |
| 7.   | Dr. Amanpreet Singh     | M.Sc. (Hons. School), UGC-JRF, Ph.D.     |
| 8.   | Dr. Ramandeep Kaur      | M.Sc., Ph.D.                             |
| <b>Department of Physics</b>                       |                         |  |
| 1.   | Dr. Sukhjeet Singh      | M.Sc., Ph.D.                             |
| 2.   | Dr. Ramandeep Kumar     | M.Sc. (Hons. School), UGC-NET, Ph.D.     |
| 3.   | Ms. Kanika              | M.Sc., UGC-JRF, Ph.D. (IISER)            |
| 4.   | Dr. Amandeep Sharma     | M.Sc., UGC-NET, Ph.D.                    |
| 5.   | Dr. Ramneek Kaur        | M.Sc., CSIR-NET, M.Phil, Ph.D.           |
| 6.   | Dr. Ramadeep Kaur       | M.Sc., CSIR-NET, Ph.D. (IIT, Roorkee)    |
| <b>Department of Chemistry</b>                     |                         |  |
| 1  | Prof. N.K. Ralhan       | M.Sc. (Hons. School), Ph.D., PDF (USA)   |
| 2  | Dr. Sandeep Kumar       | M.Sc., UGC-NET, Ph.D.                    |
| 3  | Dr. Atul Kumar          | M.Sc., UGC-NET, Ph.D., PDF (HPU)         |

|                                  |                          |  |
|----------------------------------|--------------------------|--|
| 4                                | Dr. Vajinder Kumar       | M.Sc. (Hons. School), UGC-NET, Ph.D., PDF (NIPER)  |
| 5                                | Dr. Tirtha Mukerjee      | M.Sc., M.Phil, UGC-NET, Ph.D, PDF (IISc, Bangaluru)  |
| 6                                | Dr. Suman Samai          | M.Sc.,Ph.D (IIT, Khargpur),PDF (Georgetown University, USA), PDF (KAUST, Saudi Arabia)                                     |
| 7                                | Dr. Sandip Saha          | M.Sc. (IIT, Madras), Ph.D. (IIT, Khargpur ), PDF (Taiwan)  |
| <b>Department of Mathematics</b> |                          |  |
| 1                                | Ms. Isha Rani            | M.Sc., UGC-NET   |
| 2.                               | Mr. Iqbal Singh          | M.Sc., UGC-NET   |
| 3.                               | Ms. Mamta Rani           | M.Sc., UGC-NET   |
| 4.                               | Mr. Rajat Singla         | M.Sc., UGC-NET   |
| 5.                               | Dr. Sukhpreet Kaur Sidhu | M.Sc., Ph.D.   |
| 6.                               | Mr. Preetinder Singh     | M.Sc., pursuing Ph.D. (IISER)  |
| <b>Department of Economics</b>   |                          |  |
| 1.                               | A.S. Oberai              | M.Sc. (London School of Economics), Regional Director (former) UNO (ILO)   |
| 2.                               | Dr. Kanika Ratra         | B.A. (Hons.),M.A., UGC-NET, Ph.D.  |
| 3.                               | Ms. Ramandeep Kaur       | B.A. (Hons.), M.A.   |
| <b>Department of Commerce</b>    |                          |  |
| 1.                               | Mr. Khushdil Chhabra     | M.Com., UGC-JRF, CA (inter)  |
| 2.                               | Ms. Ravneet Kaur         | M.Com., pursuing Ph.D.   |
| 3.                               | Ms. Pahaljot Kaur        | M.Com., UGC-NET  |
| 4.                               | Ms. Jasleen Kaur         | M.Com., UGC-NET  |
| <b>Department of English</b>     |                          |  |
| 1.                               | Dr. Shantanu Ghosh       | M.A.(JNU), M.Phil, Ph.D. (JNU), PDF (Max Planck Institute Netherlands), HST-MIT Fellow Research Asst. Prof. (Harvard, USA) |
| 2.                               | Mr. Gaurav Kalra         | M.A., UGC-NET, M.Phil., pursuing Ph.D.   |
| 3.                               | Ms. Heena Bindal         | M.A.   |
| 4.                               | Mrs. Manika Arora        | M.A., UGC-NET, pursuing Ph.D.  |
| 5.                               | Mr. Tajinder Singh       | M.A., UGC-NET, pursuing Ph.D.  |
| 6.                               | Dr. Shyamkiran Kaur      | M.A.,M.Phil, Ph.D  |

|  |                        |  |
|--|------------------------|--|
| 7.   | Dr. Shreesha Udapa     | M.A., UGC-JRF, Ph.D. (EFLU), DAAD Fellow (Germany) |
| <b>Department of Punjabi</b>               |                        |  |
| 1.   | Dr. Sandeep Singh      | M.A., UGC-NET, M.Phil., Ph.D. (Delhi University)   |
| 2.   | Mr. Harjinder Singh    | M.A., UGC-NET, pursuing Ph.D.                      |
| <b>Department of Psychology</b>            |                        |  |
| 1.   | Dr. Navdeep Kaur       | M.A., UGC-JRF, Ph.D                                |
| 2.   | Ms. Jasveer Kaur       | M.A., UGC-JRF, pursuing Ph.D.                      |
| <b>Centre for Competitive Examinations</b> |                        |  |
| 1.   | Dr. Bhawna Basar       | M.A., UGC-NET, Ph.D. (Sociology)                   |
| 2.   | Dr. Gurinder Pal Singh | M.A., UGC-NET, Ph.D. (Political Science)           |
| 3.   | Ms. Shefali Chauhan    | M.A., pursuing Ph.D. (History)                     |

## **Ph.D. Programmes**

### **Seats, Eligibility and Admission Procedures**

In its pursuit of academic excellence to generate knowledge and first hand original scientific research of international standards, the University is looking for bright and dedicated young scholars interested for pursuing Ph.D. programme. For the year 2017-18, applications for Ph.D. enrollments are invited from the interested candidates to pursue their research in the following subjects:

#### **Subjects:**

Botany, Zoology, Physics, Chemistry, Economics and English.

#### **General Eligibility**

- iii. *For Sciences Subjects:* Any candidate who has passed the Master's examination in the concerned subject with a score of not less than 60% or CGPA of 6.0 on a 10 point scale or equivalent (55% or 5.5 CGPA for SC/ST/BC Category) marks in aggregate, or have appeared in the final year examination of Master's degree in the subject concerned from Akal University, Talwandi Sabo or from any other University (approved by the appropriate Academic Bodies of A.U.), shall be eligible to appear for the Ph.D. Entrance Test.
- iv. *For Arts, Humanities or Social Sciences Subjects:* Any candidate who has passed the Master's examination in the concerned subject with a score of not less than 55% or CGPA of 5.5 on a 10 point scale or equivalent (50% or 5.0 CGPA for SC/ST/BC Category) marks in aggregate, or have appeared in the final year examination of Master's degree in the subject concerned from Akal University, Talwandi Sabo or from any other University (approved by the appropriate Academic Bodies of A.U.), shall be eligible to appear for the Ph.D. Entrance Test.

#### **Admission Procedure**

- i. The University will admit Ph.D. students through Ph.D. Entrance test, to be conducted by the University.
- ii. Exemption from entrance test for enrollment to Ph.D.: Every candidate interested in admission to Ph.D. Programme in any of the faculty/school/ department/ institute/centre of the Akal University has to qualify Ph.D. Entrance Test except the following:
  - a) The students who have qualified UGC- JRF/ UGC-CSIR (JRF)/GATE or any similar examination /test conducted by a notified authority of the Government of India for the purpose, will be exempted from Ph.D. entrance test, subject to approval of the Vice-Chancellor.
  - b) Applications of foreign students, sponsored by Indian Council for Cultural Relations (ICCR) or any such designated authority by the Government of India, who wish to seek admission directly (with or without sponsorship) to Ph.D. programme shall be examined

- by a committee set up by the Vice-Chancellor.
- c) University teachers with minimum two years of teaching experience with the Akal University.
  - iii. The result of Ph.D. entrance test conducted by the University will be valid only for two semesters i.e. one academic session.
  - iv. The candidates who qualify the Ph.D. entrance test or otherwise eligible shall appear for an interview to be conducted by the Academic Committee of the concerned department. At the time of interview, the student has to present his/ her research interest/ area.
  - v. *Number of Seats:* Tentatively, three students shall be admitted to the Ph.D. programme in each of the above departments mentioned earlier. However, the University can change the number of seats as per capacity available at the time of admission.

### **Structure of the Entrance Examination:**

For Entrance Examination, there would be two papers i.e. Paper-1 and Paper-2. Paper-1 would be Subject Specific Multiple Choice Questions of 50 marks and Paper-2 would be Subject specific or Faculty specific Descriptive Test of 100 marks.

**Paper 1:** Subject Specific Multiple Choice Questions: Test will have 50 questions with multiple choices. All questions shall be compulsory and of one marks each. There will be negative marking for incorrect answers and for each incorrect answer  $\frac{1}{4}$  mark will be deducted.

**Paper 2:** Subject Specific Descriptive Test: This paper will be of 100 marks. The paper shall constitute two sections. Section A shall have 12 short answer questions and candidates have to answer any eight. Section B shall have 8 long answer questions and candidates have to attempt any 4. Each short answer question shall carry 5 marks and long answer question 15 marks.

**Standard of Passing:** Candidate who score 50% and more in both the papers individually will be declared as passed.

**Standard of Passing:** Candidate who score 50% and more in both the papers individually will be declared as passed.

- a) Syllabi for the entrance examination shall be the same as approved and prescribed by the Akal University for its post graduate programs offered by various faculties or as has been prescribed by the apex bodies like UGC/CSIR/ICAR/ICMR/DST for similar purposes and the same will be notified at least 30 days before the date of the examination.
- b) Marks obtained by the entrance examination shall be considered for final merit for admission to the Ph.D. program. The concerned Faculty or Department or Centre shall decide the merit of each student on the basis of their academic record, aptitude for research and importance of topic of their proposed research problem.

- c) Candidate desirous of taking admission to university Faculty or affiliated colleges or recognized institutes have to appear for the test and interview conducted by University Faculty or Department or Research Centers authorized for the purpose.
- d) The list of candidates declared successful in examination and interview shall be declared by the respective University Faculty or Department or Centre and a copy of the same will be sent to the Ph.D. Admission Section of the University.

**Selection Criteria for Admission:**

Weight for different components for determining merit is as under:

| <b>Components</b>                     | <b>Weightage (Percent)</b> |
|---------------------------------------|----------------------------|
| Percentage of Marks in Graduation     | 10                         |
| Percentage of Marks in Postgraduation | 20                         |
| Qualified UGC-NET                     | 10                         |
| Awarded JRF/CSIR fellowship           | 20                         |
| Interview                             | 50                         |
| <b>Total</b>                          | <b>100</b>                 |

- i. Selected candidates shall be provisionally registered for Ph.D. programme with the approval of the Vice-Chancellor.
- ii. Admission to Ph.D. programme shall be twice a year in the months of February and August of each year.

## SYLLABUS FOR ENTRANCE TEST

### 1. ENGLISH

- i. Chaucer to Shakespeare
- ii. Jacobean to Restoration Periods
- iii. Augustan Age : 18th Century Literature
- iv. Romantic Period
- v. Victorian Period
- vi. Modern Period
- vii. Contemporary Period
- viii. American and other non-British Literatures
- ix. Literary Theory and Criticism
- x. Rhetoric and Prosody

### 2. ECONOMICS

Unit I: Micro-Economic Analysis:

Demand Analysis-Marshallian, Hicksian and Revealed preference approaches. Theory of Production and Costs. Pricing and output under different forms of market structure. Factor Pricing analysis. Elements of general equilibrium and new welfare economics.

Unit II: Macro-Economic Analysis:

Determination of output and employment-Classical approach, Keynesian approach, Consumption hypotheses. Demand for Money-Fisher and Cambridge versions, Approaches of Keynesian, Friedman, Patinkin, Baumol and Tobin. Supply of Money, Determinants of money supply, High-powered money, Money multiplier. Phillips Curve analysis. Business cycles-Models of Samuelson, Hicks and Kaldor. Macro-economic Equilibrium-Relative roles of monetary and fiscal policies

Unit III: Development and Planning:

Economic Growth, Economic Development and sustainable Development-Importance of institutions-Government and markets-Perpetuation of underdevelopment-Vicious circle of poverty, circular causation, structural view of underdevelopment-Measurement of development conventional, HDI and quality of life indices. Theories of Development-Classical, Marx and Schumpeter; Economic Growth-Harrod-Domar model, instability of equilibrium, Neoclassical growth-Solow's model, steady state growth. Approaches to development: Balanced growth, critical minimum effort, big push, unlimited supply of labour, unbalanced growth, low income equilibrium trap. Indicators and measurement of poverty. Importance of agriculture and industry in economic development-choice of techniques and appropriate technology-Investment criteria-Elementary idea of cost-benefit analysis. Trade and Aid-International trade as 'engine of growth' - Globalization and LDC's Objectives and role of monetary and fiscal policies in economic development Techniques of planning; Plan Models in India; planning in a market-oriented economy.

#### Unit IV: Public Finance:

Role of the Government in Economic activity-Allocation, distribution and stabilization functions; Private, Public and Merit goods. The Public Budgets-Kinds of Budgets, Zero-base budgeting, different concepts of budget deficits; Budgets of the Union Government in India Public Expenditure-Hypotheses; effects and evaluation. Public Revenue-Different approaches to the division of tax burden, incidence and effects of taxation; elasticity and buoyancy; taxable capacity Public Debt-Sources, effects, burden and its management. Fiscal Federalism-Theory and problems; Problems of Centre-State Financial relations in India. Fiscal Policy-Neutral and compensatory and functional finance; balanced budget multiplier.

#### Unit V:International Economics:

Theories of International Trade: Empirical verification and Relevance International Trade under Imperfect competition Terms of Trade and Economic Growth-Secular Deterioration of Terms of Trade Hypothesis-a critical review. Equilibrium/disequilibrium in Balance of Payment-Traditional, Absorption and Monetary approaches for adjustment in the Balance of Payments, Foreign Trade multiplier. Impact of Tariffs, Partial and general equilibrium analysis; Political economy of Non-Tariff Barriers. Theory of regionalism at Global level-Collapse of Bretton-Wood System-Recent. Monetary reforms. Trade Policy and Reforms in India.

#### Unit VI: Indian Economy:

Basic Economic indicators-National income, performance of different sectors Trends in prices and money supply. Agriculture-Institutional and technological aspects, new agricultural policy Industry-New industrial policy and liberalization. Money and banking-Concepts of money supply, inflation, monetary policy and financial sector reforms. Public finance-Trends in revenue and expenditures of the Central and State Governments, Public debt; analysis of the Union Budget. Foreign trade-Trends, Balance of payments and trade reforms. Poverty, unemployment, migration and environment.

#### Unit VII: Statistical Methods:

Measures of Central tendency, dispersion, skewness and kurtosis. Elementary theory of probability-Binomial, Poisson and Normal distributions. Simple correlation and regression analysis. Statistical inferences-Applications, sampling distributions (t,  $\chi^2$  and F tests) sampling of attributes, testing of Hypothesis. Index numbers and time series analysis. Sampling and census methods, types of sampling and errors.

### 3. CHEMISTRY

#### (a) Inorganic Chemistry

- i. Chemical periodicity
- ii. Structure and bonding in homo- and heteronuclear molecules, including shapes of molecules (VSEPR Theory).
- iii. Concepts of acids and bases, Hard-Soft acid base concept, Non-aqueous solvents.
- iv. Main group elements and their compounds: Allotropy, synthesis, structure and bonding, industrial importance of the compounds.

- v. Transition elements and coordination compounds: structure, bonding theories, spectral and magnetic properties, reaction mechanisms.
- vi. Inner transition elements: spectral and magnetic properties, redox chemistry, analytical applications.
- vii. Organometallic compounds: synthesis, bonding and structure, and reactivity. Organometallics in homogeneous catalysis.
- viii. Cages and metal clusters.
- ix. Analytical chemistry- separation, spectroscopic, electro- and thermoanalytical methods.
- x. Bioinorganic chemistry: photosystems, porphyrins, metalloenzymes, oxygen transport, electron- transfer reactions; nitrogen fixation, metal complexes in medicine.
- xi. Characterisation of inorganic compounds by IR, Raman, NMR, EPR, Mössbauer, UV-vis, NQR, MS, electron spectroscopy and microscopic techniques.
- xii. Nuclear chemistry: nuclear reactions, fission and fusion, radio-analytical techniques and activation analysis.

**(b) Physical Chemistry:**

- i. Basic principles of quantum mechanics: Postulates; operator algebra; exactly-solvable systems: particle-in-a-box, harmonic oscillator and the hydrogen atom, including shapes of atomic orbitals; orbital and spin angular momenta; tunneling.
- ii. Approximate methods of quantum mechanics: Variational principle; perturbation theory up to second order in energy; applications.
- iii. Atomic structure and spectroscopy; term symbols; many-electron systems and antisymmetry principle.
- iv. Chemical bonding in diatomics; elementary concepts of MO and VB theories; Huckel theory for conjugated  $\pi$ -electron systems.
- v. Chemical applications of group theory; symmetry elements; point groups; character tables; selection rules.
- vi. Molecular spectroscopy: Rotational and vibrational spectra of diatomic molecules; electronic spectra; IR and Raman activities – selection rules; basic principles of magnetic resonance.
- vii. Chemical thermodynamics: Laws, state and path functions and their applications; thermodynamic description of various types of processes; Maxwell's relations; spontaneity and equilibria; temperature and pressure dependence of thermodynamic quantities; Le Chatelier principle; elementary description of phase transitions; phase equilibria and phase rule; thermodynamics of ideal and non-ideal gases, and solutions.
- viii. Statistical thermodynamics: Boltzmann distribution; kinetic theory of gases; partition functions and their relation to thermodynamic quantities – calculations for model systems.
- ix. Electrochemistry: Nernst equation, redox systems, electrochemical cells; Debye-Huckel theory; electrolytic conductance – Kohlrausch's law and its applications; ionic equilibria; conductometric and potentiometric titrations.
- x. Chemical kinetics: Empirical rate laws and temperature dependence; complex reactions; steady state approximation; determination of reaction mechanisms; collision and transition state theories of rate constants; unimolecular reactions; enzyme kinetics; salt effects; homogeneous catalysis; photochemical reactions.

- xi. Colloids and surfaces: Stability and properties of colloids; isotherms and surface area; heterogeneous catalysis.
- xii. Solid state: Crystal structures; Bragg's law and applications; band structure of solids.
- xiii. Polymer chemistry: Molar masses; kinetics of polymerization.
- xiv. Data analysis: Mean and standard deviation; absolute and relative errors; linear regression; covariance and correlation coefficient.

### **(C) Organic Chemistry**

- i. IUPAC nomenclature of organic molecules including regio- and stereoisomers.
- ii. Principles of stereochemistry: Configurational and conformational isomerism in acyclic and cyclic compounds; stereogenicity, stereoselectivity, enantioselectivity, diastereoselectivity and asymmetric induction.
- iii. Aromaticity: Benzenoid and non-benzenoid compounds – generation and reactions.
- iv. Organic reactive intermediates: Generation, stability and reactivity of carbocations, carbanions, free radicals, carbenes, benzyne and nitrenes.
- v. Organic reaction mechanisms involving addition, elimination and substitution reactions with electrophilic, nucleophilic or radical species. Determination of reaction pathways.
- vi. Common named reactions and rearrangements – applications in organic synthesis.
- vii. Organic transformations and reagents: Functional group interconversion including oxidations and reductions; common catalysts and reagents (organic, inorganic, organometallic and enzymatic). Chemo, regio and stereoselective transformations.
- viii. Concepts in organic synthesis: Retrosynthesis, disconnection, synthons, linear and convergent synthesis, umpolung of reactivity and protecting groups.
- ix. Asymmetric synthesis: Chiral auxiliaries, methods of asymmetric induction – substrate, reagent and catalyst controlled reactions; determination of enantiomeric and diastereomeric excess; enantio-discrimination. Resolution – optical and kinetic.
- x. Pericyclic reactions – electrocycloaddition, cycloaddition, sigmatropic rearrangements and other related concerted reactions. Principles and applications of photochemical reactions in organic chemistry.
- xi. Synthesis and reactivity of common heterocyclic compounds containing one or two heteroatoms (O, N, S).
- xii. Chemistry of natural products: Carbohydrates, proteins and peptides, fatty acids, nucleic acids, terpenes, steroids and alkaloids. Biogenesis of terpenoids and alkaloids.
- xiii. Structure determination of organic compounds by IR, UV-Vis, <sup>1</sup>H & <sup>13</sup>C NMR and Mass spectroscopic techniques.

### **(d) Interdisciplinary topics**

- i. Chemistry in nanoscience and technology.
- ii. Catalysis and green chemistry.
- iii. Medicinal chemistry.
- iv. Supramolecular chemistry.
- v. Environmental chemistry.

#### 4. LIFE SCIENCES: BOTANY AND ZOOLOGY

##### (i). MOLECULES AND THEIR INTERACTION RELEVANT TO BIOLOGY

- A. Structure of atoms, molecules and chemical bonds.
- B. Composition, structure and function of biomolecules (carbohydrates, lipids, proteins, nucleic acids and vitamins).
- C. Stabilizing interactions (Van der Waals, electrostatic, hydrogen bonding, hydrophobic interaction, etc.).
- D. Principles of biophysical chemistry (pH, buffer, reaction kinetics, thermodynamics, colligative properties).
- E. Bioenergetics, glycolysis, oxidative phosphorylation, coupled reaction, group transfer, biological energy transducers.
- F. Principles of catalysis, enzymes and enzyme kinetics, enzyme regulation, mechanism of enzyme catalysis, isozymes
- G. Conformation of proteins (Ramachandran plot, secondary structure, domains, motif and folds).
- H. Conformation of nucleic acids [helix (A, B, Z), t-RNA, micro-RNA].
- I. Stability of proteins and nucleic acids.
- J. Metabolism of carbohydrates, lipids, amino acids nucleotides and vitamins.

##### (ii). CELLULAR ORGANIZATION

- A) **Membrane structure and function**  
(Structure of model membrane, lipid bilayer and membrane protein diffusion, osmosis, ion channels, active transport, membrane pumps, mechanism of sorting and regulation of intracellular transport, electrical properties of membranes).
- B) **Structural organization and function of intracellular organelles** (Cell wall, nucleus, mitochondria, Golgi bodies, lysosomes, endoplasmic reticulum, peroxisomes, plastids, vacuoles, chloroplast, structure & function of cytoskeleton and its role in motility).
- C) **Organization of genes and chromosomes** (Operon, unique and repetitive DNA, interrupted genes, gene families, structure of chromatin and chromosomes, heterochromatin, euchromatin, transposons).
- D) **Cell division and cell cycle** (Mitosis and meiosis, their regulation, steps in cell cycle, regulation and control of cell cycle).
- E) **Microbial Physiology** (Growth yield and characteristics, strategies of cell division, stress response)

##### (iii). FUNDAMENTAL PROCESSES

- A) **DNA replication, repair and recombination** (Unit of replication, enzymes involved, replication origin and replication fork, fidelity of replication, extrachromosomal replicons, DNA damage and repair mechanisms, homologous and site-specific recombination).
- B) **RNA synthesis and processing** (transcription factors and machinery, formation of initiation complex, transcription activator and repressor, RNA polymerases, capping, elongation, and

termination, RNA processing, RNA editing, splicing, and polyadenylation, structure and function of different types of RNA, RNA transport).

C) **Protein synthesis and processing** (Ribosome, formation of initiation complex, initiation factors and their regulation, elongation and elongation factors, termination, genetic code, aminoacylation of tRNA, tRNA-identity, aminoacyl tRNA synthetase, and translational proof-reading, translational inhibitors, Post- translational modification of proteins).

D) **Control of gene expression at transcription and translation level** (regulating the expression of phages, viruses, prokaryotic and eukaryotic genes, role of chromatin in gene expression and gene silencing).

#### (iv) . Cell communication and cell signaling

A) **Host parasite interaction** Recognition and entry processes of different pathogens like bacteria, viruses into animal and plant host cells, alteration of host cell behavior by pathogens, virus-induced cell transformation, pathogen-induced diseases in animals and plants, cell-cell fusion in both normal and abnormal cells.

B) **Cell signaling** Hormones and their receptors, cell surface receptor, signaling through G-protein coupled receptors, signal transduction pathways, second messengers, regulation of signaling pathways, bacterial and plant two-component systems, light signaling in plants, bacterial chemotaxis and quorum sensing.

C) **Cellular communication** Regulation of hematopoiesis, general principles of cell communication, cell adhesion and roles of different adhesion molecules, gap junctions, extracellular matrix, integrins, neurotransmission and its regulation.

#### D) **Cancer**

Genetic rearrangements in progenitor cells, oncogenes, tumor suppressor genes, cancer and the cell cycle, virus-induced cancer, metastasis, interaction of cancer cells with normal cells, apoptosis, therapeutic interventions of uncontrolled cell growth.

E) **Innate and adaptive immune system** Cells and molecules involved in innate and adaptive immunity, antigens, antigenicity and immunogenicity. B and T cell epitopes, structure and function of antibody molecules. generation of antibody diversity, monoclonal antibodies, antibody engineering, antigen-antibody interactions, MHC molecules, antigen processing and presentation, activation and differentiation of B and T cells, B and T cell receptors, humoral and cell-mediated immune responses, primary and secondary immune modulation, the complement system, Toll-like receptors, cell-mediated effector functions, inflammation, hypersensitivity and autoimmunity, immune response during bacterial (tuberculosis), parasitic (malaria) and viral (HIV) infections, congenital and acquired immunodeficiencies, vaccines.

#### (v). DEVELOPMENTAL BIOLOGY

A) **Basic concepts of development** : Potency, commitment, specification, induction, competence, determination and differentiation; morphogenetic gradients; cell fate and cell lineages; stem cells; genomic equivalence and the cytoplasmic determinants; imprinting; mutants and transgenics in analysis of development

B) **Gametogenesis, fertilization and early development:** Production of gametes, cell surface molecules in sperm-egg recognition in animals; embryo sac development and double

fertilization in plants; zygote formation, cleavage, blastula formation, embryonic fields, gastrulation and formation of germ layers in animals; embryogenesis, establishment of symmetry in plants; seed formation and germination.

**C) Morphogenesis and organogenesis in animals** : Cell aggregation and differentiation in *Dictyostelium*; axes and pattern formation in *Drosophila*, amphibia and chick; organogenesis – vulva formation in *Caenorhabditis elegans*, eye lens induction, limb development and regeneration in vertebrates; differentiation of neurons, post embryonic development- larval formation, metamorphosis; environmental regulation of normal development; sex determination.

**D) Morphogenesis and organogenesis in plants:** Organization of shoot and root apical meristem; shoot and root development; leaf development and phyllotaxy; transition to flowering, floral meristems and floral development in *Arabidopsis* and *Antirrhinum*

**E) Programmed cell death, aging and senescence**

#### (vi). SYSTEM PHYSIOLOGY - PLANT

**A. Photosynthesis** - Light harvesting complexes; mechanisms of electron transport; photoprotective mechanisms; CO<sub>2</sub> fixation-C<sub>3</sub>, C<sub>4</sub> and CAM pathways.

**B. Respiration and photorespiration** – Citric acid cycle; plant mitochondrial electron transport and ATP synthesis; alternate oxidase; photorespiratory pathway.

**C. Nitrogen metabolism** - Nitrate and ammonium assimilation; amino acid biosynthesis.

**D. Plant hormones** – Biosynthesis, storage, breakdown and transport; physiological effects and mechanisms of action.

**E. Sensory photobiology** - Structure, function and mechanisms of action of phytochromes, cryptochromes and phototropins; stomatal movement; photoperiodism and biological clocks.

**F. Solute transport and photoassimilate translocation** – uptake, transport and translocation of water, ions, solutes and macromolecules from soil, through cells, across membranes, through xylem and phloem; transpiration; mechanisms of loading and unloading of photoassimilates.

**G. Secondary metabolites** - Biosynthesis of terpenes, phenols and nitrogenous compounds and their roles.

**H. Stress physiology** – Responses of plants to biotic (pathogen and insects) and abiotic (water, temperature and salt) stresses.

#### (vii). SYSTEM PHYSIOLOGY - ANIMAL

**A. Blood and circulation** - Blood corpuscles, haemopoiesis and formed elements, plasma function, blood volume, blood volume regulation, blood groups, haemoglobin, immunity, haemostasis.

**B. Cardiovascular System:** Comparative anatomy of heart structure, myogenic heart, specialized tissue, ECG – its principle and significance, cardiac cycle, heart as a pump, blood pressure, neural and chemical regulation of all above.

**C. Respiratory system** - Comparison of respiration in different species, anatomical considerations, transport of gases, exchange of gases, waste elimination, neural and chemical regulation of respiration.

**D. Nervous system** - Neurons, action potential, gross neuroanatomy of the brain and spinal cord, central and peripheral nervous system, neural control of muscle tone and posture.

**E. Sense organs** - Vision, hearing and tactile response.

**F. Excretory system** - Comparative physiology of excretion, kidney, urine formation, urine concentration, waste elimination, micturition, regulation of water balance, blood volume, blood pressure, electrolyte balance, acid-base balance.

**G. Thermoregulation** - Comfort zone, body temperature – physical, chemical, neural regulation, acclimatization.

**H. Stress and adaptation**

**I. Digestive system** - Digestion, absorption, energy balance, BMR.

**J. Endocrinology and reproduction** - Endocrine glands, basic mechanism of hormone action, hormones and diseases; reproductive processes, gametogenesis, ovulation, neuroendocrine regulation

(viii). **INHERITANCE BIOLOGY**

**A) Mendelian principles** : Dominance, segregation, independent assortment.

**B) Concept of gene** : Allele, multiple alleles, pseudoallele, complementation tests

**C) Extensions of Mendelian principles** : Codominance, incomplete dominance, gene interactions, pleiotropy, genomic imprinting, penetrance and expressivity, phenocopy, linkage and crossing over, sex linkage, sex limited and sex influenced characters.

**D) Gene mapping methods** : Linkage maps, tetrad analysis, mapping with molecular markers, mapping by using somatic cell hybrids, development of mapping population in plants.

**E) Extra chromosomal inheritance** : Inheritance of Mitochondrial and chloroplast genes, maternal inheritance.

**F) Microbial genetics** : Methods of genetic transfers – transformation, conjugation, transduction and sex-duction, mapping genes by interrupted mating, fine structure analysis of genes.

**G) Human genetics** : Pedigree analysis, lod score for linkage testing, karyotypes, genetic disorders.

**H) Quantitative genetics** : Polygenic inheritance, heritability and its measurements, QTL mapping.

**I) Mutation** : Types, causes and detection, mutant types – lethal, conditional, biochemical, loss of function, gain of function, germinal verses somatic mutants, insertional mutagenesis.

**J) Structural and numerical alterations of chromosomes** : Deletion, duplication, inversion, translocation, ploidy and their genetic implications.

**K) Recombination** : Homologous and non-homologous recombination including transposition.

(ix). **DIVERSITY OF LIFE FORMS:**

**A. Principles & methods of taxonomy:**

Concepts of species and hierarchical taxa, biological nomenclature, classical & quantitative methods of taxonomy of plants, animals and microorganisms.

**B. Levels of structural organization:**

Unicellular, colonial and multicellular forms. Levels of organization of tissues, organs & systems. Comparative anatomy, adaptive radiation, adaptive modifications.

**C. Outline classification of plants, animals & microorganisms:**

Important criteria used for classification in each taxon. Classification of plants, animals and microorganisms. Evolutionary relationships among taxa.

**D. Natural history of Indian subcontinent:**

Major habitat types of the subcontinent, geographic origins and migrations of species. Common Indian mammals, birds. Seasonality and phenology of the subcontinent.

**E. Organisms of health & agricultural importance:**

Common parasites and pathogens of humans, domestic animals and crops.

**F. Organisms of conservation concern:**

Rare, endangered species. Conservation strategies.

**(x). ECOLOGICAL PRINCIPLES**

**The Environment:** Physical environment; biotic environment; biotic and abiotic interactions.

**Habitat and Niche:** Concept of habitat and niche; niche width and overlap; fundamental and realized niche; resource partitioning; character displacement.

**Population Ecology:** Characteristics of a population; population growth curves; population regulation; life history strategies (*r* and *K* selection); concept of metapopulation – demes and dispersal, interdemic extinctions, age structured populations.

**Species Interactions:** Types of interactions, interspecific competition, herbivory, carnivory, pollination, symbiosis.

**Community Ecology:** Nature of communities; community structure and attributes; levels of species diversity and its measurement; edges and ecotones.

**Ecological Succession:** Types; mechanisms; changes involved in succession; concept of climax.

**Ecosystem Ecology:** Ecosystem structure; ecosystem function; energy flow and mineral cycling (C,N,P); primary production and decomposition; structure and function of some Indian ecosystems: terrestrial (forest, grassland) and aquatic (fresh water, marine, eustarine).

**Biogeography:** Major terrestrial biomes; theory of island biogeography; biogeographical zones of India.

**Applied Ecology:** Environmental pollution; global environmental change; biodiversity: status, monitoring and documentation; major drivers of biodiversity change; biodiversity management approaches.

**Conservation Biology:** Principles of conservation, major approaches to management, Indian case studies on conservation/management strategy (Project Tiger, Biosphere reserves).

**(xi). EVOLUTION AND BEHAVIOUR**

A. Emergence of evolutionary thoughts

Lamarck; Darwin—concepts of variation, adaptation, struggle, fitness and natural selection; Mendelism; Spontaneity of mutations; The evolutionary synthesis.

B. Origin of cells and unicellular evolution:

Origin of basic biological molecules; Abiotic synthesis of organic monomers and polymers; Concept of Oparin and Haldane; Experiment of Miller (1953); The first cell; Evolution of prokaryotes; Origin of eukaryotic cells; Evolution of unicellular eukaryotes; Anaerobic metabolism, photosynthesis and aerobic metabolism.

C. Paleontology and Evolutionary History:

The evolutionary time scale; Eras, periods and epoch; Major events in the evolutionary time scale; Origins of unicellular and multi cellular organisms; Major groups of plants and animals; Stages in primate evolution including Homo.

**D. Molecular Evolution:**

Concepts of neutral evolution, molecular divergence and molecular clocks; Molecular tools in phylogeny, classification and identification; Protein and nucleotide sequence analysis; origin of new genes and proteins; Gene duplication and divergence.

**E. The Mechanisms:**

Population genetics – Populations, Gene pool, Gene frequency; Hardy-Weinberg Law; concepts and rate of change in gene frequency through natural selection, migration and random genetic drift; Adaptive radiation; Isolating mechanisms; Speciation; Allopatricity and Sympatricity; Convergent evolution; Sexual selection; Co-evolution.

**F. Brain, Behavior and Evolution:**

Approaches and methods in study of behavior; Proximate and ultimate causation; Altruism and evolution-Group selection, Kin selection, Reciprocal altruism; Neural basis of learning, memory, cognition, sleep and arousal; Biological clocks; Development of behavior; Social communication; Social dominance; Use of space and territoriality; Mating systems, Parental investment and Reproductive success; Parental care; Aggressive behavior; Habitat selection and optimality in foraging; Migration, orientation and navigation; Domestication and behavioral changes.

**(xii). APPLIED BIOLOGY:**

A. Microbial fermentation and production of small and macro molecules.

B. Application of immunological principles, vaccines, diagnostics. Tissue and cell culture methods for plants and animals.

C. Transgenic animals and plants, molecular approaches to diagnosis and strain identification.

D. Genomics and its application to health and agriculture, including gene therapy.

E. Bioresource and uses of biodiversity.

F. Breeding in plants and animals, including marker – assisted selection

G. Bioremediation and phytoremediation

H. Biosensors

**(xiii). METHODS IN BIOLOGY**

**A. Molecular Biology and Recombinant DNA methods:**

Isolation and purification of RNA , DNA (genomic and plasmid) and proteins, different separation methods.

Analysis of RNA, DNA and proteins by one and two dimensional gel electrophoresis, Isoelectric focusing gels.

Molecular cloning of DNA or RNA fragments in bacterial and eukaryotic systems.

Expression of recombinant proteins using bacterial, animal and plant vectors.

Isolation of specific nucleic acid sequences

Generation of genomic and cDNA libraries in plasmid, phage, cosmid, BAC and YAC vectors.

In vitro mutagenesis and deletion techniques, gene knock out in bacterial and eukaryotic organisms.

Protein sequencing methods, detection of post translation modification of proteins.

DNA sequencing methods, strategies for genome sequencing.

Methods for analysis of gene expression at RNA and protein level, large scale expression, such as micro array based techniques

Isolation, separation and analysis of carbohydrate and lipid molecules

RFLP, RAPD and AFLP techniques

#### **B. Histochemical and Immunotechniques**

Antibody generation, Detection of molecules using ELISA, RIA, western blot, immunoprecipitation, fluocytometry and immunofluorescence microscopy, detection of molecules in living cells, in situ localization by techniques such as FISH and GISH.

#### **C Biophysical Method:**

Molecular analysis using UV/visible, fluorescence, circular dichroism, NMR and ESR spectroscopy Molecular structure determination using X-ray diffraction and NMR, Molecular analysis using light scattering, different types of mass spectrometry and surface plasma resonance methods.

#### **D Statistical Methods:**

Measures of central tendency and dispersal; probability distributions (Binomial, Poisson and normal); Sampling distribution; Difference between parametric and non-parametric statistics; Confidence Interval; Errors; Levels of significance; Regression and Correlation; t-test; Analysis of variance; Chi-square test; Basic introduction to Multivariate statistics, etc.

#### **E. Radiolabeling techniques:**

Detection and measurement of different types of radioisotopes normally used in biology, incorporation of radioisotopes in biological tissues and cells, molecular imaging of radioactive material, safety guidelines.

#### **F. Microscopic techniques:**

Visualization of cells and subcellular components by light microscopy, resolving powers of different microscopes, microscopy of living cells, scanning and transmission microscopes, different fixation and staining techniques for EM, freeze-etch and freeze- fracture methods for EM, image processing methods in microscopy.

#### **G. Electrophysiological methods:**

Single neuron recording, patch-clamp recording, ECG, Brain activity recording, lesion and stimulation of brain, pharmacological testing, PET, MRI, fMRI, CAT.

#### **H. Methods in field biology:**

Methods of estimating population density of animals and plants, ranging patterns through direct, indirect and remote observations, sampling methods in the study of behavior, habitat characterization: ground and remote sensing methods.

## **5. PHYSICS**

### **Unit-I. Mathematical Physics**

Dimensional analysis. Vector algebra and vector calculus. Linear algebra, matrices, Cayley-Hamilton Theorem. Eigenvalues and eigenvectors. Linear ordinary differential equations of first & second order, Special functions (Hermite, Bessel, Laguerre and Legendre functions). Fourier series, Fourier and Laplace transforms. Elements of complex analysis, analytic functions; Taylor & Laurent series; poles, residues and

evaluation of integrals. Elements of computational techniques: root of functions, interpolation, extrapolation, integration by trapezoid and Simpson's rule, Solution of first order differential equation using Runge-Kutta method.

### **Unit-II. Classical Mechanics**

Newton's laws. Dynamical systems, Phase space dynamics, stability analysis. Central force motions. Two body Collisions - scattering in laboratory and Centre of mass frames. Rigid body dynamics- moment of inertia tensor. Non-inertial frames and pseudoforces. Variational principle. Generalized coordinates. Lagrangian and Hamiltonian formalism and equations of motion. Conservation laws and cyclic coordinates. Periodic motion: small oscillations, normal modes. Special theory of relativity- Lorentz transformations, relativistic kinematics and mass-energy equivalence. Poisson brackets and canonical transformations.

### **Unit-III. Quantum Mechanics**

Wave-particle duality. Schrödinger equation (time-dependent and time-independent). Eigenvalue problems (particle in a box, harmonic oscillator, etc.). Tunneling through a barrier. Wave-function in coordinate and momentum representations. Commutators and Heisenberg uncertainty principle. Dirac notation for state vectors. Motion in a central potential: orbital angular momentum, angular momentum algebra, spin, addition of angular momenta; Hydrogen atom. Stern-Gerlach experiment. Time-independent perturbation theory and applications. Variational method. Time dependent perturbation theory and Fermi's golden rule, selection rules. Identical particles, Pauli exclusion principle, spin-statistics connection.

### **Unit-IV. Nuclear and Particle Physics**

Basic nuclear properties: size, shape and charge distribution, spin and parity. Binding energy, semi-empirical mass formula, liquid drop model. Nature of the nuclear force, form of nucleon-nucleon potential, charge-independence and charge-symmetry of nuclear forces. Deuteron problem. Evidence of shell structure, single-particle shell model, its validity and limitations. Elementary ideas of alpha, beta and gamma decays and their selection rules. Nuclear reactions, reaction mechanism, compound nuclei and direct reactions.

Classification of fundamental forces. Elementary particles and their quantum numbers (charge, spin, parity, isospin, strangeness, etc.). Gellmann-Nishijima formula. Quark model, baryons and mesons. C, P, and T invariance. Parity non-conservation in weak interaction.

### **Unit-V. Electronics**

Semiconductor devices (diodes, junctions, transistors, field effect devices, homo- and hetero-junction devices), device structure, device characteristics, frequency dependence and applications. Opto-electronic devices (solar cells, photo-detectors, LEDs). Operational amplifiers and their applications. Digital techniques and applications (registers, counters, comparators and similar circuits). A/D and D/A converters. Microprocessor and microcontroller basics.

### **Unit-VI. Condensed Matter Physics**

Bravais lattices. Reciprocal lattice. Diffraction and the structure factor. Bonding of solids. Elastic properties, phonons, lattice specific heat. Free electron theory and electronic specific heat. Response and relaxation phenomena. Drude model of electrical and thermal conductivity. Hall effect and thermoelectric power.

Electron motion in a periodic potential, band theory of solids: metals, insulators and semiconductors. Superconductivity: type-I and type-II superconductors. Josephson junctions. Superfluidity. Defects and dislocations. Ordered phases of matter: translational and orientational order, kinds of liquid crystalline order. Quasi crystals.

### GENERAL RULES OF ENTRANCE EXAMINATION

1. Qualifying the entrance test shall not, ipso facto, entitle a candidate to get enrolment in the department concerned where he/she intends to seek enrolment. This will be followed by mandatory interview. The selection would be solely based on the performance of the candidates in the interview. It will be the responsibility of the candidate to ensure his/her eligibility and fulfilment of such other conditions as may be prescribed for enrolment in the rules and regulations of the university. The enrolment will be subject to the availability of seats and experts for guidance/supervision in the area of research to be chosen by the candidate and the candidate is required to verify these facts from the concerned department before applying for the test.
2. Once paid, the cost of prospectus for the entrance test shall in no case be refunded.
3. The entrance test will be held at Talwandi Sabo, on **WEDNESDAY, JULY 05, 2017**.
4. Online Application form once submitted by the candidate shall not be allowed to make any change in it by way of any addition/deletion/alteration/amendment/ changes of any other particular etc. under any circumstances i.e., they shall have no access to the application at all.
5. No application form will be received under any circumstances after the closing of the last date.
6. For blind candidates: Any blind candidate can avail the services of a writer. The maximum qualification of a writer is 10+2. He/ she should not have attained the above mentioned qualification more than one year prior to the entrance test. The interested blind candidates should contact the Registrar, one week before the commencement of the entrance test to fulfil the formalities for the assignment of a writer.
7. Thirty minutes extra would be given to the visually handicapped candidates (subject to approval of the Vice-Chancellor).
8. E-admit cards will be issued to the candidates **provisionally**. The candidates shall appear in the test at their own risk and responsibility subject to final confirmation of their eligibility at the time of enrolment. The university shall, in no way, be responsible if they are found to be ineligible later, leading to cancellation of their result or any other consequence(s) emanating from the same.
9. The candidates shall be admitted to the test only on the production of the admit card at the test centre. No candidate shall be allowed to appear in the test without the admit card under any circumstances. The candidates must retain the e-admit cards with them till the enrolment process is over and must produce the same at the time of enrolment.

10. The candidates shall be required to answer the questions only on the Answer-Sheets provided for that purpose, as per the rules/ norms stated in the respective Answer Sheets.
11. The use of calculator is not allowed in any subject/paper, except in Paper-II of Faculty of Engineering but it should not be Programmable/Scientific Calculator.
12. The University will provide the logarithmic table. Borrowing of log table or other material from any other person/ candidate is not allowed.
13. For rough work, only the sheets marked 'Rough Work' at the end of the question booklet/script should be used. No rough work should be done on the Answer Sheet under any circumstances.
14. **THE CANDIDATES ARE NOT PERMITTED TO CARRY ANY TELECOMMUNICATION EQUIPMENT SUCH AS PAGER, CELLULAR PHONE, WIRELESS SET, ETC., INSIDE THE EXAMINATION HALL. ANYBODY IN POSSESSION OF TELECOMMUNICATION EQUIPMENT WILL MAKE HERSELF/HIMSELF LIABLE FOR EXPULSION.**
15. Any person who impersonates a candidate shall be disqualified from appearing in any University examination for a period of **five years** including this test. If that person is a student on the rolls of a recognized College or University, he/she shall be declared as a person not fit and proper to be admitted to any examination of this University for a period of **five years**. His/her case, if necessary, shall also be reported to the police for further action in the matter.
16. Any candidate who creates disturbance of any kind during examination or otherwise misbehaves in or around the examination hall or refuses to obey the Superintendent/Deputy Superintendent/Assistant Superintendent/any other official on examination duty or changes his/her seat with any other candidate or occupies any seat, other than the one allotted to him/her shall be expelled from the examination hall.  
("Expulsion" for this purpose would mean cancellation of candidature)
17. Any candidate having in his possession or accessible to him/her papers/books or notes which may possibly be of any assistance to him /her or is found giving or receiving assistance, or copying from any paper/book or note or from anywhere else or allowing any other candidate to copy from his/her answer book or found writing on any other paper question set in the question paper during examination, or using or attempting to use any other unfair means, or indulging in any kind of misconduct, shall be expelled from the examination hall.  
("Expulsion" for this purpose would mean cancellation of candidature)
18. The Centre Superintendent/Observer/any other authorized University Officer/Official shall be competent to expel a candidate from the Examination Centre under instruction Nos.13 & 14.
19. No candidate be permitted to leave the examination hall/room before the expiry of the time allowed for the examination.
20. The candidates shall be required to hand over their answer-sheets and the question papers / booklets in full to the Centre Superintendent even if they have not attempted any question. No page/part of the Question Paper/Answer Sheet is to be removed / torn/taken out of the

Examination Centre under any circumstances, failing which the candidates shall be disqualified from the entire test.

21. There will be no negative marking.
22. There shall be no re-evaluation/re-checking/re-assessment of answer sheets. Request for seeing the Question Booklet/Evaluated Answer Sheets/Answer-Books by the candidates shall not be entertained. The evaluation once done by the University shall be taken as absolutely final.
23. If any answer sheet of a candidate shows or if it is otherwise established that he/she has received or attempted to receive help from any source in any manner or has given help or attempted to give help to any other candidate in any manner, the relevant answer-sheets shall be cancelled. The decision of the Controller of Examinations, Panjab University, Chandigarh, in this regard shall be final.
24. If a candidate writes his/her name or puts any kind of identification mark or discloses his/her identity by any method whatsoever on the cover or anywhere else in the Question Booklet/Answer Sheets, the same shall be treated as cancelled. The decision of the University in this regard shall be final.
25. If it is found that a candidate has knowingly or willfully concealed or suppressed any information/fact which renders him/her ineligible to take the Entrance Test, his/her result of the Test and as also enrolment to Ph.D., if granted, shall stand cancelled. He/ She shall have no claim, whatsoever, against the University. The case, if necessary, shall be reported to the police for further necessary action in the matter
26. If a dispute or controversy of any kind arises before, during, or after conduct of the Entrance Test, the decision of the Controller of Examinations, Akal University, in all such cases, shall be final.
27. Notwithstanding anything contained in this prospectus, the eligibility conditions for enrolment to Ph.D. shall be governed by the respective rules/regulations as enshrined in the Akal University Statutes/Regulations/Ordinances and decisions of the University. In case of any conflict or inconsistency between the prospectus on the one hand and the aforesaid Akal University Rules and Regulations /Guidelines/ Hand-Book of Information / Decisions of Governing Body/Board of Management, on the other, the latter shall prevail.
28. If a candidate wishes to verify his/her result, he/she will be provided a photocopy of his/her answer sheet on payment of Rs.5,000/- within 10 days after the declaration of the entrance test result and the office should process the whole procedure within three working days. In case, a discrepancy is found in the result of the candidate, the result would accordingly be revised and the fee deposited will be refunded.
29. For urgent enquiries, Registrar may be contacted at 9316163073 only during the working hours.

## **ALLOTMENT OF RESEARCH SUPERVISOR**

Allotment of Research Supervisor will be done by the respective University, Faculty or Department or Research Centre as per the following Research Supervisor Allocation System:

- i. On the basis of the interview, allotment of Research Supervisors for selected candidates shall be decided by the University Faculty or Department or Centre in a formal manner depending on the number of candidates per teacher and the available specialization among the Faculty Members. In order to be eligible to act as supervisor for Ph.D. program, faculty members must:
  - a) hold Ph.D. degree in the subject concerned with published quality work, such as books, research articles/papers in referred research journals; and
  - b) evidence of having being engaged in active research for at least two years after award of the Ph.D. degree.
- ii. Research Supervisors and the research interest as indicated during interview by the candidates will form the basis of supervisor nomination. The Research Supervisor may also be approved through a consultative process with the research students.
- iii. While granting admission to candidates to Ph.D. programs, the University Faculty or Department or Centre will follow the State Reservation Policy. Foreign candidates will be treated at par with Open Category for admission.
- iv. Normally, only one foreign student will be permitted per Research Supervisor.
- v. Dean of the University Faculty or Department or Centre will ensure the allotment of Research Supervisor(s) to the candidates.

## **ADMISSION AND REGISTRATION**

### **Submission of Application**

- a. Every person, if he/she is otherwise eligible and qualifies as per above conditions and desirous of doing research work for the Ph.D. degree shall face the interview before the committee constituted for the purpose. All such candidates will apply to respective University Faculty or Department or Research Centre for registration for the purpose of interview.
- b. Candidates exempted from Entrance Examination shall also have to register their candidature with the respective University or Department or Research Centre.
- c. Candidates will be interviewed by the Committee constituted for the purpose as per clause below.

### **The Committee for admission to Ph.D. Program at University:**

The Committee shall consist of:

- 1) Head of the concerned or Department or Centre (Chairperson)
- 2) Professor from the allied Department or centre of the University, nominated by the Vice Chancellor.
- 3) Two Professors/Associate Professors of the Department by rotation.

### **Admission/Registration after the Interview**

- a) An eligible applicant seeking admission to the Ph.D. program shall apply to the Registrar, Akal University in the prescribed Application Form along with the registration fee as may be prescribed from time to time and other documents in original as proof of their eligibility.
- b) On successful completion of the course work, the candidate shall be required to submit a set of eight copies of his/her Ph.D. research proposal in the prescribed structure; to be decided by the concerned or Department or Centre; within 12 months from the date of their of their provisional admission to the program. The submission period is extendable to six months subject to the recommendation of the supervisor(s), Head of the Department and Dean of the faculty concerned and on payment of prescribed fee.
- c) The candidate shall present his/her research proposal before the Research Degree Committee of Faculty or Department or Centre.
- d) After successful presentation, the research proposal shall be sent to the Dean Research. If need arises, the candidate has to resubmit his/her research proposal after incorporating the suggestion made by the Research Degree Committee.
- e) The Dean Research after due consideration shall consider the suitability of the research proposal, supervisor (s) and fulfilment of other requirements of the rules and regulations of the University for the purpose.
- f) On his/her satisfaction, the Dean Research shall recommend the case for confirmation of the registration of the candidates for the Ph.D. program.

- g) In case of any dispute/problem, the Dean of the Faculty concerned shall take an appropriate decision. In case where Dean - Research is the Dean of the Faculty concerned, the Vice-Chancellor will take an appropriate decision.
- h) If the presentation is unsatisfactory, the proposal shall be rejected and the applicant shall be required to submit a fresh proposal and make a presentation again after a gap of three months and before six months from the date of earlier presentation.
- i) The Research Committee shall consider approval of the topic of Research and appoint, in case of inter-disciplinary subjects, co-Research-Supervisor(s) recognized by the University or, in special circumstances, by any other recognized University.
- j) The date of registration shall be the date of provisional admission. The registration shall be valid for five years. Extension up to a maximum period of two years shall be given by the Research Committee concerned only if considerable work has been done by the candidate. The candidate concerned must submit the application for extension through his Research Supervisor, and Dean or Head of the Faculty or Department or Centre, three months before the expiry of the registration period. The request for extension will be approved by the Dean Research. Further extension of one year will be given by Vice-Chancellor on the recommendation of the Dean of the Faculty concerned.
- k) If the candidate desires, he/she can partially modify the title and the proposed plan of the research and the Research Committee shall approve such changes on the recommendation of the Research Supervisor and Dean of the Faculty.
- l) As per provisions of Ordinance, registered candidates shall not be allowed to register simultaneously for any other degree Program of this University or any other University.
- m) The admission will be confirmed after the Research Committee approves the topic. Dean Research shall admit the candidates as per the rules and regulations of the University.

## COURSE WORK

- 1) Admitted candidates shall be required to undertake course work organized by the concerned faculty, as the case may be. The course work will be for a minimum Period of one semester.
- 2) The course work shall be treated as pre-PhD preparation and partial fulfillment of the requirements for the award of Doctor of Philosophy degree. The University Faculty or Department or Research Centre, as the case may be, shall decide the minimum Qualifying requirement for allowing a candidate to proceed further with the writing of the PhD thesis.
- 3) If found necessary, course work may be carried out by doctoral candidates in related Faculty or institutes either within or outside the University, with prior permission of the Vice-chancellor.
- 4) The course work shall be as follows:
  - a. Paper-I: Research Methodology. It may include fundamentals of the research methods of the subject concerned, quantitative research methods, instrumentation, basic skills in writing research proposals or synopsis, research articles or papers, research projects or reports or books or thesis, communication skills, seminar presentation and review of published research.
  - b. Paper-II: Subject Related course- Advanced Theory of the Subject concerned.
  - c. Paper-III: Subject Related course- Research Topic or Area specific course. Each Department shall offer minimum three electives and the candidates shall opt one closely related with his/her specialization
- 5) The evaluation will be done by the teachers of the Faculty concerned. Candidates who have completed M.Phil. from any recognized University and who were admitted to M.Phil. through an entrance examination and had also undertaken course at M.Phil. level, will be exempted from the course work.

## **SUPERVISION AND MONITORING**

### **a. Research Supervisor**

- (i) All teachers working on regular basis in faculties or Departments or Schools or Centers of the Akal University, having Ph.D. Degree and minimum two years post Ph.D. experience as teacher or research, with proven research record in the form of a minimum of two research publications, in professionally recognized National or International journals, will be eligible for guiding research as supervisors or co-supervisors.
- (ii) Scientists or Researchers working on regular basis in various regional and National Institutions or Research Laboratories or Organizations and having a Ph.D. degree and actively involved in research with at least two international research papers in professionally recognized National or International journals are also eligible for supervising research as external supervisor. Provided that, at least one teacher from the Akal University in the area of research concerned agrees to act as co-supervisor of the Ph.D. scholar.
- (iii) Normally a candidate shall be required to complete his/her doctoral research under the supervision of the Research Supervisor allotted to him/her. However, the Research Committee concerned may allow change of Research Supervisor on the production of a 'No Objection Certificate' from the first Research Supervisor and an acceptance letter from the new Research Supervisor. In case of such change, the candidate shall work for a minimum period of one calendar year under the new Research Supervisor before he/she submits the thesis.
- (iv) A 'No Objection certificate' will not be required if the candidate justifies the non-availability of his Research Supervisor. The Justification will have to be endorsed by the Dean or Head of the concerned Faculty or Department or centre and Dean Research. In case of any dispute, non-availability of the Research Supervisor, the Vice-Chancellor on recommendation of the Dean Research, will take an appropriate decision.
- (v) At any given time, a Research Supervisor shall not have more than eight registered Ph.D. candidates working under his/her supervision.
- (vi) In case of a dispute between a candidate and his Research Supervisor, the Committee consisting of the following shall examine the matter and submit a report to the Vice Chancellor, whose decision shall be final.
  - Dean, Research Chairman
  - Dean, Academic Affairs
  - Dean of the Faculty concerned
  - Head of the Department or Centre concerned
  - One Professor to be nominated by the Vice Chancellor.
- (vii) If the complaint is against any member of the committee, he/she shall not participate in the proceedings of the meeting. In that case, additional member(s) may be appointed by the Vice Chancellor to replace him.
- (viii) The report shall include, among other things, specific recommendations.
- (ix) The report shall be submitted to the Vice Chancellor whose decision will be final.

## **b. Progress**

- All the registered candidates shall be required to submit to the Dean Research, through their Research Supervisors and Dean or Head of the Faculty or Department or Centre detailed progress report every six months. If a candidate fails to submit three reports consecutively, his/her registration may be treated as cancelled.
- The Dean/Head of the Faculty or Department or Centre, within fifteen days after the completion of the given period [one and half years], shall send to the Ph.D. Admission Section of the University, a report on the non-compliance of the condition.
- Dean/Head of the Faculty, shall also send a copy of the progress report submitted by the candidate to the Ph.D. Admission Section of the University, with fifteen days after the completion of the given period [one and half years].
- The progress reports submitted shall be placed before the Research Committee consisting of:
  - a) Dean - Research
  - b) Dean of Academic Affairs
  - c) Dean of the Faculty
  - d) One Professor of the faculty nominated by the Vice Chancellor
  - e) The Research Supervisor

The Committee shall scrutinize the progress reports and prepare a brief Statement on the progress of the candidate. In case of dispute, the Dean of the Faculty concerned shall take final decision.

- V. The Dean Research shall maintain the record of these reports and statements.

## **MONITORING THE PROGRESS OF THE SCHOLAR**

- i. Commencing from the date of provisional registration till the submission of thesis, all research scholars shall submit the progress report in the prescribed format duly signed by the Supervisor and Head of the Department of the Supervisor at least one week before the end of every semester, without which the scholars shall not be permitted to pay the semester fee.
- ii. The Academic committee of the concerned department will evaluate and communicate the six monthly assessment reports about the progress of the research work to RDC, until the scholar submits synopsis of his/her thesis.
- iii. First presentation of the Ph.D. synopsis shall be given by the scholar before the submission of synopsis. Second presentation of Ph.D. synopsis shall be given by the scholar before RDC. Both presentations shall be open to faculty members and research scholars. The scholars in consultation with his/her supervisor(s) may incorporate the suggestions made during both the presentations.
- iv. Research scholars getting scholarship shall sign the attendance register in the Department of the Supervisor on all working days. They are eligible for a total of 15 days leave every semester and a maximum of 30 days in a calendar year, which they shall avail after obtaining permission from the Supervisor and Head of the Department. However, sponsored scholars or availing financial assistance from funding agencies shall be governed by the rules of the concerned sponsoring agencies.

## **DURATION OF THE PROGRAMME**

- v. The duration of the programme and the time for submission of Thesis are counted from the date of provisional registration.
- vi. The minimum duration of the programme shall be three years. However, for M.Phil. Degree holders, the minimum duration shall be reduced by one year, if the M.Phil. Degree relates to the field of research of the programme.
- vii. As a special Case, on recommendation of the Supervisor(s) and Head of the department, Vice-Chancellor can allow submission of Ph.D. thesis before the minimum duration of three years.
- viii. The Dean Research shall permit with the approval of Vice-Chancellor, if deemed fit for reasons, break of study for the scholar under extraordinary circumstances such as medical grounds and other compelling reasons which warrants his/her absence to the programme. However, the break of study period shall not be counted for the minimum duration of the programme.
- ix. Break of study to scholars shall be granted upto a maximum period of two years not exceeding one year at a time. Such request with the recommendation of the Supervisor(s) and Head of the Department should reach the Dean Research prior to availing the break of study. If prior permission is not sought and obtained, it will be considered as a case of discontinuation and action will be taken to cancel the registration of such scholars. Break of study period shall be counted for the maximum duration of the programme. The scholar should remit the semester fees during the break of study period.
- x. The maximum duration for the programme shall be five years.

### **EXTENSION FOR SUBMISSION FOR THESIS**

- i. Scholars who do not submit the thesis within the maximum duration of the programme (five years) shall apply for extension of time three months before the completion of five years recommended by the Supervisor. In such cases, a maximum grace period of one year, beyond the normal maximum period of five years shall be granted by the Vice-Chancellor to enable the scholar to submit the Thesis. Penalty fees as prescribed from time to time shall be paid beyond the maximum duration.
- ii. If the scholar fails to submit the Thesis within the extended period of one year, the registration shall be cancelled and his/her name will be removed from the rolls.

## **CANCELLATION OF REGISTRATION**

- i. The registration of a scholar who has not submitted his/her thesis before the end of the maximum duration including the extension period for the programme shall stand cancelled automatically.
- ii. The registration is liable for cancellation administratively by the Dean Research, if
  - a) The scholar has not paid the semester fees within the stipulated time period.
  - b) Two consecutive six month progress reports are not submitted or are not satisfactory by the department's relevant committee.
  - c) If the scholar fails to complete the confirmation of provisional registration beyond three years after his/her registration for the Ph.D. programme
  - d) Scholar's performance is not satisfactory to the RDC and accordingly recommended for cancellation.
  - e) Prior permission is not obtained for break of study from the Dean Research.
  - f) The scholar wishes to withdraw from the programme and requests to cancel his/her registration.
  - g) Extension of time (beyond five years) not obtained
  - h) Submission of revised thesis incorporating the suggestions of any examiner beyond three months.
  - i) The act of plagiarism involved in the thesis or any publication thereof.
  - j) Contact of thesis examiners by the scholar regarding thesis evaluation.
  - k) Any violation of the rules and regulations of Ph.D. Programme.
- iii. In all the above cancellation cases, the fees already paid by the scholar shall not be refunded.

## **SUBMISSION AND EVALUATION OF THESIS**

### **Submission of Thesis**

- a)** The submission of thesis may be permitted only after completion of three years from the date of registration and after successful completion of the Course Work. However, on recommendation of the supervisor and Dean or Head of the Faculty or Department or centre concerned, the Vice-Chancellor may grant a special permission to a candidate to submit his/her thesis six month prior to the minimum three year requirement.
- b)** Ph.D. candidates has to publish minimum two research papers in a standard refereed journal(s) before the submission of the thesis for adjudication, and produce evidence for the same in the form of acceptance letter or the reprint.
- c)** At least three months before the date of submission of the thesis, each candidate shall give pre-submission seminar to be arranged by the Dean Research at the University in the Concerned Faculty or Department or Centre on the request of the candidate duly endorsed by the Research Supervisor. The final plan of the thesis will be discussed by the scholars present, among whom the presence of the research Supervisors and the Dean Research or his/her nominee shall be necessary.
- d)** The thesis shall be submitted in compact bound form along with a soft copy (CD), five copies of the abstract to the Dean Research. The final thesis shall he presented in accordance with the following specifications:
  - i. The paper size used for printing shall be of A4 size;
  - ii. Printing shall be in a standardized form on both sides of the paper and in 1.5 lines spacing;
  - iii. A margin of 1.5 inches shall be there on the left hand side;
  - iv. The cover shall not be more than 330 GSM;
  - v. The title of the thesis, name of the candidate, degree, name of the Research Supervisor, place of research and the month and year of submission shall be printed on the title page and the front cover;
  - vi. The hard-bound thesis cover shall be of black color. Spine of the binding [side cover] should mention 'Ph.D. thesis' on the top, name of the candidate and month and year.
  - vii. The candidate shall submit to the Registrar five copies of his/her thesis.
  - viii. The thesis shall include a Certificate of and a declaration by the candidate that the work reported in the thesis has been carried out by the candidate himself/herself and that the material from other sources, if any, is duly acknowledged.
  - ix. The thesis shall he written in English except when it is related to Indian languages.

## ORAL EXAMINATION: VIVA VOCE AND DEFENSE OF THE THESIS

- a)** The day, date, time and the place for the viva voce and the defense of thesis shall be notified by the Dean Research at least eight days in advance. Normally, the viva voce and the defense of the thesis shall be arranged in the University Faculty or Department or Centre. In exceptional cases, the Vice-Chancellor may allow the viva to be conducted at a place outside the University campus. In such a case, the procedure and norms for the conduct of viva, payments, etc. shall be as laid down by the University
- b)** The Viva-Voce and Defense of the Thesis shall be open to the public. The Dean or Head of the Faculty or Department or Centre shall invite all faculty members and Research Scholars of the Department and also from other allied Departments of the University to the Viva-Voce. In case of dispute, the Dean of the Faculty concerned shall take an appropriate decision. Other Faculty members and Research Scholars of the University present in the Viva-Voce examination will not be part of the evaluation.
- c)** The external examiner present for the viva-voce and the defense of the thesis shall submit to the COE their final consolidated report along with the reply given to the queries raised by the external examiner in the written form, signed and accepted by the Dean or Head of the Faculty or Department or centre and Supervisor(s) and a list of the persons attending the open defense in respect of the award of the Ph.D. degree immediately after the defense is over.
- d)** In case the defense is not satisfactory, the examiner shall recommend with reasons that a fresh viva-voce and defense of the thesis be organized within a period of not less than one month. If the defense is still not satisfactory, the Committee constituting External Examiner, Supervisor(s) and Dean or Head of faculty or Department or centre would record the reasons for the same. The Committee may recommend the resubmission of the thesis with suggested changes or recommend the rejection of the thesis.
- e)** On satisfactory completion of the Viva-Voce examination, the candidate, if required, shall submit two copies of the final version of thesis after incorporating all the changes or corrections suggested by the examiner(s).

## **AWARD OF Ph.D. DEGREE**

- i. After satisfactory completion of the *Viva-Voce* examination, the degree may be conferred after approval by the Board of Management or Governing Body of the university.
- ii. The Ph.D. degree shall be designated as Doctor of Philosophy of Akal University, Talwandi Sabo.
- iii. The Ph.D. degree normally would be conferred during the annual convocation of the university. However, on request of the candidate, a provisional certificate would be given to the candidate on approval of the same from competent authorities.

### **PUBLICATION OF THESIS**

Papers culled out of the Thesis may be published by the scholar and the supervisor(s), however prior approval of the Akal University is mandatory for publication of thesis (as such or with modifications).

## **THE ACT OF PLAGIARISM**

- i. In the case of scholars who have committed the act of plagiarism in the Thesis/journal publication, his/her Thesis/degree shall be forfeited and his/her research registration shall be cancelled and also he/she shall be debarred to register for any other programme in the University.
- ii. For the abetment of any such actions (mentioned in 20.1), the recognition of his/her Supervisorship shall be withdrawn for a period of five years and he/she shall be debarred from guiding the scholars for any research programme in the University till such period.
- iii. If any scholar has committed an act of self plagiarism in the publications and ascertained by the Committee constituted by the Vice-Chancellor, such work shall not be allowed in his/her thesis and the scholar shall be fined upto Rs.50000/- with a warning to the Supervisor. The thesis of such scholar shall be accepted only based on a new publication in a referred journal (as applicable). If plagiarism is detected in the publications of any other scholar under the same supervisor, the recognition of his/her Supervisorship shall be withdrawn for a period of five years and he/she shall be debarred from guiding the scholars for any research programme in the University till such period.

## RESEARCH CONDUCT RULES

- i. *Research Ethics:*
  - a) All individuals conducting research in connection with the University should incorporate appropriate consideration of ethical issues.
  - b) Research involving interaction with environmental issues, human subjects or communities should be informed by context specific ethical practice. Scholars must respect the human rights and dignities of all those involved in any inquiry project and must appropriately address questions of consent, power relations, deception, confidentiality and privacy. In particular, scholars must address a range of complex issues around developing and maintaining respectful and ethical relationships with research partners based on mutual respect for academic traditions and institutional circumstances. Information and/or complaints regarding the above issues, shall be referred to the committee constituted by the Vice-Chancellor for necessary action.
  - c) At the time of admission, each scholar must give an undertaking that he/she will abide by the regulations.
- ii. Misconduct in research: Falsification, fabrication, or dishonesty in creating or reporting laboratory results, research results, and/or any other assignments; sexual harassment of other scholars; Contacting the examiner about thesis evaluation are the mode for misconduct.
- iii. *Submitting plagiarized work for an academic requirement:* Plagiarism means representation of another's work or ideas as one's own; it includes the unacknowledged word-for-word use and/or paraphrasing of another person's work, and/or the inappropriate unacknowledged use of another person's ideas.
- iv. Submitting substantially the same work to satisfy requirements for one course or academic requirement that has been submitted in satisfaction of requirements for another course or academic requirement without permission of the teacher/instructor of the course for which the work is being submitted or supervising authority for the academic requirement.
- v. All complaints related to research activities or any matters relating to differences among scholars or complaints about the supervisor or seeking of any information related to research shall be addressed to the Dean Research. Only in the absence of any response, alternate measures shall be sought.
- vi. Any scholar exhibiting misconduct, their registration will be cancelled. Such a scholar will not be eligible for readmission to any of the courses of this University. Further, if such scholar receives any fellowship from the University, it will be withdrawn and the fellowship has to be refunded from the date of the last award. Vice-Chancellor shall be the ultimate authority in imposing disciplinary actions against the scholars for acts of prohibited behaviour.
- vii. *Right to Appeal:* The scholar(s) aggrieved by the action of any authority of the University can appeal to the Dean Research and any scholar aggrieved by the action of the Dean Research can appeal to the Dean Academic Affairs and then to Vice-Chancellor. The decision of the Vice-Chancellor shall be final and binding on the all concerned.
- viii. If Supervisors are found to indulge in any of following acts, based on the severity of the complaint, the supervisorship will be cancelled for a specific duration and disciplinary action will be taken.

- a) Exploiting the services of the scholar for completing the academic tasks assigned to an individual.
  - b) Any act of financial extortion or forceful expenditure burden put on the scholar.
  - c) Any act of sexual abuse or abuse by spoken words, phone calls, short message service (sms) through mobile, emails, posts, public insult leading to the discomfort to the scholar.
- ix. For Supervisors under suspension/undergoing any disciplinary proceedings of the University, Supervisor-in-charge should be nominated by the Dean Research based on the request of the Supervisor and/or the recommendation of the Head of the Department of the Supervisor. The Supervisor-in-charge shall function till the Supervisor resumes duty.

#### **Depository with the University Grants Commission**

- i. Following the successful completion of the evaluation process and announcements of the Award of Ph.D., the University shall submit a soft copy of the Ph.D. thesis to the University Grants Commission within a period of thirty days, for hosting the same in **INFLIBNET** accessible to all Colleges, institutions and Universities.
- ii. The University shall issue a provisional certificate, certifying to the effect that the Degree has been awarded in accordance with the Regulations issued by the University Grants Commission as per the Notification dated 1st June 2009 and subsequently the Gazette of India Published on 11th July 2009.
- iii. The overall result shall be officially declared by the COE within 15 days from the date of the receipt of the favorable report on the defense of the thesis.

## FEE STRUCTURE FOR Ph.D. PROGRAMME

### Schedule of Fee payable for Ph.D Programme:

|  |                                       |
|--|---------------------------------------|
| Prospectus including Entrance Test   | Rs. 1,500/-                           |
| Registration Fee   | Rs. 5,000/-                           |
| Topic Modification   | Rs. 2,000/-                           |
| Semester Fee   | Rs. 30,000/- for Science Subjects     |
|  | Rs. 25,000/- for Non Science Subjects |
| Security (Refundable) to be deposited at the time of Registration          | Rs. 10,000/-                          |
| Thesis Evaluation Charges to be deposited at the time of Thesis Submission | Rs. 10,000/-                          |

### *Extension of period for submission of synopsis*

|  |             |
|--|-------------|
| Upto two months  | Rs. 2,000/- |
| More than two months upto four months                                    | Rs. 4,000/- |
| More than four months upto one year                                      | Rs. 5,000/- |
| Beyond one year; permission and fee to be decided by the Vice-Chancellor |             |

### *Condonation of delay:*

|  |             |
|--|-------------|
| <b><i>In the submission of Progress Report Delay:</i></b>                      |             |
| Upto one month   | Rs. 1,000/- |
| More than a month but upto end of semester                                     | Rs. 2,000/- |
| After that the case will be referred to Research Degree Board for cancellation |             |
| <b><i>In the submission of Thesis after pre-submission presentation:</i></b>   |             |
| Upto two months  | Rs. 1,000/- |
| More than two months, upto four months   | Rs. 2,000/- |
| Beyond four months; permission and fee to be decided by the Vice-Chancellor    |             |

## SCHOLARSHIPS/FELLOWSHIP FOR Ph.D. SCHOLARS

### Scholarships

All the students who join the Akal University for Ph.D. are eligible for scholarship/ Fellowship from CSIR/UGC/DBT/ICMR/MHRD/AICTE/DAE (NBHM)/ DST as the case may be. Immediately on joining the University the students must send the joining report to the concerned authorities/agencies appropriately for activating their scholarship.

### Research Fellowship

- (a) Students not availing any fellowship/scholarship from any organization shall be considered for award of Teaching Assistantship from the date of their application for the same. The value of the assistantship per month for students enrolled in different departments is given below.
- |                      |             |
|----------------------|-------------|
| For first two years  | Rs. 13000/- |
| For next three years | Rs. 15000/- |
- (b) Teaching assistantships shall be awarded upto a maximum period of 5 years.
- (c) Students who join the teaching assistantships programs are, by default, deemed to agree to and assure that they will not leave the course midway. In case, due to unavoidable reason/situation made to leave the course midway, in such a case, must refund the entire scholarship amount drawn by them before leaving the Institute.
- (d) Candidates who receive a salary from their employers/sponsors are not eligible for any teaching assistantships.
- (e) Candidates who receive teaching assistantships shall be required to take teaching load of 5-6 hours per week in the Akal University.



# AKAL UNIVERSITY

**Talwandi Sabo, District: Bathinda-151302**  
[www.auts.ac.in](http://www.auts.ac.in)

## Application Form for entrance test to admission to Ph.D. Programme

**For Office Use**

Date of Receipt:

Reg No. :

**Name of Department:** \_\_\_\_\_

Photograph

1. Name (In Block Letters): .....

2. Father's Name: .....

3. Mother's Name: .....

4. Address:

(a) For correspondence

(b) Permanent

(c) Email: ..... (d) Mobile/Phone : .....

5. (a) Date of Birth : .....(b) Marital Status: .....

(c) Nationality: .....(d) Category: SC/ST/Physically Handicapped.....

6. Details of Universities/Institutions attended (from 10<sup>th</sup> Standard onwards)

*(Attested copies of mark sheets/ grade cards of each examination passed must be attached)*

| University / Board | Degree obtained (with discipline) | Year | % Marks / CGPA / CPI | Class /Div. Obtained | Subjects taken |
|--------------------|-----------------------------------|------|----------------------|----------------------|----------------|
|                    |                                   |      |                      |                      |                |
|                    |                                   |      |                      |                      |                |
|                    |                                   |      |                      |                      |                |
|                    |                                   |      |                      |                      |                |
|                    |                                   |      |                      |                      |                |

*(Attach extra sheets, if required)*

7. (a) Professional Examination passed (attested copy of certificate must be attached):

(I) GATE

(II) UGC/CSIR-NET

| Subject | Score | Roll No. |
|---------|-------|----------|
|         |       |          |
|         |       |          |

| Subject | Date of qualifying | Roll No. |
|---------|--------------------|----------|
|         |                    |          |
|         |                    |          |

8. (a) Professional Experience (Teaching/Research/Industrial), if any, (Certificate to be attached).

| Sr. No | Name of organization | Position held | Type of work | Period |    |
|--------|----------------------|---------------|--------------|--------|----|
|        |                      |               |              | From   | To |
| (i)    |                      |               |              |        |    |
| (ii)   |                      |               |              |        |    |
| (iii)  |                      |               |              |        |    |

*(Attach extra sheets, if required)*

(b) Particulars of Publication (if any):

| Sr. No | Title of the Paper/ Book | Name of the Journal/ Publisher | Place and Year of Publication |
|--------|--------------------------|--------------------------------|-------------------------------|
| (i)    |                          |                                |                               |
| (ii)   |                          |                                |                               |
| (iii)  |                          |                                |                               |
| (iv)   |                          |                                |                               |

(Attach a list of publications/projects etc. separately)

9. (a) If employed, name of the present employer:.....  
 (b) Total period of service up to the date of application:

10. List of Enclosures\*:

|  |  |
|--|--|
|  |  |
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|  |  |

### Declaration

I declare that the entries made in this application form are correct to the best of my knowledge and belief. If admitted, I undertake to abide by the rules and regulations of the University as exist and amended from time to time.

I note that the decision of the University is final with regard to selection for admission and assignment to a particular supervisor. The University shall have the right to take any action it deems fit, including expulsion, against me at any time after my admission, if found that information furnished by me are false or incorrect. I shall abide by the decision of the University, which shall be final.

**Place :**

**Date :**

**Signature of the applicant**

\*The following documents should be submitted with the form:

1. Proof of payment of Entrance test Fee.
2. Two passport size photographs.
3. Self-attested photocopies of Secondary Exam, Senior Secondary, Graduation DMC and Degree, Post Graduation DMC & Degree, M.Phil. Examination, UGC-NET certificates, any other qualification etc.
4. Character Certificate from the last attended institution.
5. NOC from employer, if employed.



**AKAL UNIVERSITY**  
Talwandi Sabo, District: Bathinda-151302  
[www.auts.ac.in](http://www.auts.ac.in)

**Ph.D. Entrance Test 2017**  
**ADMIT CARD**

|                               |                      |  |
|-------------------------------|----------------------|--|
| <b>For office use only</b>    |                      |  |
| <b>Center of Examination:</b> | <b>Roll No.:</b>     |  |
| <b>Application Form No.</b>   | <b>Subject:</b>      |  |
|                               | <b>Subject Code:</b> |  |

|                                 |                                     |
|---------------------------------|-------------------------------------|
| <b>Candidate's Name:</b>        | <b>Self-attested<br/>Photograph</b> |
| <b>Father's/Husband's Name:</b> |                                     |
| <b>Date of Birth:</b>           |                                     |
| <b>Gender:</b>                  |                                     |
| <b>Category:</b>                |                                     |
| <b>Mailing Address:</b>         |                                     |

| <b>Date of Exam</b> | <b>Paper</b> | <b>Timings</b> |
|---------------------|--------------|----------------|
|                     | I            |                |
|                     | II           |                |

**Note:** Candidates without photograph and signature on the admit card will not be permitted to appear in the examination

**Controller of Examination**



**AKAL UNIVERSITY**  
**Talwandi Sabo, District: Bathinda-151302**  
www.akaluniversity.in, www.auts.ac.in

...../Ph.D

**Application form for Registration as a candidate for the degree of Doctor of Philosophy in the Department of .....Under the faculty of .....**

Note: The applicant must carefully read the regulations/rules and Instructions before filling up this form. Please fill in all the columns and clearly indicate 'NOT APPLICABLE' wherever not relevant.

1. (i) Name( IN BLOCK LETTERS): Mr./Ms .....
- (ii) (a) Father's Name : Shri .....
- (b) Mother's Name : Smt.....
2. (i) Permanent Home Address:.....
- (ii) Local Address : .....
- .....Mobile/Tel.No.....
- E-mail Address .....
3. Particulars about Master's Degree (Please also state whether it is M.A. M.Sc./M.Com/M.Ed./M.Phil etc.)
- (i) Year .....
- (ii) University .....
- (iii) Division .....
- (iv) Percentage of Marks obtained .....
- (v) Subject .....
- (vi) Roll No. ....
4. Registration Number (if any) of Akal University, Talwandi Sabo.....
5. Department of the University /approved Centre where research work will be carried out  
 ..... (in case of approved Centre , permission of Head of the Centre be enclosed)  
 .....
6. Fees of Rs. .... Remitted vide Receipt No./D.D. No.....  
 Dated ..... Post Office / Bank .....
7. Whether receiving any scholarship/fellowship? .....
- If Yes, its nature, amount, tenure and source.....
8. Whether employed?.....
- If yes, name and address of the Institution /Organization .....
- (NOC) from the employer be enclosed).....
- .....Tel. No. ....
- Post held .....since .....Permanent /temporary /and hoc.....

DECLARATION

I declare that I shall abide by the regulation, rules and instruction for the degree of Doctor of Philosophy of Akal University, which I have read.

Date .....

.....  
 ( Signature of the Applicant)

CONSENT OF THE PROPOSED SUPERVISOR (S)

1.

2.

Date.....

Signatures of the proposed supervisor(s)  
With complete address, Phone Numbers

**RECOMMENDATION OF THE CHAIRPERSON OF THE  
DEPARTMENT OF THE AKAL UNIVERSITY**

I forward the application of .....for Registration for the degree of Doctor of Philosophy in the faculty of ..... with effect from ..... Provided he/she is found eligible. I further certify that the consent of Prof./Dr./ Shri/Ms. .... and Prof./Dr./ Shri/Ms ..... has been obtained to act as Supervisor of the candidate. The proposed supervisor(s) fulfils/fulfill the condition for appointment as Supervisors and the Research Degree Committee exists in the Subject.

Date.....  
 Signatures of the Head /Chairperson of the  
 Department of .....  
 (Stamp)

**INSTRUCTIONS**

1. Fee for Registration as a Ph.D Candidate.
  - (i) Current Charges /fee may be confirmed from University Website
  - (ii) Fee once remitted /deposited is not refundable.
2. The candidate must submit the following documents with the application:
  - (i) Masters/M.Phil. Degree and DMC in original along with photocopy.
  - (ii) Migration Certificate in case the candidate is migrated from another University.
  - (iii) Permission of Head of the approved centre where research to be carried out.
  - (iv) NOC from the employer in case the candidate is employed.

**IMPORTANT NOTES**

1. Foreign students must hold a valid Research Visa for doing Ph.D. as per circular No. F. 22-7/97-114, dated 9-5-1997 from the Government of India, Ministry of Human Research Development (Department of Education) New Delhi.
2. The date of Registration of the candidate shall be the one on which the Head /chairperson of the Department forwards the application with certificates, documents and other essential papers related to his / her Registration for Ph.D.

**FOR OFFICE USE**

| Remarks regarding eligibility                          | Remarks regarding fees   |
|--|--|
| 1. Date of receipt of application .....                | Fees Required .....  |
| 2. Verification of Masters Degree.....                 | Registration fee Rs.....   |
| 3. a) Year .....                                       | Approval of Candidacy fee : Rs..... Migration fee :                        |
| b) University .....                                    | Rs..... Total fee : Rs.....  |
| c) Division .....Percentage of Marks obtained<br>..... |  |
| d) Subject .....                                       | Asstt. Dealing Official  |
| e) Roll No. ....                                       | <b>VERIFICATION</b>  |
| f) Registration No. ....                               | The sum of Rs. ....has been received vide receipt No.<br>..... dated ..... |
| The application is eligible and may be Registered      |  |

A.R. Asstt. Dealing Official Signature of Accounts Clerk  
 For Further action please. Date.....  
 O.S.M.



# AKAL UNIVERSITY

Talwandi Sabo, District: Bathinda-151302

[www.auts.ac.in](http://www.auts.ac.in)

## APPLICATION FOR CONFIRMATION OF REGISTRATION FOR THE DEGREE OF DOCTOR OF PHILOSOPHY (Ph.D.)

IN THE DEPARTMENT of:..... UNDER THE FACULTY:.....

(i) Name (IN BLOCK LETTERS):.....

(ii) Father's Name: .....

(iii) Mother's Name:.....

(iv) Registration Number of Akal University:.....

(v) Permanent Address:.....

(vi) E-mail:.....

(vii) Phone No/Mobile :.....

(viii) Address for Correspondence:.....

(ix) Department of the University/Centre where research work will be carried out by the candidate:.....

(x) Date of registration for Ph.D.:.....Registration No:.....

(xi) Tentative title of thesis\*:.....

I am appending here with \_\_\_\_\_ copies (15 copies) of the tentative design/ synopsis of my proposed research project, through the Head of the Department. I further certify that I have thoroughly checked all words and spellings of the tentative title of the proposed thesis of synopsis and found the same as correct.

Date:.....

.....  
(Full Signatures of Applicant)

\*Provide the title in Roman Script in Case the title of Ph.D. thesis is in a language other than English.

RECOMMENDATION OF THE HEAD OF THE DEPARTMENT OF THE AKAL UNIVERSITY FOR RESEARCH  
WORK LEADING TO Ph.D. DEGREE.

(i) I recommend that the candidate Mr/Ms..... be  
registered for the degree of Doctor of Philosophy (Ph.D.) in the Faculty of.....

(ii) I further recommend that

(a) Mr./Ms/Dr.:.....

(Address)..... be appointed as his/her

Supervisor/s, whose consent has already been obtained in writing

(b)The proposed title of synopsis as mentioned above be approved.

(iii)It is certified that the recommendation regarding appointment of Supervisor/s is covered under the relevant rule/s relating to number of candidates which could be guided by a Supervisor (as contained in Akal University Calendar).

(v) It is further certified that the appointment of Supervisor/s, and tentative title of Ph.D. thesis/broad area of work have been duly recommended by the Academic and Research Degree Committee (RDC) of the Department in their joint meeting held on .....

Signature/s, designation and address of Supervisor/s

(i) .....

.....

(ii) .....

.....

Dated :.....

.....

Signature (along with seal of the office)  
of the Chairperson of the Department

**PROFORMA FOR SIX-MONTHLY PROGRESS REPORT FOR Ph.D. CANDIDATES**

(To be submitted in every semester)  
(Please use extra sheet/s where required)

- (1) Name of the candidate:.....
- (2) Faculty:.....
- (3) Department:.....
- (4) Registration Number and Date:.....
- (5) Confirmation of Registration:.....
- (6) Tentative/Approved Title:.....  
.....  
.....
- (7) \* A summary of the work done during the last six months (Depending upon the stage of Ph.D. work providing details of(i) Review of Literature; (ii) Experimentation/Data Collection, Field work; (iii) Data Processing; (iv) Data Analysis and Interpretation and (v) Stage of Thesis Writing, with specific reference to the goals set for the previous 6 months.
- (8) \*Did you complete the tasks and achieve the goals you had set for the period under report?
- (9) \*Difficulties, constraints faced in achieving the objectives that had been formulated for the period under report.
- (10)\*Work to be undertaken. Specific details (in quantifiable terms to the extent possible) of the plan of work for the next 6 months.

\*To be provided separately.

**Certificate**

It is certified that the information provided above is correct to the best of my knowledge. I shall try my best to achieve the above targets during the next six months.

Name of the Candidate:.....

Signature with date:.....

**Certificate**

I/We approve and certify the progress report and plan of work submitted by the candidate.

Supervisor(s) Name(s):

(1).....

(2).....

(3).....

Signature(s) with date:

(1).....

(2).....

(3).....

Counter-Signature of the Head of the Department

Note: The Head of the Department will place the six-monthly progress report so received before the meeting of the Academic Committee of the Department within one month of its receipt. The Head will send the minutes and recommendations of the Committee to the Dean Research within a week's time and a copy of the report be also kept in the personal file of the candidate to be maintained by the Department concerned. In the case of a candidate who does not submit the progress report within the stipulated time, the Committees may recommend suitable action, and repetition of such a practice might invite cancellation of his/her Ph.D. registration

## GUIDELINES FOR THE PREPARATION OF SYNOPSIS

In view of the growing interdisciplinary research, qualitative research methodology and diverse nature of different disciplines within sciences and social sciences, it would be self damaging to process a structured model synopsis for Ph.D. There has to be sufficient space across and within disciplines for developing research proposals using different methodologies and structure as per the research questions methodology etc. However, a broad format for the Ph.D. synopsis is as follows so that minimum pre requisites are met:

- i. Title of research.
- ii. Introduction of the research topic in broader framework.
- iii. Importance/motivation of the topic chosen.
- iv. Theoretical framework available on the research topic.
- v. Evidence available on the topic: Review of Literature (instead of merely presenting the review in chronological order, with no-connection to each other,. a thematic presentation of literature/ empirical studies should be attempted out of which research gaps may be identified)
- vi. Overview of the evidence (Preferable in Tabular Form)
- vii. Research gaps.
- viii. Formulation of Research problem
- ix. Objectives of the proposed study
- x. Hypotheses proposed (optional)
- xi. Methodology proposed (detailed method of study must be presented)
- xii. Chapter Scheme (Tentative).
- xiii. Time Framework.
- xiv. References.

The size of Synopsis should not be less than 30 pages of typed matter reckoned from the first page to the last page including the List of References.

The sequence in which the Synopsis should be arranged is as follows with References and List of Publications in separate pages:

1. Cover Page (As per Sample I)
2. Main Pages: Text divided into suitable Headings (numbered consecutively)
3. References: American Physiological Society (APS) reference style should be followed.
4. Appendices: If any

Standard A4 size (297mm x 210mm) paper may be used for preparing the copies. The Synopsis should have a margin of at least 4.0 cm must be left at the top and left side of each page and a margin of at least 2.5 cm on the right and bottom. One and half line spacing should be used for typing the general text. The general text shall be typed in Font Style Times New Roman/Calibri and Font Size 12 with both side printing. Tables/Figures may be included at appropriate places in the text and they should conform to the margin specifications. All page numbers should be typed without punctuation on the bottom

centre 20 mm from bottom with the last digit in line with the bottom margin. Synopsis can be bound or spiral bound. The cover should be printed in black letters and the text for printing should be identical to what has been prescribed for the title page.

Sample I

<Font Style: Time New Roman/Calibri same for entire page>

**TITLE OF THE RESEARCH STUDY**

<Font Size: 18 and 1.5 line spacing>

<Font Size: 12 and 1.5 line spacing>

Synopsis

For the degree of

DOCTOR OF PHILOSOPHY

In the FACULTY OF ARTS

(Economics)

AKAL UNIVERSITY, TALWANDI SABO



Supervisor(s):

Submitted by:

Signature  
(Name)

Signature  
(Name)

<Font Size: 12 and 1.5 line spacing>

NAME OF THE DEPARTMENT

AKAL UNIVERSITY

TALWANDI SABO

MONTH, YEAR

## **GUIDELINES FOR THE PREPARATION OF THESIS**

### **1. GENERAL**

The manual is intended to provide broad guidelines to the research scholars in the preparation of the Thesis. In general, the Thesis shall report, in an organized and scholarly fashion, an account of original research work of the research scholar leading to the discovery of new facts or techniques or correlation of facts already known (analytical, experimental, etc.). Thesis shall demonstrate a quality as to make a definite contribution to the advancement of knowledge and the research scholar's ability to undertake sustained research and present the findings in an appropriate manner with actual accomplishments of the work.

### **2. SIZE OF THESIS**

The size of the Thesis shall be normally between 100 and 400 pages of typed matter reckoned from the first page of Chapter 1 to the last page of the thesis excluding reference section. However, it may vary as per subject/research topic specific requirements.

### **3. ARRANGEMENT OF THE CONTENTS OF THE THESIS**

The sequence in which the Thesis material should be arranged and bound is as follows:

- i. Cover Page and Title page (as shown in Sample II)
- ii. Certificate (as shown in Sample III)
- iii. Acknowledgements
- iv. Table of Contents (as shown in Sample IV)
- v. List of Tables
- vi. List of Figures
- vii. Acronyms used (as shown in Sample V)
- viii. Chapters
- ix. Appendices and/or Annexure
- x. References

The Tables and Figures should be included subsequently after referring them in the text of the Thesis.

**The thesis should be printed on both sides of paper.**

### **4. FONT**

The Thesis should be written in English except in the faculty of languages where the thesis shall be in that language. It must be typewritten on A4 size paper (21 cm x 29.7 cm) in a clear and legible font (Times New Roman 12 or Calibri 12). As far as possible, use the same font for the entire thesis but, if necessary, different fonts may be used for Tables, Figures, and Appendices. The Thesis has to be printed both-sided. 1.5 spacing should be used in the text of the Thesis. Single spacing should be used in long Tables, block quotations separated from the text, footnotes, and bibliographical entries. Paragraphs should be indented, or an empty line left between paragraphs.

Larger size type may be used for the title of the Thesis and for Chapter headings, as long as it is not larger than 18 point. Boldface type may also be used on the title page and for headings, as well as in the

text for special symbols or for emphasis. Reduced type may be used within Tables, Figures, and Appendices, but it should be at least 9 point in size and must be completely legible.

The Thesis should be free from grammatical, lexical and punctuation errors. In addition to the computer spellchecker, a thesis should be proof-read to avoid errors bypassed by the spellchecker. The thesis should consistently use either American or British spelling but should not mix the two. When using numbers in the text, if the first word of a sentence is a number, it should be written in words.

#### **4. CHAPTER AND PAGE LAYOUT**

Begin each Chapter on a new page. Do the same with each element of the front matter (list of Tables, Acknowledgments, etc.), the Reference section, and each Appendix. Avoid typing a heading near the bottom of a page unless there is room for at least two lines of text following the heading. The Chapters should begin on a new page, but sections and subsections should not. A "display" page (a page that shows only the Chapter title) can be placed at the beginning of Chapters or Appendices. Pages should be numbered at the bottom in the centre, using Arabic numerals (1, 2, 3) beginning with 1 on the first page of the Introduction and continuing consecutively to the end of the manuscript including References. The preliminary pages are numbered in lower-case Roman numerals, beginning with the declaration page.

#### **5. MARGINS**

A margin of at least 4.0 cm must be left at the top and left side of each page and a margin of at least 2.5 cm on the right and bottom. The last letter or character in the longest line on the page determines the margin.

#### **6. CAPTIONS AND NUMBERING (TABLES AND FIGURES)**

Each Table should carry a number and a title clearly describing the data presented. Similarly each Figure / Illustration should carry a number and caption that clearly describes the nature of data presented. The caption should be at the bottom of the Figure. Number them consecutively throughout, in the order in which they are placed in the text. The Figures, Graphs, Tables should be embedded in the text of the thesis, immediately after the first mention of it in the text, on the same page if there is room, or on the following page.

Captions and titles of Figures and Tables should appear on the same page as the material itself. Tables should be numbered consecutively with Arabic numerals throughout the thesis. Figures and Illustrations should also be numbered consecutively in the order of presentation. All Tables and Figures must be referred to in the text by numbers and not by a phrase such as "the following table".

Tables or Figures of peripheral importance to the text may be placed in an Appendix.

## **7. APPROPRIATE USE OF HEADINGS AND SUBHEADINGS**

Headings should be distinguished from the surrounding text by a larger font size, a different font/bold/italics/underlined/or a combination of these. All headings of the same level should follow the same style, and headings at lower levels should be less prominent than those at higher levels.

*Example:*

Chapter Title (Calibri/ Times New Roman 16 point -Bold Small caps)

Heading for section (Calibri/ Times New Roman 14 point - Bold Italic)

Heading for sub-section (Calibri /Times New Roman 12 point - Bold)

Heading for part of subsection- (Calibri / Times New Roman 12 point- Bold Italic)

All headings should be left aligned, except chapter headings, which may be centered. The headings and subheadings can be numbered, if necessary.

## **8. FORMAT OF THESIS**

The manuscript generally consists of three main parts: The Preliminaries, The Text, and The Annexure/Appendix. It may be arranged in the following sequence:

### **The Preliminaries**

Cover Page

Title Page

Declarations by scholar

Certificate by supervisor(s)

Acknowledgements

Table of Contents

List of Figures, Tables or Illustrations

List of Acronym used (optional)

### **The Body Matter**

The body matter contains the main text of the thesis. It should be divided into chapters, which are often (but not necessarily) of approximately the same length. Each chapter title should provide a reasonable clue to the contents of the chapter.

#### **Chapter 1/Introduction**

The first chapter in the thesis is to be labeled as "Introduction" and it should serve to acquaint the reader with the topic of investigation, its importance and the issues it raises. The introduction may include a theoretical and empirical overview of literature, where the author provides short summaries of works relevant for the topic. The main emphasis should be to illustrate what is already known about the problem(s) dealt with in the thesis, and to demonstrate that the doctoral candidate is most update with the past and latest knowledge on the topic.

The middle chapters

The exact structure of the middle chapters may vary, depending on the research topic/field of study. It should usually contain Methods and Materials, Results and Discussion. In some thesis, the middle chapters can be journal articles where the doctoral candidate is a first author.

Final chapter/Summary and Conclusion

The final chapter of a thesis is almost inevitably called "Conclusion". It should summarize whole of the thesis presented in proceeding chapters and may include suggestions for future research, and/or practical implications of the findings. This chapter should be relatively short and preferably written in a way that it can stand alone. Avoid copy-pasting sentences from the introduction and middle chapters.

### ***Back Matter***

The contents of the back matter are generally supplementary. The back matter of a thesis usually comprises of the followings:

#### ***Reference List***

A reference list includes all sources cited in the work.

#### ***Annexure/Appendix***

The material found in the annexure/appendix is not essential to the thesis, but can be helpful for the reader who seeks further information. Examples are: source texts, lists, survey questionnaires, and sometimes even charts and tables. The appendix should not be a repository of raw data that the author has not been able to work into the main text. If there are two or more appendices, they may be designated by letters: Appendix A, Appendix B, etc.

## **9. STRUCTURE OF THE PRELIMINARY PARTS**

**OUTER COVER** (Lay out given in **Sample-I**)

**TITLE PAGE** (Lay out given in **Sample-II**)

**DECLARATION OF AUTHORSHIP** (Format given in **Sample-III**): The student should make this declaration.

**CERTIFICATE BY THE RESEARCH GUIDE** (Format given in **Sample-IV**) The supervisor(s) have to provide a certificate.

### **ACKNOWLEDGEMENTS**

The acknowledgement of the thesis is written in gratitude to all those who were instrumental in bringing the thesis to fruition. The language used should be formal. Acknowledge those who have assisted technically (including materials, supplies), intellectually (assistance, advice) and financially (for example, funding agency institutional support, travel grants)

### **TABLE OF CONTENTS**

The thesis must have a table of contents page listing chapters' headings, section headings and sub-headings as well as appendices and their corresponding page number, as illustrated below. Indent

subheadings as shown below

**TABLE OF CONTENTS**

|                        | Page    |
|------------------------|---------|
| Declaration by student | i       |
| Certificate of guide   | ii      |
| Acknowledgements       | iv      |
| List of Figures        | v       |
| List of Tables         | vi      |
| Acronym used           | vii     |
| Introduction           | 1-5     |
| Subhead 1              | 2       |
| Subhead 2              | 3       |
| Subhead 3              | 5       |
| Chapter 2 Title        | 12-25   |
| Subhead 1              | 16      |
| Subhead 2              | 19      |
| Subhead 3              | 25      |
| Chapter 3 Title        | 26-40   |
| Subhead 1              | 32      |
| Subhead 2              | 34      |
| Subhead 3              | 36      |
| .....                  | .....   |
| Conclusion             | 390-396 |
| References             | 397-400 |
| Appendices/Annexures   | 401-405 |
| Title....A             | 401     |
| .....B                 | 403     |

A separate list of Figures, Tables, or Illustrations should be included on a separate page immediately following the table of contents.

**LIST OF FIGURES**

| Figure No. | Caption | Page |
|------------|---------|------|
|------------|---------|------|

**LIST OF TABLES**

| Table No. | Title | Page |
|-----------|-------|------|
|-----------|-------|------|

**LIST OF ABBREVIATIONS:** (optional)

If a large number of abbreviations are used in the thesis, which may be unfamiliar to general

readers, a list of abbreviations may be included.

#### **10. THE TEXT OF THE THESIS**

The text of the thesis is usually divided into chapters with subheadings within the chapters to indicate the orderly progression of topics and their relation to each other.

All chapter headings should be typed consistently. When there are subheadings, each level of heading should be clearly distinguished typographically from the other levels, and the variations should be selected so as to reflect in an obvious way the hierarchy of headings (that is, higher level headings should look more important). Always allow at least one extra line of space above subheadings, and preferably below as well.

**LIST OF REFERENCES:** All publications cited in the thesis should be presented in a list of references following the text. Students are advised to strictly follow American Physiological Society (APS) citation and reference style.

#### **11. APPENDICES/ANNEXURE**

Appendices may include the formulas, diagrams, protocols, or any similar data that are not contained in the body of the thesis. The number can be given as A, B, C and listed as such in the table of contents.

**Sample-I: Sample of the outer cover of the thesis**

<Font Style: ALL IN CAPITALS FONT SIZE 16, BOLD, ARIAL, CENTRE, 1.5 LINE SPACING>

**TITLE EXACTLY AS APPROVED BY THE RDC**

< FONT SIZE 14, ARIAL, CENTRE, SINGLE LINE SPACING>

**A THESIS  
Submitted to the  
FACULTY OF.....  
AKAL UNIVERSITY, TALWANDI SABO  
for the degree of**

**DOCTOR OF PHILOSOPHY**

**YEAR OF SUBMISSION**

**Name of the candidate in u/l Arial font size 14 bold Centre**

**Address of the department where registered**

On the bone of the thesis

**Ph.D. Thesis,** Its title in bold caps, name of the candidate and year of submission.

**Sample-II: Sample of the Title page**

<Font Style: ALL IN CAPITALS FONT SIZE 16, BOLD, ARIAL, CENTRE, 1.5 LINE SPACING>

**TITLE EXACTLY AS APPROVED BY THE RDC**

< FONT SIZE 14, ARIAL, CENTRE, SINGLE LINE SPACING>

**A THESIS**  
**Submitted to the**  
**FACULTY OF.....**  
**AKAL UNIVERSITY, TALWANDI SABO**  
for the degree of

**DOCTOR OF PHILOSOPHY**



**MONTH AND YEAR OF SUBMISSION**

**Name of the candidate in u/l Arial font size 14 bold Centre**

**Address of the department where registered**

Sample-III:

**Format of Declaration given by students**

**DECLARATION**

I, ....., certify that the work embodied in this Ph. D. thesis is my own bonafide work carried out by me under the supervision of.....and the co-supervision of .....for a period of ..... from ..... to ..... at Akal University.

The matter embodied in this Ph.D. thesis has not been submitted elsewhere for the award of any other degree/diploma. I declare that I have faithfully acknowledged, given credit to and referred to the research workers wherever their works have been cited in the text and the body of the thesis.

I, further certify that I have not will-fully lifted up some other's work, para, text, data, results, etc. reported in the journals, books, magazines, reports, dissertations, theses, etc., or available at web-sites and have included them in this Ph. D. thesis and cited as my own work.

.....

(Signature of the Research Scholar)

Date:

Sample-IV:

**Format of Certificate given by supervisor(s)**

**CERTIFICATE**

I certify that *Name of the Candidate* has prepared his/her thesis entitled "*Title exactly approved by RDC*", for award of Ph.D. degree of Akal University, Talwandi Sabo under my guidance.

He/ She has carried out his/her research work at the *Name of the Department, Akal University, Talwandi Sabo*.

Supervisor(s) Signature

Name and Designation

Date: