

Zoology — Optional Syllabus

UPSC Civil Services (Main) Examination

Animal life in full — from cells and genetics to ecology and evolution.

Paper I	250 marks	3 hours
Paper II	250 marks	3 hours
Optional total	500 marks	Counts toward the Mains merit

Paper I syllabus 250 marks · 3 hours

1. Non-chordata and Chordata :

- (a) Classification and relationship of various phyla up to subclasses: Acoelomate and Coelomate, Protostomes and Deuterostomes, Bilateria and Radiata; Status of Protista, Parazoa, Onychophora and Hemichordata; Symmetry.
- (b) Protozoa: Locomotion, nutrition, reproduction, sex; General features and life history of Paramaecium, Monocystis. Plasmodium and Leishmania.
- (c) Porifera: Skeleton, canal system and reproduction.
- (d) Cnidaria: Polymorphism, defensive structures and their mechanism; coral reefs and their formation; metagenesis; general features and life history of Obelia and Aurelia.
- (e) Platyhelminthes: Parasitic adaptation; general features and life history of Fasciola and Taenia and their-Pathogenic symptoms.
- (f) Nematelminthes: General features, life history, parasitic adaptation of Ascaris and Wuchereria.
- (g) Annelida: Coelom and metamerism; modes of life in polychaetes; general features and life history of Nereis, earthworm and leach.
- (h) Arthropoda: Larval forms and parasitism in Crustacea; vision and respiration in arthropods (Prawn, cockroach and scorpion); modification of mouth, parts in insects (cockroach, mosquito, housefly, honey bee and butterfly), metamorphosis in insect and its hormonal regulation, socialbehaviour ofApis and termites.
- (i) Molluscs: Feeding, respiration, locomotion, general features and life history of Lamellidens, Pila and Sepia. Torsion and detorsion in gastropods.
- (j) Echinodermata: Feeding, respiration, locomotion, larval forms, general features and life history of Asterias.
- (k) Protochordata: Origin of chordates; general features and life history of Branchiostoma and Herdmania.
- (l) Pisces: Respiration, locomotion and migration.
- (m) Amphibia: Origin of tetrapods, parental care, paedomorphosis.
- (n) Reptilia; Origin of reptiles, skull types, status of Sphenodon and crocodiles.
- (o) Aves: Origin of birds, flight adaptation, migration.

- (p) Mammalia: Origin of mammals, dentition, general features of egg laying mammals, pouched-mammals, aquatic mammals and primates, endocrine glands (pituitary, thyroid, parathyroid, adrenal, pancreas, gonads) and their interrelationships.
- (q) Comparative functional anatomy of various systems of vertebrates. (integument and its derivatives, endoskeleton, locomotory organs, digestive system, respiratory system, circulatory system including heart and aortic arches, urinogenital system, brain and sense organs (eye and ear).

2. Ecology :

- (a) Biosphere: concept of biosphere; biomes, Biogeochemical cycles, Human induced changes in atmosphere including green house effect, ecological succession, biomes and ecotones, community ecology.
- (b) Concept of ecosystem; structure and function of ecosystem, types of ecosystem, ecological succession, ecological adaptation.
- (c) Population; characteristics, population dynamics, population stabilization.
- (d) Biodiversity and diversity conservation of natural resources.
- (e) Wildlife of India.
- (f) Remote sensing for sustainable development.
- (g) Environmental biodegradation; pollution and its impact on biosphere and its prevention.

3. Ethology :

- (a) Behaviour: Sensory filtering, responsiveness, sign stimuli, learning, and memory, instinct, habituation, conditioning, imprinting.
- (b) Role of hormones in drive; role of pheromones in alarm spreading; crypsis, predator detection, predator tactics, social hierarchies in primates, social organization in insects;
- (c) Orientation, navigation, homing; biological rhythms: biological clock, tidal, seasonal and circadian rhythms.
- (d) Methods of studying animal behaviour including sexual conflict, selfishness, kinship and altruism.

4. Economic Zoology :

- (a) Apiculture, sericulture, lac culture, carp culture, pearl culture, prawn culture, vermiculture.
- (b) Major infectious and communicable diseases (malaria, filaria, tuberculosis, cholera and AIDS) their vectors, pathogens and prevention.
- (c) Cattle and livestock diseases, their pathogen (helminths) and vectors (ticks, mites, Tabanus, Stomoxys).
- (d) Pests of sugar cane (*Pyrilla perpusiella*), oil seed (*Achaeajana*) and rice (*Sitophilus oryzae*).
- (e) Transgenic animals.
- (f) Medical biotechnology, human genetic disease and genetic counselling, gene therapy.
- (g) Forensic biotechnology.

5. Biostatistics :

- Designing of experiments; null hypothesis; correlation, regression, distribution and measure of central tendency, chi square, student-test, F-test (one-way & two-way F-test).

6. Instrumentation methods :

- (a) Spectrophotometer, phase contrast and fluorescence microscopy, radioactive tracer, ultra centrifuge, gel . electrophoresis, PCR, ELISA, FISH and chromosome painting.
- (b) Electron microscopy (TEM, SEM).

Paper II syllabus 250 marks · 3 hours

1. Cell Biology :

- (a) Structure and function of cell and its organelles (nucleus, plasma membrane, mitochondria, Golgi bodies, endoplasmic reticulum, ribosomes and lysosomes), cell division (mitosis and meiosis), mitotic spindle and mitotic apparatus, chromosome movement chromosome type ploytene and lambrush, organization of chromatin, heterochromatin, Cell cycle regulation.
- (b) Nucleic acid topology, DNA motif, DNA replication, transcription, RNA processing, translation, protein foldings and transport.

2. Genetics :

- (a) Modern concept of gene, split gene, genetic regulation, genetic, code.
- (b) Sex chromosomes and their evolution, sex determination in Drosophila and human.
- (c) Mendel's laws of inheritance, recombination, linkage, multiple alleles, genetics of blood groups, pedigree analysis, hereditary diseases in human.
- (d) Mutations and mutagenesis.
- (e) Recombinant DNA technology, plasmid, cosmid, artificial chromosomes as vectors, transgenics, DNA cloning and whole animal cloning (principles and methods).
- (f) Gene regulation and expression in prokaryotes and eukaryotes.
- (g) Signal molecules, cell death, defects in signaling pathway and consequences.
- (h) RFLP, RAPD and AFLF and application of RFLP in DNA finger-printing, ribozyme technologies, human genome project, genomics and protomics.

3. Evolution :

- (a) Theories of origin of life.
- (b) Theories of evolution; Natural selection, role of mutation in evolution, evolutionary patterns, molecular drive, mimicry, variation, isolation and speciation.
- (c) Evolution of horse, elephant and human using fossil data.
- (d) Hardy-Weinberg Law.
- (e) Continental drift and distribution of animals.

4. Systematics :

- Zoological nomenclature, international code, cladistics, molecular taxonomy and biodiversity.

5. Biochemistry :

- (a) Structure and role of carbohydrates, fats, fatty acids, cholesterol, proteins and amino-acids, nucleic acids. Bioenergetics.
- (b) Glycolysis and Krebs cycle, oxidation and reduction, oxidative phosphorylation; energy conservation and release, ATP, cyclic AMP-its structure and role.
- (c) Hormone classification (steroid and peptide hormones), biosynthesis and functions.
- (d) Enzymes: types and mechanisms of action.
- (e) Vitamins and co-enzymes.
- (f) Immunoglobulin and immunity.

6. Physiology (with special reference to mammals) :

- (a) Composition and constituents of blood; blood groups and Rh factor in human; factors and mechanism of coagulation; iron metabolism, acid-base balance, thermo regulation, anticoagulants.
- (b) Haemoglobin: Composition, types and role in transport of oxygen and carbon dioxide.
- (c) Digestion and absorption: Role of salivary glands, liver, pancreas and intestinal glands.
- (d) Excretion: nephron and regulation of urine formation; osmo-regulation and excretory product.
- (e) Muscles: Types, mechanism of contraction of skeletal muscles, effects of exercise on muscles.
- (f) Neuron: nerve impulse—its conduction and synaptic transmission; neurotransmitters.
- (g) Vision, hearing and olfaction in human.
- (h) Physiology of reproduction puberty and menopause in human.

7. Developmental Biology :

- (a) Gametogenesis; spermatogenesis, composition of semen, in vitro and in vivo capacitation of mammalian sperm, Oogenesis, totipotency; fertilization, morphogenesis and morphogen; blastogenesis, establishment of body axes formation, fate map, gastrulation in frog and chick; genes in development in chick homeotic genes, development of eye and heart, placenta in mammals.
- (b) Cell lineage, cell to cell interaction, Genetic and induced teratogenesis, role of thyroxine in control of metamorphosis in amphibia, paedogenesis and neoteny, cell death, aging.
- (c) Developmental genes in human, in vitro fertilization; and embryo transfer; cloning.
- (d) Stem cells: Sources, types and their use in human welfare.
- (e) Biogenetic law.

APPENDIX-II

INSTRUCTIONS TO THE CANDIDATES FOR FILLING ONLINE APPLICATIONS

- Candidates are required to apply Online using the website <https://upsconline.nic.in>.
- Detailed instructions for filling up online applications are available on the above mentioned website under 'Instructions and FAQs' -> 'Instructions for Filling the form.'
- Candidates are advised to go through the General instructions, Profile/Module wise instructions and instructions for uploading of documents before proceeding to fill up the form. A candidate who is willing to apply for Civil Services Examination shall be required to submit the requisite information and supporting documents towards various claims, such as date of birth, educational qualification, etc. as may be sought by the Commission alongwith the Universal

Registration Number (URN), Common Application Form (CAF) and the fourth module i.e. Examination Specific module (including fees and centre etc.).

- The candidate should have details of one Photo ID Card viz. Aadhar Card/ Voter Card (EPIC) / PAN Card / Passport/ Driving License / Any other photo ID card issued by the State / Central Government. The details of this photo ID will have to be provided by the candidate while filling up the online application form. This photo ID will be used for all future references and the candidate is advised to carry this Photo ID while appearing for the Examination/Personality Test.
- The Online applications (Part I, Part-II, Part-III and Part-IV) can be filled from 04 th February, 2026 to 24th February, 2026 till 18:00 Hrs.
- Applicants should not submit multiple applications.
- The applicants must ensure that while filling their Application Form, they are providing their valid and active E-Mail IDs as the Commission may use electronic mode of communication while contacting them at different stages of examination process.
- The applicants are advised to check their emails at regular intervals and ensure that the email addresses ending with @ nic.in and @ gov.in are directed to their inbox folder and not to the SPAM folder or any other folder.
- Candidates are strongly advised to apply online well in time without waiting for the last date for submission of Online Applications.
- APPENDIX-III IMPORTANT INSTRUCTIONS TO WITHDRAW APPLICATION The candidates will not be allowed to withdraw their applications after the submission of the same.
- APPENDIX-IV
- Appendix –V
- Certificate regarding physical limitation in an examinee to write
- This is to certify that, I have examined Mr./Ms./Mrs..... (name of the candidate with benchmark disability), a person with (nature and percentage of disability as mentioned in the certificate of disability), S/o/D/o....., a resident of (Village/District/State) and to state that he/she has physical limitation which hampers his/her writing capabilities owing to his/her disability.
- Signature
- Chief Medical Officer/Civil Surgeon / Medical Superintendent of a Government Health Care Institution.
- Note: Certificate should be given by a specialist of the relevant stream/disability (eg. Visual Impairment – Ophthalmologist, Locomotor disability – Orthopaedic specialist/PMR).
- Appendix –VI
- Letter of Undertaking for Using Own Scribe (To be filled by the candidates online to the Commission)
- I....., a candidate with.....(name of the disability) appearing for the (name of the examination)..... bearing Roll No..... at (name of the centre) in the District, (name of the State). My qualification is I do hereby state that (name of the scribe) will provide the service of scribe/reader/lab assistant for the undersigned for taking the aforesaid examination.
- I do hereby undertake that his qualification is In case, subsequently it is found that his/her qualification is not as declared by the undersigned and is beyond my qualification, I shall forfeit my right to the post and claims thereto.

- (Signature of the candidates with Disability)
- Place: Date:
- Appendix-VII
- Certificate for person with specified disability covered under the definition of Section 2(s) of the RPwD Act, 2016 but not covered under the definition of Section 2(r) of the said Act, i.e. persons having less than 40% disability and having difficulty in writing
- This is to certify that, we have examined Mr./Ms./Mrs.....
(name of the candidate), S/o / D/o, a resident of
..... (Vill/PO/PS/District/State), aged.....yrs, a person with
..... (nature of disability/condition), and to state that he/she has limitation which hampers his/her writing capability owing to his/her above condition. He/she requires support of scribe for writing the examination.

2. The above candidate uses aids and assistive device such as prosthetics & orthotics, hearing aid

- (name to be specified) which is /are essential for the candidate to appear at the examination, with the assistance of scribe.

3. This certificate is issued only for the purpose of appearing in written examinations conducted by

- recruitment agencies as well as academic institutions and is valid upto (it is valid for maximum period of six months or less as may be certified by the medical authority)
- Signature of medical authority
- (Signature & (Signature & Name) (Signature & (Signature & (Signature & Name) Name) Name) Name) Orthopedic/PMR Clinical psychologist/ Neurologist (if Occupational Other Expert, as Specialist Rehabilitation Psychologist available) therapist (if nominated by the / Psychiatrist / Special available) Chairperson (if Educator any) (Signature & Name) Chief Medical Officer / Civil Surgeon / Chief District Medical Officer Chairperson
- Name of Government Hospital / Health Care Centre with seal
- Place : Date :
- Appendix-VIII
- Letter of Undertaking by the person with specified disability covered under the definition of Section 2(s) of the RPwD Act, 2016 but not covered under the definition of Section 2(r) of the said Act, i.e. persons having less than 40% disability and having difficulty in writing
- I....., a candidate with (nature of disability/condition) appearing for the (name of the examination) bearing Roll No..... at (name of the centre) in the District (name of the state). My educational qualification is

2. I do hereby state that (name of the scribe) will provide the service of

- scribe for the undersigned for taking the aforementioned examination.

3. I do hereby undertake that his qualification is In case, subsequently it is

- found that his qualification is not as declared by the undersigned and is beyond my qualification. I shall forfeit my right to the post or certificate/diploma/degree and claims relating thereto.
- (Signature of the candidate) Place : Date :

Syllabus as per the official UPSC Civil Services (Main) Examination notification. Study notes for this optional are being added on RaahUPSC — raahupsc.com.