

PREFACE

With its grounding in the “guiding pillars of Access, Equity, Equality, Affordability and Accountability,” the New Education Policy (NEP 2020) envisions flexible curricular structures and creative combinations for studies across disciplines. Accordingly, the UGC has revised the CBCS with a new Curriculum and Credit Framework for Undergraduate Programmes (CCFUP) to further empower the flexible choice based credit system with a multidisciplinary approach and multiple/ lateral entry-exit options. It is held that this entire exercise shall leverage the potential of higher education in three-fold ways – learner’s personal enlightenment; her/his constructive public engagement; productive social contribution. Cumulatively therefore, all academic endeavours taken up under the NEP 2020 framework are aimed at synergising individual attainments towards the enhancement of our national goals.

In this epochal moment of a paradigmatic transformation in the higher education scenario, the role of an Open University is crucial, not just in terms of improving the Gross Enrolment Ratio (GER) but also in upholding the qualitative parameters. It is time to acknowledge that the implementation of the National Higher Education Qualifications Framework (NHEQF), National Credit Framework (NCrF) and its syncing with the National Skills Qualification Framework (NSQF) are best optimised in the arena of Open and Distance Learning that is truly seamless in its horizons. As one of the largest Open Universities in Eastern India that has been accredited with ‘A’ grade by NAAC in 2021, has ranked second among Open Universities in the NIRF in 2024, and attained the much required UGC 12B status, Netaji Subhas Open University is committed to both quantity and quality in its mission to spread higher education. It was therefore imperative upon us to embrace NEP 2020, bring in dynamic revisions to our Undergraduate syllabi, and formulate these Self Learning Materials anew. Our new offering is synchronised with the CCFUP in integrating domain specific knowledge with multidisciplinary fields, honing of skills that are relevant to each domain, enhancement of abilities, and of course deep-diving into Indian Knowledge Systems.

Self Learning Materials (SLM’s) are the mainstay of Student Support Services (SSS) of an Open University. It is with a futuristic thought that we now offer our learners the choice of print or e-slm’s. From our mandate of offering quality higher education in the mother tongue, and from the logistic viewpoint of balancing scholastic needs, we strive to bring out learning materials in Bengali and English. All our faculty members are constantly engaged in this academic exercise that combines subject specific academic research with educational pedagogy. We are privileged in that the expertise of academics across institutions on a national level also comes together to augment our own faculty strength in developing these learning materials. We look forward to proactive feedback from all stakeholders whose participatory zeal in the teaching-learning process based on these study materials will enable us to only get better. On the whole it has been a very challenging task, and I congratulate everyone in the preparation of these SLM’s.

I wish the venture all success.

Professor (Dr.) Indrajit Lahiri
Vice-Chancellor

Netaji Subhas Open University
Four Year Undergraduate Degree Programme
Under National Higher Education Qualifications Framework (NHEQF)
& Curriculum and Credit Framework for Undergraduate Programmes
Bachelor of Arts (Honours) in Zoology
Programme Code : NZO
Course Type : Discipline Specific Core (DSC)
Course Title : Cell & Developmental Biology
Course Code: 6CC-ZO-06

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**Netaji Subhas
Open University**

UG : Zoology (NZO)

Course Title : Cell & Developmental Biology

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- Unit-1** ☐ Cell: General structure and function, Concept of Eukaryotic cell evolution
- Unit-2** ☐ Plasma membrane structure and function; Transport across membrane, active, passive, facilitated transport
- Unit-3** ☐ Mitochondria – structure and function, Mitochondrial respiratory chain
- Unit-4** ☐ Golgi apparatus: structure and function; GERL system and its significance
- Unit-5** ☐ Cytoskeleton–structure and function; Microtubules, microfilaments and intermediate filaments
- Unit-6** ☐ Structure of nucleus, nuclear envelop, nuclear pore complex, nucleolus
- Unit-7** ☐ Cell junction; Tight junction, Gap junction, Desmosome
- Unit-8** ☐ Cell Division: Mitosis and meiosis, Cell cycle and its regulation
- Unit-9** ☐ General concept of cellular differentiation, maturation and lineage specificity, symmetric and asymmetric cell division
- Unit-10** ☐ Early embryonic development – Gametogenesis, Spermatogenesis, Oogenesis; Egg and egg membrane
- Unit-11** ☐ Fertilization event, acrosome reaction, activation and block of polyspermy

- Unit-12** ☐ Cleavage planes and patterns, types of blastula, Fate map construction
- Unit-13** ☐ Gastrulation and early development of frog and chick embryo, Germ layers and their fate
- Unit-14** ☐ Embryonic induction and organizers – introductory concept of mechanism at cellular level
- Unit-15** ☐ Extraembryonic membrane – general concept; Chick extraembryonic membrane
- Unit-16** ☐ Placenta: Types and function with examples
- Unit-17** ☐ Post-embryonic development; Metamorphosis and its regulation in insects and amphibia
- Unit-18** ☐ Implication of Developmental Biology – Teratogenesis; *in vitro* fertilization (IVF); Use of stem cells; Amniocentesis

