पोखरा विश्वविद्यालय
POKHARA UNIVERSITY
FACULTY OF SCIENCE AND TECHNOLOGY · SCHOOL OF ENGINEERING

PROSPECTUS · INTAKE 2026

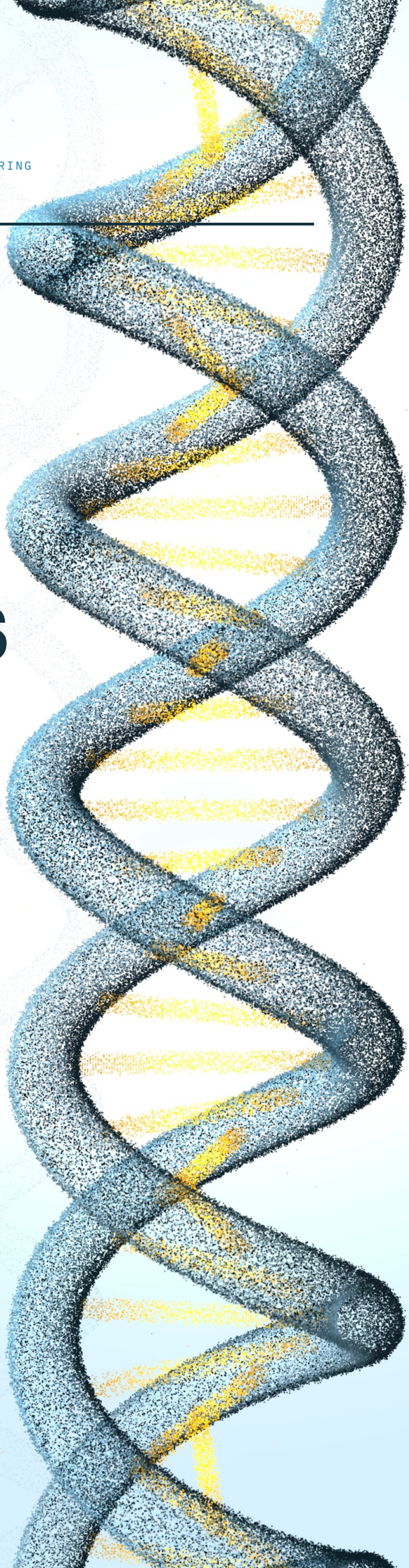
MASTER OF SCIENCE IN

BIO INFORMATICS

Nepal's first master's degree in bioinformatics — where the genome meets the algorithm.

TWO YEARS · 60 CREDITS · FULL-TIME

Computational biology, omics science, algorithmic analysis and research skills — taught as one integrated degree under the Faculty of Science and Technology, and closed with a supervised thesis.



School of Engineering, Pokhara University
POKHARA-30, KHUDI, KASKI, NEPAL · PU.EDU.NP

01

CONTENTS & AT A GLANCE

What is in this prospectus

This prospectus describes the curriculum approved for the 2026 intake. Course codes follow the School of Engineering scheme.

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THE PROGRAM AT A GLANCE

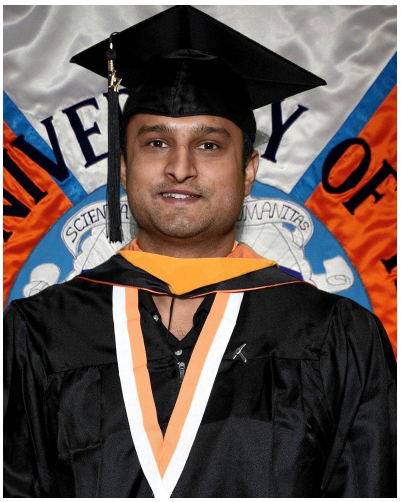
2 YEARS FOUR SEMESTERS	**60** CREDIT HOURS 15 PER SEMESTER	**13** ELECTIVES POOL A, SEMESTER III	**15** CREDIT THESIS SEMESTER IV
24 COURSES IN THE CATALOGUE	**6** CORE AI CREDITS PLUS TWO ELECTIVES	**13** SEATS FEE-PAYING, 2026	**1st** IN NEPAL PROGRAM OF ITS KIND

Program type

Full-time and interdisciplinary, concentrating on computational biology, omics science, algorithmic analysis and research skills. Open to graduates of the life sciences, the physical sciences and the computing sciences alike.

02

FOREWORD FROM THE PROGRAM COORDINATOR



Madan Baral

Assistant Professor, Pokhara University · M.Sc. Bioinformatics, The University of Texas at El Paso

The first in Nepal

No other Nepali university has offered a dedicated master's degree in bioinformatics. The curriculum described here was revised and approved for the 2026 intake.

A welcome, and an invitation

It is my great pleasure to welcome you to Nepal's first M.Sc. program in Bioinformatics, offered by the School of Engineering under the Faculty of Science and Technology at Pokhara University.

Bioinformatics brings together the life sciences, computer science, mathematics and data analytics to address some of the most difficult problems in biology and medicine. From genome sequencing to drug discovery, it has become a principal driver of innovation in healthcare, biotechnology, agriculture and the environmental sciences.

The curriculum set out in these pages has been revised for the 2026 intake. It places programming and statistics in the first semester; carries artificial intelligence and machine learning as core credit through the second and third; and gives the whole of the fourth semester to an independent thesis. Thirteen electives allow each student to build a specialisation of their own — from cancer genomics and protein engineering to chemoinformatics and deep learning.

> *This program is more than an academic qualification. It is a transformational interdisciplinary degree, designed for a fast-changing analytical world.*

Our priority at Pokhara University is to foster excellence, innovation and international standards in both education and research. With a dedicated faculty, a progressive curriculum, and modern computational and molecular biology tools, we intend to produce graduates equipped for the global challenges of science and technology — and equally prepared to meet Nepal's own.

I invite aspiring students, researchers and collaborators to become part of this journey.

With warm regards,

Madan Baral

PROGRAM COORDINATOR, M.SC. BIOINFORMATICS
SCHOOL OF ENGINEERING, POKHARA UNIVERSITY

03

THE PROGRAM PREMISE AND AIMS

Duration 2 years · 4 semesters

60 credit hours

Full-time, interdisciplinary

Focus: computational biology, omics science, algorithmic analysis and research skills

Built between the wet lab and the command line

Bioinformatics fails when it is taught as biology with some software attached, or as computing with some biology attached. This curriculum refuses that split.

Every student writes code, and every student reads the biology the code is about. The first semester deliberately levels a mixed cohort — programming and data structures for those arriving from the life sciences, molecular biochemistry and cell biology for those arriving from computing. From the second semester onward the cohort moves as one.

WHAT THE PROGRAM SETS OUT TO DO

01 Produce graduates who can carry an analysis from raw sequencing reads through to an interpreted, defensible biological result.

02 Establish artificial intelligence and machine learning as working competence rather than vocabulary.

03 Ground every computational claim in sound experimental design and statistics.

04 Build reproducible, shareable analysis practice on cloud and high-performance infrastructure.

05 Prepare candidates for doctoral study and for research leadership in Nepal and abroad.

06 Serve national needs in health, agriculture and biodiversity with locally trained expertise.

Why now

Sequencing has become inexpensive; interpretation has not. Nepal is generating biological data faster than it can analyse it, and the shortfall is not equipment but trained people. This degree exists to close that gap — with graduates educated here, working here.

04

HIGHLIGHTS OF THE DEGREE

What distinguishes this degree

AI-bearing courses

BIN 553 · core
BIN 601 · core
BIN 554 · core
BIN 608 · elective
BIN 610 · elective

ARTIFICIAL INTELLIGENCE

AI is not one elective here. It is a spine.

Machine learning is carried as core credit in two consecutive semesters, supported by a full course on cloud and high-performance computing, and extended by two further electives. Students do not merely run the models — they build them, train them, validate them honestly, and learn where they break.

First of its kind in Nepal

A dedicated M.Sc. in Bioinformatics designed and taught in the country, not a computing degree with a biology elective attached.

Two entry routes, one cohort

Life-science and computing graduates are levelled through a shared first semester, then progress together.

Real compute, real data

Cloud infrastructure, pipeline engineering and reproducible workflows taught as core skills on genomic data at working scale.

Thirteen electives

Cancer genomics, protein engineering, chemoinformatics, drug discovery, microbial and plant genomics, medical informatics and more.

A study visit built into the degree

A structured academic and professional visit to research institutions and industry, mandatory within the internship course.

A full year oriented to research

Directed research or a supervised internship in semester III, then an entire semester given to a 15-credit thesis and its defence.

Small, supervised cohort

Thirteen seats, so that laboratory access, supervision and project guidance are genuinely individual.

Faculty across three disciplines

Molecular biology, computing and mathematics taught by specialists in each, coordinated as a single curriculum.

05

CURRICULUM SEMESTERS I & II

Sixty credits, four semesters

Fifteen credits are carried in every semester and each taught course is worth three, except the thesis. The first year establishes the shared foundation; the second is given to specialisation and research.

Semester I

15 CREDITS

BIN 501	Foundations of Bioinformatics	3
STT 501	Advanced Biostatistics	3
CMS 501	Programming in Python	3
CMB 502	Molecular Biochemistry	3
CHOOSE ONE		
CMS 502	Data Structure and Algorithm	3
	– or –	
CMB 501	Cell Biology and Genetics	3

The paired course levels the cohort: computing entrants take cell biology, life-science entrants take data structures.

Semester II

15 CREDITS

BIN 551	Computational Genomics	3
BIN 552	Structural Bioinformatics	3
BIN 553	AI for Bioinformatics	3
BIN 554	Cloud Computing on Biological Data	3
CMB 551	Frontiers in Molecular Biology	3

Artificial intelligence enters the core here, alongside the computing infrastructure needed to run it at scale.

First-year outcome

By the end of semester II a student can write and test scientific Python, handle genomic data at scale, apply appropriate statistics, and train and evaluate a machine-learning model on biological data.

Teaching and assessment

Lectures are paired with laboratory sessions in every core course. Assessment combines continuous internal evaluation with semester-end examination, following Pokhara University regulations.

READING THE COURSE CODES

BIN	Bioinformatics
CMB	Cell and molecular biology
CMS	Computer science
STT	Statistics
MTH	Mathematics
RES	Research
INS	Internship

CREDIT-HOUR CONVENTION

Theory	15 hrs
Practical and laboratory	22.5 hrs
Research and thesis	45 hrs
Internship	60 hrs

Notional hours per credit, as applied at the School of Engineering. The 500 series runs through year one, the 600 series through year two.

06

CURRICULUM SEMESTERS III & IV

Specialisation, then research

The third semester adds two elective slots — one taken from a pool of thirteen subject courses, the other from a pool of two research placements. The fourth is the thesis.

Semester III

15 CREDITS

BIN 601	Machine Learning for Bioinformatics	3
BIN 602	Computational Molecular Design	3
BIN 603	Systems Biology	3
–	**Elective 1** pool A	3
–	**Elective 2** pool B	3

Semester IV

15 CREDITS

BIN 699	**Thesis**	15

The whole semester is given to one independent, supervised research project, submitted as a thesis and defended before a board of examiners.

Elective 1 — Pool A

SEMESTER III · CHOOSE ONE OF THIRTEEN

- CMB 601 Population and Evolutionary Genomics
- CMB 602 Genetic Engineering
- CMB 603 Microbial Genomics
- CMB 604 Plant Functional Genomics
- BIN 604 Medical Informatics and Translational Medicine
- BIN 605 Chemoinformatics
- BIN 606 Protein Engineering
- BIN 607 Cancer Genomics
- BIN 608 Deep Learning in Bioinformatics
- BIN 609 Drug Design and Discovery
- BIN 610 Data Science and Mining
- MTH 601 Mathematical Modeling for Bioinformatics
- RES 602 Research Methodology

Elective 2 — Pool B

SEMESTER III · CHOOSE ONE

- INS 601 Internship
- RES 601 Directed Research

Pool B places the student in a host organisation or with a research supervisor for the semester, and prepares the ground for the thesis.

TOTAL CREDITS · TWO YEARS **60**

07

RESEARCH THEMES

Where our work is concentrated

Thesis and directed-research projects are supervised within these eight themes. Students may propose work outside them where a suitable supervisor is available.

THEME 01

RNA and DNA sequence analysis

Alignment, assembly, annotation and comparative analysis of nucleotide sequence, including variant discovery and interpretation.

THEME 02

Protein structure prediction

Sequence-to-structure modelling, fold recognition and the evaluation of predicted structures against experimental evidence.

THEME 03

Molecular dynamics and drug design

Simulation of biomolecular systems, docking, virtual screening and structure-based lead optimisation.

THEME 04

Machine learning in genomics

Supervised and unsupervised models for genomic prediction, classification and feature discovery, with honest validation.

THEME 05

Systems biology and network modelling

Reconstruction and analysis of regulatory, metabolic and interaction networks, and simulation of system-level behaviour.

THEME 06

Gene expression profiling

Differential expression, clustering and pathway enrichment across microarray and RNA-seq experiments.

THEME 07

Next-generation sequencing analysis

Pipeline construction and quality control for high-throughput sequencing, from raw reads to interpreted output.

THEME 08

Structural bioinformatics

Analysis of macromolecular structure, binding sites and interfaces, and the relationship between structure and function.

Proposing your own project

Students are encouraged to bring problems from their own background — a clinical question, an agricultural dataset, a conservation problem. Where a suitable supervisor can be identified, such projects are welcomed and often produce the strongest theses.

08

RESEARCH TRAINING

Research is the spine, not the appendix

The third semester places each student inside a host organisation or a supervisor's project. The fourth is a research year in miniature.

RES 601 · 3 credits

INS 601 · 3 credits

BIN 699 · 15 credits

Half of the degree is spent producing original work.

RES 601 · DIRECTED RESEARCH

A supervised investigation

One semester of supervised work on a defined problem, assessed continuously and by final report. This is the usual route for students intending to continue to doctoral study.

INS 601 · INTERNSHIP

A placement, and a study visit

A structured and graded placement in a host organisation, paired with a mandatory academic and professional study visit to research institutions and industry. The visit is non-graded but required for completion.

BIN 699 · THESIS

Fifteen credits, one semester

Proposal, execution, written thesis and oral defence before a board of examiners. The thesis is designed to stand as a publishable piece of research and as the evidence base for doctoral applications.

ON GRADUATION, YOU WILL BE ABLE TO

- Assemble, annotate and compare genomes from raw sequencing reads
- Train, tune and honestly validate machine-learning models on omics data
- Predict protein structure and dock candidate ligands against it
- Build reproducible pipelines that run on cloud infrastructure
- Design a statistically sound study and defend the analysis behind it
- Query and integrate public biological databases at scale
- Write clean, tested Python for scientific work
- Explain a computational result to a clinical or wet-lab audience

09

CAREERS AND SCOPE

Where a bioinformatician works

The skill set is unusually portable — the same training serves a diagnostics laboratory, an agricultural research institute, a pharmaceutical pipeline and a data science team.

ROLES GRADUATES ARE PREPARED FOR

Bioinformatics Analyst
Sequence analysis and interpretation for research and diagnostic groups

Computational Biologist
Modelling biological systems and testing hypotheses in silico

Genomics Data Scientist
Statistical and machine-learning analysis of large omics datasets

Clinical Bioinformatician
Variant calling and interpretation in a diagnostic laboratory

Machine Learning Engineer, life sciences
Building and deploying predictive models on biological data

Structural Bioinformatician
Protein structure prediction, modelling and molecular dynamics

Drug Design Scientist
Computer-aided screening, docking and lead optimisation

Genomic Epidemiologist
Pathogen surveillance, outbreak tracing and resistance monitoring

Biostatistician
Study design and inference for trials and population studies

Pipeline / Scientific Software Engineer
Reproducible workflows and analysis infrastructure

Agricultural Genomics Specialist
Crop and livestock improvement through marker and genome analysis

Research Fellow and PhD candidate
Doctoral research in computational biology and allied fields

SECTORS THAT EMPLOY THEM

- Universities and higher education
- Bioinformatics and genomics research centres
- Pharmaceutical and biotechnology companies
- Hospitals and diagnostic laboratories
- Public health and epidemiology units
- Information technology and data science
- Agriculture and environmental genomics
- Government and NGO-led health programs
- Biomedical and translational research
- National and international biological databases

Further study

The 15-credit thesis is designed to stand as the evidence base for doctoral applications in computational biology, biomedical informatics, genomics and data science, in Nepal and internationally.

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ADMISSION
2026 · 2083
B.S.

How to apply

Applications are made online through the School of Engineering portal, and admission is by merit in the entrance examination.

Who can apply

A **four-year Bachelor's degree** in biological, medical, biomedical, pharmaceutical, physical or computer sciences, or in computer engineering — or an equivalent degree recognised by Pokhara University.

Minimum **second division, or 2.0 / 4.0 CGPA**. Every applicant must sit and pass the entrance examination.

Pokhara University undergraduates who have passed all courses up to the seventh semester and have appeared in the eighth semester examination may apply for provisional admission.

APPLICATIONS OPEN	APPLICATIONS CLOSE	ENTRANCE EXAMINATION
1 Bhadra 2083	**11 Asoj 2083**	**12 Asoj 2083**
2083 / 05 / 01	2083 / 06 / 11	2083 / 06 / 12 2:00 – 5:00 pm

STEP 1

Apply online

Register at entrance.pusoe.edu.np and complete the form. The portal opens on 1 Bhadra 2083.

STEP 2

Pay the fee

Pay Rs. 2,500 to the School of Engineering account at Kamana Sewa Bikas Bank Ltd, through the portal.

STEP 3

Sit the examination

Attend your centre on 12 Asoj with the admit card and a photo identity document.

STEP 4

Take your seat

Selected candidates are called in merit order and enrol at the School of Engineering.

Examination centres

POKHARA
School of Engineering, Bijayapur Block B

LALITPUR
Shramik Shanti Campus, Chyasal

SYLLABUS AND GUIDELINES
pu.edu.np · entrance.pusoe.edu.np

Fee, seats and documents

APPLICATION FEE
Rs. 2,500 per candidate, non-refundable

INTAKE CAPACITY
13 seats · fee-paying category

KEEP READY
Transcripts and mark sheets, character and migration certificates, citizenship or passport, passport-size photographs

POKHARA UNIVERSITY

FACULTY OF SCIENCE AND TECHNOLOGY
SCHOOL OF ENGINEERING

ENQUIRIES AND ADMISSIONS

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UNIVERSITY
pu.edu.np

APPLICATION PORTAL
entrance.pusoe.edu.np

PROGRAM
M.Sc. in Bioinformatics
Intake 2026 · 2083 B.S.

Read the genome. Write the algorithm. Defend the result.