a guidebook to

Faculty of Mathematics and Natural Sciences

Institut Teknologi Bandung

Certified by:

FMIPA-ITB

BAN-PT

ASIIN

ROYAL SOCIETY OF CHEMISTRY

ISO QSCert 9001

In Harmonia Progressio

itb.ac.id

Cirebon Campus

Jatinangor Campus

Ganesha Campus

Physics
Astronomy
Physics
Actuarial Science
Mathematics
Chemistry
Mathematics
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Mathematics
Chemistry

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INTRODUCTION

The Faculty of Mathematics and Natural Sciences (FMIPA) is the oldest and foremost faculty in Indonesia specializing in mathematics and natural sciences. It was established on October 6, 1947, under the name "Faculteit van Exacte Wetenschap." On September 22, 1948, the faculty's name was changed to "Faculteit van Wiskunde en Natuur Wetenschap." In 1950, it became the Faculty of Science and Natural Sciences (FIPIA), and from 1972 until present day, it has been known as the Faculty of Mathematics and Natural Sciences (FMIPA).

As a key player in the regional and international mathematics and science development, FMIPA ITB has gained substantial recognition from the global community. This is evident in the growing number of educational and research partnerships with reputable universities at both regional and international levels. Moreover, FMIPA ITB has been privileged to have several Nobel Laureates and renowned scientists, such as Prof. Ben L. Feringa (Nobel Laureate in Chemistry), Prof. Gerardus 't Hooft (Nobel Laureate in Astrophysics), Prof. Peter Agre (Nobel Laureate in Chemistry), Prof. Matthew Colles (Astronomy Scientist, ANU Australia), Prof. Hiroshi Sekimoto (Nuclear Physics Scientist, Japan), and Prof. Hadi Susanto (Mathematician, Univ. Essex, England) as Honorary Professors, which is a testament to its global reputation.

MATHEMATICS AND ACTUARIAL SCIENCE

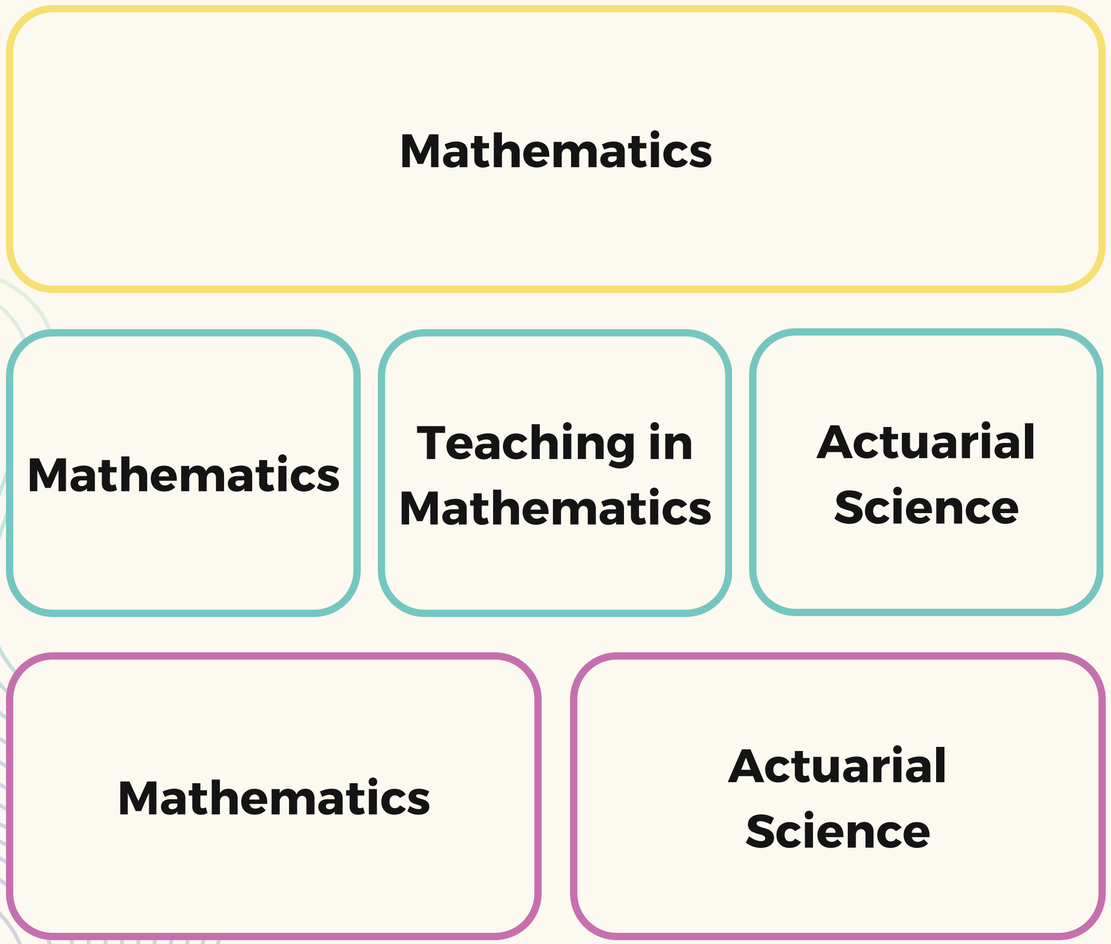
DESCRIPTION

SCAN ME!

The Undergraduate Program in Mathematics at ITB provides a learning process in mathematics and related fields. **The Master's Program in Mathematics** at ITB provides an advanced education programs in pure and applied mathematics. **The Doctoral Program in Mathematics** at ITB provides higher education for students interested in pursuing a doctorate in pure or applied mathematics. Renowned as one of the prime graduate programs in Indonesia, it stands out for its diverse range of programs and a substantial number of enrolled students. **The Master's Program of Mathematics in Teaching** at ITB is an accredited academic higher education program designed to enhance the professionalism of participants as mathematics teachers in schools. The program focuses on improving participants' competence in mathematics and related aspects of teaching and learning.

The Undergraduate Program in Actuarial Science at ITB provides study disciplines that utilize mathematical and statistical methods to evaluate and control risks, with a specific focus on insurance, encompassing life and general insurance (including coverage for natural disasters and reinsurance), pension funds, investments, and banking. Meanwhile, the aim of **The Master Program in Actuarial Science** at ITB is to enhance participants' understanding of actuarial mathematics and mathematical finance.

MATHEMATICS AND ACTUARIAL SCIENCE STUDY PROGRAMS



*After completion of certain and several courses

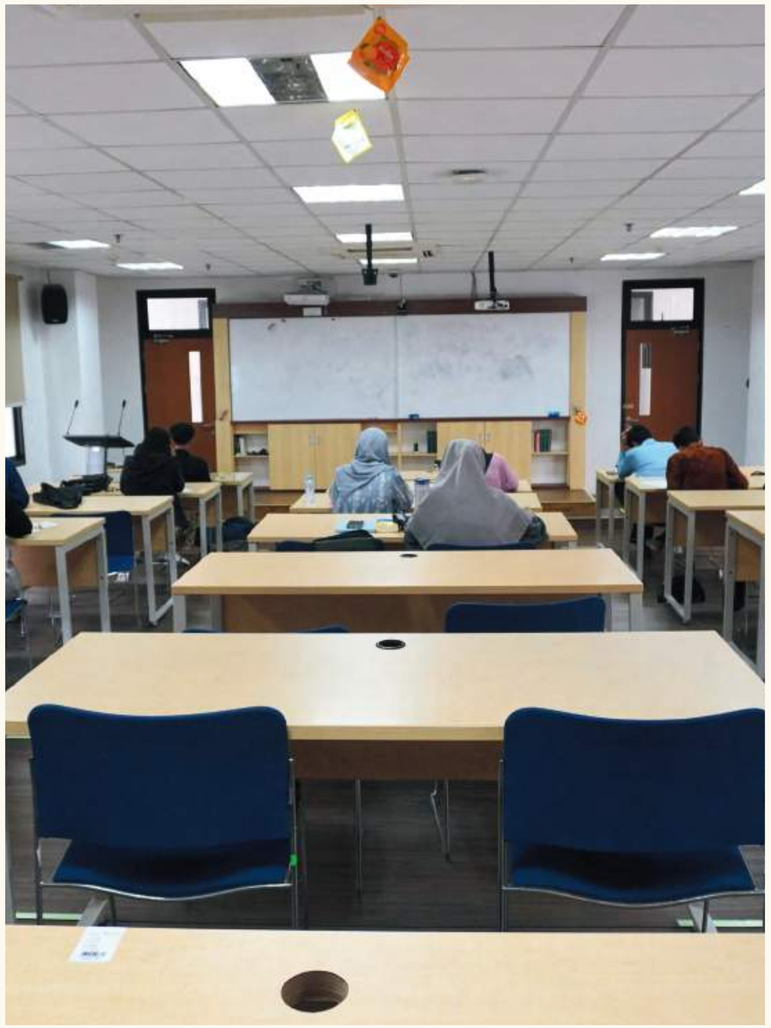
Mathematics

- **Excellent** (Unggul) accreditation from BAN-PT (Undergraduate Program in Mathematics)
- "**A**" accreditation from BAN-PT (Master Program in Mathematics, Master Program of Teaching in Mathematics, and Doctoral Program in Mathematics)
- International recognition from **ASIIN** (Akkreditierungsagentur für Studiengänge der Ingenieurwissenschaften, der Informatik, der Naturwissenschaften und der Mathematik e.V.) for Undergraduate Program in Mathematics

Actuarial Science

- **Good** (Baik) accreditation from BAN-PT (Undergraduate Program in Actuarial Science)
- **Excellent** (Unggul) accreditation from LAMSAMA (Master Program in Actuarial Science)
- Collaboration with the **Association of Indonesian Actuaries**, called PAI, allows students to be exempt from some exam modules for getting ASAI (Associate of Society of Actuary of Indonesia) certification upon graduation from the undergraduate and master programs.*

FACILITIES



Classrooms

Computer Laboratories

Library

CAREER PROSPECTS

Graduates of **Undergraduate, Master, and Doctoral programs in Mathematics** have promising career prospects in the fields of :

- Mathematics research
- Teaching or academia
- Data analysis
- Finance expertise and banking
- Consulting
- Industry
- Manufacturing
- Information technology

Graduates of **Master program of Teaching in Mathematics** have promising career prospects in the fields of teaching or academia

Graduates of **Undergraduate and Master programs in Actuarial Science** have promising career prospects as :

- Actuaries
- Risk consultants
- Risk managers
- Financial analysts and consultants
- Investment managers
- Risk analysis and management roles in various industries and sectors
- Researchers

PHYSICS AND NUCLEAR SCIENCE & ENGINEERING

DESCRIPTION

Physics is one of the fundamental natural sciences that studies the physical world around us, including matter and its interactions. The laws of physics underlie the motion and behavior of everything around us. Physics aims to explain on a fundamental level how our environment behaves the way it does. Most of the Physical Laws are deduced from observations, and the objective is to describe the large number of "complicated" observations with a few simple ideas.

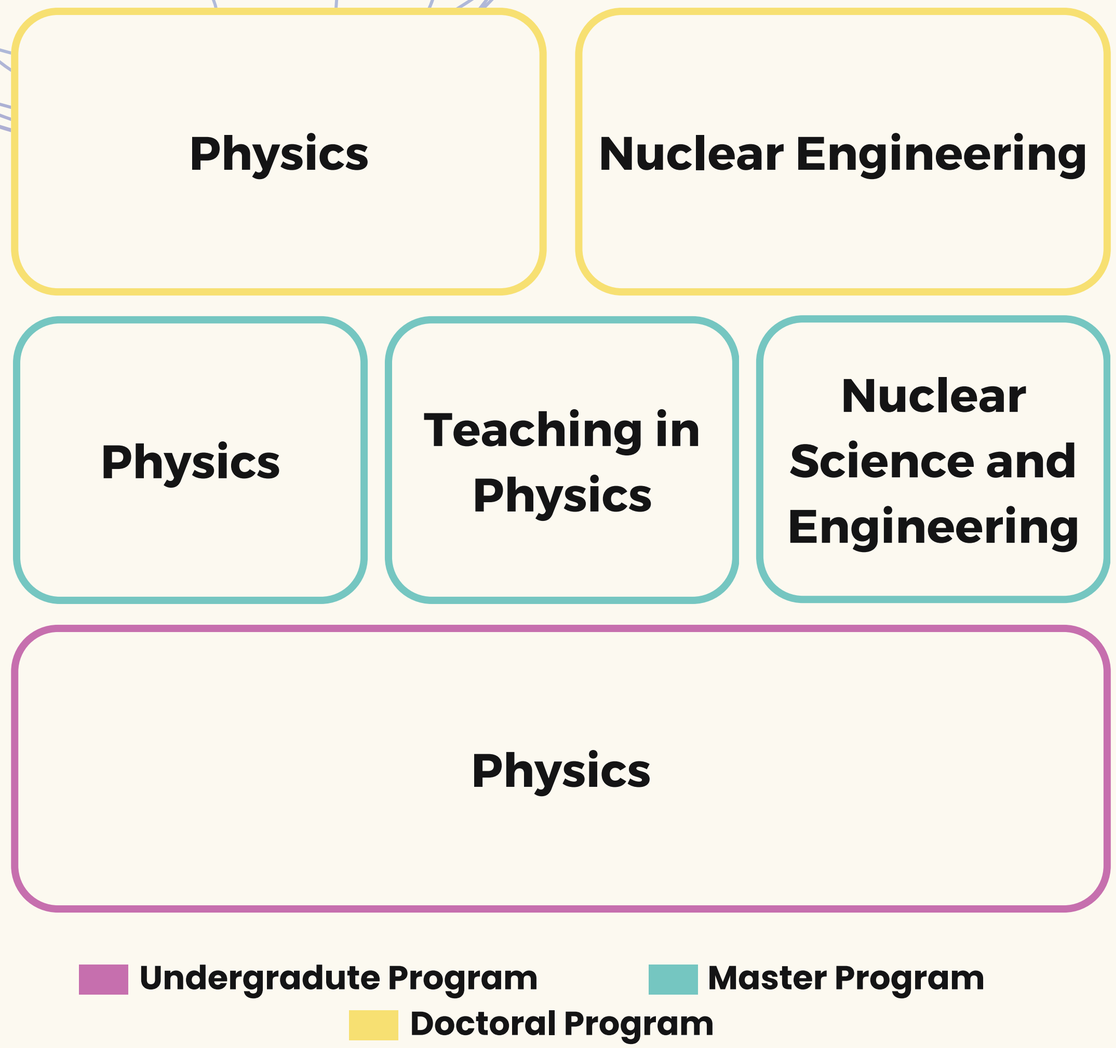
The Doctoral Program in Physics at ITB aims to produce graduates with the attitude and quality of academic competence, the ability to do research independently, and the ability to provide meaningful contributions to the repertoire of physics. The Doctoral Study Program in Physics has produced graduates since 1986.

fi.itb.ac.id

Physics

SCAN ME!

PHYSICS AND NUCLEAR SCIENCE & ENGINEERING STUDY PROGRAMS



- **Excellent** (Unggul) accreditation from BAN-PT (Undergraduate Program in Physics)
- "**A**" accreditation from BAN-PT (Master Program in Physics)
- "**A**" accreditation from BAN-PT (Master Program of Teaching in Physics)
- **"A"** accreditation from BAN-PT (Doctoral Program in Physics)
- International recognition from ASIIN (Akkreditierungsagentur für Studiengänge der Ingenieurwissenschaften, der Informatik, der Naturwissenschaften und der Mathematik e.V.) for Undergraduate Program in Physics

FACILITIES

Workshop

Laboratories

Library

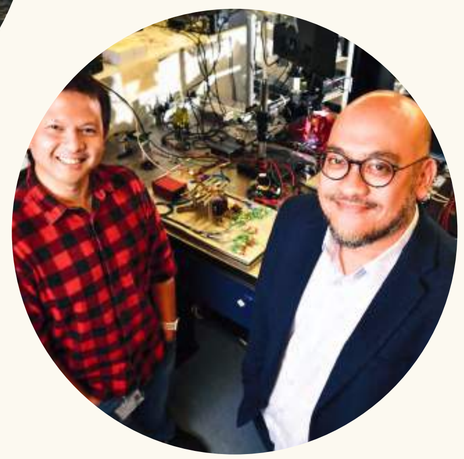
Classrooms

CAREER PROSPECTS

Graduates of **Undergraduate, Master, and Doctoral program in Physics** have promising career prospects in the fields of :

- Physics research
- Teaching or academia
- Data analysis
- Industry
- Manufacturing
- Information technology
- Oil & gas

Graduates of **Master program of Teaching in Physics** have promising career prospects in the fields of teaching or academia. Specifically as a high-quality senior high school (SMA/MA) physics teachers and junior high school (SMP/MTs) science teachers.



ASTRONOMY

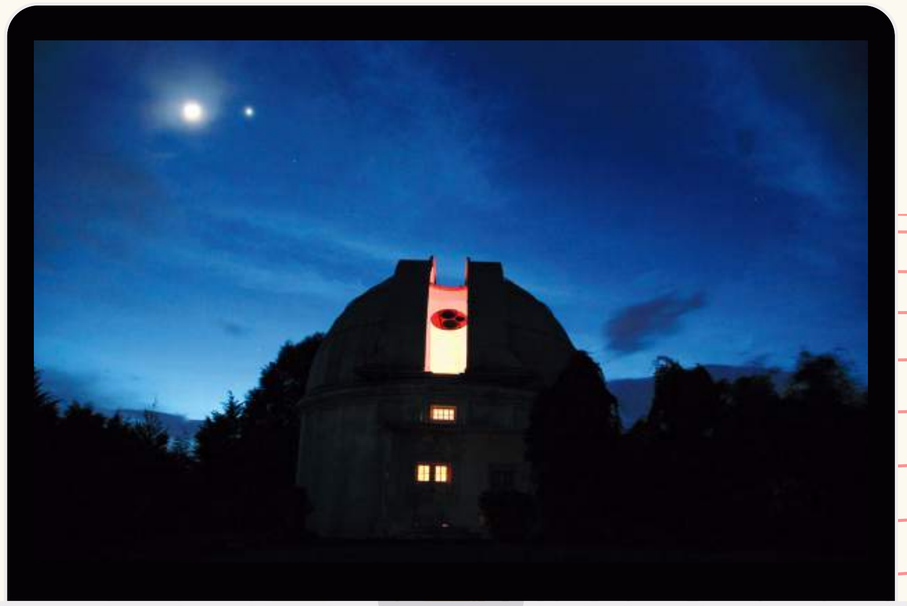
as.itb.ac.id

DESCRIPTION

SCAN ME!

Astronomy is an observational science that studies the universe. Astronomy uses mathematics and physics to observe, analyze, and model celestial objects. In the working process, astronomy is an inverse problem at the limit: based on data provided by the universe with complex statistical analysis, and based on the knowledge of physics applicable to the Earth and its surroundings, astronomers construct descriptions of the Universe and its very diverse content. The Undergraduate program in Astronomy was established in October 1951 and awarded superior accreditation by the National Accreditation Agency for Higher Education (NAAHE/BAN-PT).

The Master's Program in Astronomy was established on 23 February 1998 and also awarded superior accreditation by the National Accreditation Agency for Higher Education (NAAHE/BAN-PT). **The Doctoral Program in Astronomy**, established in 6 March 2006, is an advanced educational program, accredited A by the National Accreditation Agency for Higher Education (NAAHE/BAN-PT).



ASTRONOMY STUDY PROGRAMS

Astronomy

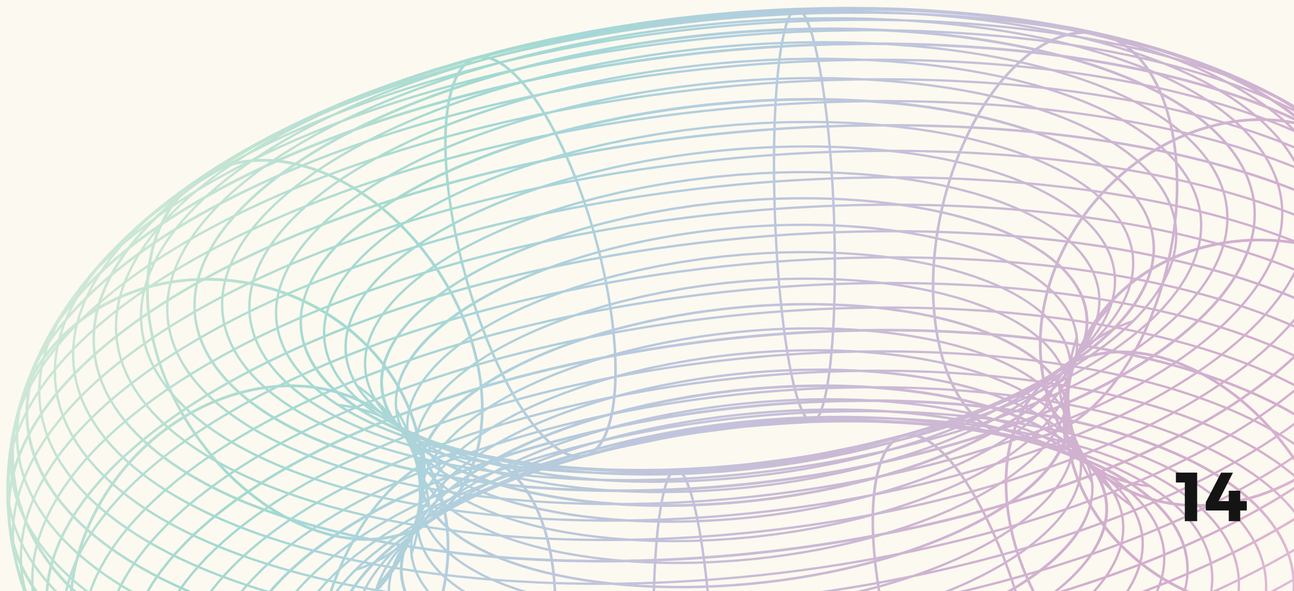
Advanced Astrophysics

Astronomical Development and Education

Astronomy

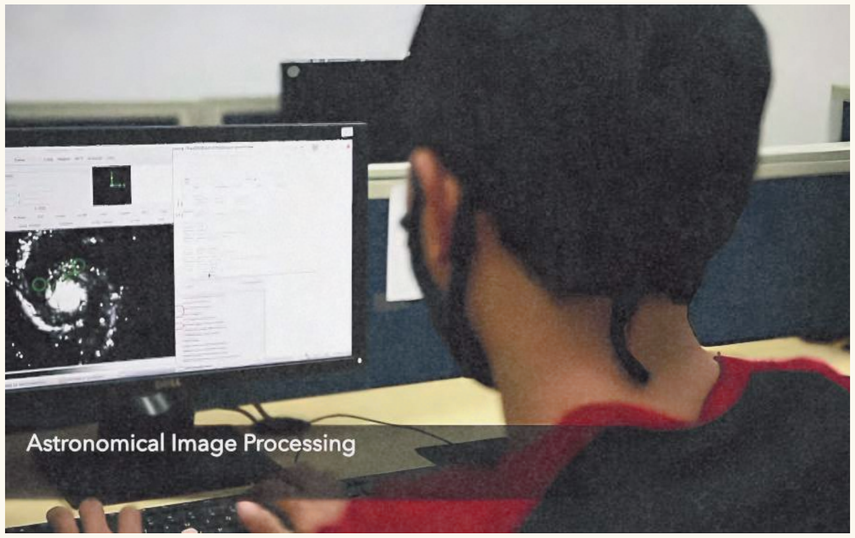
Undergradute Program **Master Program**
Doctoral Program

- **Excellent** (Unggul) accreditation from BAN-PT (Undergraduate Program in Astronomy)
- **Excellent** (Unggul) accreditation from BAN-PT (Master Program in Astronomy)
- **“A”** accreditation from BAN-PT (Doctoral Program in Astronomy)
- International accreditations by the Akkreditierungsagentur für Studiengänge der Ingenieurwissenschaften, der Informatik, der Naturwissen und der Mathematik. (ASIIN) for Undergraduate Program in Astronomy.



FACILITIES

Library



HPC and Computation Lab

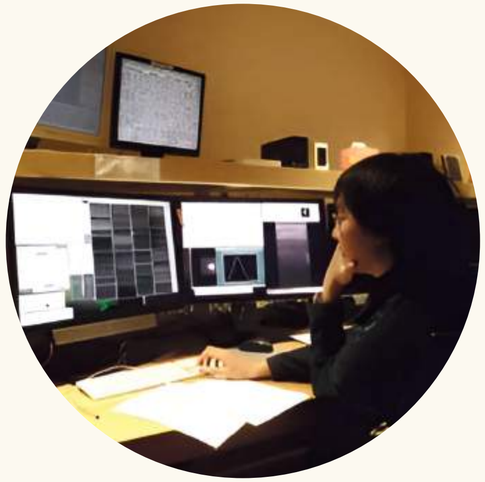
Robotic Telescope

Bosscha Observatory

CAREER PROSPECTS

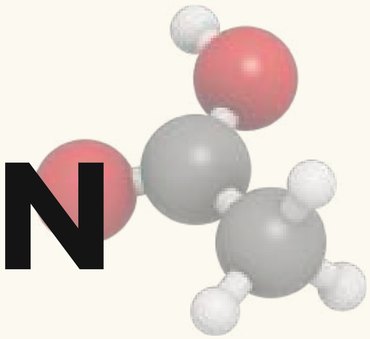
Career prospects for **astronomy graduates** are :

- Researcher in national institutes such as BRIN and BMKG.
- Some alumni in Southeast Asia and internationally pursue careers at international observatories such as NARIT and STScI.
- Post-doctoral researchers or lecturer at various universities/observatories.
- In the sector of technology and business: data/computer analyst/scientist, software developer, database manager, entrepreneurs, financial advisors in national/multinational/international companies
- Teachers in global-oriented high schools.
- Column writers and editors of magazines and scientific journals.
- Science communicators in the leading media.



CHEMISTRY

DESCRIPTION

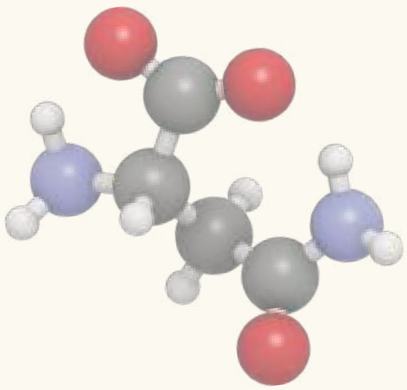


Chemistry is the science that studies matter and changes, covering all objects that are around us, including the cells and organs in our bodies. Therefore, chemistry is the basic knowledge to master a variety of fields, such as disease diagnosis and treatment, forensics, cosmetics, energy, manufacturing, waste treatment, and various other aspects of life.

Since 1992, the **Chemistry Doctoral Study Program** has produced more than 90 doctors working in various universities and research institutes, some of whom have become Professors.

chem.itb.ac.id

SCAN ME!



CHEMISTRY
STUDY PROGRAMS

Chemistry

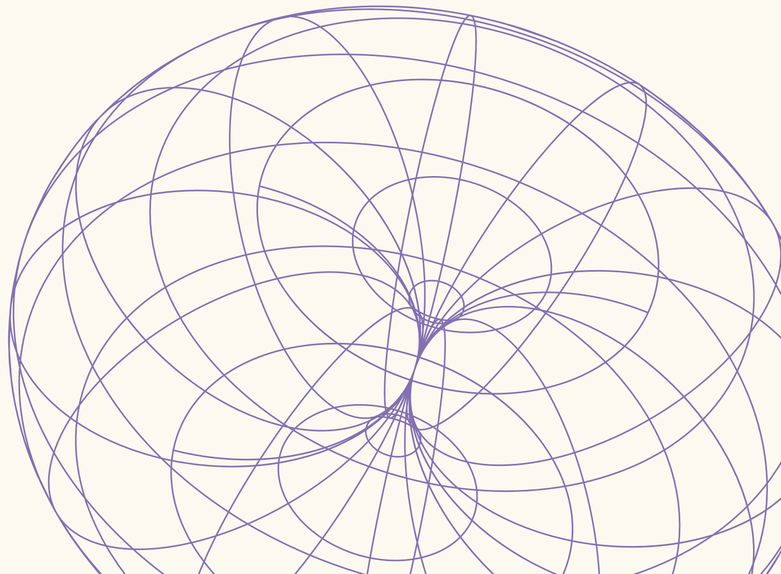
Chemistry

Teaching in Chemistry

Chemistry

Undergradute Program **Master Program**
Doctoral Program

- **Excellent** (Unggul) accreditation from LAMSAMA (Undergraduate Program in Chemistry)
- Undergraduate Program in Chemistry **internationally accredited** by The Royal Society of Chemistry (RSC)
- **"A"** accreditation from BAN-PT (Master Program in Chemistry)
- **"A"** accreditation from BAN-PT (Master Program of Teaching in Chemistry)
- **"A"** accreditation from BAN-PT (Doctoral Program in Chemistry)



FACILITIES

Library

Instruments for Chemical Analyses

Classrooms

Education & Research Laboratories

CAREER PROSPECTS

Chemistry graduates have reassuring career prospects in the fields of :

- Academia
- Research at educational and research institutions such as universities, the National Agency for Research and Innovation, ministry institutions, and overseas research institutes
- Strategic industrial sectors:
  Food & cosmetics
  Oil & gas
  Energy
  Manufacturing
  Waste treatment
  Dye & textiles
- Forensics
- Enterpreneurship

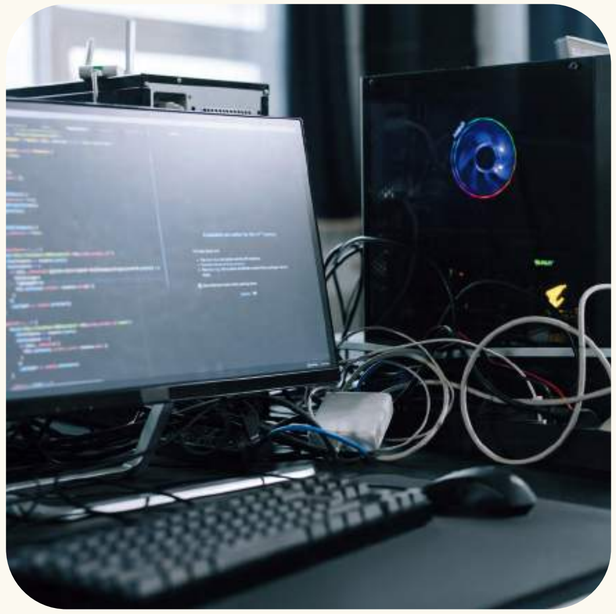
COMPUTATIONAL SCIENCE

DESCRIPTION

csx.itb.ac.id

SCAN ME!

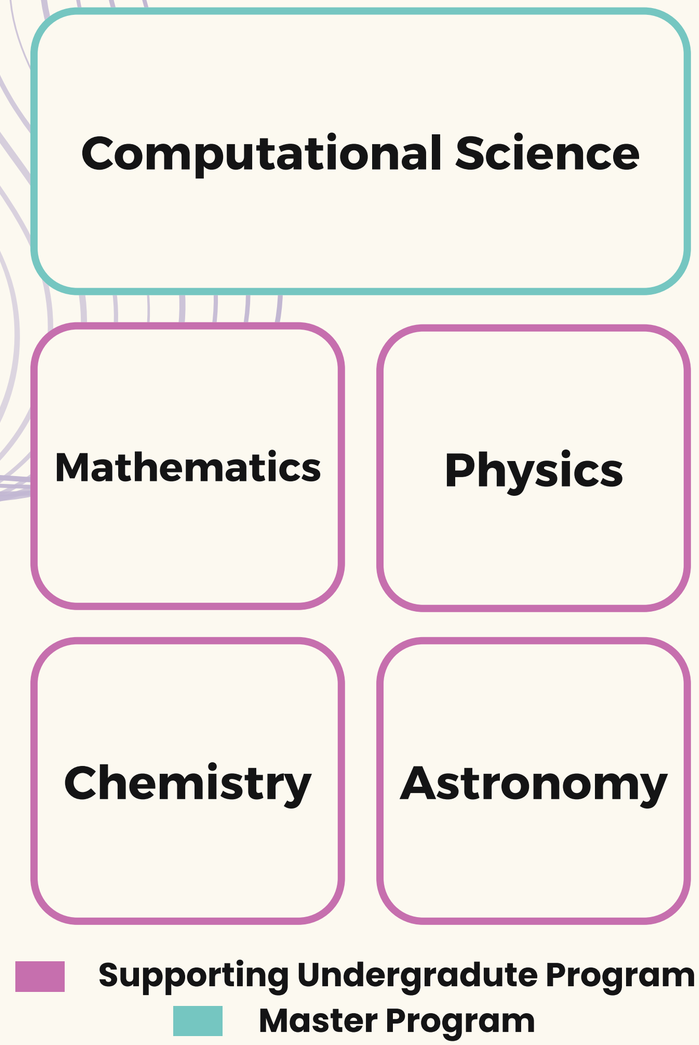
Computational science is a relatively young discipline in the modern world. Computational science involves modeling, simulation, and analyzing world phenomena through computing. Computational science will play an essential role in scientific discovery in the future because modern science has opened new windows into the physical and social sciences, earth sciences, and life sciences at various levels (atomic, nano, mezzo, and macroscopic scales).



Computational science has several essential components, namely:

- Understanding non-deterministic and chaotic natural phenomena that analytical methods cannot resolve
- Understand the simulation process, which is a bridge between theory and experiment
- Prediction or divination
- Static and dynamic modeling systems
- Calculation, organization, and presentation of data

COMPUTATIONAL SCIENCE STUDY PROGRAMS



- **Excellent** (Unggul) accreditation from LAMSAMA (Master Program in Computational Science)

Students can participate in the Double Degree Master's Program in Computational Science at ITB and Kanazawa University (Japan). ITB students will spend up to one year at Kanazawa University. In addition, the Master Program in Computational Science also has a double degree program with the University of Lleida, Spain, and collaboration with several other universities.

The study material for Computational Science Master Programs combines materials from mathematics, physics, chemistry, and astronomy.

FACILITIES

Server Rooms

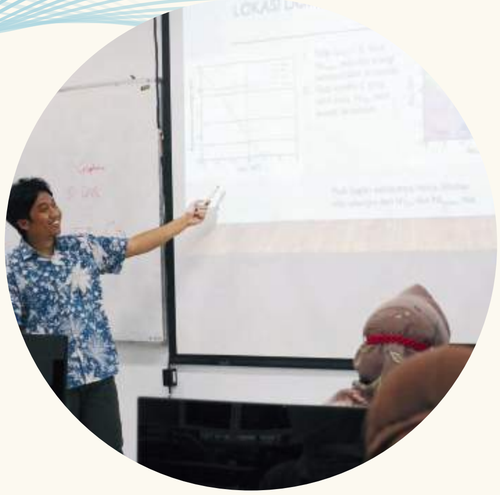
Computer Laboratories

Lecture Rooms

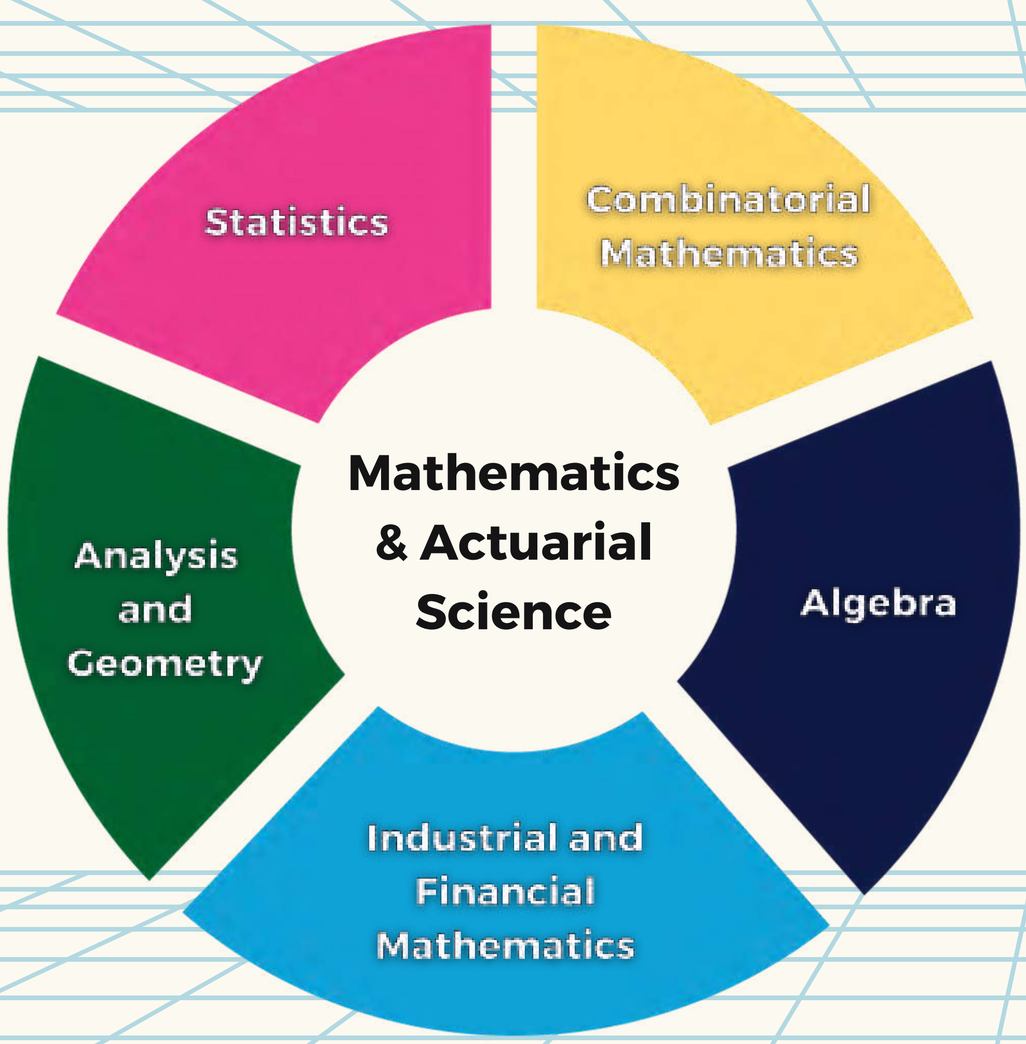
CAREER PROSPECTS

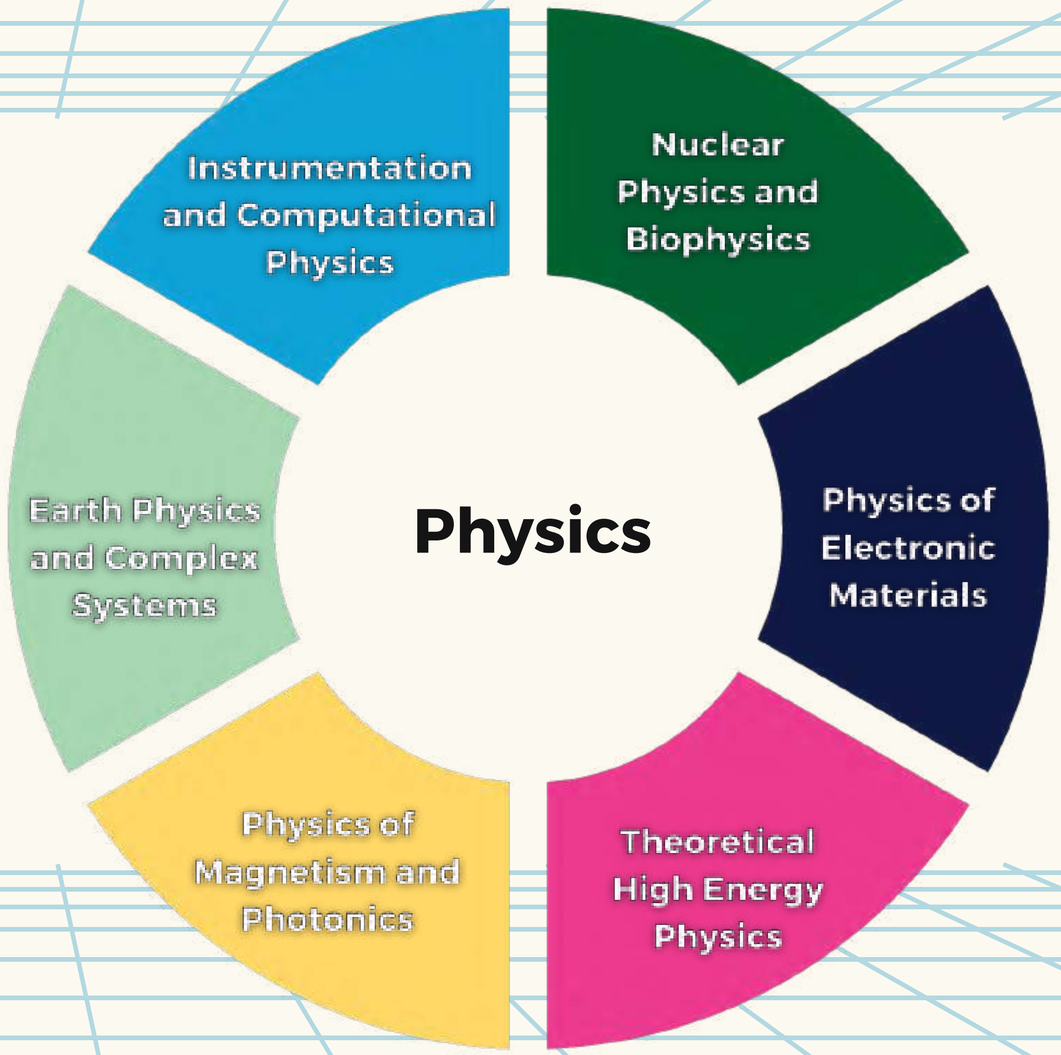
Computational science graduates have excellent career prospects in the fields of :

- Research and development (both at universities and research centers)
- Insurance
- Banking and finance
- Information technology
- Telecommunications
- Automotive industry
- Physics and nuclear science & engineering
- Data scientist at pharmaceutical and chemical industry, oil and gas industry, etc.



RESEARCH GROUPS





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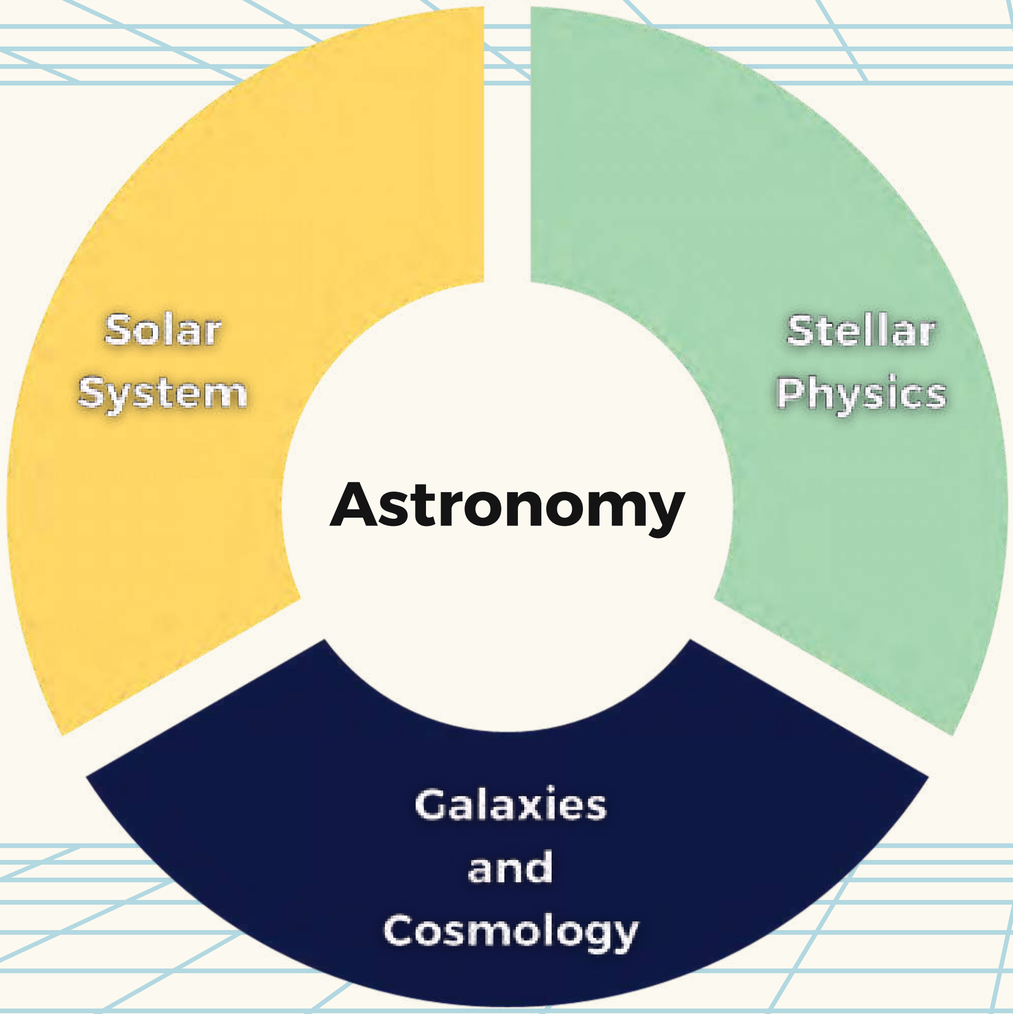
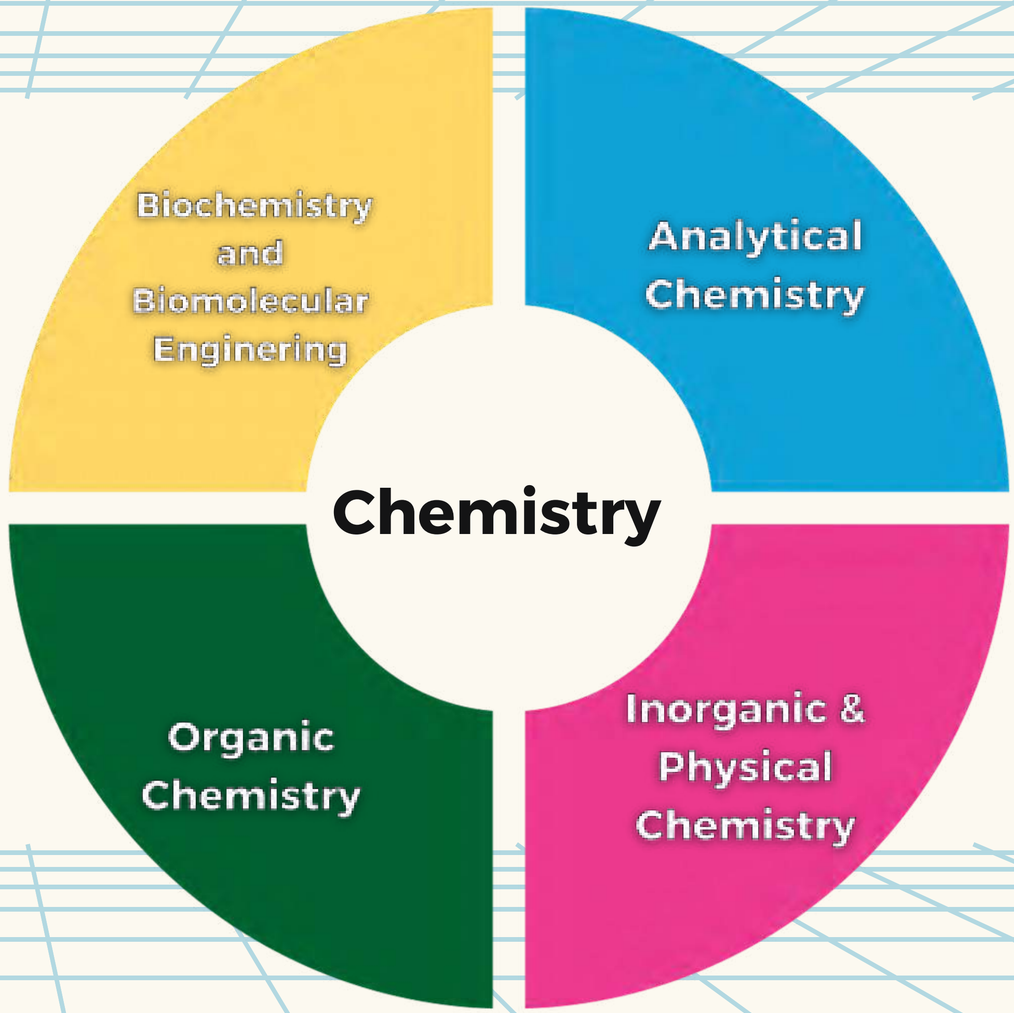




INTEGRATED PHYSICS LABORATORY

MATERIAL SCIENCE LABORATORY

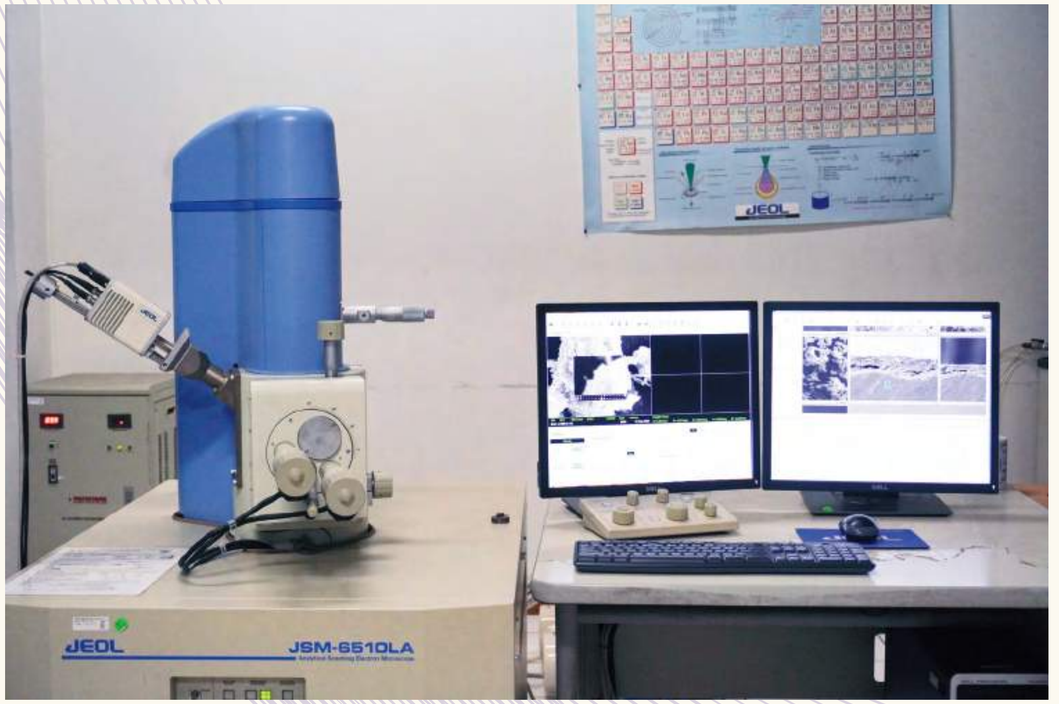
Micro-CT Scan

Raman Spectrometer

INTEGRATED PHYSICS LABORATORY

MATERIAL SCIENCE LABORATORY

SDS



Scanning Electron Microscope (SEM)

INTEGRATED CHEMISTRY LABORATORY

MOLECULAR SCIENCE LABORATORY

Circular Dichroism (CD) Spectrometer

Simultaneous Thermal Analyzer (STA)

INTEGRATED CHEMISTRY LABORATORY

MOLECULAR SCIENCE LABORATORY

Nuclear Magnetic Resonance (NMR)

UV-Vis Spectrophotometer

X-Ray Diffraction (XRD)

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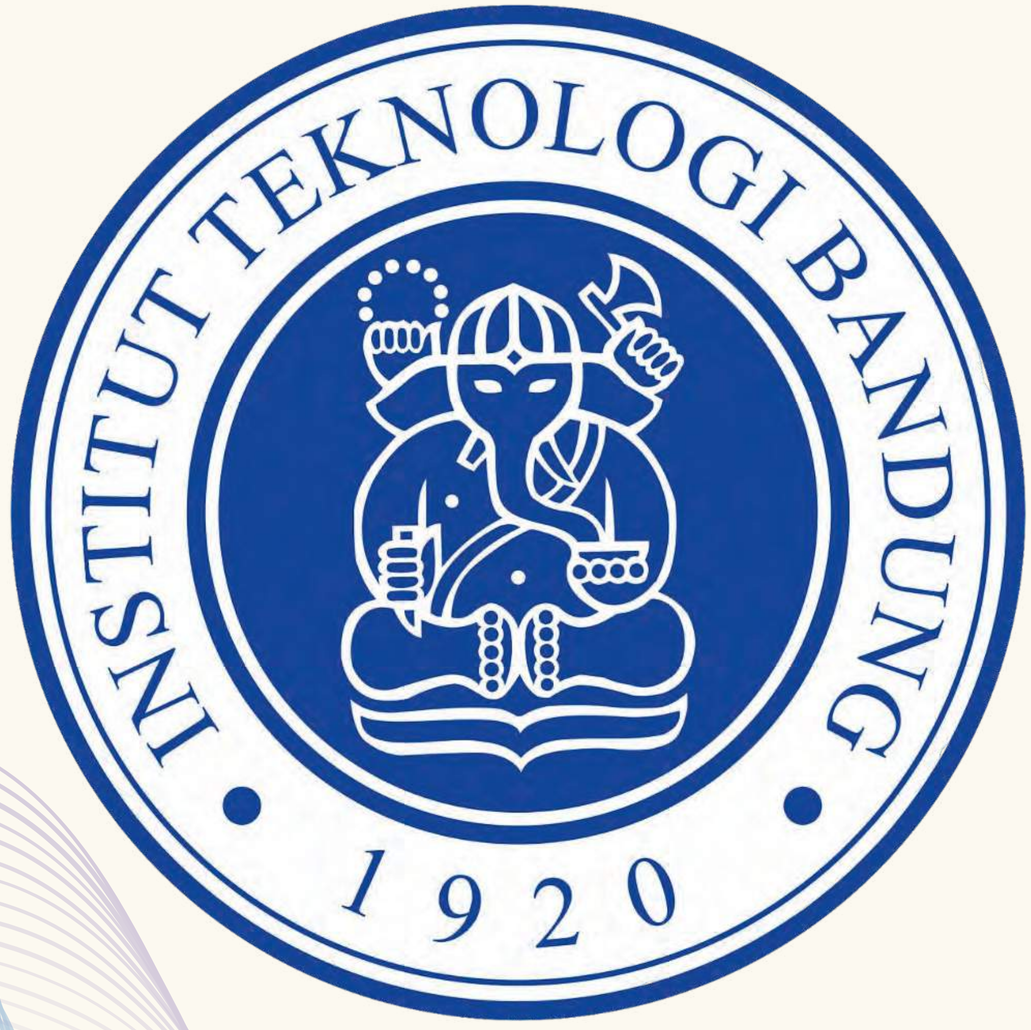
In Harmonia Progressio

Ganesha Campus

Jatinangor Campus

Cirebon Campus



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