UNIVERSITY'S ACADEMIC PROGRAMS

School of Engineering and Technology (INTERNATIONAL

INSTITUTE OF INNOVATION AND TECHNOLOGY)

Computer Science

COMBINE ENGINEERING THEORY AND DESIGN WITH COMPUTING PRINCIPLES

Computers are everywhere in our society. The infrastructure of business, government science, and everyday life is increasingly based on computers and digital communication. Whether you are listening to your digital music player, instant messaging with friends, driving a modern car, trading stocks, producing a movie, performing or undergoing a medical procedure, playing a video game, or submitting an income tax return, you depend on networks of computers that store, exchange, and process information in increasingly elaborate ways.Understanding the foundation of this technology — what it can and cannot do, how it relates to information processing in living things and society, and how you can use it — will enable you to utilize, analyze and create information processing systems for whatever career, advanced education or personal interests you choose to pursue.

Computing is a critical tool for controlling and shaping the processes of modern society. If you want to be in the driver's seat for this amazing ride, consider one of several options that the Department of Computer and Information Science offers, from a single introductory course to a minor or major.

Educational Objectives of the CS Program

The undergraduate program in Computer Science strives to prepare students to: identify, formulate, and solve challenging computer science problems; develop professional skills that prepare them for immediate employment or graduate study in computer science and related disciplines; understand and apply the scientific and relevant mathematical foundations of computer science; understand the social and human context in which their computer science work will be used; and communicate ideas and collaborate effectively with other members of research and development teams.

Systems Science and Engineering Major

 TO DESIGN AND IMPLEMENT SYSTEMS THAT ASSURE EFFECTIVE OPERATION OF TECHNOLOGICAL SYSTEMS AS A WHOLE

The Systems Science and Engineering (SSE) program specializes in those aspects of engineering that pertain to effectiveness of whole systems. In contrast to other engineering specialties which are grounded in certain aspects of science, system engineering is grounded primarily in mathematics and methodology. The core curriculum focuses on mathematical modeling and simulation, rather

than on particular physical sciences. To assure that designs are responsive to real needs, students learn how to model, simulate, optimize, integrate, and evaluate systems.

Educational Objectives of the SSE Programs

The undergraduate program in Systems Science and Engineering strives to prepare students to:

integrate fundamentals of systems science and engineering with design tools and methodologies to architect innovative solutions to complex technological problems;

communicate effectively, excel in multi-disciplinary/multi-cultural teams, and value non-technical disciplines;

pursue careers or graduate studies in systems engineering or their chosen field and engage in lifelong learning; and be recognized in their chosen fields for their leadership, integrity, and sensitivity to global societal issues.

Bioengineering

TO APPLY ENGINEERING ANALYSIS, SIMULATION AND DESIGN TO BIOMEDICAL PROBLEMS.

Bioengineers, also known as biomedical engineers, use principles from electrical, mechanical, chemical, and materials engineering to solve problems in medicine and the biological sciences. The growing field of bioengineering now ranges beyond its more traditional scope of technical design, basic and applied research, health professions, and industry, particularly the medical device industry.

Bioengineers now also pursue careers in business, investing, intellectual property law, and government, including the regulation of patents and medical devices. The BSE degree, with a major in bioengineering, is for those who want a fully-accredited professional engineering degree . The BAS degree, with a major in biomedical sciences, offers greater flexibility than the BSE program and is often chosen by students interested in dual-degree programs or advanced study in non-engineering fields. Educational Objectives of the B Tech Program

The undergraduate program in Bioengineering strives to prepare students with: a broad flexible curriculum that allows students to investigate a wide range of subject areas across the University; core abilities and knowledge in areas such as mathematics, physical and life science, engineering science, and design that prepare students for a range of technical and interfacial fields; and opportunities to function at a professional level, using teamwork and communication skills and taking responsibility for their own life-long education.

Computer Engineering

The enormous computational capabilities of modern computer technology offer the potential to create new applications and value that can be turned into concrete artifacts and services that improve our lives and create wealth. Computer Engineering is the discipline that designs and engineers computer systems from digital circuits, through compilers and runtime systems, to networking and world-wide distributed systems. As an engineering discipline, the computer

engineer must appreciate the physical aspects of computations (energy, delay, area, reliability, costs) and be able to expertly navigate the
multi dimensional tradeoff space associated with implementing computations.
 Computer Engineers write software and firmware for embedded and handheld systems, design chips, network and telecommunication hardware and software, and operating systems, and engage in robotics research.
To be offered jointly by the Departments of Computer and Information Science and
Electrical and Systems Engineering, VIU's Bachelor of Technology in Computer Engineering (CMPE) program is set up to capitalize on the strengths of both departments.

Civil Engineering

Civil engineers design, plan, and improve the built environment and infrastructure systems, including buildings, power generation facilities, water supply networks, pollution control works, flood protection structures, dams, and canals, as well as vital network systems for commerce such as roadways, airports, railroads, and ports. Civil engineering encompasses several sub-disciplines, including hydraulics and hydrology, structural, geotechnical, construction, environmental, civil engineering materials, and transportation engineering.
Coursework in the major builds especially on a strong foundation in math and physics, and exposes students to these sub-disciplines. An emphasis in the sustainable engineering of civil infrastructure is also provided by the curriculum.

Environmental Engineering

Environmental engineers design systems to provide safe water, air, and land for human habitation, and to address the impact of human activities on the environment. For example, environmental engineers may be involved in the design of technologies to remove emerging contaminants from drinking water, monitor and mitigate greenhouse gas compounds, recover resources and energy from waste streams, design sustainable alternative energy sources, cleanup hazardous waste sites, or restore streams and lakes damaged by human activities.
In this major, a strong foundation in math, chemistry, physics, biology, and earth science is important, and the engineering tools to apply them are provided in the curriculum. The social and policy issues associated with environmental problems are also explored.

 Academic Objectives
 The graduates of the Civil and Environmental Engineering Programs at VIU
  will have the necessary intellectual tools and technical skills to take on
  careers of leadership in the development of new technologies, construction of
  modern infrastructure, and to contribute to society through participation in
  policy making and governance. Graduates will have a solid foundation in civil
  or environmental engineering and will achieve success in graduate education

and a broad range of career opportunities. Our graduates will become team leaders, and   will successfully address open-ended problems applying critical thinking.

The VIU Civil and Environmental Engineering graduates will become effective communicators of technical and professional information in written, oral,   visual and graphical form. Professional careers of graduates will be distinguished with a high degree of awareness of moral, ethical, legal and professional obligations to protect human health, human welfare, and the environment.

Academic and Research Program in Emerging Technology

It seems as though every day there is a new type of technology that we learn about. These emerging technologies range from biotech to nanotech to miniature electronics, to hydrogen fueled cars and beyond. The intended effect of a technology is rarely, if ever, the only impact it has on human life. Unintended, unknown, and delayed consequences may prove even more important in the long run than the direct and intended effects. At times, different technologies can have similar unintended consequences that combine to have a serious impact undreamed of by the users of the technology.

The purpose of this is to identify course objectives, course content, and activities for a course entitled "Emerging Technologies". It will take a glimpse into four proposed major content areas and activities that support the learning objectives of the course.

Potential Course Objectives

- Students will acquire knowledge about various emerging technologies within the present society.
- Students will become more aware of positive and negative outcomes that arise from changing technological cultures.
- Students will utilize gained knowledge to research areas of emerging technology and develop hypotheses regarding future developments.
- Students will learn about new processes and materials and develop a decreasing dependency upon natural materials and knowledge of uses for new materials.
- Students will become aware of new career opportunities that are emerging as a result of emerging technologies.
- Students will utilize acquired knowledge to research and develop innovative ideas by putting knowledge into practice.
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Content

There are many possibilities in regard to content area for a course about emerging technologies. Four major content areas for the course would be nanotechnology, biotechnology, miniature electronics.   In the following section you will find a brief overview of each major area.

Nanotechnology

Nanotechnology is the science and technology of building electronic circuits and devices from single atoms and molecules. Nanotechnology "is used to describe many types of research where the characteristic dimensions are less than about 1,000 nanometers" (Nanotechnology). Nanotechnology deals with the molecular make-up and organization of structures. Future applications will involve manufacturing using atomic structures.

<u>Biotechnology</u>

Biotechnology is the use of microorganisms, such as bacteria or yeasts, or biological substances, such as enzymes, to perform specific industrial or manufacturing processes. Applications include the production of certain drugs, synthetic hormones, and bulk foodstuffs as well as the bioconversion of organic waste and the use of genetically altered bacteria in the cleanup of oil spills.

An important area of biotechnology is the area of Biometrics. Biometrics are automated methods of recognizing a person based on a physiological or behavioral characteristic. The characteristics measured include: face, fingerprints, hand geometry, handwriting, iris, retinal, vein, and voice. Biometric technologies can be used in order to identify, authenticate, or verify the identity of a person. Biometric technologies can be used as stand alone technology or integrated with other technologies such as smart cards, encryption keys, and digital signatures. Biometrics consists of "an industry that is transitioning from emerging technologies into the necessary tool, which is part of our daily lives".

Another key area of growth in the biotech industry is pharmacogenomics. A specific area that is increasingly growing is the Human Genome Project. It is analysis of DNA for function of discovered genes, it is designed to sequence all 24 of the human chromosomes. Similarly bioinformatics deal with annotation of genomes.

The simplest tasks used in bioinformatics concern the creation and maintenance of databases of biological information. Nucleic acid sequences (and the protein sequences derived from them) comprise the majority of such databases. While the storage and organization of millions of nucleotides is far from trivial, designing a database and developing an interface whereby researchers can both access existing information and submit new entries is only the beginning." (BioTech: Bioinformatics)

<u>Activities</u>

A course entitled "Emerging Technologies" would be of a nature that lends itself more naturally to research and development activities and projects. Although the course would not be limited to this area, the focus of potential activities that follow concentrate on improving knowledge and research skills. Such a course would be more adequately taught within a communications laboratory with internet access, although a laboratory setting would be equally appropriate.

<u>activity #1</u>

Computer Related Emerging Technologies

Research and develop a paper (with annotation and bibliography) that outlines one of the following topics as it concerns the newest technologies that are in the field. Choose a topic from the following list:

- Wireless capabilities (this is currently one of the greatest emerging technologies)
- Database developments
- Storage ability on computers (perhaps some type of external device that is under development)
- New software (specific type of program, no gaming)
- Processing chips
- Operating systems
- Altered hardware designs (how small computers are becoming)
- Possible alternatives:
    - Digital phones
    - Nextel's 2 way capabilities
    - Fiber optic cable and wiring

activity #2

Innovation upon Existing Technologies

Take a traditional technology that is no older than four years. Determine how technologies from activity one are altering the technology or how they could alter it. Sources may be no older than five years. Discuss positives and negatives of the alteration along with design concepts. Choose an emerging technology that has to deal with an area in the following list:

- Food production
- Food preservation
- Sports safety
- Architecture
- Furniture
- Textiles
- Genome project
- Cochlear implants

activity #3

Emerging Technologies for use Within the Classroom

Every educator is aware of instructional technologies. Most teachers have either an overhead projector . Teachers that are within wealthier districts have the luxury of using projector systems and SMART boards. Some technologies that are on the rise for use in the educational setting are: satellites, desktop audio/graphics conferencing, and desktop videoconferencing. These three emerging technologies take the education outside the classroom. They allow students and instructors to communicate from remote locations and also allow the opportunity for students and educators to communicate more personally over long distances by exchanging information, ideas, and experiences. Emerging technologies for instructional use will have a large impact on education for both the students and educators. The important thing to remember is that

The technology is really only serving as the intermediary between the learner and a human instructor. Human beings are the ones who decide how to teach the material—what to present and when, how to ask questions, what choices to give the learner, and so forth. The fact that these choices are encapsulated in a computer program, for example, does not change the fact that humans are real teachers.

Without the emergence of technologies everything in our daily lives would take so much longer, for example surgeries are much faster and recovery times are of remarkable speed. There are new drugs that are being developed and produced all the time that may eventually lead to a cure for diseases that were once thought of as incurable.
At the rate at which knowledge is growing, by the time the child born today graduates from college, the amount of knowledge in the world will be four times as great. By the time that same child is 50 years old, it will be 32 times as great, and 97 percent of everything known in the world will have been learned since the time he was born.

A course entitled "Emerging Technologies" would be extremely beneficial to both students and educators. It would help students to become better prepared for not only today's society, but the rapidly approaching future. Educators would gain the knowledge necessary to effectively pass on information to students and aid in helping students become informed members of society. Industrial arts teachers should realize that our society is a technological society. Technology is future oriented which means we are in an opportune position to assist students in the challenges they will have as adults. Our goal must be to provide the most realistic models of life that we can.

Emerging technologies are the future. Ideologies that are being developed today will become the technologies used daily in our future society. A course in emerging technologies would be beneficial in that the youth of today would acquire the knowledge base that is necessary to live and understand the ever-changing highly technological society in which we live.

SCHOOL OF MANAGEMENT AND ENTREPRENEURSHIP

Mission
BBA Full Time (4 years)

 MBA Full Time
 Full time 2 years MBA Programme spread over 4 semesters.

The specializations in major/minor mode offered includes Marketing, Finance, Operations, Information Systems, Human Resources, International Business

Marketing :

The curriculum focuses on leadership and management development in order to provide students with the skills and qualifications necessary to successfully target market strategies, consumer behavior, market research and product management.

Human Resource Management :
The course focuses on various facets of organizational design, motivation, leadership, strategic human resource management, compensation, negotiation, teams, managing change and business ethics.

Operations Research
:
The operations curriculum focuses on the design and management of the processes by which products are manufactured and services are delivered to customers.
The core course provides an overview of the field and Critical processes that enable service delivery systems, supply chain, and quality improvement efforts.

 Finance :

The finance specialization is designed to provide a means for students to gain exposure to five major fields in the field of finance namely corporate finance, financial institutions, investments, insurance and personal financial planning including modules on portfolio management, financial analysis, decision making and international financial management.

International Business :

This specialization is intended to provide them with opportunities to acquire a deeper understanding of doing business in a global context. The course integrates international finance, strategy and marketing with rich cross-cultural material.

 Information Systems :

The IT course builds the skills necessary to analyze business strategies and processes, identify IT related problems and opportunities, specify required IT capabilities and manage the design, implementation and evaluation of IT solutions.

Retail Management :

The specialization on Retail Management caters to the current needs of the growing retail market in India and covers courses related to visual merchandizing, store management, store location and inventory and logistics management. The students are imparted skills on opening and managing retail stores.

Special Program in Engineering Management

The Engineering Management Program will offer a Master of Technology in Engineering Management and a Certificate in Engineering Management. This program

will combine a practical business approach with an in-depth technical concentration and emphasizes how to lead people and manage complex projects. Our engineering management courses are developed and taught by industry experts and are designed to address real-world problems in the workplace.

The Engineering Management Program at VIU is designed to help maximize technical and business skills and is ideally suited for engineers employed in technology-oriented enterprises or government programs.

WHY ENGINEERING MANAGEMENT?

The global environment demands skilled engineers who understand the essential principles of management and business. Combining technical and business skills gives engineers a competitive advantage. Engineering management professionals are trained to understand not just how a system works technically, but also how these systems fit in and relate to others. Organizations seek engineering experts who can understand the complexity of technological and business-related challenges and who can create solutions to solve them.

Special Program in Entrepreneurship

 The curriculum focuses on dealing with issues that a potential entrepreneur must be aware of, much before starting the venture. It pertains to important concerns while starting a business, such as making a business plan and raising finance and also it addresses important to the day-to-day operations of an entrepreneurial enterprise, such as marketing, project management. Entrepreneurship is emerging as key word to Indian economy after the economic liberalization in 1991. Some states of India have done well where as some states like West Bengal lagged far behind to take advantage of globalization. In order to take advantage of globalized economy, any young mind willing to set up his own business needs to be well trained in formulating business plan, product plan, project plan, Enterprise Resource Management, marketing plan and source of investment. Key trust will be on how we could equip the young boys and girls better prepared for his business venture.

What the School of Management could offer for Entrepreneurship?

A. Course works on Entrepreneurship, Project Management, Product Management, E-Commerce, Enterprise Resource Management, Human Resource and Online Marketing. There will be hands-on training on each of the course work which can be 6 month, 3 month and 1 week (corporate)
B. IT infrastructure for setting up Web technology for them : Any new business needs website, customer interaction (Customer service, sales etc) in the website and different types of business package
C. Building, office space needed for their incubation
D. Marketing infrastructure needed for incubation: No business can take shape without proper marketing. For any new business, we would be able to offer a marketing platform that would be generically prepared
E. Setting up seed venture fund to start a new business after it is being properly reviewed

Specific Course that can be offered which has high demands

1. **Online Marketing** – Search Engine Optimization, Google Ad Words, Email Marketing, SMS marketing, Social Media Marketing (Can be 3 courses -1 week, 3 months and 6 months of course works) : There will be theoretical as well as practical trainee engagement with real marketing projects.
2. **Ecommerce** –IT technology, System Engineering, Marketing of Ecommerce, CRM, Order processing, Shopping Cart Design, Payment Gateway, Product Template design (Can be 3 courses -1 week, 3 months and 6 months of course works)
3. **Entrepreneurship development** : Business Plan writing, Product Planning, Project Planning, Funding, Accounting, HR, Marketing Plan (3,6 and 12 month course works)
4. **Product Line Management**
5. **Project Management**

This department will mainly earn course work from Practical Training of the course works in association with the International Center for Innovation and entrepreneurship.

INTERNATIONAL CENTER FOR INNOVATION AND ENTREPRENEUERSHIP

The *Center for Innovation* at Vivekananda International University is intended to be an entrepreneur outreach center in West Bengal.. The Center will provide assistance to innovators, entrepreneurs, and researchers to launch new ventures, commercialize new technologies, and secure access to capital from private and public sources.

The Center for Innovation's vision and mission is to provide entrepreneur outreach and education, and become the leader in tech entrepreneurship in rural India.. Our goals are:

- Grow entrepreneur ventures
- Foster Innovation
- Secure access to entrepreneur capital
- Provide superb entrepreneur infrastructure
- Provide world-class entrepreneur education..

    In the spirit of entrepreneurship, the Center will pay its own way through fees for services, contracts, incubator rents and grants from foundations, entrepreneurs and government sources.

    ### Center for Innovation Foundation
- The Center for Innovation Foundation serves as a link between successful entrepreneurs and the Center for Innovation and its two tech incubators and foster entrepreneur initiatives and new ventures in the region.

What is the Center for Innovation?

Many of us have dreams, ideas, products or solutions that we would like to see in the marketplace. The Center for Innovation is here to help realize the potential of your ideas and products.

The Center for Innovation helps entrepreneurs, innovators and students launch new ventures and market new products and technologies.

What can the Center for Innovation offer students?

Internships

The Center has one distinctive Internship available to students. **The Internship** program will provide undergraduate and graduate students interested in starting a venture or launching new product with an internship while they are developing their venture.

Scholarships

There are three Entrepreneur scholarships available through the Center **Scholarship** will be given to an undergraduate student who is studying entrepreneurship and/or new business formation with the goal to start, own or manage his/her own business.

Loan Program

Funded through the Foundation, the Student Entrepreneur Seed Fund is a program that assists young entrepreneurs by providing seed capital they would not otherwise have access to. The Seed Fund provided to undergraduate and graduate students with opportunities to launch their own ventures. This is a great opportunity for entrepreneurs who have little to no collateral or equity.

Entrepreneur Coaching

The staff at the Center for Innovation will assist beginning entrepreneurs reach their goals. Professional consultants and grant writers will offer a wide variety of skill and knowledge to the Center's clients.

Who can be a tentant of the incubators and for how long?

The Center for Innovation will operate two tech incubators. Our two Tech Incubators will offer startups and emerging entrepreneurs unique facilities specialized for growth ventures. These new ventures include branch offices entering our region who need to build up their core staff before signing a long-term lease. Incubators offer entrepreneur coaching, a community of like-minded entrepreneurs as well as access to university talent, flexible office and lab space, entrepreneur capital, and much more.

. Our proposed Tech incubators will be IT/Communications intensive multi-tenant facilities are especially well suited for software, SaaS, and communications companies that need extensive and expensive IT/communications infrastructure a young company could rarely afford, and local landlords cannot afford or justify in their rental buildings.

Our Technology Incubators are for:

Technology and innovative startups that will benefit from entrepreneur coaching and being with peers in an entrepreneur community

- Entrepreneurs needing ready access IITHS talent.
- Entrepreneurial Branch offices locating in the region who need time to make key hires before choosing rental space in region

- Technology-intensive companies who need short-term arrangements while other lease space is under development
- Service providers who specialize in services to entrepreneurs

Thus tech incubators are primarily for tech startups and also for technology-intensive ventures who need flexibility in space and agreements to meet their initial needs as they settle into the region. Landlords typically do not want to rent to startups because they are a high financial risk, their space needs change too often as they hire people, and landlords are rarely well equipped to help them finding sources of entrepreneur financing, talent or expertise. We charge rates at or above market price for our services and space, but we offer flexibility and services that typical landlords do not, and cannot offer, which makes us ideally suited for this entrepreneur population.

Out-of-area companies seeking to develop a presence in our trade area may be provided incubator space. These companies are required to pay market rate or above for space and will be provided the entrepreneur development services and programming to expand their operations and job opportunities into this market. It is anticipated that firms will graduate from the incubator within one (1) year or whenever their new space in the region is completed.

Our two incubators are designated as Soft Landings International Incubators, meaning they are well suited sites for international firms seeking to develop a presence in our country. Soft Landings international companies may be provided space, services and programming, and cultural integration assistance as they enter Indian markets.

Incubator Graduation Policy:

Entrepreneur companies cannot stay forever in an incubator, and need to move elsewhere to make room for newer ventures. A venture is ready to "graduate" once the company achieves two of the following:

- Has been an entrepreneur tenant for more than five years
- Employs more than 25 people
- Has successfully cash flowed for more than 18 months and not anticipating another round of equity financing (cash flow positive)
- Exceeds the capacity of the tech incubator

A venture is also ready to graduate when they are acquired or merged with a large company, or when their new facility is completed construction.

HOW DOES THE ENTREPRENEUERSHIP PROGRAM WORK ?

The Center for Innovation Foundation's campaign goal is Rupees. 20 Crores. to keep the Center for Innovation competitive and to further develop the entrepreneurship program.

- Entrepreneurship courses from the , individualized instruction provided by the Center for Innovation, or other programs that may be available and appropriate for the individual
- Prospective participants submit their business plan for consideration as the first step in program participation, following the Center for Innovation guidelines set forth for proper business plans (Business Plan Step-by-Step Workbook, and Ultimate Business Planner Software and the Sample Business Plan Format Checklist)

- After reviewing business plan, prospective entrepreneurs will be interviewed on venture plans, commitment, market strategies, etc.
- The Center for Innovation staff may research typical start-up costs of similar ventures, to ensure students receive adequate capital and to verify that their start-up costs are reasonable
- Entrepreneur participants must sign a Promissory Note before receiving funding

Entrepreneurs must meet with Center for Innovation staff on a monthly basis for up to date reports of venture success

Building a qualified workforce

The program is designed to expand the number of new internship, work experience and apprenticeship positions with employers. Employers in the state's targeted industries can

Business Plan Review

If you choose to write the business plan yourself the Center for Innovation staff iwill be available to review and critique the business plan before it will be presented. The staff will read the plan from the view of the group you are targeting – bankers, investors, suppliers, or key employees to make sure it reads well, answers the most common questions of the target audience and presents your business proposal in the best possible way.

[Marketing Services](#)

Defining and understanding the market for your venture is critical to success and the ability to communicate the market opportunity that exists is necessary in attracting capital.

The Center for Innovation will help you estimate the potential size of your market, describe its characteristics, define key market segments that will make up your sales, identify how best to approach the market, and help you clarify the direction for your marketing efforts.

The Center will provids a wide array of marketing services:

- **Market Research and Analysis** is the foundation of any successful business. In fact, strategies such as market segmentation (identifying specific segments within a market) and product differentiation (creating an identity for your product or service that separates it from your competitors') would be impossible to develop without a thorough understanding of your customers, competitor activities and market trends.
- **Market Feasibility Studies** evaluate the market potential for your venture and help you determine if your venture is viable. Market feasibility studies may help you identify the strategies that will offer the greatest potential for success.
- **Marketing Plans** identify your key market segments and define the work that will be done in order to create sales. This plan should provide you with a clear direction for your marketing efforts in the near- and long-term.
- [Export/Import Planning](#)

Ready to export? Looking to expand to new markets**?**Found a product you would like to import**?** Need assistance in developing the best approach to your markets**?** Need an export plan**?**

SCHOOL OF PUBLIC HEALTH AND BIOTECHNOLOGY

BIOTECHNOLOGY PROGRAM

INTRODUCTION

Biotechnology is broadly defined as using living organisms, or products of living organisms, to improve life, to make a product, or to solve a problem. This field involves the process of discovering, developing, manufacturing, or regulating the final quality of new products. Depending on the tools and applications, it often overlaps with the (related) fields of bioengineering and biomedical engineering.

LEARNING OUTCOMES
By the end of this program, students will be able to:
- Explain and discuss the fundamentals of the sciences that underlie biotechnology and their applications to product development
- Interpret and analyze new scientific discoveries and technologies relevant to biotechnology
- Assess and apply established and emerging biotechnology techniques used for commercial development
- Communicate ideas effectively and persuasively in writing and oral presentations
- Analyze and use company financial information to make effective budgetary and resource allocation decisions
- Describe and apply sound legal and ethical standards, reasoning, and tools in a biotechnology context

PROGRAM CURRICULUM
Core Courses
Traditional didactic coursework will provide the conceptual framework necessary in the biotechnology sector.
- Applied Biochemistry
- Molecular Biology
- Cell Biology and Genetics
- Genome Organization, Structure, and Maintenance
- Microbiology
- Cell Signaling
- Introduction to Molecular Biotechnology
- Introduction to Statistics
- Applied Bioprocess Engineering
- Emerging Topics in Biotechnology
- Regulatory Issues in Biotechnology

- Legal & Ethical Issues in the Science Professions
- Financial Management

Seminars
- Student seminars
- Journal clubs
- Invited speakers

Advanced Level Courses

- Good Manufacturing Practices for Bioprocesses
- Project Management Fundamentals
- Innovation and Technology Entrepreneurship
- Biostatistics
- Comparative Genomics
- Bioinformatics
- Proteomics

Laboratory Experience

- Molecular Techniques
- Workshops

Internships: 8-10 weeks internship in collaboration with industry partners.

Professional Development

- Advanced Scientific and Technical Writing
- Database Management
- Interpersonal Communication

PUBLIC HEALTH

Core Courses

As part of the degree requirements for the School of Public Health's MPH program, students must complete core coursework in the areas of biostatistics, epidemiology, social and behavioral determinants of health, management sciences, practice/problem-solving, environmental health, and biological sciences.

In addition to the required core curriculum, students will have ample opportunity to choose elective courses and complete a practicum as well as a capstone project. Followig are the core curriculum.

Biostatistics

Biostatistics provides the essential methodological and quantitative underpinning necessary for much of public health and medical research. Appropriate study design, data collection and analysis are all needed in order to quantify the effect of risk factors and health interventions on individuals or populations. Areas of concentration in the department are the development and application of methods in statistical genetics and bioinformatics, statistical epidemiology, statistical issues in clinical research including clinical trials, and the geographic information systems.

Environmental Health Sciences

The overall aim of the Environmental Health Sciences (EHS) department is to provide the latest scientific information about the etiology of various health conditions due to environmental exposures and to provide skills in environmental risk assessment and abatement. Students may take advantage of the wide variety of courses relevant to environmental health offered by the university.

Epidemiology of Microbial Diseases

Infectious diseases are one of the main contributors to global mortality and morbidity. The Department of Epidemiology of Microbial Diseases (EMD) has a tradition of both research and teaching courses designed to understand the distribution, transmission, pathogenesis, and ultimately the control of pathogens.A unique feature of EMD is the strong laboratory component within an epidemiology department. Areas of excellence include HIV/AIDS, vector biology, parasitology, molecular epidemiology, immunology, and the modeling of infectious diseases.

Health Policy and Management

The mission of the Department of Health Policy and Management (HPM) is to advance the health of the public by promoting an evidence-based approach to policy making related to the delivery of health care and improving public health. The department considers the determinants of health to be broad, beyond health care alone, and takes a social science approach to studying the many determinants of health.

Department faculty will be involved in research, educational and leadership activities in these areas. Our classes combine practical skills development with theory and case studies, to equip students to take leadership positions in health policy and health care management. Students take positions in government, not-for-profit, for-profit and research organizations across the country and around the world.

Social and Behavioral Sciences Division

The mission of the Social and Behavioral Sciences (SBS) Division is to promote training and research that is focused on:

(1) understanding the psychosocial, behavioral, community, and societal influences on health in the general population, including those who are disadvantaged; and

(2) creating multilevel interventions that eliminate barriers to health, from infancy to old age.

The Global Health Concentration

The multidisciplinary approach of the Global Health Concentration encourages creativity and innovation, while fostering a global perspective. The concentration emphasizes an integrative problem–solving approach to global health issues and to diseases and conditions that afflict developing and developed countries. Students who complete this concentration will be well prepared for positions in a variety of organizations—public and private, national, bilateral and multilateral—dedicated to global health challenges.

M.P.H. students in our traditional two–year program may complete this concentration while they satisfy the requirements of their respective departments or programs. Students in the one–year Advanced Professional M.P.H. Program may enroll in a Global Health Track.

Placement for internships and permanent positions after graduation include the World Health Organization (WHO), UN agencies (e.g., UNHCR, UNICEF), the World Bank and other community–based and research/academic institutions in various countries.

[Division of Health Professions and NursingDepartments & ProgramsDepartment of Biomedical Science and Biomedical Technology](#)

Course Descriptions

Introduction to Disease Processes

The changes in the human body that may be biological, physical, chemical or anatomical which induce disease or an abnormal process are discussed. The etiology and pathogenesis of altered body systems is emphasized. How change can significantly reduce normal function of body systems is also identified.

Computer Applications

This course reviews the usefulness of computers for home or business. Students learn the current Microsoft Office Programs (Word, Excel, Power Point, and Access) and the utilization of an online course management system (i.e. Blackboard or WebCT). Extensive "hands-on" computer use is involved for the completion of this course.

Laboratory Information Systems

This course describes the selection and evaluation of Laboratory Information Systems (LIS) to coordinate and interface departments of Clinical and Anatomical Pathology in the hospital setting. Problems concerning needs analysis, cost, value of the system and communication through computer technology are addressed. The usefulness of computer operations in charting, graphing, database analysis and on-line Internet services is also presented. Students identify criteria to be considered to evaluate the success of LIS systems, quality management and their competency.

Clinical Chemistry I and Urinalysis

This course introduces students to safety principles, quality control and laboratory math and the analysis, quantification, physiologic and pathologic assessment of the serum and urine specimen. Emphasis is based on the clinical correlations and analytical procedures commonly performed on serum to determine the quantity of carbohydrates, lipids, proteins, enzymes, and non-protein nitrogen substances and to assess cardiac, liver, renal, pancreatic and gastrointestinal function. Analysis of the physical, chemical and microscopic examination of urine (urinalysis) is also presented along with the disease processes that hinder kidney function.

Pharmacology

The study of drugs or poisons and their effect to correct abnormal body function is presented. Emphasis is placed on the use of drugs to therapeutically treat disease and the consequence or expectation of body changes possible with their continued use. The Pharmacokinetics, Pharmacology and Pharmodynamics of drugs, in common use to treat disorders, is also discussed.

Introduction to Hematology/Phlebotomy

This course is an introduction to the methodologies, instrumentation and OSHA regulations within a clinical hematology lab. Collection and preservation of blood specimens, description of all formed cellular elements, analysis of blood smears and classification of hematological disorders, such as the anemias and leukemias are discussed. The clinical significance of sedimentation rates and reticulocyte counts and proper phlebotomy techniques and theory are also identified. Safety regulations for blood collection, universal precautions and patient preparation ethics, confidentiality and patient rights are addressed. Practice and competency in phlebotomy is required for course completion.

Introduction to Criminalistics

The course includes an overview of forensic science laboratory techniques. The subject introduces the student to information collected and chain of custody followed at the crime scene; photography; physical evidence and its properties (trace evidence, fingerprints; firearms; fibers; paint; documents examination). This subject includes principles of microscopy; serology (blood identification procedures); origin determination; semen identification procedures; other biological substances of interest; hair comparison; drugs and toxicology; casework interpretation; quality control, proficiency testing and accreditation; and recent criminal cases. Lectures, demonstrations and basic laboratory exercises are used to present the subject matter. Two-hour lecture and three-hour laboratory.

Immunology

This course is an introduction to Immunology and Immunochemistry. The structures, reaction and biological effects among antigens, antibodies and complement in the body (in vivo) and in vitro are discussed. Cells of the immune and inflammatory responses, their structure, functions and inter-

relationships in normal individuals and in disease states are also presented.

Clinical Immunology

In addition to reviewing the cells and tissues of the immune system, specific and non-specific mechanisms of the immune response, the major histo-compatibility complex, hypersensitivities and tumor surveillance of the immune system, this course emphasizes immunologic techniques in the serologic identification of antigens and antibodies. Emphasis is made on measurement of the immune product or reaction which can yield significant information in the clinical differential diagnosis or monitoring the progress of a disorder / disease.

Microbiology in Health Sciences

This course is required for all medical biology majors and health related majors including those students seeking graduate study in the biological sciences and those seeking admission into professional schools. The course introduces the principles of clinical microbiology and characteristics of microorganisms, host-parasite relationships, resistance, immunity, hypersensitivity, public health, epidemiology as well as applied, medical and industrial microbiology; includes clinical diagnostic methods such as culture, control, identification, sterilization, microbiological techniques and concepts; emphasizes those techniques specifically employed in the clinical microbiological laboratory.

Virology

Viral structure, mode of infection of human cells, replication and classification are discussed. The DNA and RNA viruses associated with human diseases as well as the resultant clinical syndromes; diagnostic procedures used to collect and detect viral antigens in clinical specimens; viral serology; viral culture and storage are also presented.

Undergraduate Research

Junior and seniors can undertake an independent research project under the direction of a faculty member in the area of the student's principles interest. Permission of the Department is required to register for this course.

Undergraduate Research

Junior and seniors can undertake an independent research project under the direction of a faculty member in the area of the student's principles interest. . Permission of the Department is required to register for this course.

Clinical Chemistry II and Instrumentation

This Clinical Chemistry Course is a sequel of BMS 50. It presents topics addressing endocrinology, electrolyte and acid/base balance, porphyrins, vitamins and nutrition status, therapeutic drug monitoring, toxicology and identification of tumor markers. The clinical correlations, analytical methods commonly performed on serum or urine are discussed with an emphasis on evaluating the patient's health care status. The principles of operating instrumentation used in clinical chemistry laboratories including point of care testing devices are also presented.

Hematology and Body Fluids

The formed elements of the peripheral blood, their precursors, function and structure including basic methodologies for quantitation of cells and cellular components are discussed. Normal and abnormal cellular morphologies, their clinical relevance in both the quantitative and qualitative assessment of disease in blood is also emphasized. Other body fluids are also addressed: cerebrospinal, synovial, pericardial, peritoneal, pleural, amniotic fluids and seminal fluid in terms of normal and abnormal findings, methods of collection and assessment.

Coagulation

The mechanism of Blood Coagulation/Hemostasis is discussed including evaluation of bleeding disorders and thrombosis. Case studies identify the diagnostic evaluation of normal and disease states.

Immunohematology

Theoretical aspects of immunohematology (blood banking) with emphasis on laboratory techniques used in blood banking are presented. Students completing this course perform techniques in actual use in the characterization of blood in hospital blood banks.

Clinical Bacteriology

The study of the bacteria that are medically important to man with emphasis on identification of clinically significant pathogens distinguished from members' of the normal flora are described. Methods of isolation, identification and characterization of bacteria are integral components of this course.

Mycology and Parasitology

This course introduces the student to the science of Mycology and Parasitology. It addresses the pathogenesis, clinical manifestations and laboratory diagnosis of medically important fungi and parasites. Emphasis is given to the differential characteristics in the identification and clinical diagnosis of mycotic and parasitic diseases. The laboratory component of this course introduces students to various diagnostic techniques used to identify these eukaryotic organisms.

Pathophysiology II

This course extends a student's comprehension of disease processes by presenting the molecular, biochemical and metabolic events which identify a disease or disease process affecting several body systems.

Histopathology of Body Systems

The student comprehends the magnitude of changes that occur in diseased cells and tissues of the human body that are diseased. Emphasis is on major changes observed in tissues undergoing pathologic processes such as: Inflammation, degenerations, necrosis, growth disorders; those changes that occur that influence the health and function of normal tissues within various body systems. Examination of pathology slides is an essential course requirement.

CLS Review Seminar

This course is designed to provide senior CLS students with the appropriate experiences in answering ASCP and NCA certification examination questions and in case study analysis. Review questions in the major categories of hematology, chemistry, immunology, immunohematology (blood bank), and microbiology are addressed. The review sessions are team-taught by program faculty. The seminar culminates in a mock exam which contributes to the determination of the final grade for the course. This course extends into the summer session.

Undergraduate Research Project

This course serves as the culminating experience for students in the Biomedical Technology degree program. Students select a mentor to pursue a hands-on laboratory research project which investigates a Biomedical problem or question. They are then expected to analyze the data obtained and submit to the department and the mentor a written copy of the research project in a format consistent with that of a scientific publication/thesis. Department consent is required to register for this course.

Bioinformatics

This course addresses computational techniques used to study three-dimensional structures and orientation of macromolecules within biological systems. The subject enables students to work on a research life science problems and develop applications employed computerized biological images. Both areas of interest rely on proficiency in the use of the World Wide Web data. Training in bioinformatics is a prerequisite to the comprehension of information regarding the function of genes, proteins, and numerous cellular components. Comprehension about bioinformatics enhances the qualification of graduates in biomedical sciences by allowing them to meld computer skills with current information about the special relationships of biomolecules in living systems.

Diagnostic Techniques in Molecular Pathology

Molecular diagnostics is the application of methods in biotechnology to assist in the diagnosis of disease at the cellular level. Biotechnology involves techniques used in molecular biology that are applied to the study of abnormal cells. Techniques used in biotechnology are: cell culture, the polymerase chain reaction (PCR), immunohistochemistry, cloning and genetic probes. Formal lectures are followed by experiments in a laboratory equipped to perform some of the aforementioned techniques. Additionally, the use of the internet will be demonstrated as a means of accessing databases.

257 Forensic Molecular Techniques

This subject provides a detailed introduction to, and history of, forensic molecular techniques and applications, and covers relevant principles from genetics and biochemistry. This subject includes principles of forensic DNA profiling and repetitive DNA in the human genome; individualization versus identification; how genetic polymorphisms arise and are maintained; continuous versus discrete allele systems; DNA isolation methods; RFLP (Restriction fragment length polymorphism) analysis methods; short tandem repeat (STR) markers; PCR-based typing systems; automated systems and DNA databases; applications of mitochondrial DNA analysis; linkage, pedigree analysis, and reverse paternity; introductory applied statistics for forensic laboratories.

SCHOOL OF EDUCATION

UNDERGRADUATE AND GRADUATE TEACHER EDUCATION PROGRAMS

Our undergraduate teacher education programs will prepare students to become highly qualified teachers who apply and continue to become outstanding teachers and leaders in their field of study. Through the many resources of integrating technology, research-based knowledge of teaching, and service of clinical experiences, students draw on the best practices to assist the diverse and international students they teach. The
commitments from both faculty and students seek to build and strengthen the linkages across courses, experiences, and policies of core values: diversity and equity, innovation and creativity, internationalization, and policy.

Teacher candidates are expected to understand there are many ways to describe and approach knowledge. Candidates are exposed to a range of theoretical perspectives in order to help them make informed, reflective judgments about research and practice. Given this vision, our mission is to foster the learning and development of PK-16 students through our educator preparation programs; therefore, we aim to prepare educators with the skills and commitments necessary to ensure equity for all students in the public schools and classrooms they will lead.

The School of Education will offer several undergraduate teacher education programs that prepare teach candidates for certification in early childhood, elementary, secondary, and special education. In addition, we offer several minors that prepare students for a variety of specializations that can enhance their educational programs and better prepare them for graduate programs.

Foundational Competencies

Foundational Competencies are a comprehensive set of expectations that teacher candidates must demonstrate at various stages during their teacher preparation programs.

These non-academic criteria include:

English Language Competence:The ability to express oneself in standard written and oral English
Interpersonal Competence: The ability to interact effectively with others
Work and Task Management: The ability to organize and manage multiple work demands

Analytic/Reasoning Competencies: The ability to think analytically and reason logically about professional topics, issues, and problems
Professional Conduct: The ability to work within a set of reasonable expectations for conduct as defined by the profession and/or workplace

Physical Abilities: The ability to meet the professional demands of the profession and/or workplace

Professional Dispositions: A commitment to one's own continuing professional development and to the belief that one can be a responsible agent for the improvement and reform of education; commitment to the belief that all children and adults can learn.

While many of these skills and dispositions are expected to be well-developed by individuals as they apply to our professional programs, it is also expected that some of these abilities will continue to develop and be refined during our program-based courses and field experiences.

Early Childhood Education (PreK-3rd Grades)

The Early Childhood Education program offers a Bachelor of Science degree for students seeking certification to teach PreK-Grade 3. Since early childhood teachers are expected to provide an inclusive, developmental education, content courses consist of psychology, science, math, music and arts.

Elementary Education (1st-6th Grades)

This program is intended for students seeking certification to teach grades 1-6 and middle school. Content courses consist of liberal arts classes (e.g., science, mathematics, history, social sciences, music, and arts) and includes an 18-credit Area of Emphasis.

Middle School Math and Science Education (4th-9th Grades)

This program is designed to prepare candidates to earn a Bachelor of Science degree and to meet the requirements for certification in grades 4-9, with a specific focus on mathematics and science teaching. The program prepares reflective practitioners, skilled in inquiry, with the knowledge of content, pedagogy and student learning necessary for teaching middle school mathematics and science.

According to the West Bengal department of Education, there is a critical shortage of teachers in the state's 24 districts. Many of these shortages occur at the middle school and secondary levels. We believe that the best way to increase the number of teachers to address a statewide shortage is to offer pathways for teacher certification.

This option is ideal for first time students. It includes a fully articulated dual major in an Arts and Sciences content area and education. Freshmen are able to complete the university's CORE general education classes, along with the requirements for the academic subject area and education majors within eight semesters. The following programs are available as double majors in conjunction with Secondary Education.
English Education

Four-Year Plan & Program Requirements Information: English Education/English Double Major 4-Year Plan

Government & Politics (Social Studies)

Four-Year Plan & Program Requirements Information: Social Studies Education/Government Double Major 4-Year

Mathematics Education

Four-Year Plan & Program Requirements Information: Mathematics Education/Mathematics Double Major 4-Year Plan

Physics

Four-Year Plan & Program Requirements Information:
Science Education/Physics Double Major 4-Year Plan & Program Requirements (CORE)

Art Studio/Art Education

 Program Description:
The Art/Art Education program is intended for students seeking teacher certification in art. In addition to the CORE general education classes, students complete teaching methods, student teaching courses, and the content course work required to earn a degree in Art Studio. This dual major program provides teacher candidates with the content needed to teach art, Pre-Kindergarten through 12th grade.

Music Education

The teacher certification program for music is offered through the Department of Music.

Physical Education

The physical education certification program is offered through the School of Public Health, Kinesology Department.

5-year BS/MEd Combined Programs

Secondary Education (7th-12th Grades)

The program is for talented students who wish to combine undergraduate studies

in the content area and professional education as a foundation for focused
professional coursework at the graduate level leading to secondary-level
certification in the subject field and the Master's of Education degree. As
undergraduates, admitted students complete their baccalaureate degrees with a
major in the relevant and content area and a minimum of 12 credits in graduate-level professional
studies related to teacher certification requirements. In their fifth year, they enroll in a full-year
internship and complete professional studies that make them eligible for teacher certification and
the master's of education degree. The fifth year of the program will be off campus.

Special Education (All Age-Based Areas)

The Special Education program at the University of Maryland at College Park
offers a five-year, combined Bachelor's/Master's program in Special Education.
The program prepares graduates to successfully assume the increasingly complex
responsibilities of a teacher for students with disabilities. The coursework and
field experiences provide a solid foundation in generic special education followed
 by an intense two-year specialization in one of three age levels:
 Early Childhood Special Education (Birth - Grade 3)
 Elementary Special Education - (Grades 1 - 8)
 Secondary/Middle School special education (Grades 6 - Adult)

Within each age-based specialization, graduates earn cross-categorical, dual certification to work
with both students with high-incidence disabilities (e.g., learning disabilities, behavior disorders,
mild mental retardation) and students with low-incidence disabilities (e.g., autism, Down
syndrome, cerebral palsy). Distinctive features include: three full years of field experiences;
integrated B.S. / M.Ed. degrees; dual special education certification

The minor provides students who wish to support their major field of study with
knowledge of human growth and development across multiple domains and
developmental stages, as well as knowledge related to principles of teaching and
learning and/or who desire active participation in human development research
under the supervision of Human Development faculty in laboratory settings.

Leadership Studies Minor

The minor in Leadership Studies promotes college student leadership development
by educating undergraduate students for and about leadership in a complex world.
Students are prepared to serve effectively in formal and informal leadership
roles in campus, local, national, and global contexts. The Minor in Leadership
Studies consists of 18 credit hours.

Secondary Education Minor

The minor in Secondary Education provides opportunities for undergraduate
subject area majors to enroll in a sequence of education courses that helps them
to determine if teaching is a viable career option for them. The 15-18 credit
minor may be taken prior to admission into a teacher preparation program. If an
undergraduate student pursuing the minor desires to enter an education track,

the candidate may apply for the dual major program to obtain certification as a secondary education classroom teacher through completion of a West Bengal Department of Education approved program option. Some of the courses undergraduates take to complete the Minor in Secondary Education may also be applicable toward certification options at the post-baccalaureate level offered through Curriculum and Instruction.

Secondary Language Education Minor

The minor in Second Language Education provides opportunities for undergraduate subject area majors to complete a sequence of courses that helps them prepare for careers as teachers of English. If the undergraduate pursuing the minor desires to enter the ESOL teacher preparation track, the candidate may apply for the Five Year Integrated Program option or the one year MCert Program option; in either case, satisfactorily completed courses in the minor that meet program requirements will be applied to the certification program requirements.

SCHOOL OF ARTS AND SCIENCES

SWAMI NITYANANDA SCHOOL OF SPIRITUALITY AND WORLD RELIGIONS

Mission

CENTER FOR THE STUDY OF WORLD'S RELIGIONS

The mission of the Center for the Study of World Religions at Vivekananda International University is: to advance interdisciplinary, international, and interreligious exchange, learning, and research on the world's religions;to bring together the rich intellectual resources of faculty and students at Vivekananda International University and at other Schools and departments of the University with an international scholarly network to explore issues of religion in today's complex, globalizing, and changing world; andto build a deeper and broader understanding of the histories and contemporary patterns of the world's religious communities by hosting scholars and practitioners at the Center as residents and program participants.

The goals set forth in the first —the appointment of a professor of world religions, the creation of graduate and undergraduate programs in the study of religion, the support of research and

publications, fellowships for study and travel, and communication among peoples of different faiths

The CSWR at the university has particular interest in the historical and contemporary interrelationships among religions, and the theological, philosophical, comparative, political, and ethical challenges facing religious communities and those who study them today. It primarily engages the academic community, beginning with the faculty, students, and staff of VIU, and then the wider scholarly community, but also welcomes religious practitioners, policymakers, and the wider public that is interested in religion.

The CSWR itself is not a curricular department. Faculty associated with the Center include VIU faculty and those teaching in other departments of the University. The Center occasionally will bring an international visiting scholar to the School to co-teach and conduct research with a member of the faculty.

JUSTICE SHYAMAL SEN SCHOOL OF LAW

Vision and Mission

Vision:

To establish a center of legal education, bring in culture of excellence on the imperatives of social dynamics and improve the quality of life and lifetime prospects of people around the world.

Mission:
Promote excellence in teaching and training in law.
Educate students to be competent legal professionals in the diverse callings of the profession, driven by concerns of social accountabilities.
Create new knowledge, expand limits of human understanding, and produce a wide of range of benefits throughout society with the aid of fundamental research and scholarship in law. Contribute to the achievement of constitutional mandate through professional legal studies.

Our Programmes

The School of Law will offer two five years integrated undergraduate programmes, namely, B.A. LL.B. (Bachelor of Arts and Bachelor of Laws) and B.B.A. LL.B. (Bachelor of Business Administration and Bachelor of Laws).

Bachelor of Arts and Bachelor of Laws (B.A. LL.B.): The close connection between social sciences and law hardly needs to be articulated. A lawyer needs to be conscious of the intricate and complex problems of the society. Our integrated Bachelor of Arts and Bachelor of Law programme provides a deep insight into the historical perspective of development of law, political factors influencing policies culminating into law and the intricate relationship between legislations and social problems. This Programme aims at creating socially sensitive sentinels of justice.

Bachelor of Business Administration and Bachelor of Laws (B.B.A. LL.B.)- The use of word 'multi' is indeed multiplying in today's world, multi-nationals, multi-tasking, multi-dimensional, and why not multi-disciplinary'. The sweeping changes in the global economic scenario have necessitated a strong demand for a breed of youngsters with the potential knowledge of law coupled with the core essentials of management and business to enhance productivity. With the object of catering to this demand unfolding before the students, and to enable them to explore these vistas of opportunities that lie ahead, we have commenced an integrated Bachelor of Business Administration and Bachelor of Law degree programme (BBA LLB). Here we will impart exhaustive knowledge to the students not only to survive but also to excel in the increasingly competitive world.

INSTITUTE OF INTELLECTUAL PROPERTY LAW –
MAJOR FOCUS OF THE SCHOOL

Intellectual property lies at the core of our economic, cultural, and technological lives. Recognizing the importance of intellectual property to modern society, the institute will have full-time professors to offer students a variety of experiences related to intellectual property, from moot court competitions to networking with experienced practitioners.

Most important, however, is the institute's specialized intellectual property curriculum, which gives students the opportunity to take a wide variety of intellectual property courses. Indeed, those with a particular interest in the subject can graduate with the Intellectual Property Certificate—an indication of the student's expertise on these important issues. Earning the certificate involves taking a certain number of credits in qualifying courses and completing a related research project; for more information, please visit the Intellectual Property Institute. The following overview explains the school's many offerings in this area.

Introductory Course
Intellectual Property Fundamentals serves as the foundational course for the specialist who wishes to pursue the Intellectual Property Certificate, but the class is also a good choice for the generalist who simply wants to learn the basics of intellectual property law. It covers copyright, patent, trademark, and other subject matters, and it introduces students to the delicate balance inherent in protecting existing innovation without stifling new technologies.

Upper-Level Electives
Students interested in more specific intellectual property studies will have approximately a dozen options from which to choose. The law school offers several specialized courses in the core fields of intellectual property, including Copyright Law, Patent Law, and Trademark and Unfair Competition Law. Students can also learn about the role of intellectual property in particular industries through such classes as Entertainment Law and Sports Law.

Seminars
The curriculum includes a number of seminars that give students a chance to learn about intellectual property in a small-group atmosphere, and to work closely with a professor on a paper exploring a cutting-edge intellectual property issue. These courses include Computer Law, International Intellectual Property, and Intellectual Property Law and Policy, all of which typically satisfy the upper-level writing requirement. Students can also work one-on-one with a member of

the intellectual property faculty on an Independent Study—an in-depth research project of a subject of particular interest to the student.

Practice-Based Courses
 Any true understanding of intellectual property law requires learning how it works at a practical level. With that in mind, the Intellectual Property Institute has developed a wide range of courses in which students can experience the practice of intellectual property firsthand. Foremost among them is our Intellectual Property & Transactional Law Clinic, in which students work with real clients on real intellectual property transactions—helping entrepreneurs, non-profits, researchers, and artists register trademarks and copyrights, apply for patent protection, draft licensing contracts, develop e-commerce strategies, and more. The law school's Clinical Placement Program offers a similar experience by placing students in the legal departments of local companies and educational institutions, where they often encounter intellectual property issues. And experienced practitioners also teach important skills in such courses as Intellectual Property Litigation, Licensing and Technology Transfer, Patent Preparation and Prosecution, and Trademark, Copyright, and Trade Secrets Practice.

Electives in Other Areas
 A number of law school courses in other areas can also help students understand intellectual property law. These courses include Administrative Law, Antitrust, Bioethics, First Amendment Law, Information Design and the Law, Law and Economics, and Remedies.

UNIVERSTY'S RESEARCH AND TRAINING PROGRAMS AS PLANNED BY THE DIRECTORS

RENEWABLE ENERGY

Renewable energy is energy which comes from natural resources such as sunlight, wind, rain, tides, and geothermal heat, which are renewable (naturally replenished). In 2008, about 19% of global final energy consumption came from renewables. New renewables (small hydro, modern biomass, wind, solar, geothermal, and biofuels) accounted for another 2.7% and are growing very rapidly.

India lacks sufficient domestic energy resources and imports much of its growing energy requirements. In addition to pursuing domestic oil and gas exploration and production projects, India is also stepping up its natural gas imports, particularly through imports of liquefied natural gas. Coal / peat account for nearly 40 percent of India's total energy consumption, followed by nearly 27 percent for combustible renewables and waste. Oil accounts for nearly 24 percent of total energy consumption, natural gas six percent, hydroelectric power almost 2 percent, nuclear nearly 1 percent, and other renewables less than 0.5 percent. According to the Indian government, nearly 30 percent of India's total energy needs are met through imports.

The energy need for India is staggering and it needs an educated work force to pursue renewable energy ideas. Some of these energy sources would be non-polluting helping India's painful environmental problems.

What IIST could offer for Renewable Energy Research?

A) Course work on basic science and engineering associated with energy generation for human consumption through renewable and non-renewable sources.
B) Workshops where students could build demos of various renewable energy ideas. It needs to be coupled with an Entrepreneur's network to advance the demos into commercialization. This would need a strong intellectual asset management component
C) Students could also build small projects with public funding for converting renewable energy for use of villagers in India. Village groups will be encouraged to work with the students.

Specific course have to be designed but needs to cover the following topics in order to develop the needed fundamentals for the students:

(1) Fuel science and Engineering
(2) Combustion Engineering
(3) Photo and thermo-electricity and its application in solar
(4) Hydro-engineering
(5) Thermal and Thermo-nuclear Engineering

PUBLIC HEALTH RESEARCH

(Research conducted by Dr. Roopa Biswas, USA)

Regulation of inflammatory gene expression in lung diseases

Lung inflammation arising from environmental factors is a significant public health concern in India. The process of inflammation is modulated by regulating the expression of pro-inflammatory cytokine and chemokine genes. The successful orchestration of this process depends upon stringent control of inflammatory gene expression in order to provide adequate host defense and also prevent unnecessary tissue damage. Failure to resolve the associated inflammation will lead to severe consequences in the form of chronic inflammation.

Dysregulated inflammatory processes lead to high levels of secreted proinflammatory cytokine and chemokine gene products, including IL-8 and many others. IL-8 is one of the most powerful known biological attractant of neutrophils, which are called upon to mount a vigorous defense against bacterial invaders. Inflammatory chemokine genes provide an attractive model for the study of specific mechanisms controlling inflammatory gene expression, as they are expressed in significant quantity by a diverse array of cell types.

The physiologic responses to pulmonary trauma and hemorrhage are manifestations of complex cellular and molecular processes resulting from the secretion of inflammatory mediators including TNF-α, IL-6, IL-8, and IL-1β. Recently, a novel class of endogenous non-coding RNA molecules known as microRNAs (miRNAs) has emerged as important targets in the frontier of biomedical research. These small ~22 nucleotide long RNAs have been proven to be key regulators of expression of pro-inflammatory cytokine and chemokine genes by directing their target mRNAs towards degradation and/or translational repression. The mis-regulation of specific miRNAs has

been demonstrated in a variety of diseases in humans including cancer, heart disease and immunologic disorders. **miRNA expression profiles will reveal novel biomarkers for pulmonary injury/inflammation and help develop novel anti-inflammatory therapeutics.**

OTHER PROGRAMS OF THE RESEARCH INSTITUTES

International Institute of Engineering and Management

An explosion of technological advances is continually transforming the way we live and do business. Engineering managers have incredible opportunities to play a significant role in shaping the development of these technological advances, and the course of the societal transformation they are fueling. Through the countless strategic and operational decisions they make, engineering managers guide the development of technology in the production of goods and services that fulfill commercial and social needs. To be as effective as possible, they must possess both the engineering expertise to understand the technology they are managing, and the managerial skills to facilitate the efficient development of that technology. Their effectiveness is further enhanced when they can integrate these two competencies by bringing "a management perspective to the engineering problem and an engineering perspective to a management decision." The Engineering Management program at is geared towards engineers who want to stay in a technological environment, but focus on managerial roles. Through an in-depth, real world group design project, and course content in management science, project management, decision and risk analysis, information technology, finance and accounting, systems analysis, and organizational behavior, students gain the technical and managerial skills necessary to become effective engineering managers. They also learn managerial skills to help organize and supervise people from different cultures and backgrounds so as to maximize teamwork, creativity, and productivity, and to do so in an environment of global awareness and concern for ethical issues. Further, they learn to navigate this process with a broad, global perspective that considers the full range of technical, economic, environmental, social, and other consequences over an appropriate time horizon. While critically important to the success of engineering managers, many of these skills are not emphasized in traditional engineering curricula.   Graduates of the Engineering Management program may work in the private or public sector, and in technological industries ranging from computers to manufacturing to construction. For companies to compete in today's highly technical, dynamic, and competitive global economy, they not only need to have cutting-edge technology, but also the ability to manage it well.

INTERNATIONAL INSTITUTE
OF ENVIRONMENTAL MANAGEMENT

ALTERNATIVE AND RENEWABLE ENRGY CENTER (AREC)

 Mission
 The AREC mission is to be an economic development catalyst, business accelerator as well as research and development center that links business, education and government resources for the development and commercialization of existing and new technology as well as the advancement of emerging technology with emphasis on alternative and renewable energy.
 Vision

AREC will be a center of excellence that promotes economic development opportunities through advancement and commercialization of alternative and renewable energy technologies.

AREC will achieve its mission through public/private partnerships, the use of sound economic development principles, research and intellectual property development, student engagement and academic excellence. AREC is committed to the use of sound science, adherence to sustainability principles, and effective business practices. Emphasis will include the commercialization of innovative technology with both existing and new companies, and promoting the use of alternative, clean and renewable energy sources.

AREC's facilities and programs will support business development, entrepreneurial innovation and the advancement of suitable renewable energy related public policy in order to build more sustainable lakeshore communities, contributing to the advancement of the Indian conomy.

Guiding principles

1. Work in a collaborative, cooperative and multidisciplinary fashion, at local, regional and state levels to bring together the necessary partners to advance and commercialize the best available alternative, clean and renewable energy technology.

2. Move intellectual property from the classroom, laboratory and incubator to market.

3. Create economic benefit for project partners, AREC stakeholders and communities.

4. Support and participate in alternative energy related consortia and related collaborative opportunities to advance shared goals for the local community, region and State of Michigan.

5. Develop strategic partnerships and organizational relationships and build a critical mass of intellectual and investment capital and opportunity with likeminded interests consistent with the vision of the AREC stakeholders.

6. Engage others with an expectation of mutual accountability, transparency, integrity and trustful working relationships.

7. At all times, demonstrate a commitment to best practices in applying standards of sustainability.

Key objectives

1.   Bring together the necessary parties for the efficient and economical development of new and existing technology in the field of alternative energy.

2.   Promote alternative and renewable energy technology as an opportunity for economic development.

3.   Leverage assets, advance the AREC mission where appropriate, and develop intellectual property opportunities for all partners and stakeholders.

4.   Accelerate the research and development of alternative and renewable energy technologies. Work collaboratively with others engaged in similar R&D efforts. Develop mentor relationships, promote educational opportunities, utilize IITHS resources and student talent, and collaborate with other educational units to assist in advancing the AREC vision.

5.   Use the AREC facilities to accelerate the development of promising new energy related businesses and technologies, assist in bringing promising technology to maturity, to market, and accelerate the impact and profitability of alternative and renewable energy products.

6.   Develop and make available a network of business consulting support and business development resources to help inventors, entrepreneurs and early stage start-up companies become viable sooner. Integrate efforts with local inventor networks and partner with local business and industry.

7.   Help develop meaningful educational units at high school, community college and university levels to advance an understanding of sustainable energy technology, practices and clean energy alternatives to help shape the work force and talent pool of the future.

8.   Convene, host and support conferences, workshops and product demonstrations to advance an understanding of emerging alternative, clean and renewable energy technology principles.

International Institute of Public Health - Programs in Community and Public Health

Public Health Major in Health Promotion features a broad-based foundation in the liberal arts and sciences and an ecological perspective of public health and the role that health promotion plays in preventing disease while maintaining or increasing quality of life. Graduates of the program will possess an understanding of the contributions of core public health disciplines to the nation's health. At the same time, graduates will also learn how to apply knowledge and skills relating to the interactions and interdependencies of health behavior, the physical and social environment, and public policy to affect health at local, state, national and international levels.

The program is designed to prepare entry-level health promotion professionals to begin careers in a variety of community health agencies: Official health agencies, voluntary health agencies, community based/non-governmental agencies, medical care services, education agencies, and business and industry. Within these practice settings, entry-level health promotion practitioners address significant health challenges from individual, family, group, organization, neighborhood, community, and societal perspectives. Graduates will apply their competencies to assess needs, plan and implement programs, assess program outcomes, communicate and advocate for public health issues, and participate in the development of health promotion as a profession.

Program Learning Outcomes
Upon successful completion of this program, students will be able to:
•Demonstrate knowledge of the core disciplines of public health and their relationship to the ecology of public health.
•Review the development of professions and their evolving role in society in the context of health promotion.
•Compare and contrast the resources used to determine the health status of local, state, national, and international groups, communities, and populations.
•Differentiate between the behavioral, biological, environmental, and health services contributions to health from a historical perspective.
•Describe behavioral and non-behavioral variables contributing to morbidity and mortality produced by chronic and communicable diseases and injuries.
•Compare and contrast the contributions of distress, nutrition, physical activity, and the misuse and abuse of drugs to morbidity and mortality among specific groups, communities, and societies.
•Assess the need for health promotion programs in response to the characteristics of diverse communities of interest using primary and secondary data.
•Plan health promotion using measurable structural, process, and outcome objectives to address identified needs.
•Employ a variety of behavioral, environmental, and policy strategies and tactics to implement health promotion programs.
•Monitor progress of health promotion program in meeting stated goals and objectives.
•Assess the progress and outcomes of a health promotion program in relation to established standards.
•Categorize communication and advocacy strategies and tactics according to the influence of behavior, environment, and public policy according to a given health need in a given community.
•Incorporate ethical and cultural considerations in health promotion programs.

ACADEMIC PROGRAMS

Engineering / Technology

* Environmental Engineering
* Industrial Engineering and Operations Research
* Engineering Management and Systems Engineering
* Biomedical Engineering
* Water Resources Engineering
* Information Science and Technology
* Medical Technology
* Electrical Engineering
* Civil Engineering
*Mechanical Engineering

Public Health and Community Medicine
* Environmental Health
* Epidemiology
* Public Health Genetics
* Health Administration
* Physiology
* Biostatistics

Biological, Math and Physical Sciences
* Analytical Chemistry
* Biochemistry
* Food Sciences and Technology
* Genetics
* Microbiology and Molecular Biology
* Physical Chemistry
* Applied Mathematics and Statistics * Applied Physics

School of Engineering Management
School of Arts and Sciences
School of International Studies
School of Divinity and Religious Studies
School of Law

ENROLLMENT

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Engineering / Technology	300	600	900	1200	1500

* Civil and Environmental Engineering
* Industrial Engineering and Operations Research
* Engineering Management and Systems Engineering
* Biomedical Engineering
* Water Resources Engineering
* Information Science and Technology
* Medical Technology

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Public Health and Community Medicine	200		400	600	800

* Environmental Health
* Epidemiology
* Public Health Genetics
* Health Administration
* Physiology
* Biostatistics

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Biological, Math and Physical Sciences	250		500	750	1000

* Analytical Chemistry
* Biochemistry
* Biophysics
* Food Sciences and Technology
* Genetics
* Microbiology and Molecular Biology
* Physical Chemistry
* Applied Mathematics - Statistics
* Applied Physics

School of Arts and sciences / Other Schools

TOTAL ENOLLMENT	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
	800	1500	2250	4000	6000