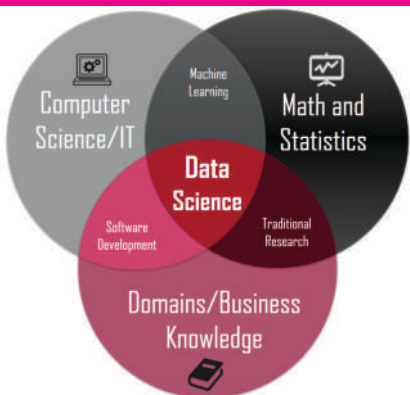


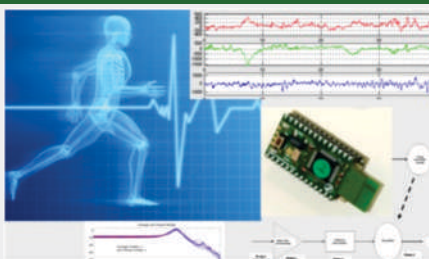
BCA (IoT) - INTERNET OF THINGS



BCA - DATA SCIENCE



B.Sc. - BIO-MEDICAL ELECTRONICS



Highlights of the Program

- ★ Aligned to the industry needs in the areas of high demand
- ★ Designed to build the skills needed by the industry
- ★ Emphasis on the building sound theoretical fundamentals and practical applications
- ★ Syllabus co-designed by the College Professors and Industry Experts
- ★ Programs delivered by interdisciplinary staff from the college and industry experts
- ★ State of the art laboratories like 'Texas Instruments Innovation Lab' in the college



THE NATIONAL EDUCATION SOCIETY OF KARNATAKA (R)

THE NATIONAL COLLEGE

AUTONOMOUS

JAYANAGAR, BANGAORE - 560 070

Accredited 'A' Grade by NAAC

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BCA (IoT) – INTERNET OF THINGS

An Exciting Career

What is IoT? (Internet of Things)

IoT (internet of things) has become a buzz word today. IoT, in simple terms can be described as a network of devices which can sense, accumulate and transfer data over the internet without any human intervention. Imagine when devices that we use can collect information, communicate with each other, draw conclusions and execute the next steps!!! It is expected that 10 Million IoT jobs will be created in the next 5 to 10 years. Indian start-ups have attracted more than \$60M in investment.

IoT applications spans across industries. Major work is happening in Automotive industry, Manufacturing, Healthcare. Agriculture etc. Government policies encourage creation of Smart cities, which use IoT for Smart metering of electricity and water, trash management, pollution control etc. Concepts like smart car, smart homes provide a large number of applications in IoT.

Why Study IoT?

Though IoT is offered as specialization in some engineering colleges, there are no 3 year undergraduate programs specialized in IoT. A specialized program in IoT enables graduates to fit into the industry requirements easily. The salient features of the BCA (IoT) program offered at The National college, Jayanagar are:

- ♦ Strong fundamentals of Embedded electronics
- ♦ Communication systems and Protocols for IoT communication
- ♦ Basics of IoT devices for sensing and actuating
- ♦ Analysis of IoT data, including statistical inferencing
- ♦ Syllabus co-designed by the College Professors and Industry Experts
- ♦ State of the art laboratories like 'Texas Instruments Innovation Lab' in the college

Courses Studied in IoT

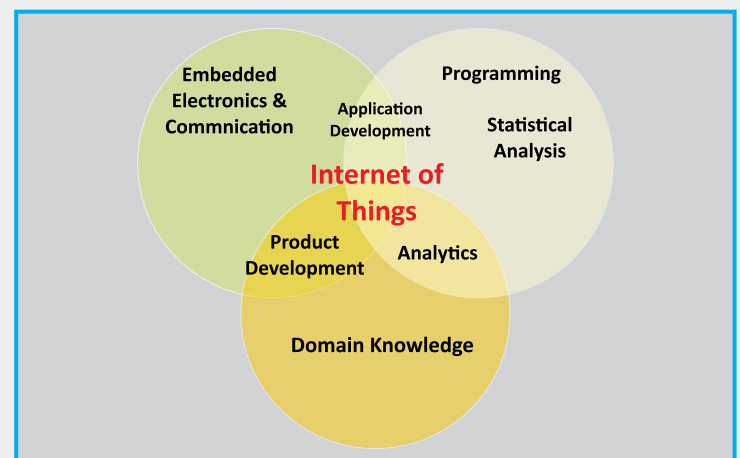
The 3 year undergraduate program is designed to build strong theoretical fundamentals, using the theory in practical applications. Extensive lab work in state-of-the-art technology makes the students ready for the industry.

Some of the courses studied are:

- ♦ Digital electronics and Verilog
- ♦ Embedded system design (ARM), RTOS
- ♦ Sensing and actuating devices for IoT
- ♦ IoT Architecture and Protocols
- ♦ Cloud architecture and computing
- ♦ Programming in C and Python
- ♦ Data Analytics
- ♦ Business English
- ♦ Japanese language (Optional)

Competency Options for Students

The coursework is designed to provide 3 competency options based on the aptitude of students. Students who excel in Embedded electronics and IoT can build products for IoT applications, Students who show proficiency in Embedded electronics and Programming can develop IoT applications. Students who enjoy statistical Analysis and IoT data/cloud computing can become IoT data analysts.



Opportunities for IoT Graduate

IoT offers job opportunities in many companies. Some examples are:

- ♦ Global multinationals like Robert Bosch, Samsung, Intel, Honeywell, CTS, etc.,
- ♦ Large Indian companies like Infosys, Wipro, TCS, HCL, Tech Mahindra, Mindtree etc..
- ♦ Several Small and medium IT companies

Most of these courses have a corresponding Lab course.
Project /Internship in 5th and 6th Semesters provides hands-on learning of the subjects

What is Data Science?

Data science is the one of the most sought out expertise in the industry. Explosion in the creation and availability of data in the last 10 years, advances in artificial intelligence and Big data technology has opened huge opportunities in Data Science. "Data Science is about extraction, preparation, analysis, visualization, and maintenance of information." India is likely to add over 1.4 million new IT jobs by 2027 finds a joint study by Cisco and IDC driven by emerging technologies like cybersecurity, Internet of things (IoT) and Big Data". Typical applications are :

E-Commerce	Banking & Insurance	Finance	Healthcare	Automobile	Manufacturing
<ul style="list-style-type: none">Product recommendationConsumer profilingConsumer response	<ul style="list-style-type: none">Fraud detectionCredit risk monitoring	<ul style="list-style-type: none">Customer segmentationAlgorithmic tradingRisk analytics	<ul style="list-style-type: none">Drug discoveryMedical image AnalyticsBioinformatics	<ul style="list-style-type: none">Car monitoring systemSelf driven cardsEnhancing Safety	<ul style="list-style-type: none">MaintenanceInventory ManagementDistribution and logistics management

Undergraduate program in Data Science

A specialized program in data science ensures that the multidisciplinary subjects from Computer science, Mathematics, Statistics and Artificial intelligence are blend together to create the competence needed for the industry.

The salient features of the BCA (Data Science) program offered at The National college, Jayanagar are:

- Strong fundamentals of Computer Science, Mathematics/ Statistics
- Machine learning algorithms taught by industry experts
- Building AI applications for Data Analytics with guidance from practitioners
- Syllabus co-designed by the College Professors and Industry Experts

Courses Studied in Data Science

The 3-year undergraduate program is designed to build strong theoretical fundamentals, using the theory in practical applications. Extensive lab work in state-of-the-art technology makes the students ready for the industry.

Some of the courses studied are:

- Advanced Mathematics and Statistics
- Data Extraction, Data mining and Data Visualization
- Advanced Machine learning
- Cloud computing, Big Data Analytics
- Natural Language processing (NLP)
- Python Programming
- Extensive Lab work - Statistics for Data Science (SAS/SPSS), Machine learning, Big data analytics

Competency Options for Students

The course work is designed to provide 3 competency options based on the aptitude of students. Students who excel in Data management / programming and Business domain knowledge can build software applications. Students who show proficiency in data management / Programming and Maths / Statistics can specialize in machine learning and data analytics. Students who enjoy Maths/Statistics and understand Business can build statistical models for Business applications.

Opportunities for Data Science Graduate

Graduates in Data science can seek postgraduation in specialized subjects like Artificial Intelligence, Machine learning, Deep learning. According to NASSCOM report, jobs in AI and Big Data are estimated to be 780,000 by 2021. Freshers with excellent theoretical expertise can expect to get higher salaries than the average IT industry salary.

Some examples are:

- Global multinationals like IBM, Accenture, CTS, Walmart, Microsoft etc.
- Large Indian companies like Infosys, Wipro, TCS, HCL, Tech Mahindra, Mindtree etc..
- Several Small and medium IT companies in Analytics Service
- Start-up companies in AI, Machine learning, Big data analytics.

Most of these courses have a corresponding Lab course.

Project /Internship in 5th and 6th Semesters provides hands-on learning of the subjects

B.Sc. BIOMEDICAL ELECTRONICS *A wave of opportunities*

What is Biomedical Electronics?

In the last decade, Convergence of Computing and Medical technology has created huge opportunities in the field of biomedical electronics and health informatics. Biomedical electronics is the study of creating devices that can capture the signals from the body, process the signal and communicate the information to either visual displays or as data that can be stored in storage devices. Biomedical electronics and Health informatics is a rare combination of biomedical electronics and healthcare that involves the application of medical transducers, signal processing technology, embedded electronics, communication and analytics to create healthcare solutions. Biomedical engineers not only create equipment and devices, but also computer systems and software used in healthcare. The healthcare industry in India is already one of the country's largest sectors in terms of both employment and revenue generation. The healthcare industry in India accounts for worth \$160 billion and is expected to reach over \$280 billion by 2020.

Why Study Biomedical Electronics?

The 3 year degree program in Biomedical electronics is designed to build competency for Healthcare industry: From capturing the signals from the body to medical instrumentation and processing of healthcare data. The salient features of the B.Sc. (Biomedical electronics) program offered at The National college, Jayanagar are:

- Strong fundamentals of Embedded electronics
- Biomedical sensors and Bio medical signal processing
- Biomedical instrumentation and Medical imaging
- Syllabus co-designed by the College Professors and Industry Experts
- State of the art laboratories in Biomedical instrumentation
- One full semester of Project work/internship to provide hands-on learning of the subjects, including visits to Hospitals to understand the practical usage of equipment.

Competency Options for Students

The course work is designed to provide 3 competency options based on the aptitude of students. Students who excel in Embedded electronics and Medical instrumentation can build products for medical instrumentation applications or become maintenance specialists of medical equipment. Students who show proficiency in Embedded electronics and Programming can develop applications for healthcare industry. Students who enjoy statistical Analysis and understand healthcare data/ cloud computing can pursue career in Health informatics.

Opportunities for Biomedical electronics Graduate

Graduates can aspire to find a career in the medical instrumentation industry in several areas like R &D, manufacturing and Maintenance of medical equipment. Also, there are plenty of opportunities in the healthcare analytics, in areas like Clinical trials data analytics etc. The job opportunities exist in many companies. Some examples are:

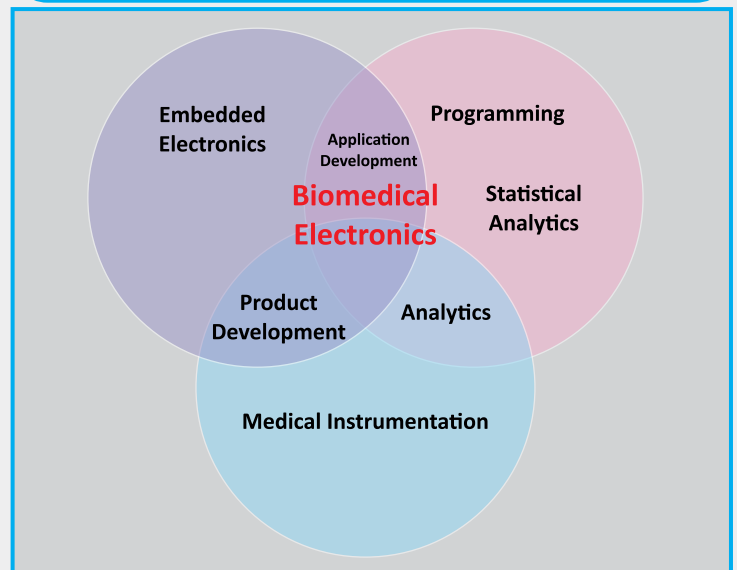
- Global multinationals like GE, Siemens, Philips, CTS, etc.,
- Large Indian companies like Infosys, Wipro, TCS, HCL, Tech Mahindra, Mindtree etc.,
- Small and medium sizes companies in Healthcare analytics Services.

Courses Studied in Biomedical Electronics

The 3 year undergraduate program is designed to build strong theoretical fundamentals, using the theory in practical applications. Extensive lab work in state-of-the-art technology makes the students ready for the industry.

Some of the courses studied are:

- Digital electronics and Verilog
- Embedded system design (ARM)
- Biomedical devices – Transducers and Sensors
- Biomedical signal processing /instrumentation
- Medical imaging systems
- Cloud architecture and computing
- RTOS, Programming in C, R and Python
- Data Analytics
- Business English
- Japanese language (Optional)



Most of these courses have a corresponding Lab course.

Project /Internship in 5th and 6th Semesters provides hands-on learning of the subjects