Career Option in Sustainable Habitats
Opportunities Unlimited !!!!

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Outline

RVCE Vision
What do we mean by Career Opportunities in Sustainable Habitats
What are we doing to Prepare our students
Conclusion
VISION

LEADERSHIP IN QUALITY TECHNICAL EDUCATION, RESEARCH & INNOVATION THROUGH TEAMWORK, WITH A FOCUS SUSTAINABLE AND INCLUSIVE TECHNOLOGY

Part of our Mission
(Initiative in this Golden Jubilee year 2013-14 to be completed in a Max 3 years)

(i) Zero Water (Discharge and Intake self sustained)
(ii) Zero Waste
(iii) Zero Energy Campus by 2016

Engineering Grand Challenges

- Make Solar Energy Economical
- Manage the Nitrogen Cycle
- Advance Healthcare Informatics
- Prevent Nuclear Terror
- Advance Personalized Learning

- Provide Energy From Fusion
- Provide Access to Clean Water
- Engineer Better Medicines
- Secure Cyberspace
- Engineer the Tools of Scientific Discovery

- Develop Carbon Sequestration Methods
- Restore and Improve Urban Infrastructure
- Reverse Engineer the Brain
- Enhance Virtual Reality
What do we mean by Career Opportunities in Sustainable Habitats?

Career Options

- Design and Construction
- Consultants, Policy makers, Advocacy and Change leaders,
- Architect (Environmental/Sustainable Design)
- Agricultural Inspector
- Building Operations Management
- Camp Counselor
- Career Consultants (Green)
  - Clean energy (solar, wind, biomass, biofuels, geothermal, waste to energy, hybrid systems, energy harvesting and scavenging)
- Scientists working on Chemical, structural, Biologist (Conservation), Material, sensors, Environmental, Hydrologist, Climatologist, Environmental Meteorologist, Toxicologist
- Energy Efficient systems (integrated infrastructure and health monitoring, electrical, light wind and air harvesting)
- Climate Risk Analyst, Emissions Manager, Emissions Trader
- Community Affairs Manager
- Complementary Health and Medical Care
- Heating, air conditioning and refrigeration engineers, mechanic to technicians/installer
- Construction (Energy Efficiency – Green Building)
- Corporate Social Responsibility Professional
- Ecologist
- Economists (Environmental & sustainable Issues)
- Educators (Ecological and all aspects of Sustainability)
- Energy Manager (Renewable)
- Engineers (Environmental / Pollution Control, Sustainable Energy)
- Entrepreneur (Green)
- Environmental Health and Safety (EHS) Technicians
- Financial analyst/adviser specializing in socially responsible investing
- Food Scientist, Organic Food and Farming
- Production Specialists
- Forester
- Furniture Builder (Eco-friendly)
- Industrial Designer (Sustainable)
- Interface & Interior Designer (Green)
- IT Specialists (Green Software and Hardware Developers)
- Lawyer (Environmental)
- Advocacy Agencies
- Sustainability Specialists
- Waste Management
- Construction Professionals
The 12 Principles Sustainable Technology
(especially for materials)

- Pollution Prevention
- Atom Economy or saving on materials
- Less Hazardous Synthesis
- Design Safer Chemicals
- Safer Solvents & Auxiliaries
- Energy Efficiency
- Renewable Feed stocks
- Reduce Derivatives
- Catalysis
- Design for Degradation
- Real-Time Analysis
- Accident Prevention

Interdisciplinary Research Groups

- The broad areas of Materials include polymers, composites, wide range of nano materials (metals, ceramics and semiconductors) and amorphous materials for applications in transport (aviation, automobile to agriculture), construction, health, communication, clean energy and electronics.
- Sensors, Networks and Communication (upto THz)
- Nano Science, Surface Engineering & MEMS
- Data Mining/ Data warehousing or Business Intelligence, Cloud Computing.
- Environment Friendly And Sustainable Technologies with Enable Intelligent Infrastructure Management buildings (Health Monitoring), Smart Cities including and Intelligent Transport Systems.
- Large Area and Plastic / Printable (Flexible) Microelectronics
- Advanced Instrumentation including Medical Instrumentation
- Highways and Transport technology
- Clean Water and Waste Management
Sustainable Clean Energy From Waste

Biofuel Generation & Waste Lignite & Coal to Clean Fuel

Plastic Waste to Fuel including thermoset plastics and using an industrial waste as catalyst

Cultivation of Algae in waste water

Rain Water Harvesting & Sewage Treatment Plant
(Expect to reach Zero discharge in 3) years

Harvesting close to & Seven million liters covering 55% of the Campus. Hope to harvest 100% in two years time.

An STP Plant with 2.5 Lakhs liter Capacity Installed and can be scaled to 5 Lakhs liters. & 1000 L experimental STP plant
50 Liters ETP plant installed
Indigenous Process Equipment for Processing Nanomaterials, Polymers, Composites and Plastics

Rapid Prototyping Infrastructure

Components made by using Rapid Prototyping Facility

Cluster Deposition (Plasma CVD) system & a DC Plasma CVD system
CUSTOM DESIGNED DC MAGNETRON SPUTTERING & PECVD COATING SYSTEM FOR SOLAR RECEIVER TUBES

Dimensions: 3320mm (W) 1600mm (D) 1520mm (H)

Tube Diameter 50 µm
Nano Carbon films Grown at near Room Temperature

- Atomic Smooth films
- Nanocluster Carbon
- Nano Pillars
- Nano Fibers / Nanohorns
Nanosphere Lithography

HHV Capabilities
Device concept - Nano patterned metal at the Front and Back Contact

Current efficiency in cell level is 8-9% and module efficiency is ~7%.

Expected increase in efficiency is by 20-30%.

300mm length of SS 304 Tube with a Wall Thickness of 1.6mm

Assembled Tube = 1000 mm long with glass outer tube (ID70mm / OD75mm)
Installed Capacity of Solar Thermal Systems at R.V. College of Engineering

- 24,000 lts of hot water per day
- Solar PV Systems 12 kW
  - 280W x 36 panels
  - 130 W x 10 panels

Will be installed to power the Computer Lab.

Nano Carbon films Grown at near Room Temperature

- Atomic Smooth films
- Nanocluster Carbon
- Nano Pillars
- Nano Fibers / Nanohorns
Novel Environment Friendly Construction Material

- Different cementious composites - using Industrial waste/Marginal
- Fly ash, GGBFS, Lime, Gypsum, Quarry dust, Pond ash etc.
- Potential to use as alternatives to OPC
- Using in construction = the best way to dispose

Application Of GIS & RS For Wide Range Of Activities Including Environment Monitoring, Water Harvesting, To Sustainable City And Town Planning

Students at the RVCE – ISRO supported GIS/RS facility in the Civil Engineering department used the satellite data to develop a detailed and optimised feeder bus route for the upcoming METRO project for Bangalore. Similarly the GIS data has been used for water resources management in the coastal regions of Dakshina Karnataka and for development of reservoirs (water bodies) in and around Bangalore. Further lot of image processing satellite data has been carried out for wide range of environment & resource analysis purposes.
Currently Established Campus Network Backbone, Wireless AP Connectivity (redundancy) and Server Virtualization being Implemented

- Expenditure to date towards the network, systems and software ~ Rs 2.2 Crores in the last 3 years.
- This includes ~25Kms of Fiber + Cat 6 cables, 93 AP (scalable to 200), Over 30 servers including 3 Blade Servers and other PC based servers, spread over 20 locations in the campus.
- A cloud environment would not just add to hands on educational opportunity to students and faculty, but help optimize resources, effective utilization of licenses and more opportunity for interdisciplinary usage.

Conclusion

Presented Is A Brief Overview Of Career Opportunities And How Even One Initiative With Sustainability And Inclusiveness Can Go A Long Way

Only Thing That Can Limit Us Is Our Imagination Other Wise It Is Opportunities Unlimited
Thank You