

EE/CpE 322
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**What to Expect in
Senior Design**

Bruce McNair
bmcnair@stevens.edu
<http://koala.ece.stevens.edu/~bmcnair>

Introduction

- Logistics:
 - Course coordinator: Bruce McNair
 - Office: Burchard 206
 - Phone: 201-216-5549
 - email: bmcnair@stevens.edu
 - Web site: <http://koala.ece.stevens.edu/~bmcnair>
 - TA: Dominik Hepp '03: dhepp@stevens.edu
- Class schedule:
 - Generally, 1 hour Tuesday sometime between 3 – 5:50 pm, as needed
 - Fall group presentations require full class schedule time and Thursday meetings
 - Senior design is a 0-8-3 course
- Class web site:
<http://koala.ece.stevens.edu/sd>
All 2002-2003 and 2003-2004 projects are archived. Many before that, as well

A personal perspective

- My perspective on senior design:
 - As a '71 student
 - As an AT&T/Bell Labs technical recruiter from 1982-1996
 - As a faculty member
 - As a design engineer

Your three tasks

1. Figure out what your job (project) is
3. Do it
2. Tell people about it

Senior Design course flow

1. Project identification
 - Is it interesting?
 - Is it doable?
 - Is it meaningful?
 - Can you find a sponsor?

2. Group formation/selection of Group Leader
 - ~4-5 students/group
 - ****Equal share in outcome of project ****
 - Group leader keeps project on target (time and direction) and is responsible for reporting

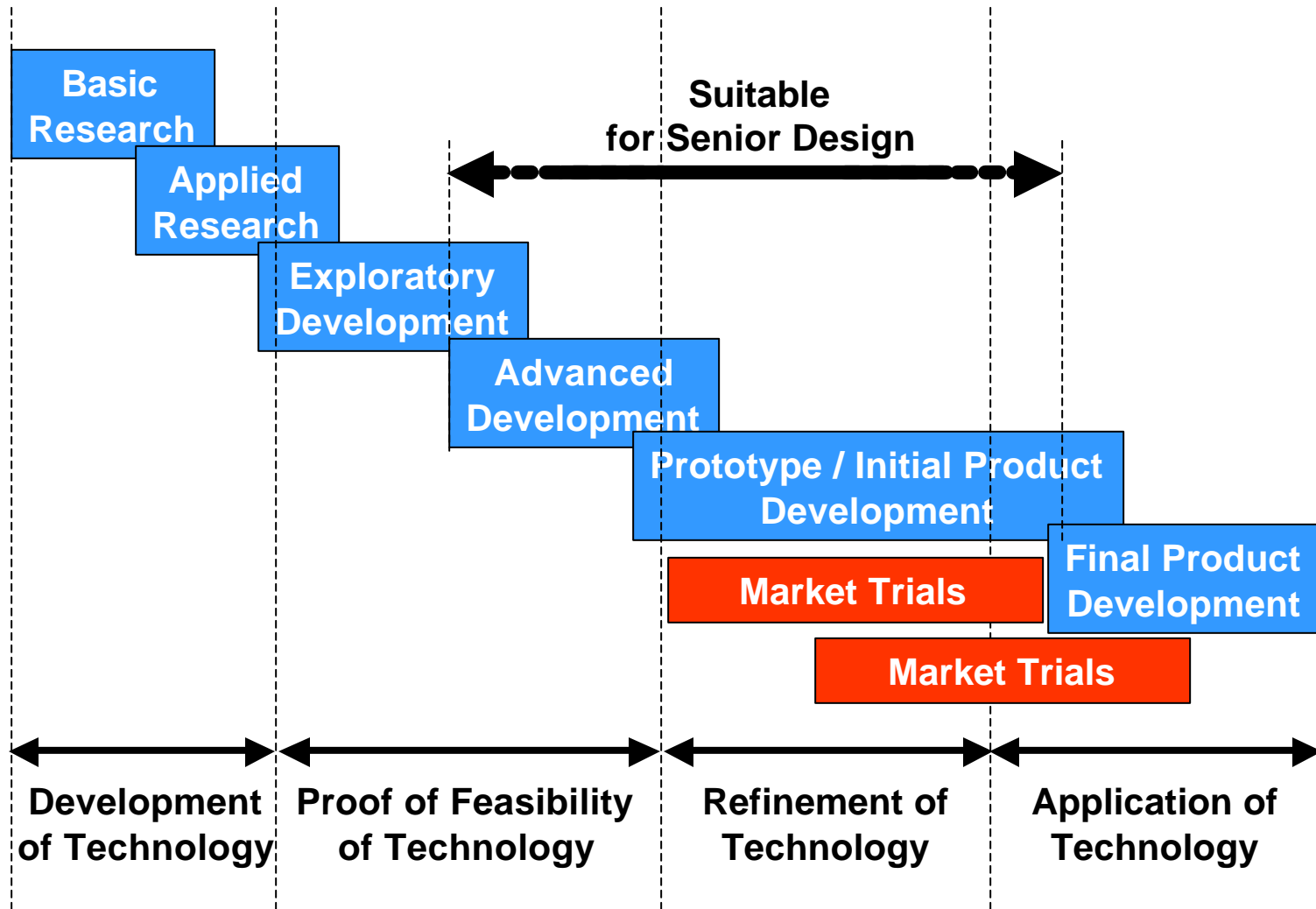
3. Find a Faculty Advisor
 - **Must** be a member of ECE, CS, or Physics Departments' faculty
 - Provides project technical guidance
 - Evaluates written reports
 - Determines 80% of group grade

Senior Design course flow (continued)

Documentation required (in order)

- Project/Advisor form – Fall semester, ~Week 2
- Weekly reports – one/group, by Monday Noon each week of classes
- Team Effectiveness Surveys – one/per person by Monday Noon each week of class (does not influence individual grades)
- Project Proposal – middle of Fall semester
- Individual project web site
- Final Design report – end of Fall semester
- Project Oral Presentation – end of Fall semester
- Interim Progress report – middle of Spring semester
- Poster/Project demonstration – end of Spring semester
- 3" x 7" project brochure
- Final Report – end of Spring semester

Stages in Development Cycle



Constraints That Can (Should?) Be Relaxed For Prototype

- **Physical size**
 - Level of integration (VLSI vs. FPGA, mC, LSI/MSI, etc.)
 - **Implementation platform**
 - simulating a Palm on a laptop,
 - simulating functions in software that would normally be in hardware, and vice versa
 - **Feature set**
 - What is essential to demonstrate concept, vs. what could be imagined/assumed
 - What is known to be doable vs. what is to be demonstrated
 - **Performance**
 - Speed, capacity, etc.
 - **Environmental constraints**
 - Operating temperature range, shock, vibration, etc.
- Focus on *key* attributes of end design, not every detail

Technical Advisors and their Research Areas

<p>Francis T. Boesch</p> <ul style="list-style-type: none">• Network Design• Network Reliability• Applications of Graph Theory	<p>Rajarthanam Chandramouli</p> <ul style="list-style-type: none">• Networked Communications• Wireless Communications• Multimedia Computing and Security• Energy Efficient Coding for Wireless Communications	<p>Cristina Comaniciu</p> <ul style="list-style-type: none">• QoS for wireless networks• Cross-layer design for wireless networks• Radio resource management• Admission/access control for multimedia• Spread spectrum communications• Multiuser detection & multi-access protocols
<p>Sumit Ghosh</p> <ul style="list-style-type: none">• Asynchronous Distributed Decision-Making Algorithms• Networking and Network Security• Computer-Aided Design of Digital Systems• Modeling and Simulation of Complex Systems• Intelligent Transportation	<p>Harry Heffes</p> <ul style="list-style-type: none">• Integrated Broadband Communications Networks• Overload Controls for Distributed Switching Systems• Queuing and Teletraffic Theory and Applications• Computer Performance Modeling and Analysis• Mobile Communications and Congestion Control for High Speed Networks	<p>Chandra Kintala</p> <ul style="list-style-type: none">• Software fault tolerance• Software rejuvenation and self-healing• Distributed Application Architectures and Protocols• Network Management and QoS• Descriptive Complexity Theory

Technical Advisors and their Research Areas

<p>Hongbin Li</p> <ul style="list-style-type: none">• Signal Processing for Communications• Channel Identification and Equalization• Transmit/Receiver Diversity• CDMA and OFDM Systems• Stochastic Signal Processing• Sensor Array Processing• Detection and Estimation• Spectral Analysis and System Identification• Radar and Medical Imaging	<p>Hong Man</p> <ul style="list-style-type: none">• Image Compression• Video Compression• Error Resilient Data Compression• Wireless Data Communications	<p>Bruce McNair</p> <ul style="list-style-type: none">• Wireless Communications• Computer and Network Security• Signal Processing for Communications• Software-Defined Radios• OFDM Wireless Systems• Wireless LANs• Embedded system design• Real-time systems• Broadband Power Line systems
<p>K.P Subbalakshmi</p> <ul style="list-style-type: none">• Joint Source-Channel Coding• Image and Video Coding• Error Resilient Multimedia Communications• Multimedia Networking	<p>Stuart K. Tewksbury</p> <ul style="list-style-type: none">• VLSI and ULSI Digital Systems• System Interconnects & Packaging• Communications for Concurrent Computing• Reconfigurable Computing Systems• Computation Science & Engineering	<p>Uf Tureli</p> <ul style="list-style-type: none">• CDMA-Based Wireless Systems• Wireless Testbeds• OFDM Wireless Systems• Signal Processing for Communications

Technical Advisors and their Research Areas

	<p style="text-align: center;">Yu-Dong Yao</p> <ul style="list-style-type: none">• Microcellular Wireless Architectures• Equalization for Co-Channel Interference• Spread Spectrum for Indoor and Mobile Wireless• Mobile Satellite Communications	
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2002 Projects

Chaotic Spreading Spectrum System Development and Implementation using FPGA/VHDL for Secure Wireless Communications	Redesign of the Stevens Campus Network	Blue Force Tracing Geolocation Services
Kalman Filter Library	Youth Monitoring Device	Self Tuning Guitar
Autonomous Advertising Robot Interface	eHousing	Wireless Cargo Tracking using 802.11a Technology
Factory Deviation Monitor	Real-time Wireless Sensor Network – Signal Analysis for Security Applications	EZPARK
Data Center Environmental Link	Home Calling Center	Financial Management Software
MyStevens	Miniaturization of MP3 Player	Remote Camera Control
Voice Over IP at Stevens	Cell Phone – Brew Based Cellphone Application Development	H-26L Video Coding Standard

2002 Projects

Missile Course Deviation	Smart Appliances	Autonomous Underwater Vehicle
Motion Tracking Device	“Universal” Credit Card	Secure Data Transfer System
Platform for Media Riche Lecture Delivery	Digital Fingerprint Scanner	Web-based Information Tracker
Real-time Multimedia Steaming System w/ advanced compression & steganograpy algorithms over wireless channels	Digital Player Piano	Digital Video Surveillance System
Automobile Black Box	LED Learners Guitar	Media Pad
GPS tracking for RF transceivers	Modular LED Display	Electronic Caddy

2003 Projects

Wireless Biomedical Sensor	Trans-verbal-ator	Intelligent Cellular Telephone Docking Station
Environment Aware GPS	GameBoy TV Tuner	Parking Assistant
Mobile MP3 Player	DBNS Filters	Autonomous Underwater Vehicle
Real-time Inventory using RFID	Intelligent SMS Ordering System	FLASH Video Game System
Thumb-thing	Hexaphonic Digital Mixer	Programmable Sculpture
Software Defined Radio	Bluebird	Vehi-Track
Automatic Mailbox Notification System	Network Bandwidth Monitor	Spectrum Analyzer
Solid State Hard Drive	Voice Activated Remote Control	
GPS Mass-Transit Tracker	Smart FRANN – Face Recognition using Artificial Neural Networks	