



COURSE TITLE	: Embedded Programming using Sun SPOTs
COURSE PREREQUISITE	: Introduction to Programming 2
COURSE DURATION	:16 weeks (3 hours/week)
COURSE METHODOLOGY	: In-class lectures and laboratory exercises

Course Description

Embedded programming using Sun Small Programmable Object Technology (Sun SPOT). Communicating Host Station with Sun SPOTs. Squawk VM. Using SPOTWorld/Solarium. Sensor Board Programming. Sun SPOT Networks with Generic Connection Framework. SPOTs Security.

Course Outline

Week	Topics
1	Introduction Getting Started with Sun SPOTs The Sun SPOT Kit Hardware and Software Specification Installation Sun SPOT SDK Releases Java Development Kit The Sun SPOT SDK The SPOTManager Tool Quick Tour: Sample Applications Appendix: Sun SPOT SDK Files
2	Overview of Java ME Introduction Java Editions Java Micro Edition MIDlets Manifests and Resources Java ME Application Development The Sun Java Wireless Toolkit Netbeans with Mobility Pack Java ME Optional Libraries
3	Sun SPOTs Setup and Configuration The Sun SPOT Basestation Getting Information Upgrading the Basestation Using the Basestation Free-Range Sun SPOTs Remote Operation Selecting the Sun SPOT SDK
4	Hardware Overview

	<ul style="list-style-type: none"> eSPOT Main Board eDemo: The Sensor Board Add-On Boards Hardware Configuration and Power Source
5	<p>Squawk Virtual Machine</p> <ul style="list-style-type: none"> Introduction Architecture <ul style="list-style-type: none"> Split Virtual Machine VM Components On-Device Virtual Machine <ul style="list-style-type: none"> Garbage Collection Thread Scheduler Device Driver and Interrupt Handling Support
6	<p>Squawk Virtual Machine (continuation)</p> <ul style="list-style-type: none"> Squawk on the Sun SPOT <ul style="list-style-type: none"> Flash Memory RAM Application Development <ul style="list-style-type: none"> The Squawk Debugger Isolates Isolate Lifecycle Inter-Isolate Communication Isolate Migration Appendix: Squawk Java ME Library
7	<p>Sun SPOT Application Development</p> <ul style="list-style-type: none"> Sun SPOT and Host Applications Sun SPOT Applications <ul style="list-style-type: none"> Programming Environment Sun SPOT Libraries Building and Deploying using the Command Line
8	<p>Sun SPOT Application Development (Continuation)</p> <ul style="list-style-type: none"> Using an IDE <ul style="list-style-type: none"> Setting Up the Development Environment: Netbeans Configuring Projects in all IDEs Building and Deploying in Netbeans
9	<p>Sun SPOT Application Development (Continuation)</p> <ul style="list-style-type: none"> Debugging <ul style="list-style-type: none"> Debugging Sun SPOT Applications Setting Netbeans as the Debug Client Ending the Debugger Limitations Batch Operations
10	<p>Emulator</p> <ul style="list-style-type: none"> Overview Remote Sun SPOTs Virtual Sun SPOTs Other SPOTWorld Options SPOTs Communication
11	<p>Device Libraries</p> <ul style="list-style-type: none"> Introduction Persistent Properties <ul style="list-style-type: none"> Accessing Properties from the Host Persistent System Properties Overriding the IEEE Address The Flash Memory Memory Allocation

	<ul style="list-style-type: none"> Accessing the Flash Memory Using IO Streams over USB and USART Connections Sleep Settings for Power Conservation <ul style="list-style-type: none"> Deep Sleep Conditions to Deep Sleep The SleepManager Writing a Device Driver Appendix: Sun SPOT Device Libraries
12	<p>Host Applications</p> <ul style="list-style-type: none"> Introduction Sample Host Application using the Command Line New Host Application using the Command Line Host Applications using Netbeans The Sun SPOT Host Libraries Appendix: Sun SPOT Host API - Host Agent, SPOT Client, Security
13	<p>The eDemo Sensor Board</p> <ul style="list-style-type: none"> General Purpose Sensor Board The Sensor Board Library On-Board Devices and Sample Applications <ul style="list-style-type: none"> 2G/6G 3-Axis Accelerometer Temperature Sensor Tri-Color LEDs Switches Light Sensor Appendix: Sun SPOT Sensorboard API
14	<p>Networking</p> <ul style="list-style-type: none"> Radio Communication <ul style="list-style-type: none"> Radio, Radio Stream & Radiogram Protocol Changing Connection Properties Hypertext Transfer Protocol Routing, Logging and Monitoring <ul style="list-style-type: none"> Mesh Routing Routing Policies Trace Route Monitoring Radio Activity Logging Appendix: SPOT Generic Connection Framework API
15	<p>Security</p> <ul style="list-style-type: none"> Introduction Security Overview <ul style="list-style-type: none"> Public-Key Cryptography Digital Signatures Digital Certificate Key Management Code Deployment Communication
16	<p>Security (Continuation)</p> <ul style="list-style-type: none"> Changing SPOT Security Settings <ul style="list-style-type: none"> SPOT Ownership Sharing Sun SPOTs Generating a New Key Pair SPOT Cryptographic Library <ul style="list-style-type: none"> Signing and Verification of Binary Data Sun SPOT Host Appendix: Sun SPOT Client API and Host Security API