

## Academic Course Description

BHARATH UNIVERSITY  
 Faculty of Engineering and Technology  
 Department of Electronics and Communication Engineering  
**BEC005 BLUE TOOTH TECHNOLOGY (Elective)**  
 Seventh Semester (2017-18) Odd Semester

### Course (catalog) description

The students will learn how Bluetooth devices operate in the frequency band where other devices operate including wireless LAN, microwave ovens, cordless telephones, wireless video cameras, and others.

**Compulsory/Elective course** : Elective for ECE students  
**Credit & Contact hours** : 3 & 45  
**Course Coordinator** : Mr. Jeyakumar, Asst.Professor  
**Instructors** :

Name of the instructor	Class handling	Office location	Office phone	Email (domain:@bharathuniv.ac.in)	Consultation
Mr. Jeyakumar	Third year	SA006			12.30-1.30 pm
Ms.G. MeenaKumari	Third year	SA006		meenakumari.ece	12.30-1.30 pm

### Relationship to other courses:

Pre –requisites : Wireless Networks, Computer Communication and Networks  
 Assumed knowledge : NIL  
 Following courses : BEC601 Computer Communication and Networks

### UNIT – I BASIC CONCEPTS

**9 HOURS**

Origin, Blue tooth SIG, Protocol Stack, Security, applications and Profiles, Management, Test and qualification Technology Basics. RF and IR Wireless Communication.

### UNIT – II BLUETOOTH MODULE

**9 HOURS**

Antennas Patterns, Gain and losses; Types of antennas: on chip antennas Radio interface: FH, Modulation, symbol timing, power emission and control, Performance Parameters, RF architecture, Blur RF, Base band:- Blue tooth Device address system Timing ,Physical links , Packet, structuring types and construction, channel coding and time base synchronization.

### UNIT – III LINK CONTROLLER AND MANAGEMENT

**9 HOURS**

Link controller and management: LCP, controller states, Pico net and scattered operations, Master/Slave Role switching LC Architectural Overview, LMC< Link set up, Quality of service, LMP version, Name Represent, Test Mode.

**UNIT – IV BLUETOOTH****9 HOURS**

L LC and adaptation Protocol L2cap signalling: Connections: Blue Tooth profiles; Version 1.0 ; Generic Profiles, Serial and Object exchange.

**UNIT – V SECURITY****9 HOURS**

Encryption and security Key generation, security Modes and architecture, Low power Operation and QOS Management.

**TOTAL 45 HOURS****Text book(s) and/or required materials****Text Books:**

1.Blue tooth Connect without cables Jennifer Bray and c.f. stuntman Pearson Education 2001.

**References:**

1.Blue Tooth Revealed: Brent A. Miller and C.Bisdikian, Pearson Education 2001.

2.Bluetooth Demystified Nathan J.Miller Tata McGraw Hill 2001

3.[www.radio-electronics.com/info/.../bluetooth/bluetooth\\_overview.php](http://www.radio-electronics.com/info/.../bluetooth/bluetooth_overview.php)

**Computer usage:** Nil

**Professional component**

General	-	0%
Basic Sciences	-	0%
Engineering sciences & Technical arts	-	0%
Professional subject	-	100%

**Broad area : Communication** | Electronics | Signal Processing | VLSI | Embedded

**Test Schedule**

S. No.	Test	Tentative Date	Portions	Duration
1	Cycle Test-1	August 1 <sup>st</sup> week	Session 1 to 14	2 Periods
2	Cycle Test-2	September 2 <sup>nd</sup> week	Session 15 to 28	2 Periods
3	Model Test	October 2 <sup>nd</sup> week	Session 1 to 45	3 Hrs
4	University Examination	TBA	All sessions / Units	3 Hrs.

### Mapping of Instructional Objectives with Program Outcome

<p>The scope of this course is to provide the complete analysis of Bluetooth Technology.</p> <p>This knowledge helps them to acquire better application of these Technology in many Communication Systems. The overall objective is to introduce the student to the basics knowledge about wireless communication using Bluetooth Technology.</p> <p>course emphasizes:</p>	Correlates to program outcome		
	H	M	L
1. Understand Bluetooth's standards, architecture and operation.	a	d,f,i,j	-
2. Understand the APIs, radio interface used by Bluetooth.	c	a,b	h
3. Configure Bluetooth-enabled devices including mobile phones, PDAs and Access Points.	c,d,e	a,g	c
4. Install and configure Bluetooth hardware and software.	-	a,k	g
5. Configure LAN access, remote access and FAX gateway access point solutions using Bluetooth.	-	b,e,i	g
6. Understand the Protocol layers used by Bluetooth.	c,f	b,e,j	-

H: high correlation, M: medium correlation, L: low correlation

**Draft Lecture Schedule**

Session	Topics	Problem Solving (Yes/No)	Text / Chapter
<b>UNIT 1 BASIC CONCEPTS</b>			
1.	Introduction and Origin of Bluetooth Technology	No	[T1] chapter -1
2.	Bluetooth SIG	No	
3.	Protocol Stack	No	
4.	Security	No	
5.	Applications and Profiles	No	
6.	Management	No	
7.	Test and qualification Technology Basics	No	
8.	RF and IR Wireless Communication	No	
9.	IR Wireless Communication	No	
<b>UNIT 2 BLUETOOTH MODULE</b>			
10.	Antennas Patterns, Gain and losses	No	[T1] chapter – 2,3,4
11.	Types of antennas: on chip antennas Radio interface	No	
12.	Symbol timing, power emission and control	No	
13.	Performance Parameters	Yes	
14.	RF architecture, Blur RF	Yes	
15.	Blue tooth Device address system Timing	Yes	
16.	Physical links , Packet		
17.	Structuring types and construction	Yes	
18.	Channel coding and time base synchronization	No	

Session	Topics	Problem Solving (Yes/No)	Text / Chapter
<b>UNIT 3 LINK CONTROLLER AND MANAGEMENT</b>			
19.	Link Control protocol	No	[T1] chapter – 5,7
20.	Link controller operation	No	
21.	Pico net operation	No	
22.	Scatter net operation	No	
23.	Master/ Slave roleswitching	No	
24.	LC Architectural Overview	No	
25.	LMC,Link set up		
26.	Quality of service		
27.	LMP version, Name Represent, Test Mode		
<b>UNIT 4 BLUETOOTH HOST</b>			
27.	Logical Link Control and adaptation Protocol	No	[T1] chapter– 9,19
28.	L2cap signalling	No	
29.	Establishing and configuring a connection	No	
30.	Transferring data	No	
31.	Connectionless data channels	No	
32.	Blue Tooth profiles; Version 1.0;	No	
33.	Structure of profiles	No	
34.	Generic Profiles	No	
35.	Serial and Object exchange.	No	
<b>UNIT – V SECURITY</b>			
36.	Encryption and security.	No	[T1] chapter– 15,16,17
37.	Key generation and the Encryption engine	No	
38.	Pairing and bonding	No	
39.	Starting Encryption	No	
40.	Security Modes	No	
41.	Security Architecture	No	
42.	Low power Operation	No	

43.	Hold mode, sniff mode and park mode	No
44.	Quality of service	No
45.	Flushing and delays	No

### Teaching Strategies

The teaching in this course aims at establishing a good fundamental understanding of the areas covered using:

- ☐ Formal face-to-face lectures
- ☐ Small periodic quizzes, to enable you to assess your understanding of the concepts.

### Evaluation Strategies

Cycle Test – I	-	5%
Cycle Test – II	-	5%
Model Test	-	10%
Assignment /Seminar/online test/quiz	-	5%
Attendance	-	5%
Final exam	-	70%

---

**Prepared by: Mr Jeyakumar, Assistant Professor**

**Dated :**

---

**Addendum****ABET Outcomes expected of graduates of B.Tech / ECE / program by the time that they graduate:**

Engineering Graduate will have

- a) an ability to apply knowledge of mathematics, science, and engineering fundamentals.
- b) an ability to identify, formulate, and solve engineering problems
- c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- d) an ability to design and conduct experiments, as well as to analyze and interpret data
- e) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
- f) an ability to apply reasoning informed by a knowledge of contemporary issues
- g) an ability to broaden the education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- h) an ability in understanding of professional and ethical responsibility and apply them in engineering practices
- i) an ability to function on multidisciplinary teams
- j) an ability to communicate effectively with the engineering community and with society at large
- k) an ability in understanding of the engineering and management principles and apply them in project and finance management as a leader and a member in a team.

**Program Educational Objectives****PEO1: PREPARATION:**

To provide strong foundation in mathematical, scientific and engineering fundamentals necessary to analyze, formulate and solve engineering problems in the field of Electronics And Communication Engineering.

**PEO2: CORE COMPETENCE:**

To enhance the skills and experience in defining problems in Electronics And Communication Engineering design and implement, analyzing the experimental evaluations, and finally making appropriate decisions.

**PEO3: PROFESSIONALISM:**

To enhance their skills and embrace new Electronics And Communication Engineering Technologies through self-directed professional development and post-graduate training or education

**PEO4: SKILL:**

To provide training for developing soft skills such as proficiency in many languages, technical communication, verbal, logical, analytical, comprehension, team building, inter personal relationship, group discussion and leadership skill to become a better professional.

**PEO5: ETHICS:**

Apply the ethical and social aspects of modern communication technologies to the design, development, and usage of electronics engineering.

Course Teacher	Signature
Mr. Jeyakumar	
Ms. G.MeenaKumari	

Course Coordinator

HOD/ECE