

# **APPENDICES**

**A.I Ethical Clearance Certificate:**

FACULTY OF MEDICINE  
INSTITUTE OF MEDICAL SCIENCES  
BANARAS HINDU UNIVERSITY

No. Dean/2011-12/ 297

Dated: 01.11.2011

Dr. Neeraj Sharma  
Asstt Professor & PI  
School of Biomedical Engineering  
Institute of Technology  
Banaras Hindu University

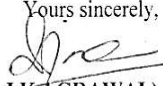
Dear Sir,

The Ethical Committee meeting was held on 01.11.2011 at 3.00 PM in the Chamber of Dean, IMS for ethical clearance of the MD/MS/MCH/Ph.D/synopsis/Project submitted by the following:.

Name of the Teacher – Dr. Neeraj Sharma
Project Title : Development of an optical technique based noninvasive blood glucose meter
Ethical Observation-
Remarks: The project is approved by the Ethical Committee for pilot project

This is for your information and necessary action at your end.

  
(B.D. BHATIA)  
DEAN &  
COORDINATOR

Yours sincerely,  
  
(Dr. J.K. AGRAWAL)  
CHAIRPERSON OF THE ETHICAL COMMITTEE

**A.II Patient Consent Form Format:**

**Study Title: Development of an optical technique based non-invasive blood glucose meter**

Myself.....aged.....  
sex.....son/daughter/wife of.....resident  
of.....  
.....have read the foregoing patient information sheet. I had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily to participate as a participant in this research. I agree to give my personal information and obtained clinical samples for the research purpose.

Signature/ Thumb impression of the participant

Signature/ Thumb impression

Name of the participant:

1. Witness.....

Date \_\_\_\_\_  
Day/month/year

Relationship with the participant:

2. Witness.....

Address:

**Statement by the researcher/person taking consent**

I have accurately read out the information sheet to the potential participant, and to the best of my ability made sure that the participant understands that the following will be done:

- 1.
- 2.

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Name of Researcher/person taking the consent.....

Signature of Researcher/person taking the consent.....

Date \_\_\_\_\_  
Day/month/year

**A.III Look-up Table for converting Peak Amplitude (mV) values in FFT Domain to its corresponding Predicted Blood Glucose Levels (mg/dl) of blood plasma mixed with Intralipid™ phantom:**

Peak Amplitude (mV)	P-BGL (mg/dl)	Peak Amplitude (mV)	P-BGL (mg/dl)	Peak Amplitude (mV)	P-BGL (mg/dl)
5.5	60.5	9.6	96.0	13.7	137.0
5.6	61.0	9.7	97.0	13.8	138.0
5.7	61.5	9.8	98.0	13.9	139.0
5.8	62.0	9.9	99.0	14.0	140.0
5.9	62.5	10.0	100.0	14.1	141.0
6.0	63.0	10.1	101.0	14.2	142.0
6.1	63.4	10.2	102.0	14.3	143.0
6.2	63.8	10.3	103.0	14.4	144.0
6.3	64.2	10.4	104.0	14.5	145.0
6.4	64.6	10.5	105.0	14.6	146.0
6.5	65.0	10.6	106.0	14.7	147.0
6.6	66.0	10.7	107.0	14.8	148.0
6.7	67.0	10.8	108.0	14.9	149.0
6.8	68.0	10.9	109.0	15.0	150.0
6.9	69.0	11.0	110.0	15.1	151.0
7.0	70.0	11.1	111.0	15.2	152.0
7.1	71.0	11.2	112.0	15.3	153.0
7.2	72.0	11.3	113.0	15.4	154.0
7.3	73.0	11.4	114.0	15.5	155.0
7.4	74.0	11.5	115.0	15.6	156.0
7.5	75.0	11.6	116.0	15.7	157.0
7.6	76.0	11.7	117.0	15.8	158.0
7.7	77.0	11.8	118.0	15.9	159.0
7.8	78.0	11.9	119.0	16.0	160.0
7.9	79.0	12.0	120.0	16.1	161.0
8.0	80.0	12.1	121.0	16.2	162.0
8.1	81.0	12.2	122.0	16.3	163.0
8.2	82.0	12.3	123.0	16.4	164.0
8.3	83.0	12.4	124.0	16.5	165.0
8.4	84.0	12.5	125.0	16.6	166.0
8.5	85.0	12.6	126.0	16.7	167.0
8.6	86.0	12.7	127.0	16.8	168.0
8.7	87.0	12.8	128.0	16.9	169.0
8.8	88.0	12.9	129.0	17.0	170.0
8.9	89.0	13.0	130.0	17.1	171.0
9.0	90.0	13.1	131.0	17.2	172.0
9.1	91.0	13.2	132.0	17.3	173.0
9.2	92.0	13.3	133.0	17.4	174.0
9.3	93.0	13.4	134.0	17.5	175.0
9.4	94.0	13.5	135.0	17.6	176.0
9.5	95.0	13.6	136.0	17.7	177.0

**A.III Look-up Table for converting Peak Amplitude (mV) values in FFT Domain to its corresponding Predicted Blood Glucose Levels (mg/dl) of blood plasma mixed with Intralipid™ phantom [Continued]:**

Peak Amplitude (mV)	P-BGL (mg/dl)	Peak Amplitude (mV)	P-BGL (mg/dl)	Peak Amplitude (mV)	P-BGL (mg/dl)
17.8	178.0	21.9	219.0	26.0	260.0
17.9	179.0	22.0	220.0	26.1	261.0
18.0	180.0	22.1	221.0	26.2	262.0
18.1	181.0	22.2	222.0	26.3	263.0
18.2	182.0	22.3	223.0	26.4	264.0
18.3	183.0	22.4	224.0	26.5	265.0
18.4	184.0	22.5	225.0	26.6	266.0
18.5	185.0	22.6	226.0	26.7	267.0
18.6	186.0	22.7	227.0	26.8	268.0
18.7	187.0	22.8	228.0	26.9	269.0
18.8	188.0	22.9	229.0	27.0	270.0
18.9	189.0	23.0	230.0	27.1	271.0
19.0	190.0	23.1	231.0	27.2	272.0
19.1	191.0	23.2	232.0	27.3	273.0
19.2	192.0	23.3	233.0	27.4	274.0
19.3	193.0	23.4	234.0	27.5	275.0
19.4	194.0	23.5	235.0	27.6	276.0
19.5	195.0	23.6	236.0	27.7	277.0
19.6	196.0	23.7	237.0	27.8	278.0
19.7	197.0	23.8	238.0	27.9	279.0
19.8	198.0	23.9	239.0	28.0	280.0
19.9	199.0	24.0	240.0	28.1	281.0
20.0	200.0	24.1	241.0	28.2	282.0
20.1	201.0	24.2	242.0	28.3	283.0
20.2	202.0	24.3	243.0	28.4	284.0
20.3	203.0	24.4	244.0	28.5	285.0
20.4	204.0	24.5	245.0	28.6	286.0
20.5	205.0	24.6	246.0	28.7	287.0
20.6	206.0	24.7	247.0	28.8	288.0
20.7	207.0	24.8	248.0	28.9	289.0
20.8	208.0	24.9	249.0	29.0	290.0
20.9	209.0	25.0	250.0	29.1	291.0
21.0	210.0	25.1	251.0	29.2	292.0
21.1	211.0	25.2	252.0	29.3	293.0
21.2	212.0	25.3	253.0	29.4	294.0
21.3	213.0	25.4	254.0	29.5	295.0
21.4	214.0	25.5	255.0	29.6	296.0
21.5	215.0	25.6	256.0	29.7	297.0
21.6	216.0	25.7	257.0	29.8	298.0
21.7	217.0	25.8	258.0	29.9	299.0
21.8	218.0	25.9	259.0	30.0	300.0

**A.IV Look-up Table for converting Peak Amplitude (mV) values in FFT Domain to its corresponding Predicted Blood Glucose Levels (mg/dl) of blood serum mixed with Intralipid™ phantom:**

Peak Amplitude (mV)	P-BGL (mg/dl)	Peak Amplitude (mV)	P-BGL (mg/dl)	Peak Amplitude (mV)	P-BGL (mg/dl)
5.5	72.4	9.6	96.0	13.7	137.0
5.6	73.0	9.7	97.0	13.8	138.0
5.7	73.5	9.8	98.0	13.9	139.0
5.8	74.2	9.9	99.0	14.0	140.0
5.9	74.5	10.0	100.0	14.1	141.0
6.0	75.0	10.1	101.0	14.2	142.0
6.1	75.6	10.2	102.0	14.3	143.0
6.2	76.2	10.3	103.0	14.4	144.0
6.3	76.5	10.4	104.0	14.5	145.0
6.4	77.1	10.5	105.0	14.6	146.0
6.5	77.6	10.6	106.0	14.7	147.0
6.6	78.0	10.7	107.0	14.8	148.0
6.7	78.5	10.8	108.0	14.9	149.0
6.8	79.1	10.9	109.0	15.0	150.0
6.9	79.6	11.0	110.0	15.1	151.0
7.0	80.0	11.1	111.0	15.2	152.0
7.1	80.6	11.2	112.0	15.3	153.0
7.2	81.0	11.3	113.0	15.4	154.0
7.3	81.7	11.4	114.0	15.5	155.0
7.4	82.1	11.5	115.0	15.6	156.0
7.5	82.5	11.6	116.0	15.7	157.0
7.6	83.0	11.7	117.0	15.8	158.0
7.7	83.5	11.8	118.0	15.9	159.0
7.8	84.3	11.9	119.0	16.0	160.0
7.9	84.7	12.0	120.0	16.1	161.0
8.0	85.2	12.1	121.0	16.2	162.0
8.1	85.6	12.2	122.0	16.3	163.0
8.2	86.0	12.3	123.0	16.4	164.0
8.3	86.5	12.4	124.0	16.5	165.0
8.4	87.3	12.5	125.0	16.6	166.0
8.5	87.6	12.6	126.0	16.7	167.0
8.6	88.0	12.7	127.0	16.8	168.0
8.7	88.5	12.8	128.0	16.9	169.0
8.8	89.0	12.9	129.0	17.0	170.0
8.9	89.7	13.0	130.0	17.1	171.0
9.0	90.0	13.1	131.0	17.2	172.0
9.1	91.0	13.2	132.0	17.3	173.0
9.2	92.0	13.3	133.0	17.4	174.0
9.3	93.0	13.4	134.0	17.5	175.0
9.4	94.0	13.5	135.0	17.6	176.0
9.5	95.0	13.6	136.6	17.7	177.0

**A.IV Look-up Table for converting Peak Amplitude (mV) values in FFT Domain to its corresponding Predicted Blood Glucose Levels (mg/dl) of blood serum mixed with Intralipid™ phantom [Continued]:**

Peak Amplitude (mV)	P-BGL (mg/dl)	Peak Amplitude (mV)	P-BGL (mg/dl)	Peak Amplitude (mV)	P-BGL (mg/dl)
17.8	178.0	21.9	219.0	26.0	260.0
17.9	179.0	22.0	220.0	26.1	261.0
18.0	180.0	22.1	221.0	26.2	262.0
18.1	181.0	22.2	222.0	26.3	263.0
18.2	182.0	22.3	223.0	26.4	264.0
18.3	183.0	22.4	224.0	26.5	265.0
18.4	184.0	22.5	225.0	26.6	266.0
18.5	185.0	22.6	226.0	26.7	267.0
18.6	186.0	22.7	227.0	26.8	268.0
18.7	187.0	22.8	228.0	26.9	269.0
18.8	188.0	22.9	229.0	27.0	270.0
18.9	189.0	23.0	230.0	27.1	271.0
19.0	190.0	23.1	231.0	27.2	272.0
19.1	191.0	23.2	232.0	27.3	273.0
19.2	192.0	23.3	233.0	27.4	274.0
19.3	193.0	23.4	234.0	27.5	275.0
19.4	194.0	23.5	235.0	27.6	276.0
19.5	195.0	23.6	236.0	27.7	277.0
19.6	196.0	23.7	237.0	27.8	278.0
19.7	197.0	23.8	238.0	27.9	279.0
19.8	198.0	23.9	239.0	28.0	280.0
19.9	199.0	24.0	240.0	28.1	281.0
20.0	200.0	24.1	241.0	28.2	282.0
20.1	201.0	24.2	242.0	28.3	283.0
20.2	202.0	24.3	243.0	28.4	284.0
20.3	203.0	24.4	244.0	28.5	285.0
20.4	204.0	24.5	245.0	28.6	286.0
20.5	205.0	24.6	246.0	28.7	287.0
20.6	206.0	24.7	247.0	28.8	288.0
20.7	207.0	24.8	248.0	28.9	289.0
20.8	208.0	24.9	249.0	29.0	290.0
20.9	209.0	25.0	250.0	29.1	291.0
21.0	210.0	25.1	251.0	29.2	292.0
21.1	211.0	25.2	252.0	29.3	293.0
21.2	212.0	25.3	253.0	29.4	294.0
21.3	213.0	25.4	254.0	29.5	295.0
21.4	214.0	25.5	255.0	29.6	296.0
21.5	215.0	25.6	256.0	29.7	297.0
21.6	216.0	25.7	257.0	29.8	298.0
21.7	217.0	25.8	258.0	29.9	299.0
21.8	218.0	25.9	259.0	30.0	300.0

**A.V Look-up Table for converting Peak Amplitude (mV) values in FFT Domain to its corresponding Predicted Blood Glucose Levels (mg/dl) of whole blood mixed with Intralipid™ phantom:**

Peak Amplitude (mV)	P-BGL (mg/dl)	Peak Amplitude (mV)	P-BGL (mg/dl)	Peak Amplitude (mV)	P-BGL (mg/dl)
7.0	70.0	11.1	99.9	15.2	136.8
7.1	70.2	11.2	100.8	15.3	137.7
7.2	70.5	11.3	101.0	15.4	138.6
7.3	70.8	11.4	102.6	15.5	139.5
7.4	71.0	11.5	103.5	15.6	140.4
7.5	71.2	11.6	104.4	15.7	141.3
7.6	71.4	11.7	105.3	15.8	142.2
7.7	71.6	11.8	106.2	15.9	143.1
7.8	71.7	11.9	107.1	16.0	144.0
7.9	71.8	12.0	108.0	16.1	144.9
8.0	72.0	12.1	108.9	16.2	145.8
8.1	72.9	12.2	109.8	16.3	146.7
8.2	73.8	12.3	110.7	16.4	147.6
8.3	74.7	12.4	111.6	16.5	148.5
8.4	75.6	12.5	112.5	16.6	149.4
8.5	76.5	12.6	113.4	16.7	150.3
8.6	77.4	12.7	114.3	16.8	151.2
8.7	78.3	12.8	115.2	16.9	152.1
8.8	79.2	12.9	116.1	17.0	153.0
8.9	80.1	13.0	117.0	17.1	153.9
9.0	81.0	13.1	117.9	17.2	154.8
9.1	81.9	13.2	118.8	17.3	155.7
9.2	82.8	13.3	119.7	17.4	156.6
9.3	83.7	13.4	120.6	17.5	157.5
9.4	84.6	13.5	121.5	17.6	158.4
9.5	85.5	13.6	122.4	17.7	159.3
9.6	86.4	13.7	123.3	17.8	160.2
9.7	87.3	13.8	124.2	17.9	161.1
9.8	88.2	13.9	125.1	18.0	162.0
9.9	89.1	14.0	126.0	18.1	162.9
10.0	90.0	14.1	126.9	18.2	163.8
10.1	90.9	14.2	127.8	18.3	164.7
10.2	91.8	14.3	128.7	18.4	165.6
10.3	92.7	14.4	129.6	18.5	166.5
10.4	93.6	14.5	130.5	18.6	167.4
10.5	94.5	14.6	131.4	18.7	117.8
10.6	95.4	14.7	132.3	18.8	116.5
10.7	96.3	14.8	133.2	18.9	115.2
10.8	97.2	14.9	134.1	19.0	114.0
10.9	98.1	15.0	135.0	19.1	112.6
11.0	99.0	15.1	135.9	19.2	111.3



**A.V Look-up Table for converting Peak Amplitude (mV) values in FFT Domain to its corresponding Predicted Blood Glucose Levels (mg/dl) of whole blood mixed with Intralipid™ phantom [Continued]:**

Peak Amplitude (mV)	P-BGL (mg/dl)	Peak Amplitude (mV)	P-BGL (mg/dl)	Peak Amplitude (mV)	P-BGL (mg/dl)
19.3	110.0	23.4	93.6	27.5	183.7
19.4	108.6	23.5	94.0	27.6	184.6
19.5	107.2	23.6	94.4	27.7	185.8
19.6	105.8	23.7	94.8	27.8	186.8
19.7	104.4	23.8	95.2	27.9	187.7
19.8	102.9	23.9	95.6	28.0	188.7
19.9	101.4	24.0	84.0	28.1	189.6
20.0	100.0	24.1	84.3	28.2	190.6
20.1	100.5	24.2	84.7	28.3	191.5
20.2	101.0	24.3	85.0	28.4	192.5
20.3	101.5	24.4	85.4	28.5	193.8
20.4	102.0	24.5	85.7	28.6	194.7
20.5	102.5	24.6	86.1	28.7	195.7
20.6	103.0	24.7	86.4	28.8	196.9
20.7	103.5	24.8	86.8	28.9	197.9
20.8	104.0	24.9	87.1	29.0	198.9
20.9	104.5	25.0	80.0	29.1	199.9
21.0	94.5	25.1	80.3	29.2	200.8
21.1	94.9	25.2	80.6	29.3	201.8
21.2	95.4	25.3	80.9	29.4	202.8
21.3	95.8	25.4	81.2	29.5	203.8
21.4	96.3	25.5	81.6	29.6	204.8
21.5	96.7	25.6	81.9	29.7	205.8
21.6	97.2	25.7	82.2	29.8	206.8
21.7	97.6	25.8	82.5	29.9	207.8
21.8	98.1	25.9	82.8	30.0	208.8
21.9	98.5	26.0	168.7	30.1	209.7
22.0	92.4	26.1	169.6	30.2	210.7
22.1	92.8	26.2	170.8	30.3	211.7
22.2	93.2	26.3	171.4	30.4	212.8
22.3	93.6	26.4	172.0	30.5	213.8
22.4	94.0	26.5	173.5	30.6	214.8
22.5	94.5	26.6	174.2	30.7	215.5
22.6	94.9	26.7	175.9	30.8	216.2
22.7	95.3	26.8	176.8	30.9	217.8
22.8	95.7	26.9	177.8	31.0	218.5
22.9	96.1	27.0	178.7	31.1	219.2
23.0	92.0	27.1	179.9	31.2	220.8
23.1	92.4	27.2	180.8	31.3	221.6
23.2	92.8	27.3	181.8	31.4	222.9
23.3	93.2	27.4	182.7	31.5	223.6

**A.V Look-up Table for converting Peak Amplitude (mV) values in FFT Domain to its corresponding Predicted Blood Glucose Levels (mg/dl) of whole blood mixed with Intralipid™ phantom [Continued]:**

Peak Amplitude (mV)	P-BGL (mg/dl)	Peak Amplitude (mV)	P-BGL (mg/dl)	Peak Amplitude (mV)	P-BGL (mg/dl)
31.6	224.3	35.7	265.9	39.8	298.5
31.7	225.0	35.8	266.7	39.9	299.2
31.8	226.4	35.9	267.8	40.0	300.0
31.9	227.1	36.0	268.9		
32.0	228.8	36.1	269.6		
32.1	229.5	36.2	270.7		
32.2	230.2	36.3	271.5		
32.3	231.9	36.4	272.2		
32.4	232.6	36.5	273.7		
32.5	233.3	36.6	274.5		
32.6	234.7	36.7	275.2		
32.7	235.7	36.8	276.0		
32.8	236.8	36.9	276.7		
32.9	237.5	37.0	277.5		
33.0	238.2	37.1	278.2		
33.1	239.9	37.2	279.0		
33.2	240.7	37.3	279.7		
33.3	241.4	37.4	280.5		
33.4	242.1	37.5	281.2		
33.5	243.8	37.6	282.0		
33.6	244.6	37.7	282.7		
33.7	245.3	37.8	283.5		
33.8	246.7	37.9	284.2		
33.9	247.4	38.0	285.0		
34.0	248.5	38.1	285.7		
34.1	249.6	38.2	286.5		
34.2	250.6	38.3	287.2		
34.3	251.7	38.4	288.0		
34.4	252.8	38.5	288.7		
34.5	253.5	38.6	289.5		
34.6	254.3	38.7	290.2		
34.7	255.0	38.8	291.0		
34.8	256.1	38.9	291.7		
34.9	257.2	39.0	292.5		
35.0	258.3	39.1	293.2		
35.1	259.3	39.2	294.0		
35.2	260.4	39.3	294.7		
35.3	261.5	39.4	295.5		
35.4	262.6	39.5	296.2		
35.5	263.7	39.6	297.0		
35.6	264.8	39.7	297.7		