RESEARCH AND TRAINING UNIT FOR NAVIGATIONAL ELECTRONICS
OSMANIA UNIVERSITY, HYDERABAD

Summer School on
DIGITAL SIGNAL PROCESSING AND COMMUNICATION WITH PROGRAMMING (DSPC-19)
(MAY 20, 2019 – JUNE 15, 2019)
(Course Code: NERTU/SC/74)

Location : NERTU, Osmania University

Time   : 09.00AM – 05.30PM (Monay-Saturday)

Faculty:
1. Prof.P.Laxminarayana, NERTU-OU

Invited Expert Lectures
1. Dr.A.V.Ramana, Neuronics Labs Pvt. Ltd.
2. Prof.K.Deergha Rao, VCE (Former Director,NERTU)
3. Prof.M.V.Krishna Rao, IARE (Formerly with NERTU)
4. Prof.K.Subba Rao, CBIT, (Formely with OU)
5. Mr.Markandeya, Mathworks
6. Dr.V.Lalitha, IIITH
7. Dr.V.Nagarajan, Avantel
8. Dr.Nanda Kishore, Mathworks
9. Dr.G.V.V.Sharma, IITH

Registration Fee (INR) : 18%GST will be extra.

Category	Fee (Rs.)	Total including GST (Rs.)
Students	5000	5900
Faculty	8000	9440

DD/Cheque should be drawn in favor of

The Director, NERTU, OU

Or online payment through NEFT to

The Director, Eqpt. Maint., NERTU, OU
A/C No. : 52198270713
IFSC Code: SBIN0020071
Osmania University Branch,
State Bank of India

Last Date for Registration: 10th May 2019

For Schedule and other Details please contact

Coordinators and Teaching Assistants
1. **Ch.Srinu, Research Scholar, NERTU**
   Ph. 0903 293 0657,
   sreenu471.ece@gmail.com
2. **S. Saraswathi, Research Scholar, NERTU**
   Ph.09948991235,
   sirikondasaraswathi@gmail.com

About School

The final year academic projects in the UG and PG courses are introduced in the curriculum to have the exposure and experience of implementation of already published paper or new idea/algorithm or development of some technology, using the skills and knowledge obtained in the course work. However, stuents are lacking skills in programming with modularity, readability, flexibility and proper programme flow to implement an idea/algorithm. Consequently, after completion of the course, many students require further training in basic concepts and programming. However many industries are looking for candidates with skills, ready to work on their ongoing projects. This is the course to fill the gap between the academics and industry by developing the necessary skills to make them to work on real time projects in the areas of signal processing and communication engineering, immediately after joining/employed in the industry. The course will have theory lectures, assignments with programming and feedback on their submitted assignments.

Objectives of the Course

1. To acquire Basic concepts of Digital Signal Processing and Digital Communication.
2. To obtain the necessary skills in programming with modularity, readability, flexibility, naming the variables etc., for implementing the given algorithm. This requires practice on implementation of mini projects, and making them to use in a big/complex project.

Targeted Participants

Faculty/Ph.D./M.E./M.Tech. Students, and few meritorious BE/B.Tech. Pre Final or Final year students of ECE/CSE/EEE with interest to work in the areas of signal processing and communication engineering, are the expected participants. This is an intensive school. Participants are expected to complete the assignments within the stipulated time by working at home or unit. Grading will be given in the certificate based on the assignments completed. Participants have to bring their own laptops for the lab sessions. The number of participants is limited and if more number of applications are received before due date, written test will be conducted in the basic concepts in the signal processing to choose the candidates.

Registration

Interested candidates can visit www.osmania.ac.in or http://www.uceou.edu for more details like faculty, schedule and registration form. Register for the course by sending the filled registration form along with receipt of online payment **to nertu.courses@osmania.ac.in** and copied to email IDs of Co-Coordinators.
or hard copy with DD/Cheque to
"The Coordinator, DSPC-19, Research and Training Unit for Navigational Electronics (NERTU), Osmania University, Hyderabad 500007".

ABOUT NERTU: The Research and Training Unit for Navigational Electronics (NERTU) is established in 1982. It is the focal point for research and training in the areas of Electronic Navigation in India. It is the first University centre to work in the area of Global Positioning System (GPS) and GPS Aided Geo Augmented Navigation (GAGAN) System. Since its inception, NERTU has been conducting almost one or two short term courses per year in the area of GNSS, since 1992. Scientists, engineers, academicians and research scholars from many organisations have participated and benefited from these courses. NERTU has successfully **executed 61 sponsored and consultancy projects** funded by DRDO, ISRO, DST, MIT, ECIL, HAL, BEL, AICTE and ASL. It has also conducted **68 short term courses/workshops/conferences** on various topics of signal processing, communications and navigation.

Prof.P.Laxminarayana,
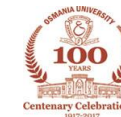**Director, NERTU, OU**
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director.nertu@osmania.ac.in   laxminarayana@osmania.ac.in

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Summer School on
DIGITAL SIGNAL PROCESSING AND COMMUNICATION WITH PROGRAMMING (DSPC-19)
(MAY 20, 2019 – JUNE 15, 2019) TENTATIVE SCHEDULE

Week	Day	Date	09.00-10.15	10.30-11.45	12.00-13.15	14.00-17.30 Lab Sessions Including Tea Time
W-1	1.	Mon, 20 May	Introduction Definition and Classification of signals	Standard signals and their properties	Programming Basics	Manipulation of Matrices
W-1	2.	Tue, 21 May	Program Flow and Control	Generation and simulation of signals for a given a) Duration b) amplitude c) Sampling frequency d) phase e) frequency etc. (One day) b) Sinusoidal, rectangular, triangular etc. (Lab Session)		Program Flow and Control Functions (Subroutines) Plotting signals (single and multiple) etc a) Standstill b) Animation c) 3-D plots
W-1	3.	Wed, 22 May	File operations and Framing)	File operations and Framing) • Different file formats (binary, ascii) • Writing (Header and data) • Reading (Header and data) (Lab Session)		• Different bit rates/data types • Splitting the file • Merging the file • Conversion of data types (int to float vice versa)
W-1	4.	Thu, 23 May	Fourier series for continuous Periodic signals	Fourier series for continuous Periodic signals	Fourier series for continuous Periodic signals(Lab Session)	Fourier series for continuous Periodic signals
W-1	5.	Fri, 24 May	Fourier Transform of continuous non-periodic signals	Fourier Transform of continuous non-periodic signals	Discrete time FS (Lab Session)	Discrete time FS
W-1	6.	Sat, 25 May	DFT and its properties	DFT and its properties	DFT(Lab Session)	DFT
W-2	7.	Mon, 27 May	FFT (Theory)	FFT (Theory)	FFT(Lab Session)	FFT
W-2	8.	Tue, 28 May	FFT(Lab Session)	FFT(Lab Session)	FFT(Lab Session)	FFT

W-2	9.	Wed, 29 May	Spectral Leakage/Aliasing	Spectral Leakage/Aliasing (Lab Session)	Spectral Leakage/ Aliasing(Lab Session)	Spectral Leakage/Aliasing
W-2	10.	Thu, 30 May	Convolution/Linear systems Definition	Implementation a) continuous b) discrete	Implementation a) continuous b) discrete (Lab Session)	Implementation continuous b) discrete
W-2	11.	Fri, 31 May	LTI, Stable, Causal etc.	Correlation	Correlation (Lab Session)	Correlation
W-2	12.	Sat, 01 June	Implementation of Filters	Implementation of Filters	FIR and IIR filtering Finite duration input signal (Lab Session)	FIR and IIR filtering Finite duration input signal FIR and IIR filtering Finite duration input signal
W-3	13.	Mon, 03 June	Filter design FIR	Filter design FIR	FIR and IIR filtering Long duration signal a) Real time b) Framing file	FIR and IIR filtering Long duration signal a) Real time b) Framing file
W-3	14.	Tue, 04 June	Filter Design IIR	Filter Design IIR	Filter design (Lab Session)	Filter design
W-3	15.	Wed, 05 June	DSP with Python Programming	DSP with Python Programming	DSP with Python Programming (Lab Session)	DSP with Python Programming
W-3	16.	Thu, 06 June	Overview of Analog and Digital Communication	AM, FM, PM	AM, FM, PM	AM, FM, PM
W-3	17.	Fri, 07 June	PAM, PPM, PWM	PAM, PPM, PWM	PAM, PPM, PWM (Lab Session)	PAM, PPM, PWM

W-3	18.	Sat, 08 June	PCM, DPCM, DM, ADM	PCM, DPCM, DM, ADM	Source coding	PCM, DPCM, DM, ADM
W-4	19.	Sun/Mon, 09/10 June	ASK, PSK, FSK, BPSK/QPSK/M-ary PSK/ M-ary ASK	ASK, PSK, FSK, BPSK/QPSK/M-ary PSK/ M-ary ASK	ASK, PSK, FSK, BPSK/QPSK/M-ary PSK/ M-ary ASK	ASK, PSK, FSK, BPSK/QPSK/M-ary PSK/ M-ary ASK
W-4	20.	Tue, 11 June	Channel modeling Noise Modeling Channel capacity, channel matrix Channel selectivity, sensitivity Channel fading Bandwidth SNR, C/N0, BER, Error probability	Channel modeling Noise Modeling Channel capacity, channel matrix Channel selectivity, sensitivity Channel fading Bandwidth SNR, C/N0, BER, Error probability	Channel modeling Noise Modeling Channel capacity, channel matrix Channel selectivity, sensitivity Channel fading Bandwidth, SNR, C/N0, BER, Error probability (Lab Session)	Channel modeling Noise Modeling Channel capacity, channel matrix Channel selectivity, sensitivity Channel fading Bandwidth SNR, C/N0, BER, Error probability
W-4	21.	Wed, 12 June	Channel Coding Interleaving, cyclic codes, convolutional coding, LDPC etc	Channel Coding Interleaving, cyclic codes, convolutional coding, LDPC etc	Interleaving, cyclic codes (Lab Session)	Interleaving, cyclic codes
W-4	22.	Thu, 13 June	Channel Coding Interleaving, cyclic codes, convolutional coding, LDPC etc	Channel Coding Interleaving, cyclic codes, convolutional coding, LDPC etc	convolutional coding (Lab Session)	convolutional coding
W-4	23.	Fri, 14 June	Multiple access techniques FDMA TDMA CDMA	Multiple access techniques FDMA TDMA CDMA	Multiple access techniques FDMA TDMA CDMA(Lab Session)	Multiple access techniques FDMA TDMA CDMA
W-4	24.	Sat, 15 June	OFDM	OFDM	OFDM (Lab Session)	OFDM

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Registration Form

1. Name	
2. Designation/Class	
3. Organization with Address	
4. Educational Qualifications	
5. Professional Experience Teaching (Years)	
6. Areas of Research Interest/Working	1. 2. 3.
7. Email	
8. Phone	
9. Registration fee a. Amount b. NEFT/DD/Cheque No.	**5000+900(GST) / 8000+1440(GST)**

Signature of the Candidate with date

Last Date for Receiving the Application form: 10th May - 2019