



**FINAL YEAR PROJECT REPORT**

**RESEARCH WORK ON SOFTWARE DEFINE  
RADIO (NI USRP-2920) USING LABVIEW AND  
MATH SCRIPT**

**In fulfillment of the requirement**

**For degree of  
BEE (Telecom)**

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**ABSTRACT**

Software Defined Radio (SDR) technology is divided in to two platforms, a Software Platform in which Radio Functions such as Modulation, Multiplexing, Source or Channel Coding, Spread Spectrum techniques are implemented and a Hardware Platform known as Universal Software Radio Peripheral (USRP) is used to transmit the actual baseband information signal over a Physical Channel. SDRs or Cognitive Radio provides means of limiting cross functionality, ability to reconfigure, less hardware tweaking, flexible and inexpensive solution towards designing of Digital Communication Systems.

The objective of this research work is to formulate a Practical Lab Manual on Software Defined Radio of Nationals Instrument the NI USRP-2920 using NI LabView, so that anyone can easily familiarized themselves with it and can be used for Instructors Illustration purposes. Apart from this Digital Modulation Techniques such as M-ary PSK and QAM digital transceivers systems have been designed using SDR technology. Detailed notes on how a signal is converted from bits to digital symbols to discrete baseband samples and steps to compute constellation diagrams of various digital modulation techniques have been explained.

Moreover, for Forward Error Correction (FEC) which helps to detect and correct errors due to various channel impairments. Block Codes such as generalized Linear Block Codes and for any order ( $m^{\text{th}}$  order) of Primitive Polynomial and Binary Primitive  $t$ -Error Correcting Bose Chaudhuri Hocquenghem (Binary  $t$ -BCH) codes have been designed in MATLAB.



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