Design Requirement		
Date:	10/4/2017	
Design Project Title:	DOPES	
Team Name:	DOPES	
Team Advisor	Dr Charles Kim	
Team Assistant	Ayotunde Odejayi	
Project's Long Term Goal	Development of an embedded monitoring system for power electronic systems to detect failure modes and also create correction conditions to prolong power electronic life without the use of excitation spectroscopy methods.	
Project's 2017-2018 Academic Year Goal	The design and implementation of a modified buck converter circuit with embedded sensing devices for experimentation.	
Team Members (Design Class)	Shamar Christian (EE, Sr)	
Team Members (Others)	Ayotunde Odejayi (EE), Ikem Uba (EE), Bibek Ramdan (ME, Jr)	
Requirements	**Descriptions**	**Source**
Background (NEED)	Because Power electronics are the underpinning of any electronic system,any fault that occurs to the components or subsystems of the system will lead to shutdown of the system.	**Electronic Products (website), Survey on Reliability of Power Electronic Systems Yantao Song and Bingsen Wang, Senior Member, IEEE**
Objective (Problem)	Should produce real time data of circuit's operation without interfering the circuit's functionality	
Performance	• Ping data regarding object temperature and magnetic field within 1% accuracy • The ability to change sampling rate of sensors from 1 reading/1ms - 1 reading/100ms • Optimal operation between 75 degrees to 250 degrees	

Cost	• Cost less than $45 per circuit board with all sensors embedded • 0$ maintenance fees • Design completed by 01/01/2018, testing by 02/01/2018	
Safety	Safety • Fuse enabled (easily replaceable) in case of high current fault • Operation between 65 degrees and 300 degrees without alteration of output • Output voltages between -3.3V to 3.3V	
Compliance	• **FCC Part 15 Compliance** • **IEC 61000-4-2 Compliance**	FCC, IEC
Chip - Computer/Impedance Analyzer Interface	The sensor circuit interface should be characterized by: • Low impedance for minimal footprint on converter operation • Readily manipulatable and sizable output connectors (5cm long) • Well insulated against heating conditions and exposure to magnetic fields	
Energy, Power, and Environment	Ability to operate using 5V DC, 0db noise in operation, paper reinforced phenolic resin with a bonded copper foil to be used as PCB raw materials.	

Intellectual Property	Must not interfere with Texas Instruments EP 1429222A1 Buck Converter Patent	European Patent Office
Size and Weight	Total weight of circuit board should be less than 0.5 lbs	
Deliverables	Functioning buck converter PCB with sensors working to deliver real time information	