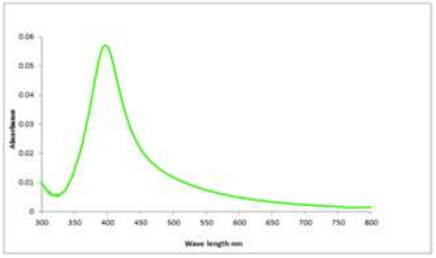
Final Year Project Showcase for Batch-2016

Department of Chemistry Industrial Chemistry Programme		
1	**Project Idea**	Synthesis of Silver Nanoparticles stabilize by Novel Stabilizer with the Expected Applications in environmental, pharmaceutical and textile industries.
2	**Process**	1. Triterpene based long chain stabilizer was synthesized under basic and room temperature with good yields and characterized via ESI/MS and HNMR Spectroscopy. 2. The fully characterized novel compound as OBC-5 was used to prepare Silver Nanoparticles .The optical properties of the as prepared AgNPs were analyzed using Ultraviolet–visible spectroscopy, Fourier-transform infrared spectroscopy. Atomic force microscopy (AFM) images distinctly showed AgNPs-OBC-5 with an average size of 9 nm with $NaBH_4$ and 26 nm with TSC as reducing agents. 3. The Ag NPs-OBC-5 catalytic activity was determined via the probe environmental reaction of reducing 4-nitrophenol into 4-aminophenol in the presence of $NaBH_4$ under ambient temperature and pressure conditions. For our delight by AgNP-OBC5 converted EPA declared number one pollutant 4-nitrophenol in to 4-aminopheno within one second.
3	**Outcome**	EPA declared number one pollutant 4-nitrophenol which is widely used in the synthesis of pharmaceuticals, dyes and other organic products converted in to 4-aminophenol, Which shows its excellent environmental control applications.
4	**Evidences (Theoretical Basis)**	A novel natural product based compound, (bis(4,6-diphenyl-1,3,5-triazine-2-aminoethyl))disulfide (OBC-5), was synthesized to modify silver nanoparticle (AgNP) surfaces. Triterpene based long chain stabilizer was synthesized under basic and room temperature with good yields and characterized via ESI/MS and HNMR Spectroscopy. The alkyl chain of OBC-5 effectively controlled the growth kinetics and surface morphology of AgNPs. Sodium borohydride ($NaBH_4$) used as a strong reducing agent for silver ions (Ag^+) and Tri sodium citrate (TSC) was used as a mild reducing agents

		The optical properties of the as prepared AgNPs were analyzed using Ultraviolet–visible spectroscopy, Fourier-transform infrared spectroscopy. Atomic force microscopy (AFM) images distinctly showed AgNPs-OBC-5 with an average size of 9 nm with $NaBH_4$ and 26 nm with TSC as reducing agents. Our experiments will provide a guideline for designing efficient catalysts and stabilizing agents in the future. The AgNPs-OBC-5 catalytic activity was determined via the probe environmental reaction of reducing 4-nitrophenol into 4-aminophenol in the presence of $NaBH_4$ under ambient temperature and pressure conditions, after addition of our as prepared AgNP-OBC5 within one second EPA declared number one pollutant 4-nitrophenol converted in to 4-aminophenol which is widely used in the synthesis of pharmaceuticals, dyes and other organic products and is mainly for the synthesis of paracetamol, clofibrate ketone, vitamin B1 and compound nicotinamide. It can be used as the raw material of medicine and dyes, antioxidants and the developer.
5	**Competitive Advantage or Unique Selling Proposition** (Cost Reduction, Process improvement, Attainment of any SDG (Sustainable Development Goal), increase of market share or capturing new market or having superior performance over competitor. In summary, any striking aspect of the project which compels industry to invest in FYP or purchase it. Some detail description is required in terms of how, why when what. You can select one or more from following dropdown and delete rest of them)	
a	**Attainment of any SDG** (e.g. How it is achieved and why it is necessary for the region)	Our successful study is expected to attain the following SDGs SDG(9) Industry, Innovation and Infrastructure SDG (12) Responsible Consumption and Production SDG(3) Good Health and Well-being
b	**Expanding of Market share** (e.g. how it expand and what is problem with current market	As novel corona virus spreads in all over the world thus the requirement of fabric face masks especially with anti bacterial /antiviral properties is arised. Silver nanoparticles (AgNps-OBC5) treated face mask is expected to be useful in this regards.
c	**Capture new market (**e.g. Niche market or unaddressed segment**)**	We can easily apply our as prepared AgNPs-OBC-5 nanoparticles in to following markets 1. Solar cell Addition of AgNPs-OBC-5 in the construction of solar cells leads to a significant increase in their efficiency and will effectively reduce the cost of electricity and can supplement our increase shortages or power.

		2. Textile AgNPs-OBC-5 can easily capture textile industries as expected their addition will provide antibacterial, anti-fungal and anti-microbial properties to the cotton fabrics 3. Pharmaceutical AgNPs-OBC-5 can easily apply in diagnostic applications and therapeutic applications, apart from its antimicrobial activity.
d	**Any Environmental Aspect** (e.g. carbon reduction, energy efficient etc.)	EPA declared number one pollutant 4-nitrophenol which is widely used in the synthesis of pharmaceuticals, dyes and other organic products converted in to 4-aminophenol, Which shows its excellent environmental control applications.
e	**Any Other Aspect**	Our AgNP-OBC5 easily to prepared, highly cost and time effective. 100% reproducibility and can easily scale up for large scale industries.
6	**Team Members (Names & Roll No.)**	Maheen Saleem – IC-16011 Aamir Akhter - IC-16039 Samra Asad – IC-16030 Farhan Nooruddin – IC-16051 Maaz Bin Khalid – IC-16040 M. Sameer Sherwani - IC-050 Zarish Alamgir – IC-16003 Shafaq Irfan – IC-16015
7	**Supervisor Name**	Supervisor: Dr. Nuzhat Arshad (nuzhat_minhas@yahoo.com) Co-Supervisor : Dr. Rafia Usman Khan (rkhan@neduet.edu.pk)
8	**Pictures**	  Signature SPR of AgNPs λ max = 403 nm **UV-visible absorption spectra of AgNps- OBC-5**