

## WORK PLAN – JANUARY TO MAY, 2017

**Course:** B.A. (Program) Semester II

**Paper:** Mathematics - Algebra

**Maximum Marks:** End Semester Exam – 75 marks

Internal Assessment – 25 marks

| Dates of the Week   | Contents/Topics                                                                                                                                                                                                                                                      |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Jan 02 – Jan 06     | Introduction to Complex Numbers-Polar & Cartesian Form, Conversion of Cartesian to Polar form and vice versa, De Moivre's Theorem for Integral Indices                                                                                                               |
| Jan 09 – Jan 13     | De Moivre's Theorem for Rational Indices, Solution of Equations using Trigonometry, Expansion for $\cos nx$ , $\sin nx$ in terms of powers of $\cos x$ , $\sin x$ and $\cos^n x$ , $\sin^n x$ in terms of Cosines and Sine of multiples of $x$ , Summation of series |
| Jan 16 – Jan 20     | <b>Class Test - 1</b><br>Relation between roots and coefficients of $n$ th degree equation, Solution of Cubic & Biquadratic Equations when some conditions on roots of the equation are given                                                                        |
| Jan 23 – Jan 27     | Symmetric functions of the roots for cubic and biquadratic equations                                                                                                                                                                                                 |
| Jan 30 – Feb 03     | <b>Class Test - 2</b><br>Definition & examples of vector space, Subspace and its properties, Linear Independence & Dependence of Vectors                                                                                                                             |
| Feb 06 – Feb 10     | Basis and Dimension of a vector Space, Types of matrices, invariance of rank under elementary transformations, Reduction to normal form,                                                                                                                             |
| Feb 13 – Feb 17     | Solution of linear homogeneous and non-homogeneous equations with number of equations and unknowns up to four,                                                                                                                                                       |
| Feb 20 – Feb 24     | Cayley-Hamilton theorem, Characteristic roots and vectors                                                                                                                                                                                                            |
| Feb 27 – March 03   | <b>Class Test - 3</b><br>Integer modulo $n$ , Permutations                                                                                                                                                                                                           |
| March 06–March 10   | Groups, Subgroups                                                                                                                                                                                                                                                    |
| March 13–March 17   | MID - SEMESTER BREAK                                                                                                                                                                                                                                                 |
| March 20–March 24   | Lagrange's Theorem, Euler's Theorem                                                                                                                                                                                                                                  |
| March 27–March 31   | Symmetric Groups of a segment of a line and regular $n$ -gons for $n=3,4,5$ and $6$                                                                                                                                                                                  |
| April 03 – April 07 | Rings and Subrings in the context of $C[0,1]$ and $Z_n$                                                                                                                                                                                                              |
| April 10 – April 14 | Revision                                                                                                                                                                                                                                                             |
| April 17 – April 26 | Revision                                                                                                                                                                                                                                                             |
| April 27 – May 08   | Prep Leave / Practical Exams                                                                                                                                                                                                                                         |

### References:

- John A. Beachy and William D. Blair – Abstract Algebra with a Concrete Introduction, Prentice Hall, 1990
- W.J. Gilbert – Modern Abstract Algebra with Applications, W.J. Gilbert, John Wiley & Sons, 1976