STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

COURSE PLAN (June - November 2026)

Department : **Bioinformatics**

Name/s of the Faculty : **Ms. Pujaa B**

Course Title : **Proteomics and Metabolomics**

Course Code : **23BI/PC/PM34**

Shift : **II**

COURSE OUTCOMES (COs)

COs	Description	CL
CO1	Gain an insight of the basic and advanced concepts and applications of proteomics and metabolomics	K1
CO2	Understand the mechanisms of integrating proteomics and metabolomics data with the previously learnt omics techniques	K2
CO3	Apply functional genomics techniques to analyze proteome and metabolome data for biological system	K3
CO4	Deduce differential abundances in proteome and metabolome during health and disease	K4
CO5	Analyze the proteomic and metabolomics interactions in complex disease	K5, K6

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Jun 15 – 22, 2026 (Day Order 1- 6)	1	**Proteomics** 1.1. Introduction to Proteomics - Proteins structure, Organization of protein structure, structural conformation of proteins, three dimensional structures of proteins. Practical -Protein classification and structure analysis –Chou Fasman, GOR, Procheck	K1-K2	6	1-5	Lecture, Power Point presentations and Demonstration	Discussion and Practical test
Jun 23 – July 1, 2026 (Day Order 1- 6)	1	1.2. Protein extraction and purification - 1D and 2D-gel electrophoresis, Mass Spectrometry - ESI, MALDI, Software for Matching MS Data with Specific Protein Sequences, Peptide sequencing by tandem mass spectrometry	K2-K3	6	1-5	Lecture and Power Point presentations	III component Seminar (20 marks) (1.2. Protein extraction techniques)
July 2 – July 8, 2026 (Day Order 1- 6)	1	1.3. Preparative IEF, Protein Digestion Techniques, Protein structure prediction - Elementary Description of Crystallography - Crystal Growth, Data Collection, Structure Solution, Refinement and Interpretation	K3-K6	4	1-5	Lecture and Power Point presentations	Discussion
July 9 – 16, 2026 (Day Order 1- 6)	2	**Computational Proteomics** 2.1. Protein Structure prediction - Secondary Structure Prediction, Homology modelling, Structure validation tools - Ramachandran Plot, Threading and ab initio method, Tools for	K1-K3	5	1-5	Lecture, Power Point presentations and Demonstration	Discussion and Practical test

		Structure prediction Practical - Homology modelling – Swiss model, Modeller software Secondary structure prediction – JPRED, MFOLD					
July 17 – 24, 2026 (Day Order 1- 6)	2	2.2. Protein structural visualization; Geometry optimization and Loop refinement, AI based methods- alpha fold, alpha meet Practical - Protein motif and domain search – PROSITE, PDBeMotif, MASCOT	K3-K4	5	1-5	Lecture, Power Point presentations and Demonstration	Quiz and Practical test
July 25 – 28, 2026 (Day Order 1- 3)	2	2.3. Proteogenomics - overview, applications and computational resources available	K4-K6	3	1-5	Group discussion and case studies	Assignments
July 29 – Aug 3, 2026	**C.A. Test - I**						
Aug 4 - 6, 2026 (Day Order 4 - 6)	3	**Protein-protein interactions** 3.1. Proteomic interactions - Yeast Two-Hybrid, Mammalian Screen Methods and Co-Immuno Precipitation techniques	K1-K3	3	1-5	Lecture and Power Point presentations	Discussion
Aug 7 – 14, 2026 (Day Order 1- 6)	3	3.2. Protein-Protein Interactions, chaperones, protein misfolding in diseases and protein complexes. Databases and proteomic tools Practical - Protein–Protein interaction analysis – DIP, STRING, BIND, Expasy, Cytoscape	K3-K6	5	1-5	Lecture, Power Point presentations and Demonstration	III component quiz (20 marks) (3.2. Protein-protein interaction tools)

Aug 17 - 24, 2026 (Day Order 1- 6)	3	3.3. Post translational modifications, top down and bottom up approaches in proteomics. Data analysis in proteomics, Applications of proteomics in Biomarker discovery, personalized medicine, astrobiology, paleo proteomics	K4-K6	5	1-5	Group discussion and case studies	Assignments
Aug 25 – Sep 2, 2026 (Day Order 1- 6)	4	**Metabolomics** 4.1. Metabolite to metabolome and metabolic reactions, importance of metabolomics and designing a metabolome study	K1-K3	3	1-5	Lecture and Power Point presentations	Discussions
Sep 3 – 11, 2026 (Day Order 1- 6)	4	4.2. Metabolomic databases and web resources, Experimental methods in metabolome Generation-Plant/bacterial secondary metabolites, MS based approaches, targeted and untargeted metabolomics, and experimental errors. Practical - Metabolic pathway database – KEGG, PharmGKB, PubChem	K3-K4	5	1-5	Lecture, Power Point presentations and Demonstration	Quiz and Practical test
Sep 15-17, 2026 (Day Order 1 - 3)	4	4.3. Metabolomic categories - Lipidomics, Glycomics, Fluxomics, genome scale metabolic modelling	K4-K6	3	1-5	Group discussion and case studies	Written test and group discussion
Sep 18 –23, 2026	**C.A. Test - II**						
Sep 24 - 28, 2026 (Day 4 – 6)	5	5.1. Generation of metabolome data, over representation analysis and disease-based enrichment analysis.	K1-K3	3	1-5	Lecture and Power Point presentations	III component Assignments (10 marks) (5. Metabolic pathways tools)

Sep 29 – Oct 7, 2026 (Day Order 1 - 6)	5	5.2. Statistical analysis in metabolomics – univariate and multivariate analysis, dimensionality reduction and differential abundance of metabolomics.	K4-K6	5	1-5	Lecture and Power Point presentations	Discussion
Oct 8 - 14, 2026 (Day Order 1 - 6)	5	5.3. Functional annotation, Softwares and tools for metabolome analysis - Mzime, metabolome analyst, paintomics.	K2-K3	4	1-5	Lecture and Power Point presentations	Assignments and Discussion
Oct 15 - 21, 2026 (Day Order 1- 4)	**REVISION**						

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

COURSE PLAN (June - November 2026)

Department : **Bioinformatics**

Name/s of the Faculty : **Dr. M. Sharanya**

Course Title : **Machine Learning, Deep Learning and Artificial Intelligence**

Course Code : **23BI/PC/MA34**

Shift : **II**

COURSE OUTCOMES (COs)

COs	Description	CL
CO1	Demonstrate the fundamental knowledge on concepts of machine learning and deep learning	K1, K2
CO2	Utilise the different libraries available to understand the fundamental prerequisite for ML and DL	K3
CO3	Identify the right method of classification and clustering analysis specific for the datasets	K4
CO4	Enable to build a model and examine their performance using various statistical methods by training and testing to culminate Artificial Intelligence	K5
CO5	Apply the ML, DL and AI concepts to solve problems in biology and medicine	K6

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Jun 15 – 22, 2026 (Day Order 1- 6)	1	Different Forms–statistics, data mining, data analysis, data science, Statistics vs. Data Mining vs. Data Analytics vs. Data Science.	K1-K4	5	1-5	PowerPoint presentation	Discussion and MCQs
Jun 23 – July 1, 2026 (Day Order 1- 6)	1	Machine Learning perspectives of data– Scales of Measurement, data imputation, dealing with missing data, normalising data, feature generation.	K2-K5	5	1-5	Demonstration	Learning-by-doing (Other component 15 marks) (Real world data preprocessing)
July 2 – July 8, 2026 (Day Order 1- 6)	1	Machine Learning Categories-supervised, unsupervised, reinforcement learning.	K3-K6	5	1-5	PowerPoint presentation	Discussion
July 9 – 16, 2026 (Day Order 1- 6)	2	Exploratory data analysis –multivariate and univariate analysis, Supervised Learning concepts- Regression, correlation and causation.	K1-K4	5	1-5	Demonstration	Case Analysis
July 17 – 24, 2026 (Day Order 1- 6)	2	Supervised Learning – Classification, ROC curve, Evaluating a Classification Model Performance, SVM, SOM and KNN.	K2-K5	5	1-5	Demonstration	Discussion and Quiz (Other component 15 marks) (Model performance)
July 25 – 28, 2026 (Day Order 1- 3)	2	Unsupervised learning – K means, Hierarchical and random forest, evaluation – cross fold K validation.	K3-K6	3	1-5	PowerPoint presentation	Case Analysis

July 29 – Aug 3, 2026	**C.A. Test - I**						
Aug 4 - 6, 2026 (Day Order 4 - 6)	3	Ensemble methods- bagging, boosting, Ensemble voting, stacking.	K1-K4	3	1-5	PowerPoint presentation	Discussion
Aug 7 – 14, 2026 (Day Order 1- 6)	3	Text mining, data assemble, Data Preprocessing (Text) - Convert to Lowercase and Tokenize, Removing Noise, Part of Speech (PoS) Tagging, Stemming, Lemmatization, N-grams, Word2Vec, FastText, Glove.	K2-K5	5	1-5	Demonstration	Learning-by-doing
Aug 17 - 24, 2026 (Day Order 1- 6)	3	Transformer based architecture and models, Data Exploration, model building and evaluation.	K3-K6	5	1-5	PowerPoint presentation	Discussion
Aug 25 – Sep 2, 2026 (Day Order 1- 6)	4	Artificial Neural Network (ANN), Image Recognition with Deep Learning and Neural Networks, Perceptron–Single Artificial Neuron, Multilayer Perceptrons (Feedforward Neural Network).	K1-K4	5	1-5	PowerPoint presentation	Model display (Other Component 20 marks) (ANN, multilayer perceptrons)
Sep 3 – 11, 2026 (Day Order 1- 6)	4	Restricted Boltzmann Machines (RBM), Multilayer Perceptrons (MLP) Using Keras, tensor flow, Autoencoders.	K2-K5	5	1-5	PowerPoint presentation	Group Discussion
Sep 15-17, 2026 (Day Order 1 - 3)	4	Convolution Neural Network (CNN), Recurrent Neural Network (RNN), Long Short-Term Memory (LSTM), Transfer	K3-K6	4	1-5	PowerPoint presentation	Case Analysis

		Learning and Reinforcement Learning					
Sep 18 –23, 2026	**C.A. Test - II**						
Sep 24 - 28, 2026 (Day 4 – 6)	5	ML, DL and AI in drug discovery and development	K1-K4	2	1-5	Research Article discussion	Case Analysis
Sep 29 – Oct 7, 2026 (Day Order 1 - 6)	5	Approaches of ML, DL and AI in medical diagnosis and personalized medicine	K2-K5	5	1-5	Research Article discussion	Case Analysis
Oct 8 - 14, 2026 (Day Order 1 - 6)	5	Implementation of ML, DL and AI in disease prediction and prevention	K3-K6	5	1-5	Research Article discussion	Case Analysis
Oct 15 - 21, 2026 (Day Order 1- 4)	**REVISION**						

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

COURSE PLAN (June - November 2026)

Department : **Bioinformatics**

Name/s of the Faculty : **Dr. R. Sagaya Jansi and Dr. M. Sharanya**

Course Title : **Molecular Modeling and Computer Aided Drug Design**

Course Code : **23BI/PC/MC34**

Shift : **II**

COURSE OUTCOMES (COs)

COs	Description	CL
CO1	Interpret the protein structural features, minimize the energy and simulate to attain the stability for its importance in drug action	K1, K2
CO2	Construct and analyse the molecular dynamics and Monte Carlo simulation methods	K2, K3
CO3	Compare, categorize and examine the concepts of molecular interactions and QSAR studies	K3, K4
CO4	Determine the functional disease targets and interpret the target-ligand interactions	K4, K5
CO5	Apply the knowledge towards design and development of potential lead molecules	K5, K6

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Jun 15 – 22, 2026 (Day Order 1- 6)	1	**Molecular Mechanics** 1.1. Concepts in Molecular Modeling - Molecular Representations, Coordinate Systems, Potential Energy Surfaces.	K1-K4	4	1-5	Lecture	Discussion
Jun 23 – July 1, 2026 (Day Order 1- 6)	1	1.2. Molecular Mechanics, Force fields - Bond Length, Bond Angle and Torsion angle potential	K2-K4	3	1-5	Lecture and animations	Quiz
July 2 – July 8, 2026 (Day Order 1- 6)	1	1.3. Non- bonded Interactions-Van der Waals and Electrostatic Potential, Hydrogen bond interactions	K5-K6	3	1-5	Lecture, power point presentation and animations	Discussion
July 9 – 16, 2026 (Day Order 1- 6)	2	**Energy Minimization Methods** 2.1. Energy Minimization- Derivative and Non-Derivative Energy Minimization Methods.	K1-K4	4	1-5	Lecture, power point presentation and animations	Test - III component Assignment (10 marks) (2. Energy minimization)
July 17 – 24, 2026 (Day Order 1- 6)	2	2.2. Calculation of Simple Thermodynamic Properties, Computer Simulation, Boundaries, Monitoring the Equilibration, Long Range Forces.	K2-K4	3	1-5	Lecture	Test and Practical
July 25 – 28, 2026 (Day Order 1- 3)	2	2.3. Analyzing the Results of Simulation and Estimating Errors.	K5-K6	3	1-5	Lecture	Test and Practical

July 29 – Aug 3, 2026	**C.A. Test - I**						
Aug 4 - 6, 2026 (Day Order 4 - 6)	3	**Pharmacophores** 3.1. Molecular structures, representation – SMILES, InChi keys, Chemical Fingerprint generation, Tanimoto coefficient.	K1-K3	5	1-5	Lecture, Group Discussion	Discussion
Aug 7 – 14, 2026 (Day Order 1- 6)	3	3.2. Molecular structure similarity and diversity, Molecular Descriptors – 1D, 2D, 3D, 4D, CoMFA, COMSIA, QSAR, 3D QSAR, ADMET prediction.	K2-K4	5	1-5	Lecture and demo	III component-presentations (20 marks) (4. Molecular docking)
Aug 17 - 24, 2026 (Day Order 1- 6)	3	3.3. 3D Pharmacophore identification and mapping, Ligand-based and structure based pharmacophores, Chemical libraries, Scaffold hopping	K5-K6	5	1-5	Lecture and demo	Test Practical
Aug 25 – Sep 2, 2026 (Day Order 1- 6)	4	**Molecular Docking** 4.1. Drug discovery and development, computational approaches in drug discovery.	K1-K3	5	1-5	Lecture and animations	Group Discussion
Sep 3 – 11, 2026 (Day Order 1- 6)	4	4.2. Structure Based Drug Design - Target Discovery and Validation, Active Site Prediction, Lead identification and Optimization, De Novo Drug Design.	K2-K4	5	1-5	Lecture, Case study and animations	Group Discussion
Sep 15-17, 2026 (Day Order 1 - 3)	4	4.2. Molecular docking and high throughput virtual screening.	K5-K6	5	1-5	Lecture, Case study	Quiz

						and animations	
Sep 18 –23, 2026	**C.A. Test - II**						
Sep 24 - 28, 2026 (Day 4 – 6)	5	**Molecular Dynamics and Monte Carlo Simulations** 5.1. Molecular Dynamics Using Simple Model, Molecular Dynamics with Continuous Potentials	K1-K4	5	1-5	Lecture and PowerPoint presentations	III Component-Test (20 marks) (5. Molecular dynamics)
Sep 29 – Oct 7, 2026 (Day Order 1 - 6)	5	5.2. Molecular Dynamics at Constant Temperature and Pressure, Incorporating Solvent effects into Molecular Dynamics, Conformational Changes from Molecular Dynamics Simulation	K2-K4	5	1-5	Lecture and animations	Discussion
Oct 8 - 14, 2026 (Day Order 1 - 6)	5	5.3. Monte Carlo Simulation of Molecules, Calculation of Chemical Potential- Simulating Phase Equilibria by Gibbs Ensemble Monte Carlo Method	K5-K6	5	1-5	Lecture and animations	Discussion
Oct 15 - 21, 2026 (Day Order 1- 4)	**REVISION**						

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

COURSE PLAN (June - November 2026)

Department : **Bioinformatics**

Name/s of the Faculty : **Dr. R. Sagaya Jansi**

Course Title : **Molecular Modeling and Computer Aided Drug Design - Practical**

Course Code : **23BI/PC/P232**

Shift : **II**

COURSE OUTCOMES (COs)

COs	Description	CL
CO1	Understand the importance of drug-like properties and their prediction	K1, K2
CO2	Describe the use of lead candidates and database representations	K2, K3
CO3	In silico identification of lead molecules through molecular docking, pharmacophore modeling	K3, K4
CO4	Perform the mechanics and dynamics of molecules	K4, K5
CO5	Gain practice in macromolecular simulations and perform research work in the area of computational drug design	K5, K6

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Jun 15 – 22, 2026 (Day Order 1- 6)	1	**Pharmacophore modeling** Ligand Search – PubChem, Drug bank, CHEMBL, ZINC databases.	K1-K6	3	1-5	Presentation and Demonstration	Exercise
Jun 23 – July 1, 2026 (Day Order 1- 6)	1	Chemical drawing package – Marvin Sketch. ADME prediction – Online tools (Swiss ADME, etc.).	K1-K6	3	1-5	Learning by Doing	Discussion - Exercise
July 2 – July 8, 2026 (Day Order 1- 6)	1	QSAR model prediction – In Silico tools. Pharmacophore mapping.	K1-K6	2	1-5	Simulation	Discussion - Exercise
July 9 – 16, 2026 (Day Order 1- 6)	2	**Active site prediction** Binding Site - Cast-P	K1-K6	3	1-5	Learning by Doing	Exercise Third component (20 marks) (1 and 2. Protein and ligand preparation)
July 17 – 24, 2026 (Day Order 1- 6)	2	Identification Different approaches for binding site identification Tools - POCASA	K1-K6	3	1-5	Learning by Doing	Exercise Third component
July 25 – 28, 2026 (Day Order 1- 3)	2	3D ligand site, Metapocket, Ghecom.	K1-K6	2	1-5	Learning by Doing	Exercise Third component
July 29 – Aug 3, 2026	**C.A. Test - I**						
Aug 4 - 6, 2026 (Day Order 4 - 6)	3	**Molecular Docking** Structure Based Drug Design	K1-K6	3	1-5	Learning by Doing	Exercise
Aug 7 – 14, 2026 (Day Order 1- 6)	3	Molecular docking using AutoDock and pyrx.	K1-K6	2	1-5	Case Analysis	Discussion - Exercise

Aug 17 - 24, 2026 (Day Order 1- 6)	3	Discovery Studio	K1-K6	3	1-5	Learning by Doing	Discussion - Exercise
Aug 25 – Sep 2, 2026 (Day Order 1- 6)	4	**Molecular Visualisation**: Pymol and Chimera, Pdb file format and Parsing	K1-K6	2	1-5	Case Analysis	Discussion - Exercise
Sep 3 – 11, 2026 (Day Order 1- 6)	4	Visualizing a molecule in different representations Identifying interacting residues (protein and ligand interactions) Measuring distances between atoms B-factor visualisation Image tracing and preparation.	K1-K6	2	1-5	Learning by Doing	Exercise Third component (20 marks) (3. Docking)
Sep 15-17, 2026 (Day Order 1 - 3)	4	Geometry Optimization using SwissPdb Viewer Energy Minimization of protein molecule, Determining Maxima and Minima energy points	K1-K6	3	1-5	Case Analysis	Exercise Third component
Sep 18 –23, 2026	**C.A. Test - II**						
Sep 24 - 28, 2026 (Day 4 – 6)	5	**Molecular Dynamics** Molecular dynamics using GROMACS/NAMD	K1-K6	3	1-5	Simulation	Exercise Third component (10 marks on (5. Dynamics)
Sep 29 – Oct 7, 2026 (Day Order 1 - 6)	5	AMBER	K1-K6	3	1-5	Simulation	Discussion - Exercise
Oct 8 - 14, 2026 (Day Order 1 - 6)	5	Discovery Studio (CHARMM)	K1-K6	2	1-5	Simulation	Discussion - Exercise
Oct 15 - 21, 2026 (Day Order 1- 4)	**REVISION**						

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

COURSE PLAN (June - November 2026)

Department : **Bioinformatics**

Name/s of the Faculty : **Dr. M. Sharanya**

Course Title : **Molecular Biology - Practical**

Course Code : **23BI/PC/P332**

Shift : **II**

COURSE OUTCOMES (COs)

COs	Description	CL
CO1	Utilize laboratory skills to enhance understanding of cell structure and function while participating in a group environment	K1,K2
CO2	Develop responsible conduct of laboratory skills appropriate to the field of cell and molecular biology	K2,K3
CO3	Apply the molecular biology techniques to biotechnological approaches	K3,K4
CO4	Perform the mechanics and dynamics of molecules	K4,K5
CO5	Gain practice in macromolecular simulations and perform research work in the area of computational drug design	K5,K6

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Jun 15 – 22, 2026 (Day Order 1- 6)	1	Cell Fraction and Extraction of cell organelles - Chloroplast	K1-K6	3	1-5	Laboratory Experiment	Learning-by-doing
Jun 23 – July 1, 2026 (Day Order 1- 6)	1	Extraction of DNA from Onion	K1-K6	3	1-5	Laboratory Experiment	Learning-by-doing
July 2 – July 8, 2026 (Day Order 1- 6)	1	Extraction of RNA from Yeast	K1-K6	3	1-5	Laboratory Experiment	Learning-by-doing
July 9 – 16, 2026 (Day Order 1- 6)	2	Estimation of DNA and RNA	K1-K6	3	1-5	Laboratory Experiment	Learning-by-doing
July 17 – 24, 2026 (Day Order 1- 6)	2	Estimation of Proteins by Lowry's Method	K1-K6	3	1-5	Laboratory Experiment	Learning-by-doing
July 25 – 28, 2026 (Day Order 1- 3)	2	Estimation of Mitochondria by Assessing the Marker Enzyme	K1-K6	3	1-5	Laboratory Experiment	Exercise Third component (15 marks) (2. DNA and RNA estimation)
July 29 – Aug 3, 2026	**C.A. Test - I**						
Aug 4 - 6, 2026 (Day Order 4 - 6)	3	Denaturing Proteins and Identification of Amino Acids by Thin Layer Chromatography	K1-K6	3	1-5	Laboratory Experiment	Learning-by-doing
Aug 7 – 14, 2026 (Day Order 1- 6)	3	Amplification of DNA by PCR	K1-K6	3	1-5	Laboratory Experiment	Group Performance
Aug 17 - 24, 2026 (Day Order 1- 6)	3	Electrophoretic Techniques: Agarose Gel Electrophoresis,	K1-K6	3	1-5	Demonstration	Discussion

		SDS PAGE, Southern Blotting (Demo)					
Aug 25 – Sep 2, 2026 (Day Order 1- 6)	4	Plant sample extraction using solvents	K1-K6	3	1-5	Laboratory Experiment	Learning-by-doing
Sep 3 – 11, 2026 (Day Order 1- 6)	4	Identification of secondary metabolites	K1-K6	3	1-5	Laboratory Experiment	Exercise Third component (15 marks) (2 and 3. Protein estimation and AGE)
Sep 15-17, 2026 (Day Order 1 - 3)	4	Evaluation of secondary metabolites for therapeutic use	K1-K6	3	1-5	Laboratory Experiment	Data Analysis
Sep 18 –23, 2026	**C.A. Test - II**						
Sep 24 - 28, 2026 (Day 4 – 6)	5	Sample collection from different environments	K1-K6	1	1-5	Discussion	Exercise Third component (20 marks) (5. Microbial techniques)
Sep 29 – Oct 7, 2026 (Day Order 1 - 6)	5	Microbial isolation and culture techniques	K1-K6	3	1-5	Laboratory Experiment	Learning-by-doing
Oct 8 - 14, 2026 (Day Order 1 - 6)	5	Metagenomics analysis	K1-K6	3	1-5	Discussion	Data Analysis
Oct 15 - 21, 2026 (Day Order 1- 4)	**REVISION**						