On completion of this unit succesfull students will be able

- state the definition of a Riemannian manifold M and calculate the length of a curve, and area of a domain in M
- calculate the Riemannian metric on surfaces embedded in $\mathbf{E}^3$
- define a connection on a manifold, state the Levi-Civita theorem, and calculate the connection for surfaces of cylinder, sphere and cone in $\mathbf{E}^3$, and for Lobachevsky (hyperbolic) plane
- state the properties of geodesics on a Riemannian manifold, and calculate the parallel transport of vectors along a geodesics for the sphere and cylindre in $\mathbf{E^2}$ and for Lobachevsky plane
- state the definition of the Riemann curvature tensor, and calculate the Riemann curvature tensor for some 2-dimensional Riemannian manifolds.