Coding for study of field disturbance in non-edible ester oil using COMSOL Multiphysics

```
% Create the COMSOL model
model = ModelUtil.create('Model');

% Define material properties for Non-Edible Ester Oil
rho = 920;  % Density in kg/m^3
mu = 0.05;  % Viscosity in Pa.s

% Create geometry (2D rectangle channel)
model.geom.create('geom1', 2);  % 2D Geometry
model.geom('geom1').lengthUnit('m');  % Length units in meters
model.geom('geom1').create('Rectangle1', 'Rectangle');
model.geom('geom1').feature('Rectangle1').set('size', {'0.1', '0.05'});  % Size (0.1m x
0.05m)
model.geom('geom1').run();

% Define material for Non-Edible Ester Oil
material = model.material.create('mat1');
material.propertyGroup('def').set('density', rho);  % Set density
material.propertyGroup('def').set('dynamicviscosity', mu);  % Set viscosity

% Physics setup - Laminar Flow
model.physics.create('spf', 'LaminarFlow', 'geom1');
model.physics('spf').field('velocity').component('u').set('U', '0.1');  % Inlet velocity in m/s

% Apply boundary conditions
model.physics('spf').create('inlet', 'Inlet', 1);  % Inlet boundary
model.physics('spf').feature('inlet').set('U0', '0.1');  % Set inlet velocity

model.physics('spf').create('outlet', 'Outlet', 2);  % Outlet boundary
model.physics('spf').feature('outlet').set('p0', '0');  % Set outlet pressure to 0

model.physics('spf').create('wall', 'Wall', 3);  % Wall boundary (no slip)
model.physics('spf').feature('wall').set('noSlip', true);

% Mesh creation
model.mesh.create('mesh1', 'geom1');
model.mesh('mesh1').run();
```

```
% Study setup - Stationary Study for steady-state solution
model.study.create('std1');
model.study('std1').create('stat', 'Stationary');
model.study('std1').feature('stat').set('solnum', 1);  % Solve steady state

% Solve the model
model.study('std1').run();

% Post-processing: Visualize results (e.g., velocity field)
model.result.create('pg1', 'PlotGroup2D');
model.result('pg1').create('surf1', 'Surface');
model.result('pg1').feature('surf1').set('expr', 'spf.u');  % Plot velocity field
model.result('pg1').run();
```